DYNAMICS OF TRANSITION TO A LOW-CARBON ECONOMY ACROSS EUROPE

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Approval of the Graduate School of Social Sciences

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ABSTRACT

DYNAMICS OF TRANSITION TO A LOW-CARBON ECONOMY ACROSS EUROPE

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This thesis aims to examine the dynamics of transition to a low-carbon economy (LCE) across Europe through transition frameworks of European Union (EU), United Kingdom (UK), Germany, Poland and Turkey. Contrary to the general approaches in transition literature which study transitions as almost purely national processes, this thesis suggests that low-carbon transitions are global processes that require international cooperation. Within this scope, the thesis attempts to explore the dynamics of transition to an LCE through international developments, EU-level strategies and national circumstances from a neoclassical realist perspective. From such a perspective, transition processes of EU and four European states will be examined through their policies, strategies, targets and policy instruments upon their distinctive characteristics and reactions towards international developments. In accordance with these examinations, the thesis suggests that EU level transition policies and policy instruments create a dynamic and inclusive environment for international cooperation; however, states tend to be a part of this environment to the extent that their relative powers and domestic circumstances allow.

Keywords: Low-carbon economy, low-carbon transition, decarbonisation

ÖZ

AVRUPA'DA DÜŞÜK KARBON EKONOMİSİNE GEÇİŞİN DİNAMİKLERİ

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Bu tez, Avrupa Birliği (AB), Birleşik Krallık, Almanya, Polonya ve Türkiye'nin geçiş çerçeveleri aracılığıyla Avrupa'da düşük karbon ekonomisine geçiş sürecinin dinamiklerini incelemeyi amaçlamaktadır. Geçiş süreçlerini salt ulusal süreçler olarak ele alan genel yaklaşımların aksine bu tez, düşük karbona geçiş süreçlerinin uluslararası işbirliği gerektiren küresel süreçler olduğunu ileri sürmektedir. Bu kapsamda, tez, düşük karbon ekonomisine geçişin dinamiklerini; uluslararası gelişmeler, AB seviyesindeki stratejiler ve ulusal koşullar doğrultusunda, neoklasik realist bir perspektiften incelemeye çalışmaktadır. Bu bakış açısıyla, AB'nin ve dört devletin geçiş süreçleri bunların politikaları, stratejileri, hedefleri ve politika araçları üzerinden ve kendilerine özgü nitelikleri ile uluslararası gelişmelere yönelik yaklaşımları temelinde incelenmektedir. Bu incelemeler doğrultusunda tez, AB seviyesindeki geçiş politikalarının ve politika araçlarının uluslararası işbirliği için dinamik ve kapsayıcı bir ortam yarattığını fakat devletlerin ancak göreceli güç düzeylerinin ve ulusal koşullarının izin verdiği ölçüde bu ortamın bir parçası olma eğiliminde olduklarını öne sürmektedir.

Anahtar Kelimeler: Düşük karbon ekonomisi, düşük karbon geçişi, karbonsuzlaşma

To my beloved family

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LIST OF ABBREVIATIONS

AEAs	Annual Emission Allocations
BAU	Business-as-usual
CAN	Climate Action Network
CCL	Climate Change Levy
CfD	Contracts for Difference
CH_4	Methane
CM	Capacity Market
CO_2	Carbon dioxide
COP	Conference of Parties
CPF	Carbon Price Floor
CPS	Carbon Price Support
CRC	Carbon Reduction Commitment
DEHSt	German Emissions Trading Authority
EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECCP	European Climate Change Programme
EEA	European Energy Agency
EPP	Energy Policy of Poland
EPS	Emission Performance Standard
ETS	Emission Trading Scheme

EU	European Union
EU ETS	European Union Emission Trading System
EUR	Euro
FOS	Green Budget Germany
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GNI	Gross National Income
$GtCO_2e$	a gigaton of carbon dioxide equivalent
GUS	Central Statistical Office
IEA	International Energy Agency
IFC	International Finance Corporation
INDC	Intended Nationally Determined Contribution
IPA	Instrument for Pre-Accession Assistance
IPCC	Intergovernmental Panel on Climate Change
IR	International Relations
KAPE	The Polish National Energy Conservation Agency
$ktCO_2e$	a kiloton of carbon dioxide equivalent
LCCC	Low Carbon contracts Company
LCE	Low Carbon Economy
LNG	Liquefied natural gas
LULUCF	Land Use, Land Use Change and Forestry
MRV	Monitoring Reporting and Verification
$MtCO_2e$	a million ton of carbon dioxide equivalent

MVT	Motor vehicle tax
N_2O	Nitrous oxide
NDC	Nationally Determined Contribution
NECPs	National Energy and Climate Plans
NGO	Non-governmental Organizations
OECD	Organization for Economic Cooperation and Development
PLN	Polish Zloty
PMR	Partnership for Market Readiness
PPP	Purchasing power parity
SCT	Special consumption tax
SECR	Streamlined Energy and Carbon Reporting
tCO_2e	a tonne of carbon dioxide equivalent
TEMA	The Turkish Foundation for Combating Soil Erosion, for Reforestration and the Protection of Natural Habitats
TPES	Total Primary Energy Supply
TRY	Turkish Lira
UK	United Kingdom
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
URE	Energy Regulatory Office
USA	United States of America
USD	United States Dollar
VAT	Value-added tax

WWF	World Wildlife Fund
YEKA	Renewable Energy Resource Area
YEKDEM	Renewable Energy Support Scheme

CHAPTER 1

INTRODUCTION

1.1. Scope and Objective

This thesis aims to examine the dynamics of transition to a low-carbon economy (LCE) across Europe through the interactions between the transition frameworks of EU and nation states. With this aim, the study will review the transition processes of the EU and four significant emitters across Europe in a comparative manner. The case studies include a founding member of the EU, Germany, an almost-ex-member, the United Kingdom (UK), a relatively new member, Poland, and a candidate state, Turkey.

In the study, the term of "transition to an LCE" will be approached as a multidimensional and multilevel area shaped by economy, energy and environmental policies at national and international levels. The thesis argues that since low-carbon transitions address a global problem called climate change, they require to be conducted at a global scale through collective action. Therefore, international developments and national efforts have major roles in shaping such transition processes. In this context, a general profile will be presented for each country and the EU demonstrating their economic trends, energy mixes, greenhouse gas emission (GHG) profiles and environmental concerns. The strategies, policies, targets and policy instruments adopted by each actor in their transition processes will be evaluated on the basis of these profiles.

Within this framework, the thesis seeks to answer such questions as "What kind of motivations, challenges and results could a low-carbon transition process include?", "What is the role of the transition framework developed by the EU in improving

collective action among states?" and "How does the interaction of EU level policies and national policies shape transition process?".

Although topics like climate change, environmental politics, green growth and sustainable development have been discussed throughout last decades, "transition to an LCE" is a relatively new term and the literature on has been still developing. Therefore, the thesis also seeks to illustrate how a transition process towards an LCE is planned and realised through policy applications from the EU and selected country studies.

1.2. Literature Review

Transition to an LCE is a highly multidimensional and comprehensive topic to study. It includes various policy fields like climate, energy, economy, industry, agriculture or transport and various actors like international organizations, nation states, local authorities, civil society, academia or scientific world. Therefore, transition policies are shaped through the interaction of all these actors and sectors. In this respect, it will be useful to review the literature in terms of the dynamics of transition processes and the interaction among different actors in such processes.

Within the framework of the thesis, the literature on transitions and IR theories regarding the arguments of collective action in international environmental politics will be relevant. LCE and transition to an LCE are recently emerged concepts that have a limited space in the literature so far. However, the topics such as climate change, sustainability and energy transition are closely related to the studies on transition to an LCE. Therefore, the thesis will benefit from the views on the literature related to these topics as well.

Low-carbon transitions have been searched from a "socio-technical transition" perspective as they create changes in markets, policies, user practices and preferences and culture in addition to bringing about new technologies.[1] Frank W. Geels explains

[1] Geels, Frank W. "From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory." *Research policy*, 33.6-7 (2004): 897-920.

transitions as "regime shifts, come about through interacting processes within and between"[2] three analytical levels: niches (micro-level), socio-technical regimes (meso-level) and socio-technical landscape (macro-level).[3] He illustrates the interaction among these levels as;

> Subsequent struggles between niches and regimes, and possible replacement, take place on multiple dimensions (e.g. markets, regulations, cultural meanings, infrastructure) and are enacted by interpretive actors that fight, negotiate, search, learn, and build coalitions as they navigate transitions.[4]

In a further study, Geels et al. note that low-carbon transition includes various actors such as national and local authorities, businesses, consumers, researchers and society, which makes this process composed of struggles at business, political and social levels. They propose bridging a variety of approaches in order to analyse the multidimensional process of low-carbon transitions.[5]

Similarly, Timothy J. Foxon suggests that different analysing perspectives could be used in a complementary way to better analyse the transition to an LCE.[6] According to Foxon, multi-level perspective is helpful to develop "transition management" which is defined as "a process of governance seeking to steer or modulate the dynamics of transitions through interactive, iterative processes between networks of stakeholders".[7]

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[2] Geels, Frank W. "Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective." *Research Policy*, 39.4 (2010): 495-510, p. 495.

[3] Geels, Frank W. "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study." *Research policy*, 31.8-9 (2002): 1257-1274, p. 1261.

[4] Geels, Frank W. "Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective." *Research Policy*, 39.4 (2010): 495-510, p. 495.

[5] Geels, F. W., Berkhout, F., & van Vuuren, D. P. "Bridging analytical approaches for low-carbon transitions". *Nature Climate Change*, 6.6 (2016): 576-583.

[6] Foxon, Timothy. J. "A coevolutionary framework for analysing a transition to a sustainable low carbon economy." *Ecological Economics*, 70.12 (2011): 2258-2267.

[7] *Ibid.*, p. 2259.

On the other hand, Kern and Markard point that earlier studies on transition have been criticised for neglecting the role of power and politics in the analysis of transition processes.[8] However, they suggest, later studies have started to focus on these topics even though they have been mostly interested in power and politics at domestic level but showed "a limited attention to international political processes and how they influence transitions."[9]

Despite being among the earlier studies, in their work, Kemp et al. analyses transitions as socio-technical regime shifts which take place through public policies that "change an integrated system of technologies and social practices".[10] They suggest that policy-makers could direct transition processes through strategic niche management which they simply define as "a concentrated effort to develop protected spaces for certain applications of a new technology."[11]

Additionally, Smith et al. focus on the actors and power relations in the regimes in transition processes. They approach transition process as a closely related phenomenon to governance, yet they do not imply only states by governance. Rather they see governance as a network of state, public and market. According to them, governance and transition process could witness both consent and resistance which emerged as a result of power relations of different actors in the regime. In this respect, in order to achieve a successful transition process, it is critical to ensure coordination

[8] Kern, Florian and Markard, Jochen. "Analysing Energy Transitions: Combining Insights from Transition Studies and International Political Economy." In Van de Graaf, Thijs et al. (*eds.*), *The Palgrave Handbook of The International Political Economy of Energy*, London: Palgrave Macmillan, 2016: 291-318, p. 296.

[9] *Ibid.*

[10] Kemp, R., Schot, J. and Hoogma, R. "Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management." *Technology analysis & strategic management.* 10.2 (1998): 175-198, p. 184.

[11] *Ibid.*, p. 186.

among diverse interdependent actors.[12] Yet, they study the transitions with respect to domestic governance systems that do not include international actors.

Furthermore, they make a distinction between unintended transitions which come as a result of historical processes and intended transitions which are purposively governed by influential actors in the regime or by networks of governance.[13] Over this distinction, sustainability transitions are studied as a form of purposive transition. Markard et al. define sustainability transitions as "long-term, multidimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" and believe that they are guided mainly by political actors.[14]

Furthermore, Geels uses a variety of different perspectives from different disciplines in order to analyse the multi-dimensional process of transitions; however, he focuses on transition processes in domestic terms and uses a socio-economic perspective. In his study, *Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective*, he uses different ontologies from social disciplines including rational choice theory, evolution, structuralism or constructivism.[15] Yet, he examines these either through a sociological perspective or an economic one. In an earlier study, he refers institutional theory in the sense that institutions, rules, and regimes could be used in order to explain the dynamic interaction among actors and structures. [16] But, again, he uses a sociological and economic perspective and focus on the domestic actors. Furthermore, Geels admits the validity of the aforementioned criticisms

[12] Smith, A., Stirling, A. and Berkhout, F. "The governance of sustainable socio-technical transitions." *Research Policy*, 34.10 (2005): 1491-1510.

[13] *Ibid., 1498.*

[14] Markard, Jochen, Raven, Rob and Truffer. Bernhard. "Sustainability transitions: An emerging field of research and its prospects." *Research policy*, 41.6 (2012): 955-967, p. 956.

[15] Geels, Frank W. "Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective." *Research Policy, 39*.4 (2010): 495-510, p. 495.

[16] Geels, Frank W. "From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory." *Research policy*, 33.6-7 (2004): 897-920.

claiming that transition studies did not pay attention to the impact of actors, power and politics in transitions and he searches the role of power and politics during transitions in a further work. [17] Yet, again, he only focuses on the interaction among domestic actors.

In a further study, Geels et al. analyse different approaches for low-carbon transitions and this time they go beyond the national scale and mention the interaction among global, national and local scales.[18] However, they do not approach this interaction as a matter of international relations. Rather, they use sociological and political theories in order to analyse low-carbon transitions.

Lockwood et al. criticise socio-technical transition approach on the grounds that it cannot explain why countries experience sustainability transitions through different pathways and at different speeds since it "suffers from a lack of political analysis and of a comparative explanatory framework".[19] They suggest that transition processes of countries could be studied through "varieties or models of capitalism school of comparative institutional analysis" in a comparative manner.[20] In a later study, they use governance framework which has insights from both socio-technical transition approach and new institutionalism.[21] These studies are progressive steps in terms of studying sustainability transitions in a comparative manner, however, they do not exactly approach the issue in terms of its international dimension.

On the other hand, Schmitz contributes to the literature by examining transition to an LCE in terms of its dynamics and drivers in a comparative manner. He studies

[17] Geels, Frank W. "Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective." *Theory, Culture and Society*, 31.5 (2014): 21-40.

[18] Geels, F. W., Berkhout, F., & van Vuuren, D. P. "Bridging analytical approaches for low-carbon transitions". *Nature Climate Change*, *6*.6 (2016): 576-583., pp. 577-578.

[19] Lockwood, M. Kuzemko C., Mitchell, C. and Hoggett, R. "Theorising governance and innovation in sustainable energy transitions", University of Exeter, 2013, p. 26.

[20] *Ibid.*

[21] Kuzemko, C., Lockwood, M., Mitchell, C. and Hoggett, R. "Governing for sustainable energy system change: Politics, contexts and contingency". *Energy Research & Social Science*. 12 (2016): 96-105.

transition to an LCE through a comparative analysis between Europe and China. He argues that the motivation behind low-carbon transition could be climate change, energy security, competitiveness or job creation and as the example of China suggests motivations other than climate change could be more effective in adopting transition policies and setting alliances in this field.[22]

The literature review on transitions have indicated that there are several studies analysing the transition processes through a variety of theories from different disciplines some of which were briefly mentioned above. Although they admit that transition is a multi-level phenomenon, they mostly approach it as a domestic process and do not engage in its dynamics at international and global levels. Even they admit that transition processes have an international dimension, they do not study it as an issue of international politics. Geels makes a critical contribution to the topic by illustrating the characteristics of sustainability transition with reference to the arguments on climate change and environment. He claims that sustainability transitions have three main challenges that historical transitions do not have: they address "a normative goal and collective good problem", they could pursue multiple pathways and they address global environmental problems which would show their impact in different geographies or through different generations.[23] Yet, he does not analyse sustainability transitions from an IR perspective.

On the other hand, there are a bunch of studies which point that climate change is a global concern of which solution requires international cooperation. As Andrew Jordon, Dave Huitema and Harro van Asselt states "climate change represents a collective action problem in a world divided into separate states, each with very different historical responsibilities and response capabilities."[24]

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[22] Schmizt, Hubert. *How does the Global Power Shift affect the Low Carbon Transformation?* Brighton: Institute of Development Studies, 2013.

[23] Geels, Frank W. "Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective." *Research Policy, 39*.4 (2010): 495-510, pp. 507-508.

[24] Jordon, A., Huitema, D. and van Asselt, H. "Climate change policy in the European Union: an introduction". In Jordon, A. et al. (eds.). *Climate Change Policy in the European Union: Confronting*

Furthermore, Hurrel and Kingsburry draw attention to the fact that transborder environmental challenges which had emerged as a result of the human impact on earth started to get deeper and more visible and required to be managed through cooperation between states. But such a coordination could face conflicts in terms of developing the policy framework and managing the costs and of sovereignty-related issues.[25]In this respect, they ask this critical question of global environmental politics:

> Can a fragmented and often highly conflictual political system made up of over 170 sovereign states and numerous other actors achieve the high (and historically unprecedented) levels of co-operation and policy coordination needed to manage environmental problems on a global scale?[26]

Since such problems as climate change and global warming which resulted from the domestic activities affect beyond their boundaries, the necessary measures to prevent these problems require cooperation among states.[27] Besides from an economic perspective, Nordhaus points that the fact that climate is a global public good makes it vulnerable to free-riders and necessitates collective action in this regard.[28]

International environmental politics, on the other hand, has searched this throughout climate change policies mainly on the basis of international relations theories of neorealism, liberal institutionalism and neoclassical realism. These theories are mainly functional to interpret the actions of sovereign states especially in terms of cooperating or not in environmental policies. In this regard, major literature on these theories will be shared below.

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the Dilemmas of Mitigation and Adaptation? Cambridge: Cambridge University Press, 2010, 3-25, p. 8.

[25] Kingsbury, Benedict, and Hurrell, Andrew, (eds.). *The International Politics of the Environment: Actors, Interests, and Institutions*. Oxford: Clarendon Press, 1992, p. 37.

[26] *Ibid.*, p. 1.

[27] Young, Oran R. "Global Environmental Change and International Governance." *Millennium*, 19.3 (1990): 337–346.

[28] Nordhaus, William. "Climate clubs: Overcoming free-riding in international climate policy." *American Economic Review*, 105.4 (2015): 1339-70.

Neorealist approach suggests that self-interested states do not cooperate in an anarchic world where there is no hegemon.[29] The main arguments of this approach could be traced in Kenneth N. Waltz's book, *Theory of International Politics*. He argues that international politics deal with global problems that require cooperation among states whereas states pursue their own self-interest instead of international one.[30] According to Waltz, states cannot cooperate due to two main reasons. Firstly, even they have a common gain at the end of cooperation, they cannot know or secure how this gain will be distributed or how the opponent would use its gain. This makes international political arena an insecure and unclear domain. Secondly, states are afraid of being dependent on other states as a result of specialization in specific goods and services. That's why they tend to take care of themselves.[31] However, he suggests that "no one can take care of the system" which requires solutions to its global problems.[32]

Despite being a dominant theory in IR, especially after the World War II, the realist state-centric approach have experienced deficiencies in explaining the enhanced interdependence among states and increased need for cooperation; therefore, institutional theory of international relations have started to develop.[33] Liberal institutionalism argues that cooperation is possible without the existence of a hegemon thanks to international institutions, i.e. norms, rules, principles and procedures.[34]

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[29] Vogler, John. "Mainstream theories: realism, rationalism and revolutionism." In Harris, Paul G. (ed.), *Routledge Handbook of Global Environmental Politics.* New York*:* Routledge, 2014, pp. 31-37.

[30] Waltz, Kenneth N. *Theory of International Politics*, Massachusetts: Addison-Wesley Publishing Company, 1979.

[31] *Ibid.*, pp. 105-107.

[32] *Ibid.*, p. 109.

[33] Haggard, Stephan and Simmons, Beth A. "Theories of international regimes." *International organization*,41.3 (1987): 491-517.

[34] Vogler, John. "Mainstream theories: realism, rationalism and revolutionism." In Harris, Paul G. (ed.), *Routledge Handbook of Global Environmental Politics.* New York*:* Routledge, 2014, pp. 31-37.

In his book *After Hegemony: Cooperation and Discord in the World Political Economy*¸ Robert Keohane discusses under which conditions common interests of states do end up with international cooperation.[35] Keohane believes that cooperation is possible from an institutionalist perspective in the sense that complementary interests and the existence of institutions could pave the way for international cooperation. Thus, regarding the conditions for coordination, he suggests that "The mere existence of common interest is not enough: institutions that reduce uncertainty and limit asymmetries in information must also exist".[36] He admits that states pursue their self-interest; however, he believes that they are open for bargaining and negotiation which would provide them a somehow good deal for all actors.[37]

Oran Young analyses international activity through international regimes, i.e. "social institutions governing actions of those involved in specifiable activities or sets of activities."[38] Similar to Keohane, Young also sees international regimes and institutions as facilitating platforms for international cooperation. Furthermore, he analyses this function of international regimes in relation to environmental issues and natural resources. He specifically draws attention to this field because he believes that "cooperation will become more elusive in many realms as growing human populations, enhanced capabilities, and rising expectations generate more severe conflicts of interest as well as greater demands on the earth's natural systems."[39]

In their research on the interaction between state sovereignty and international environmental institutions, Keohane et al. suggest that;

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[35] Keohane, Robert O. *After Hegemony: Cooperation and Discord in the World Political Economy*. New Jersey: Princeton University Press, 1984.

[36] Keohane, Robert O. *After Hegemony: Cooperation and Discord in the World Political Economy*. New Jersey: Princeton University Press, 1984, pp. 12-13.

[37] *Ibid.*, pp. 52-53.

[38] Young, Oran R. *International Cooperation: Building Regimes for Natural Resources and the Environment*. London: Cornell University Press, 1989, p. 12.

[39] *Ibid.*, 1989, p. 4.

> International institutions do not supersede or overshadow states. They lack resources to enforce their edicts. To be effective, they must create networks over, around and within states that generate the means and the incentives for effective cooperation among those states.[40]

They use the term "institutions" for both international organizations and rules.[41] In that sense, throughout the thesis it is preferred to use international institution instead of international organization in order to be more comprehensive and to be in line with the general approach of liberal institutionalism.

According to them, environmental politics requires international cooperation and the way of ensuring cooperation is to form effective international institutions. Although environmental problems require behaviour change of individuals who are directed by governments through instruments like taxes or incentives, governments are directed by international organisations via incentives or pressures.[42]

As a third perspective, neoclassical realism "poses a challenge to both liberal and neorealist theories by integrating these perspectives into one single framework of analysis".[43] Neoclassical realism takes into account both international and domestic political forces in terms of the dynamics of international politics while neoliberal institutionalism studies it in terms of common norms and interests and neorealism focuses on systemic constraints on international system.[44] In this regard, neoclassical realism studies both systemic incentives (as independent variable) and domestic

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[40] Keohane, R. O., Haas, P.M. and Levy, M.A. "The Effectiveness of International Environmental Institutions." In Haas, P. M., Keohane, R.O. and Levy, M.A. and Gasser, L. (eds.). *Institutions for the earth: sources of effective international environmental protection*. Cambridge: MIT Press, 1993, p. 24.

[41] *Ibid.,* pp. 4-5.

[42] *Ibid.,* pp. 6-7.

[43] Reichwein, Alexander. "The tradition of neoclassical realism".In Toje, A. and Kunz, B. (eds.). *Neoclassical Realism in European Politics: Bringing power back in*. Manchester: Manchester University Press, 2012, p. 32.

[44] Purdon, Mark. "Neoclassical realism and international climate change politics: moral imperative and political constraint in international climate finance". *Journal of International Relations and Development*, 20.2 (2017): 263-300, p. 264.

constraints (intervening variable) when analysing states' behaviour in international politics.[45]

Gideon Rose argues that neoclassical realism highlights the impact of states' "relative material power vis-à-vis the rest of the international system" on their ambition in international politics while it also admits that it is not easy to observe such an impact.[46] Additionally, he points that neoclassical realism analyses states' behaviour through different domestic dynamics including the relative power of political elite, state structure that could affect the distribution of national resources and systemic pressures and incentives, all of which are believed to affect state behaviour in international politics.[47]

Similarly, Taliaferro et al. suggest that "leaders define the 'national interests' and conduct foreign policy based upon their assessment of relative power and other states' intentions, but always subject to domestic constraints".[48] According to neoclassical realism, state expresses the interaction between different domestic actors and includes the struggles among them.[49]

Mark Purdon studies international climate change politics from a neoclassical realist perspective by suggesting that the role of domestic constraints, political forces, and relative-gains concerns of states could be analysed in order to understand state behaviour in terms of climate change cooperation.[50] Within this perspective, relative

[45] Rose, Gideon. "Neoclassical Realism and Theories of Foreign Policy". *World Politics.* 51.1 (1998): 144-172, p. 154.

[46] *Ibid.*, p. 150.

[47] *Ibid.*, p. 147.

[48] Taliaferro, J.W., Lobell, S.E. and Ripsman, N.M. "Introduction". In Lobell, S.E., Ripsman, N.M. and Taliaferro, J.W. (eds.) *Neoclassical Realism, the State, and Foreign Policy*. Cambridge: Cambridge University Press, 2009, pp. 25-26.

[49] *Ibid.*, pp. 26-27.

[50] Purdon, Mark. "Neoclassical realism and international climate change politics: moral imperative and political constraint in international climate finance". *Journal of International Relations and Development*, 20.2 (2017): 263-300.

power of states depends on "the amount of emissions and ability to control them".[51] He argues that;

> …neoclassical realism recognises that relative gains concerns are not in themselves determinant of state behaviour. It accepts that states will vary in their sensitivity to relative gains concerns because climate change is a two-level game involving international political forces (international and state specific) as well as domestic ones to which state leaders must respond.[52]

At this point, it might be helpful to summarize the suggestions of the literature reviewed. A variety of scholars have studied transitions from different perspectives and through different disciplines. However, as Kern and Markard pointed out, these scholars mostly studied transitions as domestic processes and underestimated the impact of international politics in that sense.[53] Even though there are some studies that analyse transitions in a comparative manner[54] and some others that relate sustainability transitions to international environmental politics[55], none of them analyse transitions from an IR perspective.

In this respect, some major IR theories are reviewed regarding the discussions on cooperation in environmental international politics. Neorealist perspective argues that nation states would not undermine their self-interest due to the existence of a global interest since the consequence of their cooperation would be uncertain and insecure.[56] On the other hand, liberal institutionalist perspective believes that common interests

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[51] *Ibid.*, p. 273.

[52] *Ibid.*, p. 266.

[53] Kern, Florian and Markard, Jochen. "Analysing Energy Transitions: Combining Insights from Transition Studies and International Political Economy." In Van de Graaf, Thijs et al. (*eds.*), *The Palgrave Handbook of The International Political Economy of Energy*¸ London: Palgrave Macmillan, 2016: 291-318, p. 296.

[54] Lockwood, M. Kuzemko C., Mitchell, C. and Hoggett, R. "Theorising governance and innovation in sustainable energy transitions", University of Exeter, 2013, p. 26.

[55] Geels, Frank W. "Ontologies, socio-technical transitions (to sustainability), and the multi-level perspective." *Research Policy, 39*.4 (2010): 495-510, pp. 507-508.

[56] Waltz, Kenneth N. *Theory of International Politics*, Massachusetts: Addison-Wesley Publishing Company, 1979, pp. 105-107.

could convince national actors to cooperate if international institutions inform them on the dynamics of their mutual interest properly.[57] From a more extended perspective, neoclassical realism suggests that states do show different reactions towards international cooperation and their reactions could have been examined through both domestic and international variables. [58]

On the basis of all these arguments, the thesis aims to review transition to an LCE across Europe through the transition processes of the EU, UK, Germany, Poland and Turkey by questioning the neorealist, liberal institutionalist and neoclassical realist reflections within the interaction and dynamics among these transitions.

According to the logic of liberal institutionalism, it is expected that the EU could facilitate Member States to solve the problem of collective action and meet under a cooperative policy framework towards transition to an LCE. EU has a differentiated position in promoting collective action within the transition process across Europe in comparison to other international institutions. It is "an unusual international organization" which has both supranational and intergovernmental characteristics.[59] Furthermore, at some point, the collective action pursued under the Union could be named as integration rather than cooperation. Within this perspective, transition to an LCE across Europe could also be analysed through European integration theories such as supranationalism and intergovernmentalism. However, the thesis constructs its theoretical framework on IR theories since it aims to highlight transition to an LCE as a global phenomenon rather than an EU-level one. This seems possible considering

[57] Keohane, Robert O. *After Hegemony: Cooperation and Discord in the World Political Economy*. New Jersey: Princeton University Press, 1984, pp. 12-13.

[58] Rose, Gideon. "Neoclassical Realism and Theories of Foreign Policy". *World Politics.* 51.1 (1998): 144-172, p. 154.

[59] Lacasta, Nuno S. et al. "Articulating a consensus: the EU's position on climate change". In Harris, Paul G. (ed.). *Europe and Global Climate Change: Politics, Foreign Policy and Regional Cooperation*. Edwards Elgar Publishing, 2007, 211-231, p. 212.

the fact that there are some scholars who study EU as a microcosm of the global problem of climate change.[60]

Furthermore, Andrew Moravcsik sees the EU, or The European Community (EC) then, as "the most successful example of institutionalized international policy co-ordination in the modern world".[61] Also he believes that "although the EC is a unique institution, it does not require a sui generis theory."[62]

In the light of these arguments the dynamics of transition to an LCE across Europe will be analysed over comparative implications of transition frameworks of the EU, UK, Germany, Poland and Turkey. The literature reviewed here will guide the research when examining the transition processes and the interaction of actors in these processes throughout the thesis.

1.3.Argument

Contrary to the general approaches in transition literature including socio-technical approach, governance approach or new institutionalist approach almost all of which neglect the international dimensions of transitions, this thesis examines transition to an LCE from an IR perspective through the interaction between states and their response to international cooperation. Similar to the some of the recent studies on transitions mentioned above, this thesis suggests that low-carbon transitions, as a form of sustainability transitions, are required to be studied in a comparative manner across different countries. However, different from those studies this thesis examines the dynamics of low-carbon transitions from an IR perspective. Of course, other

[60] Grubb, M. "European Climate Change Policy in a Global Context". In Bergesen et al. (eds.). *Green Globe Yearbook of International Co-operation on Environment and Development*. Oxford: Oxford University Press, 1995, 41-50; Jordon, A., Huitema, D. and van Asselt, H. "Climate change policy in the European Union: an introduction". In Jordon, A. et al. (eds.). *Climate Change Policy in the European Union: Confronting the Dilemmas of Mitigation and Adaptation?*. Cambridge: Cambridge University Press, 2010, 3-25, p. 8.

[61] Moravcsik, Andrew. "Preferences and power in the European Community: a liberal intergovernmentalist approach". *JCMS: Journal of Common Market Studies*. 31.4 (1993): 473-524, p. 473.

[62] *Ibid.,* p. 474.

approaches have an undeniable role and impact in studying transition to an LCE, yet there is a need for an explanatory framework for low-carbon transitions on the basis of both domestic and international dynamics.

Transition to an LCE requires collective action among states since it addresses a common problem and involves a common interest. However, states do show different reactions towards adopting transition strategies and contributing to collective efforts in this field. That's why it is meaningful to study the dynamics of transition in a comparative perspective and through IR theories that analysing state behaviour in international system.

In this respect, the thesis seeks to analyse the dynamics of transition with respect to international developments and national circumstances through an examination of transition frameworks of the EU and four nation states, namely UK, Germany, Poland and Turkey in a comparative manner. This examination will be considered with respect to IR theories of neorealism, liberal institutionalism and neoclassical realism. In this regard, examinations on the policy frameworks of EU, UK, Germany and Turkey demonstrates that states' behaviour in terms of pursuing collective action for transition to an LCE has been shaped by their relative power in international system as well as their domestic characteristics and constraints. Therefore, the thesis argues that neoclassical realism is the most relevant IR theory in order to examine the dynamics of transition across Europe.

EU has been particularly chosen as the field of exploration under this study since it poses unique characteristics and further advantages that could affect transition process. In addition to the existence of the general framework presented under the international climate regime, EU offers a further, more detailed and bounding policy framework for transition to an LCE and supports it with its unique characteristics including a supranational governance system, European Single Market and internal energy market. Within this perspective, the thesis focuses on the transition policies and policy instruments at the EU level and national level for four European states in a comparative manner.

In the light of all these arguments, the thesis asks a question similar to that of Hurrel and Kingsburry mentioned in the literature review: Can EU as an international entity composed of twenty-eight sovereign states with highly differentiated economy and energy profiles achieve a collective transition process towards an LCE? With respect to this question, the thesis argues that the EUs put forwards a comprehensive and inclusive transition framework that supports collective action; however, states' attitudes regarding being a part of this action vary in line with their relative power vis-à-vis each other and domestic concerns, priorities, interests and capabilities.

1.4. Methodology

The thesis seeks to examine the dynamics within the process of transition to an LCE across Europe based on the policies and policy instruments of the EU and four nation states. In addition to reviewing the common policy framework that EU presents its member and candidate states and the interaction between the national frameworks of those states, the thesis illustrates transition processes from a neoclassical realist perspective by taking into consideration both international and domestic dynamics. Within the framework of the thesis, domestic characteristics, concerns, interests and priorities of states have a significant role in terms of reflecting their approach to collective action for transition.

The experiences of the EU, UK, Germany, Poland and Turkey in their transition processes will be analysed through their policies, strategies, targets and policy instruments. At this point, the study aims to gather the most relevant policies and policy instruments in order to see the whole picture in terms of the transition processes. Additionally, international and supranational developments and states' reactions to these developments will be taken into consideration in the analysis. The dynamics of their transition processes and their motivations in these processes will be illustrated with reference to historical and recent developments in a general framework. Throughout these examinations, the study will use data and statistics, the reports of international institutions including International Energy Agency (IEA), Organization for Economic Cooperation and Development (OECD) and World Bank, press releases, legal documents and strategies as well as books and journals.

1.5. Organisation of the Thesis

This thesis is composed of eight main chapters. In the introduction chapter, the scope and objectives, the literature review on the subject, main arguments and the methodology are presented. The second chapter reflects the emergence and definitions of the LCE and illustrates the general characteristics and dynamics of transition process to an LCE and what kind of policy framework is used in this process. This chapter aims to reflect the motivations, challenges, scope and results of a transition process through views on literature and common practices in terms of policies and policy instruments.

Third chapter of the thesis analyses the comprehensive policy framework that EU built in its transition process mainly through its strategy documents, targets and EU-wide policy instruments. The transition process of the Union is reviewed in the light of general characteristics of its economy, energy mix and GHG profile all of which can deeply differ among Member States. The review highlights the leadership role of the Union across the world and the way it uses its transition framework to ensure an ambitious transition process. In this respect, the chapter specifically asks what kind of policies and measures EU adopts in order to conduct such a comprehensive and inclusive transition process across its twenty-eight Member States with highly different national characteristics.

The subsequent chapters, namely fourth, fifth, sixth and seventh ones, examine the national transition processes of the UK, Germany, Poland and Turkey respectively. All chapters have a similar structure to that of previous chapter. They put forward characteristics of national economies by mentioning their energy and emission profiles and their experiences with the impacts of climate change. Based on these national characteristics, the chapters examine transition processes through national policies and policy instruments of the countries and with respect to international developments.

The fourth chapter describes the transition policies of the UK with a specific reference to its prominent role in terms of low-carbon transition policies. As the earliest mover

in transition to an LCE, the UK has a deep experience and a comprehensive and detailed policy framework in this field. The chapter will review this framework with reference to interaction of the transition frameworks of UK and EU in the light of Brexit.

The fifth chapter explores the transition process of Germany in the light of its national policies, especially its energy transition policy called *Energiewende*, and its related policy instruments. The chapter focuses on the fact that Germany has the largest economy and population of the EU and it has a rather earlier transition background compared to most of the Member States.

The sixth chapter demonstrates the transition process of Poland through national efforts and participation in international efforts. Different from previous two countries, national characteristics of Polish economy holds a rather significant place in order to comprehend its transition policies. Besides, the chapter gives a higher weight to the policy interaction between Poland and the EU in the light of the country's fame as a rather reluctant actor of the transition.

The seventh chapter stresses that Turkey has a differentiated place from previous examples as a candidate state. The country does not have a clear and comprehensive policy framework in terms of transition to an LCE. However, the chapter illustrates the climate and energy policies and related policy instruments from a low-carbon point of view. It includes a special focus on the national circumstances of the country based on their reflection in its international policies.

The final chapter evaluates transition processes of four nation states in comparison to each other and to that of EU from a neoclassical realist perspective. As previous chapters imply, although EU has a highly developed and comprehensive transition framework, it is seen that not all Member States and candidate states move towards the same direction and with the same level of enthusiasm because they differ in terms of their relative power and domestic circumstances.

CHAPTER 2

TRANSITION TO A LOW-CARBON ECONOMY

2.1.Introduction

In this part of the thesis, transition to a low-carbon economy (LCE) will be examined. Firstly, the term of LCE will be reviewed through its emergence, its definitions in the literature, its scope and its reflections in national and international policies. Then, main characteristics of transition to an LCE will be demonstrated with reference to certain views in the literature and reports of international institutions. Lastly, policy framework for transition will be illustrated through main policy instruments including carbon pricing, taxes, incentives and regulatory mechanisms.

2.2.The Emergence and Definition of Low-Carbon Economy

World economic system has gone through a major transition with the beginning of industrialization process. Shifting manpower to machine power have transformed the production and consumption patterns significantly and created a new era of competition among states and sectors. Besides, there emerged significant increases in the production and consumption levels and it required to consume more and more energy to produce more. The rise in the level of energy use has caused greenhouse gas (GHG) emissions increase significantly. GHG emissions from fuel combustion reached at the level of 33 gigatons of carbon dioxide ($GtCO_2$) in 2015 while it was equal to zero in 1879.[63]

[63] International Energy Agency (IEA). "CO2 Emissions From Fuel Combustion Highlights". OECD/IEA, 2017, p. 9, https://webstore.iea.org/co2-emissions-from-fuel-combustion (accessed on 12 February 2019)

According to the Fifth Assessment Report of Intergovernmental Panel on Climate Change (IPCC), global average surface temperature has been rising since pre-industrial era partly because of anthropogenic GHG emissions most of which consisted of carbon dioxide (CO_2) emissions from fossil fuel combustion and industrial processes.[64] IPCC points that "Anthropogenic GHG emissions are mainly driven by population size, economic activity, lifestyle, energy use, land use patterns, technology and climate policy."[65] It means that the continuously growing economy and population met their energy needs mainly from fossil fuels which caused a significant amount of increase in GHG emissions. In 2015, energy was the main sector causing GHG emissions by 74% and followed by agriculture, industrial processes and other sectors.[66]

There are two critical concepts that can facilitate to understand why these anthropogenic impacts matter: global warming and climate change. The fact that global mean surface temperature has been rising in comparison to pre-industrial era is called "global warming".[67] As a related phenomenon, climate change is defined as "a change in the state of the *climate* that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer."[68]

Today, various regions of the world experience severe impacts caused by climate change such as temperature-related extremes, global mean sea level rise, long time heatwaves, precipitation events, increased risk of drought and increased threats

[64] IPCC. "Synthesis Report". In *Climate Change 2014: Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland, IPCC, 2014, pp. 44-48.

[65] *Ibid.*, p. 8.

[66] IEA. "CO2 Emissions From Fuel Combustion Highlights". OECD/IEA, 2018, p. xix-xx, https://webstore.iea.org/co2-emissions-from-fuel-combustion-2018-highlights (accessed on 12 February 2019)

[67] IPCC. "Glossary". https://www.ipcc.ch/sr15/chapter/glossary/ (accessed on 11 May 2019)

[68] *Ibid.*

against water, food and energy security and human health. [69] Over the years, it has been observed that the frequency or intensity of these climate-related events have been increasing and they are expected to continue to increase as the global surface temperature increases.[70]

IPCC published a Special Report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global emission pathways in October 2018. According to the Report, the global surface temperature increase caused by human activities has already reached 1ºC above pre-industrial levels and it could reach 1.5ºC between 2030 and 2052 under current projections.[71] The risks posed by climate change "depend on the magnitude and rate of warming, geographic location, levels of development and vulnerability, and on the choices and implementation of adaptation and mitigation options".[72] Therefore, it is important to limit global surface temperature increase and develop regional measures to fight against climate change. In this respect, the Report presents pathways in order to limit the temperature increase to 1.5ºC above pre-industrial levels in order to control climate-related risks and to support sustainable development and poverty eradication.[73]

[69] IPCC. "Impacts of 1.5ºC of Global Warming on Natural and Human Systems". In *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. 2018: 175-311.

[70] *Ibid.*

[71] IPCC. "Summary for Policymakers". In *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* 2018: 1-24, p. 6.

[72] *Ibid.*, p. 7.

[73] IPCC. "Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development." In *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. 2018: 93-174.

IPCC Report argues that limiting global surface temperature rise requires a global and urgent effort on mitigating GHG emissions, developing adaptation measures in line with the current and future impacts of climate change and system transitions in the fields of energy, land and ecosystem, urban and infrastructure and industry.[74] As the scientific findings point, the increase in the global surface temperatures and expansion of the impacts of climate change as a result of rising GHG emissions interest various fields of life in terms of its causes and results. Within this perspective, fighting against climate change has had reflections on various fields through different concepts, formations, policies and measures. Some of these are green growth, sustainable development and climate compatible development.[75]

LCE can be seen as one of these reflections. The term of LCE was for the first time used in the Energy White Paper of the UK in 2003. In the White Paper, LCE was approached as an undiscovered solution towards the challenges created by climate change, decline of indigenous energy supplies and update of energy infrastructure.[76] Although there were earlier studies on renewable energy technologies in the 1970s, the issue of mitigating GHG emissions came to the front and contributed to the emergence of studies on low carbon patterns at the beginning of 1990s in line with the developments in international climate change discussions. [77]

Collective efforts on fighting against climate change have been gathered under an international climate regime starting with United Nations Framework Convention on

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[74] IPCC. "Strengthening and Implementing the Global Response." In *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. 2018: 313-443.

[75] For definitions of these concepts and further information on them, please see Urban, Frauke and Nordensvard, Johan. "Low Carbon Development: Origins, concepts and key issues". In Urban, F. and Nordensvard, J. (eds.). *Low Carbon Development: Key Issues*, London: Routledge, 2013, 3-22, pp. 6-7.

[76] United Kingdom Department of Trade and Industry. "Energy White Paper: Our energy future – creating a low carbon economy*."* The Stationary Office, Norwich, 2003. pp. 6-10.

[77] Urban, Frauke and Nordensvard, Johan. "Low Carbon Development: Origins, concepts and key issues". In Urban, F. and Nordensvard, J. (eds.). *Low Carbon Development: Key Issues*, London: Routledge, 2013, 3-22, pp. 10-11.

Climate Change (UNFCCC) adopted in the United Nations Conference on Environment and Development (1992). UNFCCC recognises that historical GHG emissions have been largely caused by developed states while developing states will also cause increasing levels of emissions as a result of meeting their social and development needs.[78] Within this regard, it brought some obligations including emissions reductions and financial and technological support for its listed Parties[79] in line with "common but differentiated responsibilities and their specific national and regional development priorities".[80] The regime was strengthened with Kyoto Protocol (1997) which brought binding emissions limitation or reduction obligations for the obliged Parties[81] and introduced certain flexibility mechanisms[82] in order to support mitigating mitigation efforts in a cost-effective way.

Within the framework of UNFCCC, Parties gather and decide the course of common policies related to climate change in regular meetings called Conference of Parties (COP). In COP 16 held in Cancun, low-carbon transition came into agenda and it was decided that developed Parties should adopt low-carbon development strategies and developing Parties were encouraged to do so.[83] On the other hand, in the Report of COP16 it was stated that;

> The Conference of Parties realizes that addressing climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative

[78] United Nations (UN). "United Nations Framework Convention on Climate Change (UNFCCC)." 1992, https://unfccc.int/resource/docs/convkp/conveng.pdf (accessed on 16 February 2019)

[79] UNFCCC introduced differentiated obligations for its certain Parties and listed them as Annex-I, Annex- II and non-Annex-I Parties. For further information please see; UNFCCC. "Parties & Observers", https://unfccc.int/parties-observers (accessed on 12 March 2019)

[80] UN, "United Nations Framework Convention on Climate Change (UNFCCC)." 1992, Article 4 (2).

[81] Kyoto Protocol classified the obliged parties as Annex-B Parties.

[82] These mechanisms include Clean Development Mechanism, Joint Implementation and Emissions trading. For further information, please see UNFCCC. "Mechanisms under the Kyoto Protocol", https://unfccc.int/process/the-kyoto-protocol/mechanisms (accessed on 13 March 2019)

[83] UNFCCC. "Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 – Addendum, Part Two: Action taken by the Conference of the Parties at its sixteenth session", FCCC/CP/2010/7/Add.1, pp. 9-11.

> technologies and more sustainable production and consumption and lifestyles, while ensuring a just transition of the workforce that creates decent work and quality jobs.[84]

The most recent component of the regime, Paris Agreement (2015) aims to limit the global temperature increase to well below 2°C compared to pre-industrial levels and to take the necessary steps to limit it even further to 1.5°C in order to mitigate the impacts of climate change.[85] The Agreement regulates the framework of post-2020 climate change regime and requires Parties to submit their national emission reduction commitments and post-2020 climate actions as nationally determined contributions (NDCs)[86] and update them every five years starting from 2020. Furthermore, Paris Agreement incorporates LCE into this framework by requiring all Parties to communicate their long-term low-GHG emission development strategies by taking into account their common but differentiated responsibilities and respective capabilities.[87]

Today, transition to an LCE is still a recent term which has a developing literature and an increasing number of exercises around the world. There is no commonly agreed definition of the LCE, yet it is possible to conceive the term through different definitions in the literature. Stephen Tinsley defines LCE as;

> …an economy that emerges at some point in the future where the planned transition from its current high carbon economy is recognized by society as having achieved a balance of economic, social and environmental activity that has an acceptable impact on the environment.[88]

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[84]UNFCCC. "Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010 – Addendum, Part Two: Action taken by the Conference of the Parties at its sixteenth session", FCCC/CP/2010/7/Add.1, p. 4.

[85] UN. "Paris Agreement". 2015, Article 2(1) b, https://unfccc.int/sites/default/files/english_paris_agreement.pdf (accessed on 16 February 2019)

[86] In the COP19, in 2013, it was decided that UNFCCC Parties shall submit intended nationally determined contributions (INDCs). Within the context of the Paris Agreement, INDCs of the Parties are called as NDCs if the Party in question has ratified the Agreement.

[87] UN, Paris Agreement, 2015, Article 4 (19).

[88] Tinsley, Stephen. *Environmental Management in a Low Carbon Economy*, London: Routledge, 2014, pp.1-5.

Urban and Nordernsvard approach the term in two different frameworks: low-carbon development and low-carbon growth. Low-carbon development is accepted as "a development model that is based on climate-friendly low carbon energy and follows principles of sustainable development, makes a contribution to avoiding dangerous climate change and adopts patterns of low carbon consumption and production".[89] On the other hand, low-carbon growth is defined as preserving growth with less carbon use which requires shifting to low-carbon energy sources, promoting low-carbon technologies, protecting carbon sinks and developing policies that support low-carbon practices. [90]

Obviously, it cannot be expected to transform the current economies into low-carbon ones overnight. It requires a transition process that needs to be planned with all related actors and by including all related sectors. Frauke Urban defines low-carbon energy transitions "as shifts from a country's economic activities based on fossil fuel to an economy based (partially) on renewable and low-carbon technologies".[91] Also, he highlights that it is possible to see the effects of low-carbon transitions in any sector of an economy.[92]

Furthermore, Geels, Berkhout and van Vuuren define low-carbon transitions as "major changes in buildings, energy and transport systems that substantially enhance energy efficiency, reduce demand, or entail a shift from fossil fuels to renewable inputs".[93]

[89] Urban, Frauke and Nordensvard, Johan. "Low Carbon Development: Origins, concepts and key issues". In Urban, F. and Nordensvard, J. (eds.). *Low Carbon Development: Key Issues*, London: Routledge, 2013, 3-22, p. 5.

[90] *Ibid.*, p. 5.

[91] Urban, Frauke. *Low Carbon Transitions for Developing Countries*. London: Routledge, 2014, p. 10.

[92] *Ibid.*

[93] Geels, F. W., Berkhout, F., & van Vuuren, D. P. "Bridging analytical approaches for low-carbon transitions". *Nature Climate Change*, 6.6 (2016): 576-583, p. 577.

As it can be understood from the arguments above, climate change and the need to mitigate GHG emissions in order to tackle climate change have contributed to the emergence of LCE. However, it is expected to have further outcomes in addition to a systemic change in terms of carbon intensity of the economy. Wurzel and Connely sees transition to an LCE as a competitive field and an opportunity created by climate change.[94] Moreover, Tinsley highlights that LCE will create three main additional outcomes:

- New job opportunities, innovation and economic growth,
- Technology driven economic competitiveness,
- Increased energy security and reduced environmental impact. [95]

In this respect, within the context of this thesis, LCE is accepted as a multidimensional area concerning economy, politics, environment and energy and contributing economic prosperity, competitiveness and energy security with low-carbon inputs and outputs. The term of transition to an LCE will be understood better when its general characteristics and policy framework will be illustrated throughout the rest of the chapter.

2.3.General Characteristics of Transition to an LCE

After forming an opinion about what an LCE indicates in the light of scientific arguments and international developments on climate change, the basic dynamics and characteristics of transition to an LCE will be demonstrated through different arguments. It will be useful to benefit from some economic terms to conceive the global characteristics of climate change and low-carbon transitions. Climate is a public good in the sense that anyone consumes it without any exclusion and rivalry.[96]

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[94] Wurzel, Rüdiger K. W. and Connelly, James. "Introduction". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a leader in international climate change politics*. New York: Routledge, 2010, p. 14.

[95] Tinsley, Stephen. *Environmental Management in a Low Carbon Economy*, London: Routledge, 2014, p. 2.

[96] Deneulin, Séverine and Townsend, Nicholas. "Public goods, global public goods and the common good", *International Journal of Social Economics*, 34.1/2 (2007): 19-36, p. 20.

In other words, it is free of charge for the whole society and it is possible to be consumed without any reduction in its availability to others. Furthermore, it is accepted as a global public good as it makes it possible to "benefit all countries, population groups and generations".[97] Like other public goods, climate creates free-rider problem. In fact, Nordhaus notes that "The structure of climate change as a global public good makes it particularly susceptible to free-riding. The costs of abatement are national, while the benefits are global and independent of where emissions take place".[98]

Another problem that climate causes as a global public good is the fact that it creates negative externalities and leads to market failure. Various production and consumption activities cause GHG emissions as explained before and those who benefited from the related goods and services that cause GHG emissions do not pay for the cost of emissions which harm the whole planet and future generations. These involuntary costs imposed on others are called externalities and they result in market failures by preventing the market from reaching the optimum situation.[99] In this context, climate change is called as "an externality that is global in both its causes and consequences" and "the greatest market failure the world has ever seen".[100]

Based on these arguments, climate change as a global environmental problem requires global political responses through cooperative and collaborative action at the levels of international organisations, governments, local authorities and non-governmental bodies.[101] In other words, since the increase in GHG emissions has raised global

[97] Kaul, I., Grunberg, I. and Stern, M.A. *Global Public Goods: International Cooperation in the 21st Century*, Oxford: Oxford University Press, 1999, p. 16.

[98] Nordhaus, William. "Climate clubs: Overcoming free-riding in international climate policy." *American Economic Review*, 105.4 (2015): 1339-70, pp. 1365-66.

[99] Dessler, Andrew. *Introduction to Modern Climate Change*. Cambridge: Cambridge University Press, 2012, p. 177.

[100] Stern, Nicholas. *The Economics of Climate Change*, Cambridge: Cambridge University Press, 2007, p. 25.

[101]. Harris, Paul G. "Introduction". In Harris, Paul G. (ed.). *Routledge Handbook of Global Environmental Politics*. New York: Routledge, 2014, p.3.

surface temperatures and caused a global problem called climate change, transition to a low-carbon economy, as a part of the solution, is expected to be a global process. Therefore, it is critical that all economies around the world adopt low-carbon pathways in order to avoid negative impacts of the transition process in one economy on another (like carbon leakages and disadvantages in terms competitiveness) and ensure a global transition.[102]

Also, Hanley et al. approach climate change as a global environmental risk which requires international cooperation since climate is a public good and affected by the sum of global GHG emissions emitted by all industries. [103] They warn that largest emitters around the world might be industrialised countries until recently, however this trend will change as transition economies like China or India will replace them. Recent statistics have point that this might have been actually happening as the largest four CO_2 emitters of the world were China, USA, EU28 and India respectively in 2017.[104]

Although climate change is a global problem, countries may not have the same level of enthusiasm to fight against climate change and decrease their GHG emissions, which stems from two main facts according to Hanley et al.[105] Firstly, countries take advantage of mitigation policies even though they do not contribute, in other words they choose to be free-riders. Secondly, countries do have differentiated financial and technological capacities which affect their climate change policies. In that sense, developing countries might have lower level of economic capabilities and prior policy concerns.[106] Regarding this argument, Frauke Urban notes that developing countries

[102] Metcalf, G. E., & Weisbach, D. "Linking policies when tastes differ: Global climate policy in a heterogeneous world." *Review of Environmental Economics and Policy*. 6.1 (2011): 110-129, p 110.

[103] Hanley, N., Shogren, J., & White, B. *Introduction to environmental economics*. Oxford: Oxford University Press, 2019, p. 178.

[104] Global Carbon Atlas. "CO_2 Emissions", http://globalcarbonatlas.org/en/CO2-emissions (accessed on 20 July 2019)

[105] Hanley, N., Shogren, J., & White, B. *Introduction to environmental economics*. Oxford: Oxford University Press, 2019, p. 178.

[106] *Ibid.*

should pursue their development policies but unlike today's industrialized countries they could do that in a more sustainable and low-carbon development path.[107]

In other respects, those who have engaged in transition policies for an LCE are currently in a strict competition. Since this is a newly emerging area, it is advantageous to control low-carbon sectors, technologies, goods and services. It is just like the competition that industrial transition brought. Even some call LCE as "a new industrial revolution".[108] In this context, low carbon economy has a chance to bring a wave of economic growth just like the earlier transitions did.[109] Bridge et al. argue that there are multiple transition pathways for different geographies with different energy systems and different levels of economic growth and development, which at the end would cause new patterns of uneven development.[110]Therefore, someday there might be a development gap between those who could succeed the transition to an LCE and those who could not.

On the other hand, Pearson and Foxon note that low carbon transition has a further challenge when compared to industrial revolution since the private benefits are not so obvious this time.[111] Instead of providing private benefits to the economic actors, transition to an LCE contributes to the public good by mitigating the effects of climate change. Therefore, they believe that a low-carbon transition will need to be managed

[107] Urban, Frauke. *Low Carbon Transitions for Developing Countries*. London: Routledge, 2014, p. 9.

[108] Jinjun, Xue. *Low Carbon Economics: Theory and Application.* Singapore: World Scientific, 2013, pp. 5-6; Stern, Nicholas. "How should we think about the economics of climate change", Leontief Prize Lecture, Global Development and Environment Institute, Tufts University, 2011, http://www.ase.tufts.edu/gdae/about_us/leontief/SternLecture.pdf (accessed on 18 May 2019)

[109] Fouquet, Roger and Pearson, Peter JG. "Past and prospective energy transitions: Insights from history". *Energy Policy*, 50 (2012): 1-7, p.2.

[110] Bridge, G., Bouzarovski, S., Bradshaw, M. and Eyre, N. "Geographies of energy transition: Space, place and the low-carbon economy." *Energy policy*, 53 (2013): 331-340, p. 337.

[111] Pearson, Peter JG. and Foxon, Timothy. "A Low Carbon Industrial Revolution: Insights and challenges from past technological and economic transformations", *Energy Policy*, 50 (2012): 117-127, p. 118.

through public policy.[112] Furthermore, Stern also states that the basis of the transition process is the interaction between the public policy and private investment.[113]

It is critical that policy-makers conduct transition process through an interaction with local authorities, private sector, non-governmental organizations and academic world in order to ensure a transparent and inclusive process based on scientific evaluations and to mobilize technical and financial support.[114] As transition processes include various actors whose interests and capabilities might contradict with each other, these processes host struggles in different fields.[115] Economic and social reactions against the changes in the market or energy systems could be both in the forms of resistance and support. Political struggles, which mainly emerged over policy frameworks and instruments, can also support transition if green policies become a political propaganda topic; however, they can also create deficiencies as changing governments may risk the continuity of transition policies.[116] The transformation that climate and energy policies of the United States of America (USA) experienced from Obama administration to Trump administration could be a good example here.

As transition to an LCE is closely related to different policy fields, the strategies and policy instruments in the transition process are also open for the influence of the trade-

[112] Pearson, Peter JG. and Foxon, Timothy. "A Low Carbon Industrial Revolution: Insights and challenges from past technological and economic transformations", *Energy Policy*, 50 (2012): 117-127, p. 118.

[113] Stern, Nicholas. "How should we think about the economics of climate change", Leontief Prize Lecture, Global Development and Environment Institute, Tufts University, 2011, http://www.ase.tufts.edu/gdae/about_us/leontief/SternLecture.pdf (accessed on 18 May 2019)

[114] Clapp, C., Briner, G. and Karousakis, K. "Low-Emissions Development Strategies (LEDs): Technical, Institutional and Policy Lesssons", OECD/IEA, Paris, 2010, pp. 14-33, http://search.oecd.org/environment/cc/46553489.pdf (accessed on 18 May 2019)

[115] Geels, F. W., Berkhout, F., & van Vuuren, D. P. "Bridging analytical approaches for low-carbon transitions". *Nature Climate Change*, 6.6 (2016): 576-583, p. 577.

[116] *Ibid.*

offs between climate, energy and economy policies.[117] Pearson and Foxon believe that;

> If low carbon policies were to take into account the scale of the transformation needed and could be designed, as far as possible, to stimulate promotion of wider macroeconomic benefits, then this could make these policies more technologically effective, socially acceptable and politically feasible.[118]

Based on all these arguments some basic characteristics of low-carbon transitions can be specified. First of all, low-carbon transitions are global processes which require international cooperation among developed and developing states across the world. Secondly, they refer deep transformations like Industrial Revolution caused especially in terms of their economic results in the long-term. Thirdly, they need to be directed through public policies in order to preserve the common good. Lastly, they are comprehensive processes that include different actors and sectors of which interests could conflict, therefore, they require to be planned carefully.

In this respect, it is critical to develop sectoral strategies and control their interaction with each other, to foresee the challenges and to take the necessary measures. By examining low-carbon transitions as a public policy field requires to demonstrate what kind of policy measures and policy instruments could be adopted in such processes. A general policy framework will be presented below on the basis of commonly used policies and policy instruments in such processes.

2.4.Policy Framework for Transition to an LCE

An increasing number of countries have been developing low-carbon policy frameworks through different strategies and policy instruments. The transition strategies can be short-term, middle-term or long-term, macro-economic or sector-specific. For example; there are strategies on "low-carbon economy" and "low-carbon cities" in the UK, "low-carbon energy technologies" in the USA, low-carbon green

[117] Pearson, Peter JG. and Foxon, Timothy. "A Low Carbon Industrial Revolution: Insights and challenges from past technological and economic transformations", *Energy Policy*, 50 (2012): 117-127, p. 118.

[118] *Ibid.,* p. 122.

growth" in the South Korea and "low-carbon technology" or "low-carbon society" in Japan.[119] There is not a formula for such strategies since these policy frameworks mainly depend on the national characteristics of the country.[120] The scope and content of transition policies could be better understood when different transition frameworks are illustrated through following chapters. Thus, this part only aims to review basic policy measures and instruments that can be adopted in transition processes.

A low-carbon future requires about 700 billion USD additional annual investment by 2030.[121] The World Bank warns that "an integrated policy response that combines domestic carbon prices, other domestic policies, climate finance and international market approaches is needed" in order to mobilise such an investment.[122] Moreover, OECD highlights the significance of aligning policies for an efficient and cost-effective transition and points out three pillars of a transition policy framework: sending price signals that can internalise the externalities created with GHG emissions, introducing regulatory measures that would complement pricing measures and supporting low-carbon technologies. [123]

The role of the policy instruments in this process is to make low-carbon goods and services more attractive while making high-carbon ones less attractive for producers, consumers and investors in the market. In other words, policy instruments are useful for creating a conscious on a low-carbon transition by directing the actors in the market in line with this transition mostly through price signals and mobilise the

[119] Jinjun, Xue. *Low Carbon Economics: Theory and Application.* Singapore: World Scientific, 2013, p. 9.

[120] OECD. "Aligning Policies for a Low-carbon Economy", 2015, p. 54, https://www.oecd.org/environment/Aligning-Policies-for-a-Low-carbon-Economy.pdf (accessed on 24 May 2019)

[121] World Bank, Ecofys and Vivid Economics. "State and Trends of Carbon Pricing 2017". Washington DC: World Bank, 2017, p. 60-61.

[122] *Ibid.*p. 60.

[123] OECD. "Aligning Policies for a Low-carbon Economy", 2015, p. 26-29, https://www.oecd.org/environment/Aligning-Policies-for-a-Low-carbon-Economy.pdf (accessed on 24 May 2019)

investments accordingly. The main policy instruments used for this purpose are carbon pricing mechanisms, energy taxes, financial incentives and regulatory schemes such as environmental standards, reporting requirements or removal of financial barriers.

As the strategies and actions within the context of an LCE are mostly about mitigating GHG emissions, **carbon pricing** holds a significant place within the transition process. Therefore, it is critical to understand the logic of carbon pricing in order to understand the logic and purpose of some policy instruments used for an LCE. Reminding the arguments on externalities and market failure could be relevant here since carbon pricing comes to the stage as an intervention to the market failure by internalizing social costs of emissions through a price to be paid by the beneficiaries of the related goods and services. In this way, economic actors bear the cost of their economic activity and may prefer low-carbon goods and services in order to avoid additional costs.[124]

Carbon pricing instruments are mainly emission trading scheme (ETS) and carbon tax. Also, there are discussions on a potential one: border carbon adjustments but there is not any practice of this yet. Carbon tax and ETS have been used since 1990s and started to become widespread in 2000s. As of May 2019, there are 57 carbon pricing initiatives in the form of carbon tax or ETS implemented or scheduled for implementation in 46 national and 28 subnational jurisdictions around the world and would cover 11 $GtCO_2e$, 19,6% of global emissions.[125]

ETS is a cap-and-trade mechanism in which the central authority sets annual limits on GHG emissions and allocates allowances to each of the participants in the scheme in a way that each allowance gives them right to emit one tonne of GHGs.[126] Those

[124] Stern, Nicholas. *The Economics of Climate Change*, Cambridge: Cambridge University Press, 2007, pp. 308-311.

[125] World Bank. "Carbon Pricing Dashboard", https://carbonpricingdashboard.worldbank.org/ (accessed on 19 May 2019)

[126] Dessler, Andrew. *Introduction to Modern Climate Change*. Cambridge: Cambridge University Press, 2012, p. 189.

who have surplus allowances can bank or sell them while those who need more allowances can buy additional allowances in the market.[127] The central authority can choose to allocate the allowances free of charge or via auctions. The first option might be preferred so that the actors can admit the system more easily.[128] On the other hand, the auction option is advantageous as it creates revenue that can be used for low-carbon investments or compensating the damage caused by rising energy prices.[129]

The price of the allowances is determined in the market and as long as this price is higher than the cost of mitigating emissions, the actors chose mitigation.[130] Thus, the high-carbon goods and services turn out to be dissuasive as their prices increase. In case that the price of allowances is lower than the cost of mitigation, the scheme makes actors pay the cost of the damage they caused over the environment. Thus, the mechanism provides flexibility for the actors in the market and contributes to transition to an LCE in a cost-effective way.[131]

As another carbon pricing instrument, **carbon tax** puts a price on the amount of CO_2 within a product or process so that the price of product or cost of service could reflect its social cost, i.e. creating carbon emissions.[132] Carbon tax ensures that the emissions

[127] Partnership for Market Readiness (PMR) and International Carbon Action Partnership (ICAP). "Emissions Trading in Practice: a Handbook on Design and Implementation." Washington D.C.: World Bank, 2016, p. 16, https://openknowledge.worldbank.org/bitstream/handle/10986/23874/ETP.pdf?sequence=11&isAllowed=y (accessed on 21 May 2019)

[128] EEA. "Market-based instruments for environmental policy in Europe". EEA Technical Report No 8/2005, Luxembourg: Office for Official Publications of the European Communities, 2005, p. 21, https://www.eea.europa.eu/publications/technical_report_2005_8 (accessed on 22 May 2019)

[129] Dessler, Andrew. *Introduction to Modern Climate Change*. Cambridge: Cambridge University Press, 2012, p. 190.

[130] PMR and ICAP, "Emissions Trading in Practice: a Handbook on Design and Implementation." Washington D.C.: World Bank, 2016, p. 16.

[131] EEA. "Market-based instruments for environmental policy in Europe". EEA Technical Report No 8/2005, Luxembourg: Office for Official Publications of the European Communities, 2005, p. 16, https://www.eea.europa.eu/publications/technical_report_2005_8 (accessed on 22 May 2019)

[132] PMR and World Bank Group, "Carbon Tax Guide: A Handbook for Policy Makers", Washington: World Bank, 2017, p. 10.

are internalised and the actors in the market that want to avoid additional taxes prefer low-carbon goods and services. There are several critical issues that needs to be taken into consideration when designing a carbon tax: which sectors and GHG gases will be in the scope of the tax, what the tax rate will be and how the tax revenue will be used.[133]

Carbon tax can create advantages by using the tax revenues and creating "double dividend". It reduces the emissions and fossil fuel dependency (first dividend) and it contributes to the economic growth and welfare improvement by using the tax revenues to decrease the rate of some distortionary taxes like income tax or corporate tax (double dividend).[134] The tax revenues could also be used to support for those who experience the diverse impacts of the tax or transferred to the environmental funds.[135]

The last type of carbon pricing instrument is **border carbon adjustments**. Even though ETS and carbon tax are useful to make the GHG emissions internalised, they are only applicable for domestic emissions. Since not all countries apply carbon pricing instruments, the problem of externalities continues within the global markets. This affects the competitiveness of sectors and firms and cause them to settle in the countries where carbon pricing regulations are not so strict, which creates the problem of carbon leakage.[136] Therefore, while domestic GHG emissions decrease, there emerge emission increases in some other parts of the world. In order to prevent the problem of carbon leakages, it is discussed that some kind of border adjustments like a border tax based on CO_2 content or a requirement for surrendering a quantity of

[133] PMR and World Bank Group. "Carbon Tax Guide: A Handbook for Policy Makers", Washington: World Bank, 2017, p. 10.

[134] Heindl, Peter and Lösches, Andreas. "Social Implications of Green Growth Policies from the Perspective of Energy Sector Reform and its Impact on Households", Centre for European Economic Reaseach (ZEW) Discussion Paper, 2014, p. 13. http://ftp.zew.de/pub/zew-docs/dp/dp15012.pdf (accessed on 2 April 2019)

[135] Baranzini, A., Goldemberg, J. and Speck, S. "A Future for Carbon Taxes", *Ecological Economics*, 32.3 (2000): 395-412, p. 399-400.

[136] OECD. "Aligning Policies for a Low-carbon Economy", 2015, p. 36., https://www.oecd.org/environment/Aligning-Policies-for-a-Low-carbon-Economy.pdf (accessed on 24 May 2019)

carbon allowances could be initiated.[137] Although there are theoretical and political discussions on this issue, there is not such a practice yet.[138]

Energy taxes and motor vehicle taxes have a similar function to carbon pricing in terms of making carbon-intense goods and services more expensive. Even energy taxes are called as "implicit carbon taxes" since they are not applied in terms of the carbon content but have an indirect carbon pricing impact.[139] **Energy taxes** are applied on the quantity of energy consumed and calculated on the basis of the unit of energy.[140]

Motor vehicle taxes are on the other hand, calculated in terms of various factors like the weight, age, motor type, fuel efficiency and emission profile of the vehicle. Traditionally, the rate of this kind of taxes were determined mainly by the motor power and weight, however, in recent years CO_2 emissions and fuel efficiency have started to be effective in the taxation, which creates an indirect carbon price impact and promotes low-carbon motor vehicles.[141]

Although carbon pricing instruments are highlighted as the primary policy instruments in transition periods, complementary policy instruments have also been used. According to Hübner, carbon pricing might be a necessary condition for transition to an LCE; however, it is not a sufficient one because there are some

[137] Condon, Madison and Ignaciuk, Ada. "Border Carbon Adjustment and International Trade: A Literature Review", OECD Trade and Environment Working Papers 2013/06, p.4, https://www.oecd-ilibrary.org/trade/border-carbon-adjustment-and-international-trade_5k3xn25b386c-en (accessed on 23 May 2019)

[138] In fact, there is an example of environmental tariff regulation on certain products coming from certain countries which was applied in the USA in 1991. However, this practice cannot be evaluated within this context since the tax rates were not depend on the carbon content. For further information, please see Mani, Muthukumara "Environmental Tariffs on Polluting Imports An Empirical Study". E*nvironmental and Resource Economics*, 7.4 (1996): 391-411. pp. 391-393.

[139] Baranzini, A., Goldemberg, J. and Speck, S. "A Future for Carbon Taxes", *Ecological Economics*, 32.3 (2000): 395-412, p. 397.

[140] *Ibid.*

[141] OECD/IEA/NEA/ITF, 2015, "Aligning Policies for a Low-carbon Economy", Paris: OECD Publishing, 2015, p. 198.

economic activities which are not provided by the market and there could emerge social, political and economic opposition due to the burdens or disadvantages the price brings.[142]

Similarly, Lehman notes that there might be other market failures "such as technological spill overs and asymmetric information" and single policies as in the form of carbon pricing may not be sufficient in that sense.[143] Furthermore, there are studies arguing that policy instruments could be more cost-effective when they are used in combinations including carbon pricing instruments, subsidies and regulation.[144]

Accordingly, other policy instruments are mainly composed of support schemes in the form of subsidies and regulations. In fact, the policy instruments used by the EU and studied countries will better illustrate how creative and flexible policy makers could be with this kind of instruments. In this part, however, a general presentation of these will be shared just to provide insight on how they do work. **Subsidies** can be used in two ways in the transition processes: introducing subsidies to promote renewable sources or low-carbon technologies and abolishing or re-regulating subsidies that support fossil fuels. Central authorities can use financial incentives as price controls, direct financial transfers or tax incentives.[145] Fossil fuel subsidies on the other hand can be seen as an obstacle for an LCE as they make carbon-intense goods and services more abundant and cheaper. Besides, they cause distortion of the price signals and

[142] Hübner, Kurt. "Decarbonization and unlocking: national pathways to low carbon emission economies". In Hübner, Kurt. (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, 1-44, pp. 3-5.

[143] Lehmann, Paul. "Justifying a policy mix for pollution control: a review of economic literature." *Journal of Economic Surveys* 26.1 (2012): 71-97, p. 72.

[144] Scrieciu, S. Şerban, Barker, Terry and Ackerman, Frank. "Pushing the boundaries of climate economics: critical issues to consider in climate policy analysis." *Ecological Economics*, 85 (2013): 155-165.

[145] OECD. "Green Growth Indicators, Paris: OECD Publishing", 2017, p. 130, https://www.oecd.org/environment/green-growth-indicators-2017-9789264268586-en.htm (accessed on 23 May 2019)

resource allocation among sectors and create additional burden on the public budget.[146]

Regulatory schemes include standards, auction regulations, reporting requirements and environmental labelling applications. They help the transformation of the goods and services in the market by incentivising the expansion of low-carbon sources and technologies. According Stern, market demand could be affected through regulations, informative policies including labels or certificates and promotion of low-carbon investments by increasing public finance for low-carbon sources and technologies.[147] In this respect, a low-carbon public procurement policy also stands as "one of the most effective potential mechanisms available to governments to drive public policies such as the low carbon agenda".[148] This policy tool is also called as sustainable or green public procurement and supports transition as public sector reshapes the production and consumption patterns in the market through its large purchasing power.[149]

Kemp et al. argues that government policy and regulatory framework could also be a barrier for transition to more sustainable technologies.[150] Although there are government policies supporting these newly emerging technologies like R&D subsidies or regulations, the fact that governments do not make a clear commitment in development of these technologies causes conflicting signals for manufacturers and

[146] OECD. "Green Growth Indicators, Paris: OECD Publishing", 2017, pp. 130-131, https://www.oecd.org/environment/green-growth-indicators-2017-9789264268586-en.htm (accessed on 23 May 2019)

[147] Stern, Nicholas. *The Economics of Climate Change*, Cambridge: Cambridge University Press, 2007. p. 377.

[148] Correia, F. et al., "Low carbon procurement: An emerging agenda", *Journal of Purchasing & Supply Management*, 19.1 (2013): 58-64, p. 58.

[149] Cheng, W. et al. "Green Public Procurement, missing concepts and future trends – A critical review", *Journal of Cleaner Production*, 176 (2018): 770-784, p. 771.

[150] Kemp, R., Schot, J. and Hoogma, R. "Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management." *Technology analysis & strategic management*. 10.2 (1998): 175-198, p. 178.

investors.[151] Similarly, OECD highlights the significance of "strong government commitment at both international and national level" in order to lead the actors in the market towards low-carbon investments.[152]

In this respect, choosing the right policy instrument(s) is highly crucial in terms of policy interactions and political and social reactions. The design of policy frameworks varies in accordance with the policy goals and country-specific conditions.[153] Yet, they need to be consistent in order to reflect the right signals in the market.

2.5.Conclusion

In conclusion, transition to an LCE has been explored through its emergence, different definitions, basic characteristics and policy framework. As stated, LCE is still a developing concept that emerged as a result of the efforts to tackle climate change and it creates additional benefits like new job opportunities, economic rivalry and energy security. An effective transition process to an LCE requires to be planned in a comprehensive way since it interests different actors, sectors and policy instruments. At this point, it is crucial to bear in mind that transition requires collective action in a global perspective even though the levels of contributions and the paths of transition may differ across countries.

[151] Kemp, R., Schot, J. and Hoogma, R. "Regime shifts to sustainability through processes of niche formation: the approach of strategic niche management." *Technology analysis & strategic management*. 10.2 (1998): 175-198, p. 178.

[152] OECD. "Aligning Policies for a Low-carbon Economy", 2015, p. 54, https://www.oecd.org/environment/Aligning-Policies-for-a-Low-carbon-Economy.pdf (accessed on 24 May 2019)

[153] Kern, F., Kivimaa, P., Rogge, K.S. and Rosenow, J. "Policy mixes for sustainable energy transitions: The case of energy efficiency." In Jenkins, K.E.H. and Hopkings, Debbie (eds.), *Transitions in Energy Efficiency and Demand: The Emergence, Diffusion and Impact of Low-Carbon Innovation, Routledge*, 2018, 215-234, p. 230
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CHAPTER 3

EUROPEAN UNION

3.1.Introduction

The unique governance structure of the EU creates both an opportunity and a challenge for transition to an LCE. EU have binding policies and measures in this field that can support collective action within the transition policies of its Member States. It is critical to understand how different EU states are in terms of their economic outlook, energy mixes, emission profiles and experiences with climate change in order to examine the common policies and policy instruments at the EU level. This chapter of the thesis aims to present a general framework of the transition process at the EU level.

3.2.General Overview

Energy and economy were among the initial motivations of a united Europe when European Coal and Steel Community and Euratom were established in 1950s. Since then, the organisation, scope, members and the agenda of European integration process have gone through severe changes, but the significance of the energy and economy has remained. As a current challenge caused by the relation between these two fields, climate change has started to be a significant agenda for EU as well. EU believes that the only solution for challenges like energy security and climate change

is European integration. In this context, the Union calls Member States to determine priorities and work in coordination in line with those priorities.[154]

EU can be placed among leading actors in terms of climate change policies in general and transition to an LCE in particular. The Union has a differentiating position within the international climate regime since it has targets, strategies and policies in the name of its twenty-eight Member States. This creates both strengths and deficiencies. On the one hand, having a united standing of twenty-eight states of which GDP accounts for 21,8% of the world's GDP[155] and population accounts for 6,8% of the world population[156] seems pretty impressive. On the other hand, it might be challenging to present a common transition framework for twenty-eight nation states with different domestic characteristics. In order to see how different these states are and what they do tell us when they are gathered under this common policy framework, a general overview of EU will be shown through the data in Table 1.

EU economy has had a rough time over the period 2008-2013 due to the financial crisis. Yet, within its recovery process, EU has a steady economic growth path with its growth rates ranging from 1.8% in 2014 to 2% in 2018.[157] The effects of recovery after financial crisis have started to be seen in all Member States. However, there is a significant variability among the shares of the Member States in the EU's total GDP.

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[154] European Commission (EC). "The European Union explained - Energy: Sustainable, secure and affordable energy for Europeans". Luxembourg: Publication Office of the European Union, 2012, p. 14.

[155] Eurostat. "The EU In The World - 2018 edition", 2018, p. 68, https://ec.europa.eu/eurostat/documents/3217494/9066251/KS-EX-18-001-EN-N.pdf/64b85130-5de2-4c9b-aa5a-8881bf6ca59b (accessed on 3 May 2019)

[156] The World Bank, Data, https://data.worldbank.org/indicator/SP.POP.TOTL?end=2017&locations=EU-1W&start=1960&view=chart (accessed on 03 May 2019)

[157] Eurostat. "Real GDP growth rate – volume". https://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tec00115 (accessed on 1 May 2019)

Table 1. General Overview of the European Union

Population (2017)	512,431,044
GDP (2017, constant 2010 US$)	17,338,846.09
GHG Emissions (2017, in $ktCO_2e$, without LULUCF[158])	4,323,163.2
GHG emissions per capita (2017, tonnes of CO_2 equivalent (tCO_2e) per capita)	8.8
CO_2 emissions (2017, $ktCO_2e$ without LULUCF)	3,515,490.1
Sectoral shares of GHG emissions (2016, without LULUCF)	Energy (78%), Industrial processes and product use (8.7%), Agriculture (10.2%), Waste (3.2%)

Source: The World Bank, UNFCCC, Eurostat

While Germany, the UK and France account for more than half of total amount, Lithuania, Latvia, Estonia, Cyprus and Malta account for less than 1% of it.[159] On the other hand, despite the recovery, the deadlock within Brexit process is expected to have severe negative impacts on the economic outlook of both UK and EU in the coming years.[160] EU economy is mainly based on services sector. In 2018, the sectoral shares in terms of the value added in GDP were 73% for services, 25% for industry and 2% for agriculture.[161]

[158] LULUCF stands for land use, land use change and forestry and supports mitigation of GHG emissions by removing GHG emissions from the atmosphere or accumulating emissions as carbon stocks. Throughout the thesis, all references for GHG emissions and CO_2 emissions will be used without LULUCF. For further information; UNFCCC. "Land Use Land-Use Change and Forestry (LULUCF)". https://unfccc.int/topics/land-use/workstreams/land-use--land-use-change-and-forestry-lulucf (accessed on 2 July 2019)

[159] Eurostat. "Which Member States have the largest share of EU's GDP?". 11 May 2018. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180511-1?inheritRedirect=true (accessed on 2 May 2019)

[160] IMF, World Economic Outlook: Growth Slowdown, Precarious Recovery", April 2019, p. 19, https://www.imf.org/en/Publications/WEO/Issues/2019/03/28/world-economic-outlook-april-2019#Full%20Report%20and%20Executive%20Summary (accessed on 3 May 2019)

[161] Eurostat. "The European economy since the start of the millennium". https://ec.europa.eu/eurostat/cache/digpub/european_economy/bloc-3a.html?lang=en (accessed on 9 May 2019)

The total energy intensity of the EU economy has decreased by 33.4% since 1990 and by 17.5% since 2005.[162] It shows that EU has decoupled its final energy consumption from economic growth since the economy continues to grow while final energy consumption declines. Despite differentiating levels, energy intensity has decreased in all Member States. Such a decrease could be the result of the transformation from an industry-based economy towards a services-based one, increasing focus on less energy intensive processes and improvements in energy efficiency as well as it could emerge with the impact of financial crisis.[163]

In 2016, total primary energy supply (TPES) was 1,598.6 Mtoe and around 72% of it consisted of fossil fuels.[164] As it is seen in the Figure 1, renewables has had an increasing but still limited share and nuclear has mainly followed a steady route over the period 1990-2016. While less amounts of oil and coal have started to be used, the use of the cleanest fossil fuel, gas, has been increased. The share of fossil fuels in total energy mix varies significantly among Member States. In 2016, it was about 90% in Ireland, Cyprus, Greece, Luxemburg, Malta and Poland while it was around 50% in France and Finland and 30% in Sweden.[165]

[162] EEA. "Intensity of final energy consumption". 30 January 2019. https://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-intensity-4/assessment-2 (accessed on 4 May 2019)

[163] EEA. "Intensity of final energy consumption". 30 January 2019. https://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-intensity-4/assessment-2 (accessed on 4 May 2019)

[164] IEA. "European Union – 28: Balances for 2016". https://www.iea.org/statistics/?country=EU28&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=table&dataTable=BALANCES (accessed on 3 July 2019)

[165] EC. "EU Energy in Figures". 2018, p. 23, https://publications.europa.eu/en/publication-detail/-/publication/99fc30eb-c06d-11e8-9893-01aa75ed71a1 (accessed on 5 May 2019)

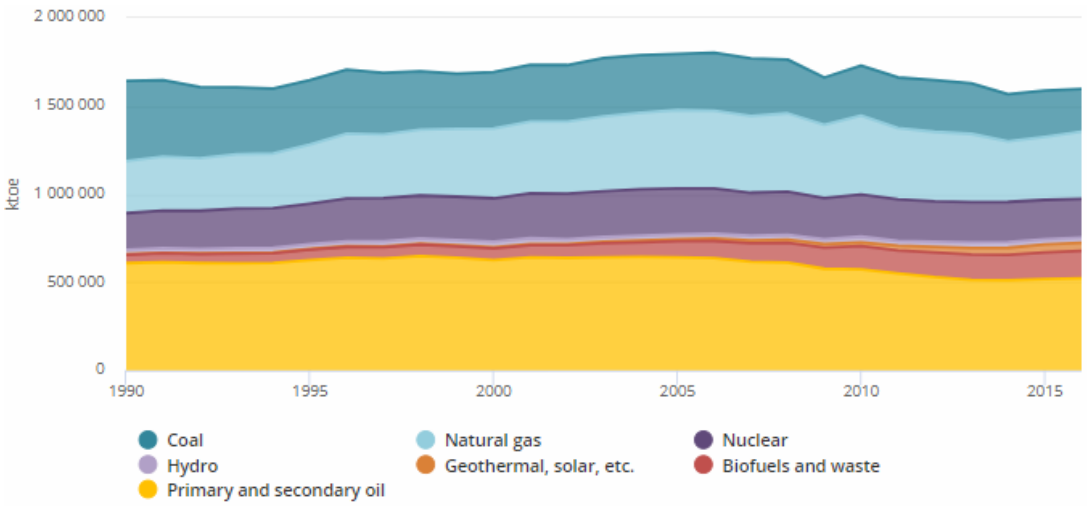

Figure 1: Total Primary Energy Supply (TPES) by source*, European Union-28 1990-2016

Source: IEA. "Statistics". https://www.iea.org/statistics/?country=EU28&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES (accessed on 4 July 2019)
*TPES here excludes electricity and heat trade

Domestic energy production has a highly differentiated profile in comparison to TPES since EU meets its energy needs mostly from imported energy products. According to 2016 statistics, EU's domestic energy production consisted of nuclear power (29%), renewables (28%), solid fuels (17%), natural gas (14%) and crude oil (10%).[166] The composition of the energy production has changed significantly since 1990 with almost consistently decreasing solid fuels production, as well as increasing trends in renewables and waste. The share of fossil fuels in net energy import of EU has had a fluctuating course since 1990 and it was 99,1% in 2016.[167]

Dependency on energy imports is a critical issue for EU economy and its energy security. As the largest energy importer in the world, EU spends around €350 billion for energy imports every year.[168] Import dependency in energy products has been

[166] EC. "What do we produce in the EU?", https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2b.html (accessed on 4 May 2019)

[167] EC. "EU Energy in Figures". 2018, p. 37, https://publications.europa.eu/en/publication-detail/-/publication/99fc30eb-c06d-11e8-9893-01aa75ed71a1 (accessed on 5 May 2019)

[168] European Council of the European Union. "Energy Union for Europe",

increasing since mid-1990s. The dependency level was almost 100% in small countries like Malta, Cyprus and Luxemburg while it was under 20% in Estonia and Denmark.[169] On the other hand, Germany, Italy and France had the highest level of net imports. Also, the fact that energy imports are concentrated on some major countries raises energy security as another dimension of the discussion. In 2016, Russia and Norway were the primary sources of natural gas and crude oil whereas Russia and Colombia were primary sources of solid fuels.[170] The gas crisis within the triangle of Russia, Ukraine and Europe in 2009 reminded the significance of diversity of the sources of energy imports.[171] In this respect, energy security can be seen as a significant driver for transition to an LCE.[172]

The Union has almost consistently mitigated its GHG emissions since the base year, 1990. In 2017, the total GHG emissions without LULUCF was 4,323,163.2 $ktCO_2e$, which implies an almost 23.5% reduction compared to 1990 levels.[173] Energy sector accounted for almost 80% of total GHG emissions and it was followed by agriculture, industrial processes and waste while within the energy sector, energy industries and transport were accountable for almost 63% of GHG emissions while the share of CO_2 emissions within the total GHG emissions without LULUCF was 81.3%.[174]

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https://www.consilium.europa.eu/en/policies/energy-union/ (accessed on 5 May 2019)

[169] EC. "EU Energy in Figures". 2018, pp. 24-25, https://publications.europa.eu/en/publication-detail/-/publication/99fc30eb-c06d-11e8-9893-01aa75ed71a1 (accessed on 5 May 2019)

[170] *Ibid.,* p. 26.

[171] Stern, Jonathan, Pirani, Simon and Yafimava, Katja. *The Russo-Ukrainian gas dispute of January 2009: a comprehensive assessment*. Oxford Institute for Energy Studies, 2009, p. 60, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/NG27-TheRussoUkrainianGasDisputeofJanuary2009AComprehensiveAssessment-JonathanSternSimonPiraniKatjaYafimava-2009.pdf (accessed on 15 July 2019)

[172] Gough, Ian. *New Paradigms in Public Policy: Climate change and public policy futures.* London: The British Academy, 2011, p. 54; Gruenig, Max, Lombardi, Patrizia and O'Donnell, Brendon. "Challenging the Energy Security Paradigm". In Lombardi, Patrizia and Gruenig, Max (eds.). *Low-carbon energy security from a European perspective*. Academic Press. 2016, 1-12, p. 4.

[173] UNFCCC. "Summary of GHG Emissions for European Union (Convention)." https://di.unfccc.int/ghg_profiles/annexOne/EUA/EUA_ghg_profile.pdf (accessed on 2 July 2019)

[174] *Ibid.*

EU was the second largest CO_2 emitter of the world following the USA until the rise of China in the beginning of 2000s. Since then, it has been the third largest CO_2 emitter and was ranked as forty-second in terms of CO_2 emissions per capita.[175] GHG emissions of Member States vary deeply as a result of the differences among their national circumstances like economic activities, energy profile and population. Germany, United Kingdom, France, Italy and Poland account for more than 60% of total GHG emissions. (Table 2) Also, according to a recent news release of Eurostat; Germany (22.5%), UK (11.4%) and Poland (10.3%) had the largest shares in total CO_2 emissions of the EU in 2018.[176] On the other hand, GHG emissions per capita has an average of 8.8 tCO_2e per capita with a range from 20.0 tCO_2e in Luxembourg to 5.5 tCO_2e in Sweden.[177]

IPCC report demonstrates that the effects of climate change have been felt deeply across Europe and they are going to get even deeper.[178]. Europe has been experiencing regionally varying increases in the average temperature and mean sea level and decrease in annual precipitation which create deficiencies for animal species, agricultural products, forests and human health. In addition to its results on the ecosystem, climate change affects various sectors and causes high levels of economic losses. According to the estimates of European Energy Agency (EEA), extreme weather and climate related events caused EUR 426 billion (in 2017 Euro values) in the EU Member States over the period 1980-2017.[179]

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[175] Global Carbon Atlas. "CO_2 emissions." http://globalcarbonatlas.org/en/CO2-emissions (accessed on 2 July 2019)

[176] Eurostat. "Early estimates of CO_2 emissions from energy use." 8 May 2019, https://ec.europa.eu/eurostat/documents/2995521/9779945/8-08052019-AP-EN.pdf/9594d125-9163-446c-b650-b2b00c531d2b (accessed on 9 May 2019)

[177] Eurostat. "Greenhouse gas emissions per capita." 12 June 2019, https://ec.europa.eu/eurostat/databrowser/view/t2020_rd300/default/table?lang=en (accessed on 3 July 2019)

[178] IPCC. "Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change", Cambridge: Cambridge University Press, 2014, pp. 1270-1271.

Table 2. The GHG emissions by countries (including international aviation, indirect and excluding LULUCF), 1990-2017 ($MtCO_2e$)

	1990	2000	2010	2017	Share in EU-28
EU-28	5,719.6	5,277.7	4,909.1	4,483.1	100%
Belgium	149.8	154.5	137.1	119.4	2,66%
Bulgaria	102.6	59.8	61.1	62.1	1,38%
Czechia	199.8	151.1	141.7	130.5	2,91%
Denmark	72.1	73.2	65.5	50.8	1,13%
Germany	1,263.2	1,064.7	967.0	936.0	20,88%
Estonia	40.5	17.4	21.3	21.1	0,47%
Ireland	56.5	70.3	63.4	63.8	1,42%
Greece	105.6	128.9	121.0	98.9	2,21%
Spain	293.3	397.1	370.1	357.3	7,97%
France	556.6	567.0	528.0	482.0	10,75%
Croatia	32.4	26.1	28.4	25.5	0,57%
Italy	522.1	562.1	514.7	439.0	9,79%
Cyprus	6.4	9.2	10.3	10.0	0,22%
Latvia	26.5	10.6	12.7	11.8	0,26%
Lithuania	48.6	19.6	20.9	20.8	0,46%
Luxembourg	13.2	10.6	13.5	11.9	0,27%
Hungary	94.2	73.9	65.7	64.5	1,44%
Malta	2.3	3.1	3.2	2.6	0,06%
Netherlands	226.4	229.8	224.1	205.8	4,59%
Austria	79.6	82.1	86.8	84.5	1,89%
Poland	475.0	396.3	413.1	416.3	9,29%
Portugal	60.8	84.3	71.7	74.6	1,66%
Romania	248.9	143.6	124.4	114.8	2,56%
Slovenia	18.7	19.1	19.7	17.5	0,39%
Slovakia	73.4	49.2	46.4	43.5	0,97%
Finland	72.3	71.3	77.4	57.5	1,28%
Sweden	72.7	70.4	66.4	55.5	1,24%
United Kingdom	809.9	741.9	642.1	505.4	11,27%
Turkey	219.8	300.5	404.6	537.4	-

Source: Eurostat. "Total greenhouse gas emissions by countries, 1990-2017 (Million tonnes of CO2 equivalents)." http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do (accessed on 4 July 2019)
Note: Highlighted lines show EU and countries which are studied within the scope of this thesis.

[179] EEA. "Economic losses from climate-related extremes in Europe", 2 April 2019, https://www.eea.europa.eu/data-and-maps/indicators/direct-losses-from-weather-disasters-3/assessment-2 (accessed on 6 April 2019)

3.3.Policies, Strategies and Targets

Environment and energy are among the policy areas in which EU has shared competences, i.e. areas that can be regulated both by the EU and Member States as long as there is not an EU legislation or intention to propose a legislation.[180] EU has a comprehensive policy framework in terms of transition to an LCE which is mostly composed of binding legislation on environment and energy.

Before going through the low-carbon transition policies and strategies of the EU, it would be helpful to have a brief review regarding international climate policies of the Union as well as its role in international climate regime. EU has been aware of the effects of climate change including creating deficiencies for the productivity of its economy.[181] In this respect, it has been one of the prominent figures which took early action against climate change. The Union claims to be a leader in climate change politics[182] and has been accepted as one.[183]

EU's domestic efforts which address climate change back to mid-1980s when it started to take some measures in this regard. [184] Its interaction with international climate politics has begun in early 1990s when international climate regime just started to be built. EU aimed to point the significance of mitigation of GHG emissions in the Rio de Janeiro Earth Summit in 1992 and this step is seen as the beginning of

[180] EC. "Areas of EU action", https://ec.europa.eu/info/about-european-commission/what-european-commission-does/law/areas-eu-action_en (accessed on 17 July 2019)

[181] EC, "A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773, Brussels, 28 November 2018, p. 2, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed on 17 April 2019)

[182] Green Growth Group. "Common statement on the long-term strategy and the climate ambition of the EU", 25 June 2018, https://www.ecologique-solidaire.gouv.fr/sites/default/files/2018.06.25_statement_ggg_climat.pdf (accessed on 4 April 2019)

[183]Wurzel, Rüdiger and Connelly, James. "Introduction". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a leader in international climate change politics*. New York: Routledge, 2010, 3-21.

[184] Böckem, Alexandra. "The political Economy of Climate Policy-making in the European Union." *Intereconomics*, 33.6 (1998): 260-273, p. 260.

EU leadership in international climate negotiations.[185] Before the Summit, EU announced that it would reduce its CO_2 emissions by 12% by 2000 in comparison to 1990 levels through concrete strategic measures on energy efficiency, renewables, energy taxation and monitoring emissions. [186]

EU has kept its leading position in international climate politics through further efforts. For Kyoto Protocol's first commitment period (2008-2012), EU had an emission reduction target of 8% for 15 Member States which were members of EU when it adopted the Protocol in 1997 and EU-15 achieved an 11.7% reduction in GHG emissions by 2012. [187] EU used a scheme called "buble" under the Protocol when determining this target. [188] First, individual targets of Member States were combined for an overall target and then it was redistributed among those 15 Member States in accordance with their relative wealth of countries under the "burden sharing" agreement.[189]

For the second commitment period (2012-2020), EU countries and Iceland set a target of 20% reduction compared to 1990, which is projected to be met.[190] The total commitment is shared between ETS and non-ETS sectors in such a way that there is a collective responsibility in ETS sectors and there are differentiated responsibilities of countries in terms of their domestic emissions in non-ETS sectors.[191] Within the context of Paris Agreement, the EU and its Member States committed to reduce the

[185] *Ibid.*

[186] *Ibid.*, p. 261.

[187] EC. "Kyoto 1st commitment period (2008–12)". https://ec.europa.eu/clima/policies/strategies/progress/kyoto_1_en (accessed on 23 June 2019)

[188] UNFCCC. "Kyoto Protocol – Targets for the first commitment period." https://unfccc.int/process-and-meetings/the-kyoto-protocol/what-is-the-kyoto-protocol/kyoto-protocol-targets-for-the-first-commitment-period (accessed on 23 June 2019)

[189] EC. "Kyoto 1st commitment period (2008–12)". https://ec.europa.eu/clima/policies/strategies/progress/kyoto_1_en (accessed on 23 June 2019)

[190] EC, "Kyoto 2nd commitment period (2013-20)." https://ec.europa.eu/clima/policies/strategies/progress/kyoto_2_en (accessed on 1 May 2019)

[191] *Ibid.*

domestic emissions by 40% by 2030 compared to 1990.[192] In summary, EU has had targets and efforts to mitigate the GHG emissions almost since 1980s, which can be interpreted in a sense that the Union has a sound basis for transition to an LCE.

EU has a desire to undertake a leadership role in the transition process and wants to do it with the support of all its Member States, institutions, businesses, NGOs and citizens.[193] This shows that EU is aware of the necessity of collective and early action in the transition process. With respect to this awareness, it calls its Member States to act together, to develop long-term strategies for transition of the whole economic system into a low-carbon one and to believe that this transition is possible and beneficial for all the actors in the economy and society.[194] According to European Commissioner for Climate Action, Connie Hedegaard,

> The low carbon economy can be built by further developing proven technologies that exist already today. In this transition, all economic sectors need to contribute, including agriculture, construction and transport. By describing the cost-effective pathway to move Europe to a low carbon future, our Roadmap provides a clear and predictable framework for business and governments to prepare their low-carbon strategies and long-term investments.[195]

There are several strategies, policy packages and targets related to transition to an LCE at the EU level and their reflections at the level of Member States. EU generally updates its strategies in line with domestic developments such as achieving a target long before the deadline or foreseeing challenges for disadvantaged regions. Also, international developments such as new IPCC reports or new international agreements

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[192] UNFCCC. "Submission by Latvia and the European Commission on behalf of the European Union and Its Member States", 6 March 2015, https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Latvia/1/LV-03-06-EU%20INDC.pdf (accessed on 5 May 2019)

[193] EC. "2050 long-term strategy", https://ec.europa.eu/clima/policies/strategies/2050_en (accessed on 18 March 2019)

[194] EC, "A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773, Brussels, 28 November 2018, p. 5, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed on 17 April 2019)

[195] EC Press Release Database. "Climate change: Commission sets out Roadmap for building a competitive low-carbon Europe by 2050." 8 March 2011, http://europa.eu/rapid/press-release_IP-11-272_en.htm (accessed on 14 March 2019)

like Paris Agreement might seem to be effective for EU to update its strategies. Therefore, it has a dynamic transition framework with a wide range of strategies. Its main strategies for an LCE are the 2020 and 2030 Climate and Energy Packages, The Roadmap 2050, Energy Roadmap 2050, Energy Union Strategy, Clean Energy for All Europeans Package and A Clean Planet for All.

In 2007, EU leaders adopted the **2020 climate and energy package** and enacted it in 2009. The package includes three main targets:

1. 20% reduction in GHG emissions compared to 1990 levels
2. 20% share for renewables
3. 20% improvement in energy efficiency[196]

Emissions reduction target covers a 21% cut in ETS sectors, i.e. power, industry and aviation, and a 10 % reduction in non-ETS sectors, i.e. housing, agriculture, waste and transport compared to 2005 levels.[197] The 10% target is distributed among Member States as national targets in the form of decrease or a limit to increase in line with their capabilities. The targets include up to 20% reduction for richer Member States and up to 20% increase for less wealthy ones. (Figure 2) Also, renewable energy target means national targets varying from 10% for Malta to 49% for Sweden. [198]

The 2030 climate and energy package includes similar targets to 2020 version only this time for the period of 2021-2030. It was adopted in 2014 and the targets were revised in 2018 in line with Clean Energy for All European Package which will be overviewed below. The main targets for 2030 are:

[196] EC. "2020 climate and energy package", https://ec.europa.eu/clima/policies/strategies/2020_en (accessed on 4 March 2019)

[197] *Ibid.*

[198] *Ibid.*

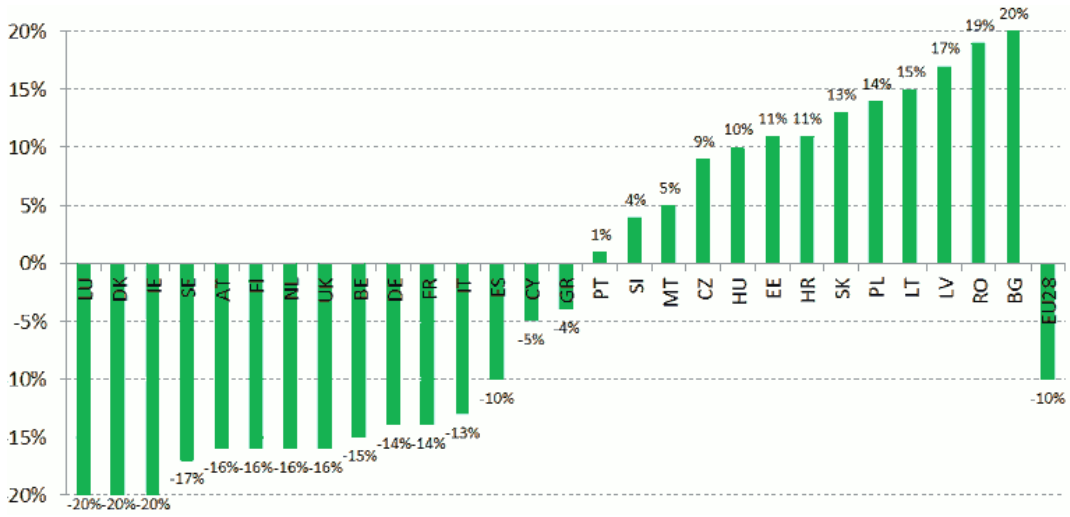

Figure 2: GHG Emission Limits of the Member States in 2020 compared to 2005 Levels

Source: EC. "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 4 March 2019)

1. At least 40% reduction in GHG emissions compared to 1990 levels
2. At least 32% share for renewable energy (it was 27% in its initial version)
3. At least 32.5% improvement in energy efficiency (it was 27% in its initial version)[199]

Within the scope of 2030 package, emission reduction target requires a 43% cut in ETS sectors compared to 2005 at the EU level and a 30% cut in non-ETS sectors compared to 2005 through national reduction targets of Member States which vary from 0% for Belgium to 40% for Luxembourg.[200] (Figure 3)

[199] EC. "2030 climate and energy package", https://ec.europa.eu/clima/policies/strategies/2030_en (accessed on 8 March 2019)

[200] EC. "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 8 March 2019)

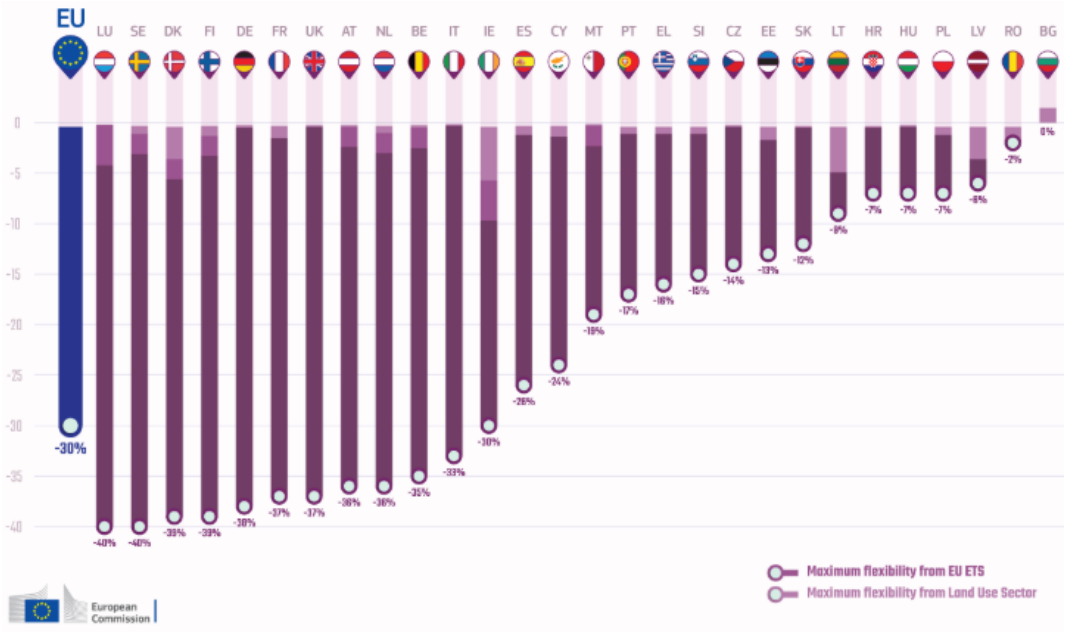

Figure 3: Emission Reduction Targets of Member States for 2030 compared to 2005

Source: EC. "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 4 March 2019)

The Roadmap 2050 (2011) provides a long-term framework for a coherent transition and presents a cost-effective roadmap for EU's long-term target of an 80-95% cut in domestic GHG emissions by 2050 compared to 1990 levels. [201] Within this context, it includes detailed projections based on several possible scenarios which include overall and sectoral reductions for different periods of time. According to the roadmap, the overall reduction target for 2050 requires a 25% cut in 2020, 40% cut in 2030 and 60% cut in 2040. [202] Moreover, sectoral reductions are mainly achieved by power sector, residential and tertiary, industry and transport sectors. In addition to scenarios, the Roadmap includes appropriate measures for transition like improving energy efficiency, increasing the use of renewables and developing innovative policy

[201] EC. "A Roadmap for moving to a competitive low carbon economy in 2050", COM (2011) 112, 2011, https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52011DC0112 (accessed on 10 March 2019)

[202] *Ibid.*p. 5.

instruments to mobilise investments in related sectors. The Roadmap stresses that although transition requires additional investments which might be challenging for the economy, it will bring additional benefits like increasing energy security, contributing economic growth, introducing new job opportunities and reducing air pollution and related health problems. Also, it is important to note that the Commission calls candidate states and potential candidate states in addition to Member States to be part of the transition process by developing national strategies and taking into account the Roadmap.[203]

In line with the Roadmap 2050, EU also launched **The Energy Roadmap 2050** in 2011. It aims to ensure sustainability, competitiveness and security of the energy system across Europe in a collaborative way and highlights that transition requires urgent and collective action in order to mitigate the future challenges in a cost-effective way.[204] The costs of the transition are said to be lower if a common EU approach ensuring a wider and flexible market is adopted and the process is said to be easier if the prices reflect the real costs.[205] The Roadmap projects that renewables will have a significant role in energy supply in 2050 while nuclear energy will remain, gas will potentially substitute coal and oil both of which will still remain in the energy mix as well.[206]

The Energy Union Strategy (2015) is another component of EU's transition process. Creating "a sustainable, low-carbon and climate-friendly economy for the EU" is one of the visions that strategy presents. [207] It places citizens at the centre of the Energy Union and aims to provide secure, sustainable and affordable energy for them through

[203] *Ibid.*, p. 14.

[204] EC. "Energy Roadmap 2050", COM (2011) 855, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0885&from=EN (accessed on 10 March 2019)

[205] EC. "Energy Roadmap 2050", COM (2011) 855, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0885&from=EN (accessed on 10 March 2019)

[206] *Ibid.*, pp. 10-13.

[207] EC. "Energy Union Package – A framework Strategy for a Resilient Energy Union with a Forwards-Looking Climate Change Policy", COM/2015/080, p. 2, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0080 (accessed on 12 March 2019)

an integrated energy market. According to Vice-President of European Commission for the Energy Union, Maroš Šefčovič, "The Energy Union is Europe at its best: tackling together the big energy security and energy transition we can't solve within national borders."[208] The Strategy includes five dimensions:

1. Ensuring energy security through solidarity and cooperation
2. Creating a fully integrated internal energy market
3. Improving energy efficiency
4. Decarbonising the economy
5. Expanding low-carbon technologies and innovation[209]

A Clean Planet for All was issued by the European Commission in 2018 as "a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy" by 2050.[210] In fact, it is an updated version of the previous long-term strategy: Roadmap 2050. It is a comprehensive document prepared in line with the target of keeping the global warming below 1.5°C as stressed in the recent Special Report of the IPCC. The strategy is significant in terms of several aspects. Firstly, it aims to reach a net-zero GHG emissions economy by 2050 and claims to present a vision towards economic, industrial and societal transition rather than simply setting targets. Secondly, it highlights that decarbonisation requires global efforts and EU is open for cooperation in this respect as a leading transition figure. Lastly, it calls for an inclusive and socially fair transition framework by ensuring coordination between EU level policies and domestic ones, including all economic sectors and inviting each stakeholder and citizen to be a part of the transition.[211]

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[208] EC Press Release Database. "The Energy union: from vision to reality", 9 April 2019, , http://europa.eu/rapid/press-release_IP-19-1876_en.htm (accessed on 5 May 2019)

[209] EC. "Building the energy union", https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/building-energy-union (accessed on 22 June 2019)

[210] EC. "A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773, Brussels, 28 November 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed on 17 April 2019)

[211] *Ibid.*, pp. 21-25.

The strategy also presents different pathways and several policy measures towards a net-zero GHG emissions economy which include improving energy efficiency, increasing the share of renewables, ensuring application of low-carbon technologies in transport, industry, and infrastructures.[212] Moreover, the transition process is expected to transform the way products are designed, produced, used and recycled and to create new investment and job opportunities. In this respect, EU sees circular economy and behavioural changes as a complementary solution in addition to mobilizing investment.[213]

Clean energy for all Europeans Package was launched in 2016 as a package of legislative acts which will create social, environmental and economic benefits by mobilising investments towards clean energy technologies and ensuring a clean and fair energy transition at all levels of the economy.[214] As of May 2019, the package was completed and formally adopted, which is also seen as a significant step for the Energy Union. It consists of five main elements:

1. Improving energy efficiency
2. Increasing the share of renewables
3. Developing the governance of the Energy Union
4. Providing further rights for consumers
5. Ensuring a smarter and more efficient electricity market[215]

In addition to these general strategies, one of the sectoral strategies of the EU worth to be mentioned here. **A European Strategy for low-emission mobility (2016)** aims

[212] *Ibid.*, pp. 7-15.

[213] EC. "Our Vision for A clean Planet for All: Economic Transition", November 2018, pp.1-3, http://europa.eu/rapid/attachment/IP-18-6543/en/4_LTS_EconomicTransition.pdf (accessed on 12 May 2019)

[214] EC. "Clean energy for all Europeans package completed: good for consumers, good for growth and jobs, and good for the planet", 22 May 2019, https://ec.europa.eu/info/news/clean-energy-all-europeans-package-completed-good-consumers-good-growth-and-jobs-and-good-planet-2019-may-22_en (accessed on 22 June 2019)

[215] *Ibid.*

to increase energy efficiency, support the expansion of low-carbon energy in transport sector by moving towards zero-emission vehicles. [216].

Furthermore, at this point it will be useful to mention **coal phase out policies** which are important policy measures for transition although they are not at the EU level, they are important policy measure for transition. There is a division between Western and Eastern European countries in terms of their intention to stop using coal. (Figure 4) This situation is described as a picture of "two Europes" by IEA report.[217] Although lots of EU states announce their phase out dates for coal, it is still the most abundant fossil fuel and a significant input for economy.

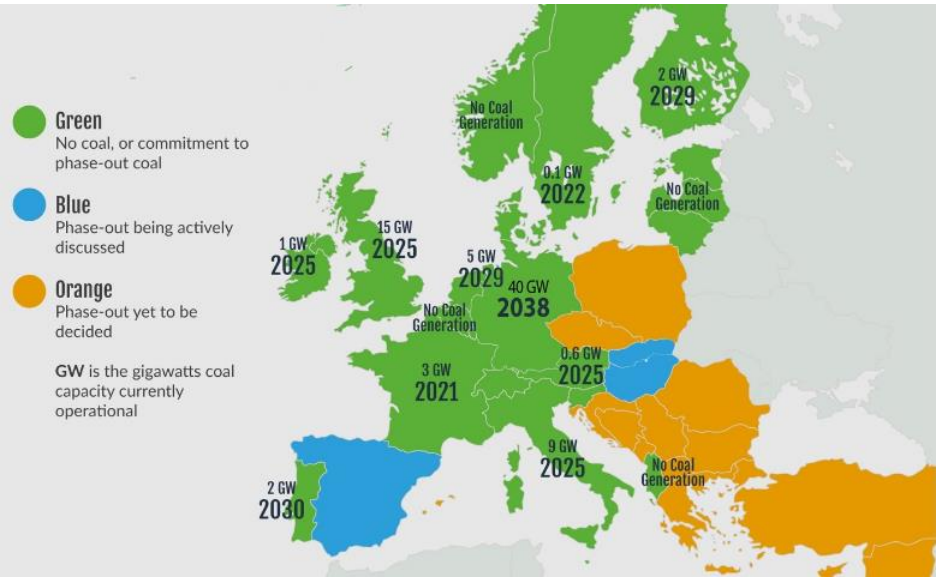

Figure 4: Coal phase out status across Europe, May 2019

Source: The Polish Wind Energy Association. "New coal curtain in Europe? Two speed Europe? The new Visegrad+ platform wants to prevent this", http://psew.pl/en/2019/05/15/new-coal-curtain-in-europe-two-speed-europe-the-new-visegrad-platform-wants-to-prevent-this/ (accessed on 23 May 2019)

[216] EC. "A European Strategy for low-emission mobility", https://ec.europa.eu/clima/policies/transport_en#tab-0-0 (accessed on 23 June 2019)

[217] Carbon Brief. "IEA: China and India to fuel further rise in global coal demand", 18 December 2018, https://www.carbonbrief.org/iea-china-and-india-to-fuel-further-rise-in-global-coal-demand-in-2018 (accessed on 1 May 2019)

The fact that coal industry has a critical place in national economies of some Member States has triggered EU to take some balancing steps. In this respect, EU launched a **Platform for Coal Regions in Transition** under the Coal and Carbon-Intensive Regions in Transition Initiative in 2017. With this platform, EU aimed to support carbon intensive regions which could face social and economic concerns in their transition processes by mobilising investments and funds towards these regions.[218] In this respect, the Platform focuses on social fairness across European regions, developing new skills for miners who could lose their job and mobilizing finance for economy. European Commission worked with stakeholder groups like national and regional authorities, coal industry, business community, trade unions, academia and NGOs as well as EU officials.[219] It can be said that the Platform is inclusive in two ways. Firstly, it aims to make all regions a part of the transition process and secondly it does this through the experiences and desires of those regions. It is stated that "The European Commission supports coal and carbon-intensive regions in transition with a view to ensuring a 'just transition', in which no region and no EU citizen is left behind."[220] In the light of recent policies and strategies it can be understood that EU is aware of the fact that only way of realising its ambition for global leadership in this field is to make the transition altogether and for all.

3.4.Policy instruments

One may think that EU would have limited number of policy instruments in this process since it does not have such a comprehensive and strong authority over national economies as nation states have. Surprisingly, EU has developed a variety of policy instruments to implement its strategies and meet its targets in the transition process.

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[218] EC. "No region left behind: launch of the Platform for Coal Regions in Transition", 8 December 2017, https://ec.europa.eu/info/news/no-region-left-behind-launch-platform-coal-regions-transition-2017-dec-08_en (accessed on 31 May 2019)

[219] EC, Platform on Coal and Carbon-Intensive Regions: Terms of Reference, pp. 8-9, https://ec.europa.eu/energy/sites/ener/files/crit_tor_fin.pdf (accessed on 31 May 2019)

[220] EC. "Structural Support Action for Coal and Carbon Intensive Regions", November 2018, https://ec.europa.eu/clima/sites/clima/files/docs/pages/initiative_5_support_en_1.pdf (accessed on 31 May 2019)

Most of these instruments are regulatory ones that would trigger Member States to shape their regulations accordingly. EU Emissions Trading System (EU ETS) is the main instrument of the Union in this process and supported by other instruments like regulations on the environmental and energy obligations of Member States.

Before reviewing these current policy instruments, it would be meaningful to mention a failed attempt of EU's introducing a carbon tax. In 1992, it is proposed to apply a carbon tax in order to limit GHG emissions, however the proposal was withdrawn by the Commission as a result of the objections of key Member States and industries. [221] The objections of Member States mainly stemmed from the oppositions to ecological taxes and oppositions to authorise EC to fix and collect taxes.[222] Later at the end of 2000s, carbon tax has come to the agenda one more time, yet again Member States could not reach a consensus. It was a significant development in terms of perceiving the significance of the requirement for unanimity in the Council.[223]

EU ETS is the oldest and largest emission trading market in the world.[224] It covers over 11,000 installations in 31 countries, EU-28 and Iceland, Liechtenstein and Norway.[225] It is used to decrease emissions by setting caps over certain trading periods and decreasing this cap each time. This cap is stands as a maximum limit for total GHG emissions that participatory companies could cause. Emission allowances are sold or allocated to the companies in line with this cap and they are expected to surrender allowances equivalent for their emissions each year if they do not want to

[221] Barnes, Ian. "Environmental Policy". In Ali M. El-Agraa (ed.), *The European Union: Economics and Policies*, Cambridge: Cambridge University Press, 2011, 270-286.

[222] Costa, Oriol. "The second image reversed in climate politics". In Harris, Paul G. (ed.). *The Politics of Climate Change: Environmental Dynamics in International Affairs*. New York: Routledge, 2009, 72-89, p. 80.

[223] Barnes, Ian. "Environmental Policy". In Ali M. El-Agraa (ed.). *The European Union: Economics and Policies*, Cambridge: Cambridge University Press, 2011, 270-286.

[224] ICAP. "EU Emissions Trading System (EU ETS)", 9 April 2019, https://icapcarbonaction.com/en/ets-map (accessed on 24 June 2019)"

[225] EC. "EU Emissions Trading System (EU ETS)", https://ec.europa.eu/clima/policies/ets_en (accessed on 24 June 2019)

face heavy fines.[226] They can close the gap in their allowances by buying extra allowances in the market or using international credits in a limited amount. On the other hand, those with surplus allowances can bank them for the following years or sell them in the market.[227]

EU ETS covers power, industry and aviation sectors and around 45% of the total GHG emissions within the EU.[228] It has been operating since 2005 and will complete its third phase by the end of 2020. In its third phase (2013-2020), EU has made some regulations in the operation of EU ETS like allocating allowances through auctions, expanding the coverage of sectors and replacing national caps with an EU-wide cap.[229] EU ETS can facilitate transition process by sending the right signals to the internal energy market however, it is critical to ensure a certain level of coherence and stability between the policies of EU and Member States so that the price signal could be useful.[230] There has been excessive supply of allowances since the financial crisis as a result of decreasing production activities. The new ETS Directive aims to solve this problem through some reforms and measures in the EU ETS. In this respect the EU-ETS has been reformed with stronger price signals for CO_2.[231] These new regulations will be effective through the fourth phase starting in 2021.

As it was mentioned in the previous part, in addition to ETS, there are binding targets of Member States which cover the non-ETS sectors including transport, buildings,

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[226] *Ibid.*

[227] *Ibid.*

[228] EC. "2020 climate and energy package", https://ec.europa.eu/clima/policies/strategies/2020_en (accessed on 4 March 2019)

[229] EC. "EU Emissions Trading System (EU ETS)", https://ec.europa.eu/clima/policies/ets_en (accessed on 24 June 2019)

[230] EC. "Energy Roadmap 2050", COM (2011) 855, p. 16, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0885&from=EN (accessed on 10 March 2019)

[231] EC. "A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773, Brussels, 28 November 2018, p. 5, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed on 17 April 2019)

agriculture and waste and are expected to reduce total GHG emissions of EU in these sectors by 10% in 2020 and by 30% by 2030 from 2005 levels. These national targets are determined in line with **Effort-Sharing legislation** which require Member States to adopt binding GHG emissions reduction targets for the periods 2013-2020 and 2021-2030 on the basis of their relative wealth, i.e. GDP per capita.[232] EU explains its logic behind this regulations as "Less wealthy countries have less ambitious targets because their relatively higher economic growth is likely to be a stronger emission driver and they have relatively lower investment capacities."[233] As it was reviewed above in the strategies, less wealthy Member States are given the chance to take their time while starting their transition processes. But at the end, they are all expected to contribute the process in line with their capacities, i.e. to reduce their emissions by 0-40% from 2005 levels. This can be seen as a very observable practice of the multilevel governance system of the EU in terms of integrating transition policies by preserving its collective leadership position without ignoring differentiated capabilities of Member States.[234] From another point of view, it highlights "the strong interdependence between international and EU policy" since EU could not lead Kyoto negotiations if it could not reach an agreement within itself in terms of Union-level efforts.[235]

Effort-sharing Decision also allocates overall national reduction targets and sets annual reduction targets, which are called "**annual emission allocations (AEAs)**". Under certain conditions, Member States have some flexibilities in meeting their AEAs like carrying surplus AEAs to following years, transferring part of their AEAs

[232] EC, "Effort Sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 19 April 2019)

[233] *Ibid.*

[234] Wurzel, Rüdiger and Connelly, James. "Introduction". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a leader in international climate change politics*. New York: Routledge, 2010, p. 15.

[235] Haug, Constanze and Jordon, Andrew. "Burden sharing: distributing burdens or sharing efforts?". In Jordon, A. et al. (eds.). *Climate Change Policy in the European Union: Confronting the Dilemmas of Mitigation and Adaptation?*. Cambridge: Cambridge University Press, 2010, 83-102, p. 88.

among themselves or using international credit they have through the international credit mechanisms.[236] The trajectories of Member States are monitored and corrective measures are required to be taken when a Member State exceeds its AEA.[237] Also according to the new Effort Sharing Regulation, new flexibilities are set for Member States like using the emission allowances under EU ETS and credits from land use sector.[238]

EU controls the total GHG emissions through its **monitoring system** that requires all Member states annually report information including their GHG emissions, national projections and measures and low-carbon strategies.[239]

Renewable Energy Directive sets baseline shares for Member States and requires that each Member State should ensure the share of renewables in their energy consumptions reach the baseline share by 2020 and would not be lower than that any year starting from 2021.[240] The national baseline shares are determined in line with the countries' capacities and potentials. The Directive also encourage Member States to use different cooperation mechanisms like statistical transfers, joint projects, joint support schemes or information exchange in order to meet their national targets. [241]

Energy Taxation Directive regulates the minimum rates for excise duties on energy products for fuel and transport and electricity.[242] Member States can determine their

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[236] EC. "Annual emission allocations 2013-2020 and flexibilities", https://ec.europa.eu/clima/policies/effort/framework_en (accessed on 6 March 2019)

[237] *Ibid.*

[238] EC. "Member States' emission reduction targets for 2021 to 2030 adopted", https://ec.europa.eu/clima/news/member-states-emission-reduction-targets-2021-2030-adopted_en (accessed on 7 March 2019)

[239] EC, "Emission monitoring & reporting", https://ec.europa.eu/clima/policies/strategies/progress/monitoring_en (accessed on 23 June 2019)

[240] "Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources", 2018, Article 3 (4), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=EN (accessed on 20 June 2019)

[241] *Ibid.*, Par. 39.

excise duty rates in accordance with their national policies as long as they stick to the minimum rates. Besides Council Directive 2004/74/EC allowed some Member States[243] to apply temporary exemptions or reductions in the levels of taxation on the grounds that they could experience social and economic deficiencies due to additional tax burdens.[244] These regulations support a fair competition environment among the businesses of Member States and indirectly contributes to the integration of transition policies by recognising the national conditions of Member States.

EU has a highly developed and detailed strategical framework for transition. It also has regulations so that the Member States would develop their own strategical frameworks. The new regulation on governance of the Energy Union and climate action[245] requires all Member States to adopt **National Energy and Climate Plans (NECPs)** for 2021-2030 and **national long-term strategies** consistent with their NCEPs.[246] In this way, EU calls all its Member States to participate in the transition process through their national strategies. The NECPs are required to address all five dimensions of the Energy Union and include policies and measures that take into consideration of 2030 targets and comply with a mandatory framework provided by the EU. [247] The regulation on NECPs aims to ensure that all NECPs would be include

[242] "Council Directive 2003/96/EC of 27 October 2003 "Restructuring the Community framework for the taxation of energy products and electricity", 2003, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:283:0051:0070:EN:PDF (accessed on 20 June 2019)

[243] The Member States in the scope of the Directive are Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovakia.

[244] "Council Directive 2004/74/EC of 29 April 2004 Amending Directive 2003/96/EC as regards the possibility for certain Member States to apply, in respect of energy products and electricity, temporary exemptions or reductions in the levels of taxation", 2004, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004L0074&from=EN (accessed on 20 June 2019)

[245] "Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action", 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN (accessed on 20 June 2019)

[246] EC. "Governance of the Energy Union", https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union (accessed on 22 June 2019)

[247] "Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action", 2018, Par. 27. https://eur-

critical policy fields and present comparable strategies in addition to providing Member States a sufficient flexibility to reflect their national capabilities. Similarly, long-term strategies are required to present at least a 30-years perspective, contribute to the commitments of the EU and Member States under UNFCCC and Paris Agreement and comply with the general framework provided by the EU.[248]

Regarding the expectations on national strategies, EU suggests that;

> While Member States need flexibility to choose policies that are best-matched to their national energy mix and preferences, that flexibility should be compatible with further market integration, increased competition, the attainment of climate and energy objectives and the gradual shift towards a sustainable low-carbon economy.[249]

Member States have already submitted their draft NCEPs and they are required to submit the final versions by the end of 2019.[250] They are also expected to submit their long-term strategies until 1 January 2020. However, the submitted NECPs are criticised on the grounds that they do not comply with the general framework provided by the EU and they include reporting rather than coherent strategy frameworks.[251] The Commission also announced that they need to be more ambitious and detailed.[252] Now, Member States are required to review their NECPs in line with the

lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN (accessed on 20 June 2019)

[248] *Ibid.*, Art. 15, Annex I and Annex IV.

[249] "Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action", 2018, Par. 18, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1999&from=EN (accessed on 20 June 2019)

[250] EC. "National Energy and Climate Plans (NECPs)", https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/governance-energy-union/national-energy-climate-plans (accessed on 22 June 2019)

[251] Euractiv. "Seven EU nations miss climate and energy plan deadline", 15 January 2019, https://www.euractiv.com/section/climate-strategy-2050/news/seven-eu-nations-miss-climate-and-energy-plan-deadline/ (accessed on 22 June 2019)

[252] EC Press Release Database, "Energy Union: Commission calls on Member States to step up ambition in plans to implement Paris agreement", 18 June 2019, http://europa.eu/rapid/press-release_IP-19-2993_en.htm (accessed on 23 June 2019)

Commissions' recommendations and public consultation and submit them until the end of the year.

Energy Efficiency Directive includes the necessary measures to meet the Union's energy efficiency target for 2020. Within this perspective, all Member States are required to set national targets in line with their primary or final energy consumption, primary or final energy savings or energy intensity.[253] National targets are expected to comply with EU's 2020 target, certain regulations of the EU and national conditions of Member States. Member States are also obliged to adopt an energy efficiency obligation scheme in which they will designate a total end-use energy savings target for the domestic energy distributors and retail energy sales companies. Energy efficiency obligations scheme requires designated amounts of energy savings of the final energy consumption annually. The amount was determined as at least 0,8% for each year over the period 2021-2030.[254]

Moreover, there are **further measures to improve energy efficiency** that could be handled another regulatory policy instrument supporting the transition process. These include mandatory energy efficiency certificates for buildings and energy efficiency labels and standards for electronic products.[255] The Ecolabel Criteria[256] promotes a competitive manufacturing market with less CO_2 emissions and waste generation. Besides, the Eco-design Directive (2009)[257] and Energy Labelling Regulation

[253] "Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency", 2012, Article 3, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012L0027&from=EN (accessed on 25 June 2019)

[254] This energy saving rate is valid for all EU-28 except for Malta and Cyprus as it would not be fair for such small island countries. Therefore, in the Directive (EU) 2018/2002, their rate was determined as 0,24% for the same period. Please see "Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency", 2018, Article 7, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2002&from=EN (accessed on 25 June 2019)

[255] EC. "Energy efficiency", https://ec.europa.eu/energy/en/topics/energy-efficiency (accessed on 29 May 2019)

[256] EC, "Environment: Ecolabel", http://ec.europa.eu/environment/ecolabel/ (accessed on 12 June 2019)

[257] "Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products." 2009,

(2017)[258] supports the improvement of energy efficiency by setting EU-wide minimum energy efficiency requirements for energy-related products and presenting those products with standardised mandatory labels. These regulations enable customers to choose more energy-efficiency products that can help them decrease their energy bills and result in a transformation in the market incentivising producers to manufacture more energy-efficient products. National market surveillance authorities are responsible for verification of products' meeting those requirements.[259]

European Single Market and Internal Energy Market enables supportive market conditions and environment for EU to effectively implement these regulations. Besides controlling over the domestic dynamics in the market, EU has a power to affect global markets.[260] In this respect, EU plans to create a transformation in the global markets as the "the world's biggest exporter of manufactured goods and services".[261] EU also supports the adoption of National Action Plans and certain voluntary criteria on green public procurement. It is a voluntary instrument that aims to increase resource-efficiency and contribute to the transformation towards more sustainable goods and services in the single market.[262]

https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:285:0010:0035:en:PDF (accessed on 23 June 2019)

[258] "Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU." 2017, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1369&rid=1 (accessed on 23 June 2019)

[259] EC. "Ecodesign", http://ec.europa.eu/growth/industry/sustainability/ecodesign_en (accessed on 12 June 2019)

[260] Wurzel, Rüdiger and Connelly, James. "Introduction". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a leader in international climate change politics*. New York: Routledge, 2010, p. 14.

[261] EC. "A Clean Planet for All: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy", COM (2018) 773, Brussels, 28 November 2018, p. 21, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52018DC0773 (accessed on 17 April 2019)

[262] EC. "Green Public Procurement", http://ec.europa.eu/environment/gpp/index_en.htm (accessed on 13 July 2019)

As it was also pointed out before, EU supports regions within the transition process in the field of industry, especially coal, steel and other energy intensive industries. EU aims to take complementary measures in the industries and regions that will face adverse effects of the transition. These include improving their innovation capacity, attracting investments and developing workers' skills.[263]

Funds can be accepted as another significant policy instrument in the transition process used by EU. Some of the main funding mechanisms used for energy projects across Member States are Cohesion Fund, Connecting Europe Facility, Horizon 2020 and Horizon Europe, European Regional Development Fund, European Investment Bank and European Fund for Strategic Investments, Financing Energy Efficiency, NER 300 and European Energy Programme for Recovery and European Energy Efficiency Fund.[264] These funding mechanisms basically aim to promote energy transition by canalising investments towards renewable energy sources, clean energy technologies and energy efficiency measures and supporting transition regions or less developed regions.

In the light of these policy measures, instruments and developments, it is evident that EU is aware of the fact that transition across the Union requires participation of all Member States and national transition policies of the Member States might quite differ from each other in line with national circumstances. In this respect, EU has developed different regulatory policy instruments for Member States in order to ensure that transition would include relative contribution of each Member State and reflect its costs and opportunities to each one in a fair way.

3.5.Conclusion

To conclude, this chapter has illustrated the policies, strategies, targets and policy instruments adopted at the EU level in terms of transition to an LCE. As a leading

[263] EC. "Structural Support Action for Coal and Carbon Intensive Regions", November 2018, https://ec.europa.eu/clima/sites/clima/files/docs/pages/initiative_5_support_en_1.pdf (accessed on 24 June 2019)

[264] EC. "Funding and contracts", https://ec.europa.eu/energy/en/funding-and-contracts (accessed on 31 May 2019)

figure in climate change policies and transition policies, EU has a comprehensive, rich and dynamic framework and ambitious targets. However, the fact that it hosts twenty-eight economies with highly different characteristics creates a further challenge for creation a common transition framework since it is not realistic to expect the same level of ambition or contribution from all Member States. Therefore, policies and policy instruments of the EU aim to ensure an inclusive, fair and cost-effective transition process created and implemented through relative efforts of each Member State. In the following chapters, a similar examination of transition processes of three Member States, i.e. the UK, Germany and Poland, and a candidate state, Turkey, will be shared.

CHAPTER 4

UNITED KINGDOM

4.1.Introduction

The UK has a significant place among country studies with two differentiating characteristics in terms of transition to an LCE and the EU. Firstly, it has a leading place in transition to an LCE not only in Europe but also across the world as the inventor of the term of LCE. Secondly, it is the first Member State demanding withdrawal of membership. Thus, it is critical to determine the fate of common transition policies and policy instruments after the exit. In this context, this chapter will review the transition process of the UK by referring its interaction with that of the EU and mentioning the Brexit impact. After overviewing the general characteristics of the country in terms of economy, energy mix, GHG emissions and impacts of climate change, its transition framework will be illustrated through policies, strategies and policy instruments.

4.2.General Overview

Table 3 presents a general overview of the UK economy which will be helpful for better understanding the general policy framework of the country. According to 2017 data, The UK has the sixth largest economy in the world and second in the EU.[265] Also, it has the third most populous Member State of the EU with its 66 million population.[266] The UK economy has experienced growth rates around 3% before the

[265] The World Bank. "Gross domestic product 2018", https://databank.worldbank.org/data/download/GDP.pdf (accessed on 25 June 2019)

[266] The World Bank. "Population, total", https://data.worldbank.org/indicator/SP.POP.TOTL?end=2017&locations=GB&most_recent_value_desc=true&start=1960 (accessed on 30 June 2019)

financial crisis in 2008-2009 when it shrank by 0.5% and 4% respectively. [267] Although it started to recover since 2010, the uncertainties and concerns emerged with the Brexit Referendum in 2016 challenge the economy and holds back the economic growth.[268]

As one of the first industrialised economies, the UK economy has mainly raised on industry and manufacturing. However, services sector has left these sectors behind with its increasing share in GDP. In 2017, services sector contributed 79,2% of total GDP and was followed by industry (20,2%) and agriculture (7%).[269] This transformation is important in terms of the energy consumption of the country.

Table 3. United Kingdom Country Profile

Population (2017)	66,022,273
GDP (2017, constant 2010 US$)	2,818,703.54
GHG emissions (2017, $ktCO_2e$, without LULUCF)	474,346.1
GHG emissions per capita (2017, tCO_2e per capita)	7.7
CO^2 emissions (2017, $ktCO_2e$, without LULUCF)	388,101.1
Sectoral shares of GHG emissions (2016, without LULUCF)	Energy – 80.5%, Industrial processes and product use – 6.4%, Agriculture – 8,8%, Waste – 4,4%

Source: World Bank Data, UNFCCC, Eurostat.

[267] The World Bank. "GDP growth (annual %)", https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=GB&most_recent_value_desc=true (accessed on 11 June 2019)

[268] OECD Library. "United Kingdom", https://www.oecd-ilibrary.org/sites/b2e897b0-en/1/2/3/44/index.html?itemId=/content/publication/b2e897b0-en&_csp_=d2743ede274dd564946a04fc1f43d5dc&itemIGO=oecd&itemContentType=book (accessed on 24 July 2019)

[269] CIA. "World Factbook: United Kingdom", https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html (accessed on 11 June 2019)

TPES of the UK has mainly decreased and been transformed in terms of sources starting from the beginning of 2000s. (Figure 5) It has decreased by around 13% over the period 1990-2016 while the GDP increased by 40% in the same period.[270] TPES is mainly composed of fossil fuels, especially oil and gas, while nuclear has the third largest share. The country gradually replaces coal with gas and increase the share of renewables and has started close its old nuclear power plants. Although it plans to develop new nuclear plants, the share of nuclear energy in TPES might decrease as the new plants require time and additional investments. Total import dependency has declined since 2013 however, import dependency on oil and gas has increased as domestic production decreased significantly.[271]

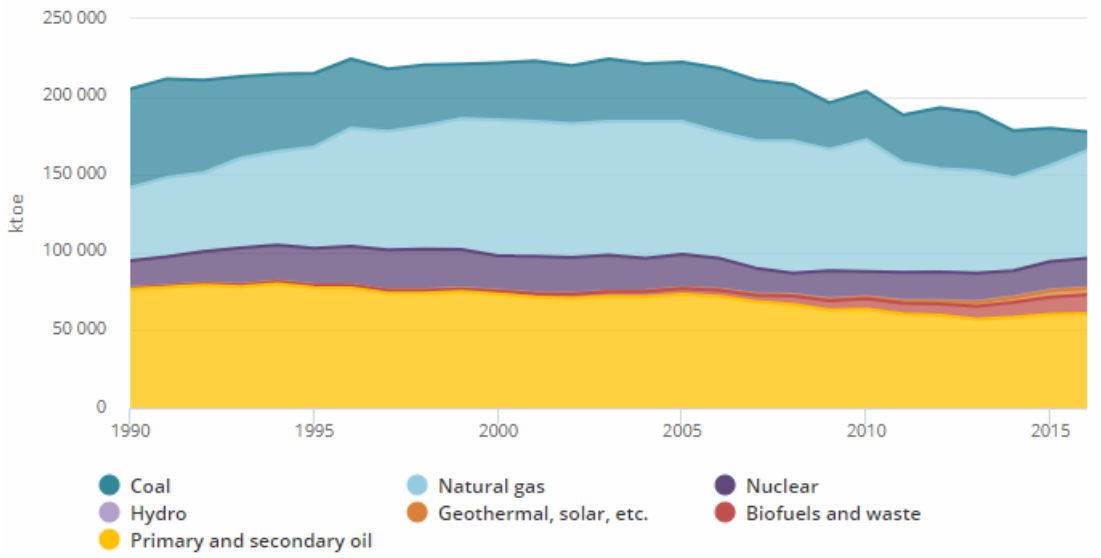

Figure 5: Total Primary Energy Supply (TPES) by source*, United Kingdom 1990-2016

Source: IEA. "Statistics", https://www.iea.org/statistics/?country=UK&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES (accessed on 11 June 2019)
*TPES here excludes electricity and heat trade

[270]IEA, "United Kingdom", https://www.iea.org/countries/United%20Kingdom/ (accessed on 14 June 2019)

[271] IEA, "Energy Policies of IEA Countries: United Kingdom 2019", IEA Publications, 2019, p. 11, https://webstore.iea.org/energy-policies-of-iea-countries-united-kingdom-2019-review (accessed on 20 June 2019)

Despite their low share in the TPES, low-carbon energy sources have started to dominate electricity generation. In 2017, the share of natural gas was 41% and the share of coal was 7% while the rest were composed of nuclear (21%), wind (15%), bioenergy and waste (11%) and solar (3%).[272]

UK succeeded to keep its economy grow while decreasing its TPES and emissions.[273] In 2017, GHG emissions of the country amounted 474,346.1 ktCO_2e, 41% lower than 1990 levels. Around 80% of total GHG emissions were stemmed from energy sector which was followed by agriculture, industrial processes and product use and waste sectors. Within the energy sector, transport had the highest share with almost 33% and was followed by energy industries, other sectors and manufacturing industries and construction. CO_2 emissions accounted for 81% of total GHG emissions.[274] Besides being the second largest CO_2 emitter of the EU[275], UK was ranked seventeenth among the countries that cause highest level of CO_2 emissions worldwide and sixty-seventh in terms of CO_2 emissions per capita in 2017.[276]

UK has been facing severe effects of climate change recently. The main impacts are observed on the water environment. These include flooding and coastal erosion stemming from the rise in the sea level and intense rainfall. It is expected that these impacts will get extended and threaten water quality and availability, biodiversity, land use, infrastructure and human health in addition to creating high economic costs. [277] In this respect, UK has been developing strategies and policies for adapting its

[272] *Ibid.*

[273] IEA. "United Kingdom", https://www.iea.org/countries/United%20Kingdom/ (accessed on 14 June 2019)

[274] UNFCCC. "Summary of GHG Emissions for United Kingdom of Great Britain and Northern Ireland", https://di.unfccc.int/ghg_profiles/annexOne/GBR/GBR_ghg_profile.pdf (accessed on 6 May 2019)

[275] Eurostat. "Early estimates of CO_2 emissions from energy use", 8 May 2019, https://ec.europa.eu/eurostat/documents/2995521/9779945/8-08052019-AP-EN.pdf/9594d125-9163-446c-b650-b2b00c531d2b (accessed on 9 May 2019)

[276] Global Carbon Atlas. "CO_2 emissions", http://www.globalcarbonatlas.org/en/CO2-emissions (accessed on 3 July 2019)

socio-economic system to the impacts of climate change, mitigating its GHG emissions and transforming its economy into a low-carbon one. These strategies and policies will be examined in the following section.

4.3.Policies, Strategies and Targets

The UK attributes itself a leadership position in tackling climate change and transition to an LCE. The Prime Minister Theresa May states that "This country led the world in innovation during the Industrial Revolution, and now we must lead the world to a cleaner, greener form of growth."[278] Also, IEA calls the UK "a global leader in decarbonisation" considering its success in mitigation efforts.[279]

Besides being a global leader in transition to an LCE, the position of the UK in terms of the transition framework of the EU should be mentioned as well. It is surprising that the UK has been "a policy-shaper" in energy and climate policies of the EU despite its Eurosceptic reputation which finally brought the country on the edge of exit.[280] Despite this generally positive stand of UK, its attitude during the negotiations on the EU climate and energy policies have been criticised for being reluctant to pursue ambitious targets and its image of "climate leader" is said to be damaged due to Brexit process.[281]

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[277] Environment Agency. "Climate change impacts and adaptation", November 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/758983/Climate_change_impacts_and_adaptation.pdf (accessed on 13 June 2019)

[278] GOV.UK. "PM Theresa May: we will end UK contribution to climate change by 2050", Press Release, 12 June 2019, https://www.gov.uk/government/news/pm-theresa-may-we-will-end-uk-contribution-to-climate-change-by-2050 (accessed on 13 June 2019)

[279] IEA, "United Kingdom", https://www.iea.org/countries/United%20Kingdom/ (accessed on 11 June 2019)

[280] Solorio, Israel and Fairbrass, Jenny. "The UK and EU renewable energy policy: the relentless British policy-shaper." In Solorio, Israel and Jörgens, Helge (eds.). *A Guide to EU Renewable Energy Policy*, Cheltenham: Edward Elgar Publishing, 2017, 104-120, pp. 104-105.

[281] Climate Action Network Europe (CAN Europe). "Off target: Ranking of EU countries' ambition and progress in fighting climate change", CAN Europe, 2018, p. 11, http://www.caneurope.org/docman/climate-energy-targets/3357-off-target-ranking-of-eu-countries-ambition-and-progress-in-fighting-climate-change (accessed on 20 June 2019)

On the other hand, the prominent role of the country in transition policies might show national ambition of the country in this field and create an impression that leaving the Union would not change the course of its transition policies. The country's current statements and measures also support this impression. The White Paper on The Future relationship between the United Kingdom and the European Union explains UK's vision on climate change policies after Brexit as;

> The UK recognises the UK's and the EU's shared interest in global action on climate change and the mutual benefits of a broad agreement on climate change cooperation. The UK's world leading climate ambitions are set out in domestic law and are more stretching than those that arise from its current obligations under EU law. The UK will maintain these high standards after withdrawal.[282]

Before reviewing the national policies, strategies and targets of the UK, it will be useful to go through the responsibilities of the country with respect to EU's transition framework. Under the Effort Sharing Decision, the UK is obliged to reduce its GHG emissions by 16% in 2020 compared to 2005 levels and by 37% in 2030 compared to 2005 levels.[283] Although the country is on track towards its 2020 targets, there is 6.6 percentage point difference between its 2030 target and projected progress.[284]

As a source of its international fame regarding low-carbon transition policies, UK has a well-developed policy framework covering different sectors and including certain measures on decarbonisation. Pearson and Foxon relates the national efforts of the UK on transition to an LCE in 2008 to the influence of scientific developments in 2007, i.e. IPCC's Fourth Assessment Report and Stern Review. [285] However, the

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[282] GOV.UK. "The Future Relationship between the United Kingdom and the European Union", presented to Parliament by the Prime Minister by Command of Her Majesty, July 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786626/The_Future_Relationship_between_the_United_Kingdom_and_the_European_Union_120319.pdf (accessed on 16 May 2019)

[283] EC. "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 26 July 2019)

[284] EEA. "Trends and Projections in Europe 2018: Tracking progress towards Europe's climate and energy targets", EEA Report No: 16/2018, https://www.eea.europa.eu/publications/trends-and-projections-in-europe-2018-climate-and-energy (accessed on 26 July 2019)

[285] Pearson, Peter JG. and Foxon, Timothy. "A Low Carbon Industrial Revolution: Insights and challenges from past technological and economic transformations", *Energy Policy*, 50 (2012): 117-127, p. 118.

initial steps of the UK in LCE policies dates back to 2003 when it launched "**Energy White Paper: Our energy future -creating a low-carbon economy**" and invented the term of LCE. The White Paper draws attention to the importance of taking action against climate change and sets a 60% reduction target in CO_2 emissions from current levels by 2050 in addition to aiming at energy security, market competitiveness, sustainable economic growth and affordable energy for everyone.[286] It puts forward a long-term strategy for national energy policy and includes a commitment towards transition to an LCE through measures in such fields as transport, heat and electricity generation, carbon pricing and energy efficiency.[287]

UK is the first country in the world that sets an emission reduction target in law.[288] **Climate Change Act (2008)** aims at least an 80% reduction in GHG emissions compared to 1990 levels by 2050.[289] Moreover, it was recently announced that the UK has been planning to be the first major economy which set a net zero emission target in law through an amendment in the Climate Change Act.[290] The Act draws the general framework of the climate change policy of the UK and forms a basis for further efforts on transition to an LCE.

UK Low Carbon Transition Plan (2009) creates a general framework for national transition and calls other countries to take their part in the global transition process. The Plan has five main components:

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[286] United Kingdom Department of Trade and Industry. "Energy White Paper: Our energy future – creating a low carbon economy*."* The Stationary Office, Norwich, 2003.

[287] *Ibid.*, p. 11.

[288] Committee on Climate Change Policy Paper. "2010 to 2015 government policy: greenhouse gas emissions", 8 May 2015, https://www.gov.uk/government/publications/2010-to-2015-government-policy-greenhouse-gas-emissions/2010-to-2015-government-policy-greenhouse-gas-emissions (accessed on 10 June 2019)

[289] United Kindgom, "Climate Change Act", Part 1 – Carbon target and budgeting, http://www.legislation.gov.uk/ukpga/2008/27/part/1/crossheading/carbon-budgeting (accessed on 13 June 2019)

[290] GOV.UK. "PM Theresa May: we will end UK contribution to climate change by 2050", Press Release, 12 June 2019, https://www.gov.uk/government/news/pm-theresa-may-we-will-end-uk-contribution-to-climate-change-by-2050 (accessed on 13 June 2019)

1. Protecting the public from immediate risk of climate change,
2. Preparing for the future through climate-resilient policies,
3. Limiting the risks of climate change through collective efforts under a new international climate agreement,
4. Building a low-carbon UK
5. Supporting different actors like individuals, communities and businesses to play their role in the fight against climate change.[291]

The transition towards building a low-carbon UK is planned to be realised by "cutting emissions, maintaining secure energy supplies, maximising economic opportunities and protecting the most vulnerable."[292] The Plan has a target of 18% emission reduction from 2008 levels by 2020 and a 40% share of low-carbon sources in electricity generation by 2020.[293]

The Clean Growth Strategy: Leading the way to a low carbon future (2017) is the long-term strategy that the UK communicated to the UNFCCC Secretariat in line with Paris Agreement. The Strategy has been mainly shaped around the industry sector, as the one that causes largest amount of GHG emissions, and aims to ensure clean growth while increasing industrial productivity and securing affordable energy for producers and consumers. It also highlights other critical areas that cause largest shares of emissions which are transport, power, natural resources, homes and public sector respectively. The Strategy plans transition policies by mobilizing finance towards clean energy and supporting innovation and improving energy infrastructure.[294]

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[291] HM Government. "The UK Low Carbon Transition Plan: National strategy for climate and energy", 2009, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/228752/9780108508394.pdf (accessed on 28 June 2019)

[292] *Ibid.*

[293] *Ibid.*, p. 9.

[294] HM Government. "The Clean Growth Strategy: Leading the way to a low carbon future", 2017, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf (accessed on 26 June 2019)

Industrial Strategy sees clean growth as one of the global challenges and opportunities that industry sector face and attributes UK a leading role in using low-carbon technologies, goods and services and efficient use of sources. Within this framework, it is targeted to improve energy efficiency of new buildings, creating at least one low-carbon industrial cluster by 2030 and one net-zero cluster by 2040 through the Industrial Strategy Challenge Funds.[295]

Road to Zero Strategy (2018) aims to decarbonise transport sector which has a significant potential of mitigation of GHG emissions. With this aim, the car market will be transformed by ending the sales of new conventional cars and vans and replacing them with low-carbon vehicles. It is aimed that by 2050 almost all cars and vans would be zero-emission.[296]

The policies and strategies show that the country has had a specific interest in transition to an LCE apart from general framework of the EU's transition process and national climate change policies. How UK realises its policies and strategies through policy instruments and what kind of changes it foresees in terms of those instruments as a result of Brexit process will be shared below.

4.4.Policy Instruments

UK has a wide range of policy instruments including taxes, subsidies and regulatory mechanisms. The country has been a part of **EU ETS** through all its three phases. It hosts around 9% of total number of power stations and industrial plants under the EU ETS.[297] Even before the introduction of EU ETS, UK initiated a national ETS which

[295] UK Department for Business, Energy and Industrial Strategy. "The Grand Challenges", 22 May 2019, https://www.gov.uk/government/publications/industrial-strategy-the-grand-challenges/industrial-strategy-the-grand-challenges (accessed on 12 June 2019)

[296] UK Department for Transport. "The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy", 2018, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/739460/road-to-zero.pdf (accessed on 13 June 2019)

[297] UK Department for Business, Energy and Industrial Strategy. "Participating in the EU Emissions Trading System (EU ETS)", 3 May 2019, https://www.gov.uk/guidance/participating-in-the-eu-ets (accessed on 11 June 2019)

was the world's first large-scale emission trading scheme in 2002.[298] Although there are differences between the designs of two mechanisms, it is believed that UK ETS has had a role in EU's adopting ETS as a policy instrument.[299]

Whether UK is going to remain in the EU ETS after leaving the Union is still uncertain. The UK government is expected to choose one of the following options: remaining in the scheme, setting its national scheme that might be integrated into EU ETS or not or initiating a carbon tax. [300] In case of a no-deal Brexit, the UK plans to apply a Carbon Emission Tax in line with the allowances under EU ETS for 2019.[301]

Towards the end of 2018, European Commission announced that UK could not auction or allocate allowances and exchange international credits from 1 January 2019 until the ratification of a Withdrawal Agreement.[302] This regulation does not cover the transfer of allowances by the UK operators. However, the ongoing uncertainty of the exit process and the possibility of a no-deal Brexit can create unbalances in the allowances market. British companies with high levels of allowances have been waiting for the clarification of the UK's future involvement in the EU ETS in order to sell or hold their allowances, which has increased the prices for the allowances under EU ETS significantly.[303] On the other hand, the prices are expected to decrease

[298] Smith, Stephen and Swierzbinski, Joseph. "Assessing the performance of the UK Emissions Trading Scheme", *Environmental and Resource Economics*, 37.1 (2007): 131-158, p. 131.

[299] UK National Audit Office. "The UK Emissions Trading Scheme: A New Way to Combat Climate Change", 2004, p. 11, https://www.nao.org.uk/wp-content/uploads/2004/04/0304517.pdf (accessed on 29 July 2019)

[300] UK Department for Business, Energy and Industrial Strategy, "Meeting climate change requirements if there's no Brexit deal", 12 April 2019, https://www.gov.uk/government/publications/meeting-climate-change-requirements-if-theres-no-brexit-deal/meeting-climate-change-requirements-if-theres-no-brexit-deal (accessed on 12 June 2019)

[301] *Ibid.*

[302] EC. "Commission decides on forthcoming suspension of UK-related processes in the Union Registry of the EU ETS and prepares for the implementation of a transitional period", 12 December 2018, https://ec.europa.eu/clima/news/commission-decides-forthcoming-suspension-uk-related-processes-union-registry-eu-ets-and_en (accessed on 10 June 2019)

[303] Financial Times. "Why the EU carbon market is being roiled by Brexit", 15 April 2019, https://www.ft.com/content/0fa14de4-5f87-11e9-b285-3acd5d43599e (accessed on 10 June 2019)

deeply in case that the UK left EU ETS since British utilities buy a significant part of the allowances.[304]

As the main policy instrument of the EU in its transition process, EU ETS can be a problematic topic during the exit process. However, other EU instruments like regulations on eco-design and energy labelling does not cause such challenges as they have already been internalised and become a part of the domestic legislation.[305] Besides these, the UK has a variety of policy instruments supporting its national transition process. Reviewing these instruments will be helpful for illustrating both the dynamics of the transition process and diversity of policy instruments.

Carbon Reduction Commitment (CRC) Scheme can be seen as a supportive mechanism for expanding the number of businesses reporting their CO_2 emissions. It requires large organisations like hotels, banks, local authorities or central government departments to report their gas and electricity use and buy allowances in line with their annual emissions and submit the allowances by the end of year.[306] Since this scheme will be closed after the current compliance year of 2018-2019, UK has introduced a new complementary scheme called **Streamlined Energy and Carbon Reporting (SECR)** which entered into force in 1 April 2019. It sets certain reporting requirements (like total or associated GHG emissions, an intensity ratio or information on energy efficiency action) for certain type of businesses (like quoted companies or large companies).[307]

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[304] Reuters. "UK signals plan to leave EU emissions trading scheme after Brexit", 15 November 2018, https://www.reuters.com/article/us-britain-eu-carbontrading/uk-signals-plan-to-leave-eu-emissions-trading-scheme-after-brexit-idUSKCN1NK1MX (10.06.2019)

[305] UK Department for Business, Energy and Industrial Strategy, "Meeting climate change requirements if there's no Brexit deal", 12 April 2019, https://www.gov.uk/government/publications/meeting-climate-change-requirements-if-theres-no-brexit-deal/meeting-climate-change-requirements-if-theres-no-brexit-deal (accessed on 12 June 2019)

[306] UK Department for Business, Energy and Industrial Strategy and Environment Agency. "CRC Energy Efficiency Scheme, 12 October 2017, https://www.gov.uk/government/collections/crc-energy-efficiency-scheme (accessed on 12 June 2019)

[307] HM Government, "Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance", March 2019,

Climate Change Levy (CCL) is applied through main rates and price support mechanism which will be reviewed later under the Electricity Market Reform. The main rates of the CCL are applied to the electricity, gas and solid fuels that supplied to the end user in the sectors of industry, commerce, agriculture and public services.[308] Within the context of the tax, there are some exemptions like domestic use and some tax reductions like those applied for energy businesses which have a Climate Change Agreement with Environment Agency.[309]

Climate Change Agreement can be seen as another policy instrument promoting a low-carbon transition. It entitles a CCL reduction for those industries becoming a part of these agreements in return for meeting certain CO_2 emission reduction and energy efficiency targets within two-year periods.[310]

Electricity Market Reform initiated in 2013 contributed to the decarbonisation of electricity market through the Capacity Market (CM), the contracts for difference (CfD) scheme, a carbon price floor (CPF) and an emission performance standard (EPS). These four components can be evaluated as the cost-effective policy instruments of the UK that it uses for a low-carbon electricity sector. The functions of these policy instruments will be briefly reviewed below.

Firstly, **Capacity Market (CM)** is a mechanism that supports the development of new electricity suppliers or sustainability of existing ones through payments.[311] Its

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/791529/Env-reporting-guidance_inc_SECR_31March.pdf (accessed on 13 June 2019)

[308] GOV.UK. "Environmental taxes, reliefs and schemes for businesses", https://www.gov.uk/green-taxes-and-reliefs/climate-change-levy (accessed on 12 June 2019)

[309] HM Revenue & Customs, "Excise Notice CCL1: a general guide to Climate Change Levy", 16 March 2018, https://www.gov.uk/government/publications/excise-notice-ccl1-a-general-guide-to-climate-change-levy/excise-notice-ccl1-a-general-guide-to-climate-change-levy#reliefs (accessed on 12 June 2019)

[310] UK Environment Agency. "Climate Change agreements", 14 May 2019, https://www.gov.uk/guidance/climate-change-agreements--2 (10.06.2019)

[311] EMR Settlement Limited. "Capacity Market", https://www.emrsettlement.co.uk/about-emr/capacity-market/ (accessed on 12 June 2019)

aim is to ensure the existence of a reliable electricity capacity with affordable prices. In this scheme Capacity Agreements are allocated to the Capacity Providers through the auctions and payments are received in line with the Agreements.[312]

Secondly, the **Contracts for Difference (CfD)** is another support mechanism for decarbonising electricity generation by incentivising investments in renewable energy through auctions.[313] Under this scheme, a long-term bilateral contract is set between the developer of the project and Low Carbon Contracts Company (LCCC). It is a competitive market scheme which also protects producers from higher costs and consumers from higher prices for the duration of contract. In the auctions a "strike price" is determined and when the developer generates electricity, difference between the strike price and the reference price (market price) is paid to generator or LCCC in accordance with which price is higher. The UK also applies a CfD levy to fund the payments to generators. The levy is collected from electricity suppliers under the framework of supplier obligation. Also, an Operational Cost Levy is applied to electricity suppliers to fund the operational costs of LCCC.[314]

Thirdly, **Carbon Price Floor** (CPF) is a support mechanism invented to complement EU ETS in terms of attracting low-carbon investments. [315] CPF mainly prices the use of fossil fuels (gas, LPG and solid fuels like coal) in electricity generation through the Carbon Price Support (CPS) rates. In fact, it is regulated as a part of CCL regime and applied to the generators in order to encourage them to produce electricity via low-carbon sources.[316] CPF has been an effective policy instrument in supporting

[312] GOV.UK. "Environmental taxes, reliefs and schemes for businesses", https://www.gov.uk/green-taxes-and-reliefs/crc-energy-efficiency-scheme (accessed on 13 June 2019)

[313] UK Department for Business, Energy and Industrial Strategy, "Contracts for Difference", 11 January 2019, https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference (accessed on 12 June 2019)

[314] EMR Settlement Limited, "Contracts for Difference", https://www.emrsettlement.co.uk/about-emr/contracts-for-difference/ (accessed on 12 June 2019)

[315] GOV.UK. "Excise Notice CCL1/6: a guide to carbon price floor", 4 April 2017, https://www.gov.uk/government/publications/excise-notice-ccl16-a-guide-to-carbon-price-floor/excise-notice-ccl16-a-guide-to-carbon-price-floor (accessed on 29 July 2019)

[316] *Ibid.*

replacement of coal with gas and high levels of investments in offshore wind and solar power.[317]

Fourthly, **Emission Performance Standard (EPS)** aims to support the transformation in the electricity sector by limiting the CO_2 emissions caused by new fossil fuel generation plants and ensures that no new fossil fuel electricity generation plants would be built unless they have a carbon capture and storage mechanism.[318] While coal-fired power plants in the UK have been mostly closed or converted to biomass, there remained six coal power stations one of which is decided to be closed by March 2020.[319]

The Climate Change Act requires to adopt statutory five-year **carbon budgets** to control GHG emissions.[320] Carbon budgets set a GHG emission cap for the economy over a five-year period and they need to be prepared twelve years earlier than their beginning period. The budgets are set in line with the country's national and EU-level targets as well as its obligations under international climate regime. There have been five carbon budgets set until now and currently it is the term of the third carbon budget (2018-2022). It requires to limit the emissions by 2,544 $MtCO_2e$ and reduce them by 37 % compared to 1990 levels.[321] UK has met the first two carbon budgets and seems on track for the third one, but it is expected to have problems with the fourth and fifth carbon budgets.[322]

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[317] IEA, "United Kingdom", https://www.iea.org/countries/United%20Kingdom/ (accessed on 11 June 2019)

[318] United Kingdom, "Emissions Performance Standard Regulations 2015", https://www.legislation.gov.uk/uksi/2015/933/introduction/made (accessed on 14 June 2019)

[319] The Guardian. "UK to be left with five coal power stations after latest closure", 13 June 2019, https://www.theguardian.com/environment/2019/jun/13/mild-but-windy-winter-was-greenest-ever-for-uk-energy-use (accessed on 14 June 2019)

[320] United Kindgom, "Climate Change Act", Part 1 – Carbon target and budgeting, http://www.legislation.gov.uk/ukpga/2008/27/part/1/crossheading/carbon-budgeting (accessed on 13 June 2019)

[321] UK Committee on Climate Change, "Carbon budgets: how we monitor emissions targets", https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/ (accessed on 13 June 2019)

Despite all these policy instruments supporting the transition process, UK continues to support fossil fuels as well, even with a higher amount than it supports renewables. It is surprising that UK is a leading figure in both LCE policies and fossil fuel subsidies among EU Member States. According to 2016 data, the annual amount spent to support fossil fuels was around €12 billion while it was €8.3 billion for renewables.[323] Former Secretary-General of the United Nations, Ban Ki-moon criticises the EU of investing in fossil fuels in developing countries in order to support British companies' exports and causing locking-in high-carbon structures in these countries despite acting as a prominent figure of climate action.[324] These policies point the significance of consistency of the policy framework both in terms of securing the domestic transition process and not harming but contributing the global transition.

4.5.Conclusion

In conclusion, the national transition policies and policy instruments of the UK and their current and possible future relation with those of EU have been reviewed. The UK presents a highly impressive example considering the timing of its policies, diversity of its policy instruments and the strength of its political commitment. The fact that UK has a highly developed and large economy with significant level of GHG emissions and has been the pioneer of transition to an LCE locates this country in a special place both within the EU and across the world. Although it maintains its support for fossil fuels especially through international investments, the UK is still accepted as a prominent actor for transition policies.

[322] IEA, "Energy Policies of IEA Countries: United Kingdom 2019", IEA Publications, 2019, p. 12, https://webstore.iea.org/energy-policies-of-iea-countries-united-kingdom-2019-review (accessed on 20 June 2019)

[323] The Guardian. "UK has biggest fossil fuel subsidies in the EU, finds commission", 23 January 2019, https://www.theguardian.com/environment/2019/jan/23/uk-has-biggest-fossil-fuel-subsidies-in-the-eu-finds-commission (accessed on 5 July 2019)

[324] The Guardian, "UK must stop investing in fossil fuels in developing countries", 24 February 2019, https://www.theguardian.com/world/2019/feb/24/ban-ki-moon-uk-must-stop-investing-in-fossil-fuels-in-developing-countries (accessed on 24 July 2019)

CHAPTER 5

GERMANY

5.1.Introduction

Germany stands as another prominent European country in a low-carbon transition. It has a high potential for a low-carbon transition with its highly industrialised and large economy. Also, the energy transition Germany has started to initiate in the beginning of 2000s and its early experience with renewables provides an advantage for the country. In this chapter, Germany's transition process will be examined through recent policies, strategies, targets and policy instruments in line with the national circumstances of the country including its economic outlook, energy profile, course of GHG emissions and experience with climate change.

5.2.General Overview

According to 2017 data, Germany has the fourth largest economy in the world and the largest economy in the EU with its total GDP of almost USD 3,9 trillion.[325] Also, it has the largest population with almost 83 million population among EU Member States.[326] Table 4 shows the main indicators that can help to understand the basic characteristics of German economy from a low-carbon point of view. German economy has followed a mainly growing trend recently, except for the financial crisis

[325] The World Bank, Data, https://data.worldbank.org/country/germany?most_recent_value_desc=true (accessed on 14 June 2019)

[326] The World Bank, "Population, total", https://data.worldbank.org/indicator/SP.POP.TOTL?locations=DE&most_recent_value_desc=true (accessed on 30 June 2019)

period. Its average growth rate for the period 2010-2017 was around 2.5%.[327] In 2017, the sectoral share of GDP was 68,6% for services, 30,7% for industry and 0,7% for agriculture.[328]

Germany has a highly export-oriented economy especially in the sector of automobiles, chemical products and machine tools. However, its export level has gone through a reduction since 2018 due to the slow-down in world trade and domestic supply problems stemming from the fact that certification of new emissions standards for cars required time and drought affected the production of chemicals. [329]

Table 4. Germany Country Profile

Population (2017)	82,685,000
GDP (2017, constant 2010 US$)	3,883,869.69
GHG Emissions (2017, ktCO_2e without LULUCF)	906,611.5
GHG emissions per capita (2017, tCO_2e per capita)	11.3
CO_2 emissions (2017, without LULUCF, in ktCO_2e)	797,966.4
Sectoral shares of GHG emissions (2016, without LULUCF)	Energy – 84.5%, Industrial processes and product use – 7.1%, Agriculture – 7.3%, Waste – 1.1%

Source: World Bank Data, UNFCCC Inventory, Eurostat

Germany has achieved to reduce its TPES and CO_2 emissions while increasing its GDP significantly over the period 1990-2016.[330] In 2016, TPES was mainly composed of fossil fuels, oil, coal and gas respectively. (Figure 6) It is seen that the

[327] The World Bank, "GDP growth (annual %)", https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2017&locations=DE&most_recent_value_desc=true&start=1971 (accessed on 30 June 2019)

[328] CIA, "World Factbook: Germany", https://www.cia.gov/library/publications/the-world-factbook/geos/gm.html (accessed on 14 June 2019)

[329] OECD, "Germany Economic Snapshot", http://www.oecd.org/economy/germany-economic-snapshot/ (accessed on 14 June 2019)

[330] IEA, "Germany", https://www.iea.org/countries/Germany/ (accessed on 14 June 2019)

usage of oil and coal has been reduced while that of gas, which is the least polluting one among them, has been increased when compared to 1990 levels. The share of renewables has been constantly increasing, but they still account for 14% of TPES.[331] On the other hand, use of nuclear has been decreasing as a part of energy transition plan of Germany that will be reviewed while examining its policies and strategies.

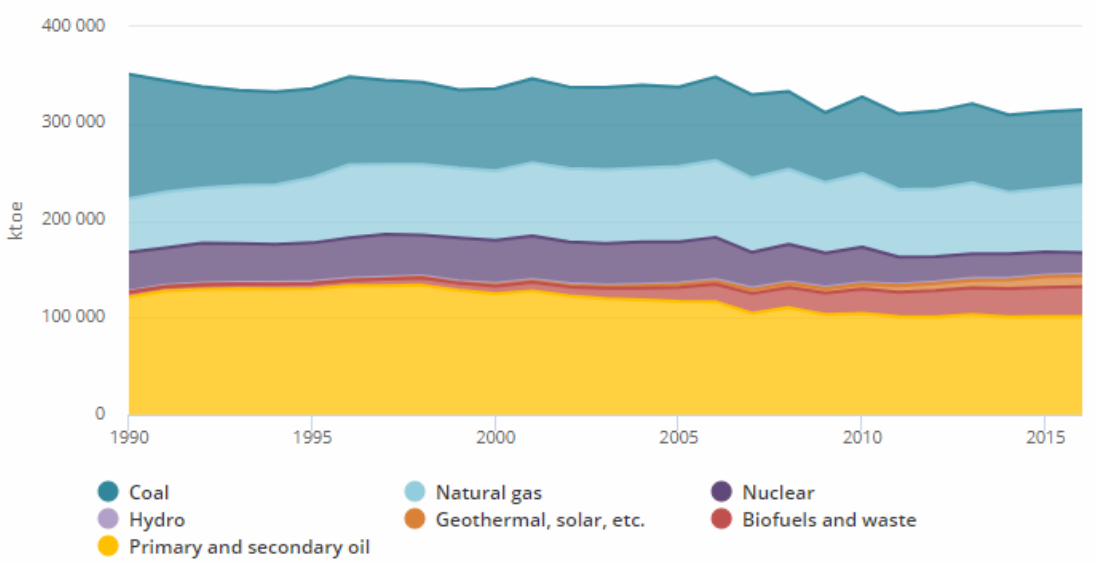

Figure 6: Total Primary Energy Supply (TPES) by source*, Germany 1990-2016

Source: IEA, "Total Primary Energy Supply (TPES) by source", https://www.iea.org/statistics/?country=GERMANY&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES (accessed on 14 June 2019)
*TPES here excludes electricity and heat trade

Germany meets its energy needs mostly from imported sources. The country imports almost 70% of its energy consumption.[332] This creates a significant challenge for energy security and a further motivation to develop renewable energy technologies; however, Germany still pursues to invest in domestic fossil fuels. In 2016, Germany

[331] IEA, "Germany: Balances for 2016", https://www.iea.org/statistics/?country=GERMANY&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=table&dataTable=BALANCES (accessed on 15 June 2019)

[332] Working Group on Energy Balances (AG Energiebilanzen). "AG Energiebilanzen Publishes Report on Energy Consumption in 2018." Press Release, No. 02: 2019, https://ag-energiebilanzen.de/index.php?article_id=29&fileName=ageb_pressedienst_02_2019engl.pdf (accessed on 15 June 2019)

was ranked as eighth among the biggest coal producers of the world and fifth among the top ten producers of electricity by coal.[333] Coal has a historically significant place for Germany since it was the source of the country's industrial and economic rise in post-war years. Although lots of coal mines have started to be closed after the reunification process in 1990 and the last hard coal mines were closed in 2018, Germany is still the largest producer of brown coal (lignite) across the world.[334]

According to 2016 data, coal was a prominent energy source with a share of 42,2% in total electricity generation and followed by nuclear, gas and wind respectively and with similar shares ranging from 12.1%-13,1%.[335] The other sources of electricity generation are biofuels, solar, hydro, waste, oil and geothermal. In 2018, total share of renewables reached around 38% in domestic electricity consumption and 14% in domestic energy consumption.[336]

Although GHG emissions of Germany has experienced a significant decrease since 1990, latest available data shows that it is still the largest emitter of the EU.[337] Ebner draws attention to the fact that the reduction in emissions of Germany is highly related to the reunification process with Eastern Germany after 1991 as de-industrialisation process of that region should have contributed a lot to the emission reductions.[338]

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[333] IEA, Key World Energy Statistics, 2017, pp. 17-31, https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf (accessed on 7 July 2019)

[334] Clean Energy Wire. "Coal in Germany", 7 February 2019, https://www.cleanenergywire.org/factsheets/coal-germany (accessed on 4 July 2019)

[335] IEA, "Share of electricity generation by fuel: Germany 2016", https://www.iea.org/statistics/?country=GERMANY&year=2016&category=Electricity&indicator=ShareElecGenByFuel&mode=chart&dataTable=ELECTRICITYANDHEAT (14.06.2019)

[336] Arbeitsgemeinschaft Energiebilanzen (AG Energiebilanzen) –Working Group on Energy Balances (Energy Balances Group). "Energy Consumption in Germany in 2018", 2019, p. 2, https://ag-energiebilanzen.de/index.php?article_id=29&fileName=ageb_jahresbericht2018_20190503_engl.pdf (accessed on 15 June 2019)

[337] Eurostat. "Total greenhouse gas emissions by countries, 1990-2017 (Million tonnes of CO2 equivalents)", https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Total_greenhouse_gas_emissions_by_countries,_1990-2017_(Million_tonnes_of_CO2_equivalents).png (accessed on 2 July 2019)

On the other hand, in terms of GHG emissions per capita, Germany was ranked as seventh among EU-28 with an amount of 11.3 t CO_2e per capita.[339] In 2017, total GHG emissions was 906,611.5 $ktCO_2e$, 27% lower than 1990 levels. [340] The energy sector was accountable for almost 85% of GHG emissions, composed of energy industries, transport, manufacturing industries and construction and others while CO_2 emissions accounted for about 88% of total GHG emissions.[341] According to 2017 data, Germany was ranked as the sixth country that cause highest level of CO_2 emissions and as thirty-third in terms of CO_2 emissions per capita.[342]

Germany has experienced severe impacts of climate change like temperature rises, increased precipitation volumes, flooding and drought, which threaten public health and food and water security in addition to causing economic losses. [343] The international trade dependency of the German economy creates a further vulnerability since the climate change impacts on foreign economies also affect German economy indirectly.[344] Moreover, as stated above, domestic impacts like drought can create deficiencies for the export products like chemicals. The country has been trying to deal with the impacts of climate change through adaptation policies and strategies besides working for mitigating the future climate change risks through mitigation

[338] Ebner, Alexander. "The transition to a low carbon economy in Germany's coordinated capitalism", In Hübner, Kurt (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, pp. 122.

[339] Eurostat, "Greenhouse gas emissions per capita", 12 June 2019, https://ec.europa.eu/eurostat/databrowser/view/t2020_rd300/default/table?lang=en (accessed on 3 July 2019)

[340] UNFCCC. "Summary of GHG Emissions for Germany", https://di.unfccc.int/ghg_profiles/annexOne/DEU/DEU_ghg_profile.pdf (accessed on 2 July 2019)

[341] *Ibid.*

[342] Global Carbon Atlas. "CO_2 Emissions", http://www.globalcarbonatlas.org/en/CO2-emissions (accessed on 2 July 2019)

[343] Climate Reality Project. "How Climate Change Is Affecting Germany", 16 March 2018, https://www.climaterealityproject.org/blog/how-climate-change-affecting-germany (accessed on 15 June 2019)

[344] Umwelt Bundesamt. "Climate change abroad also affects the German economy", 14 December 2018, https://www.umweltbundesamt.de/en/press/pressinformation/climate-change-abroad-also-affects-the-german (accessed on 15 June 2019)

strategies. As a part of these efforts, Germany's policies and strategies related to transition to an LCE will be reviewed in the following part.

5.3.Policies, Strategies and Targets

Germany has been an active participant of the international climate change negotiations since the beginning. The country had successfully achieved its target of reducing its GHG emissions by an average of 21% from 1990 levels over the first Kyoto period (2008-2012).[345] It seems unexpected that Germany is among the prominent figures of global emission reduction efforts considering the fact that industrial exports hold a significant place in its economy.[346] Yet, as Janicke points Germany has successfully shaped export markets with its climate friendly products, including car industry and renewable energy technologies, and created a strong market for others to compete.[347] He suggests that Germany has a political and economic leadership role in climate change politics thanks to its "economic strength, advanced innovation system and political visibility".[348]

Beyond its participation in international efforts, Germany has earlier efforts on climate and energy policies. In this respect, main policies and strategy documents of Germany in transition process will be reviewed briefly. The country has a comprehensive and multidimensional energy transition policy called ***Energiewende***. Germany has been initiating in energy and climate studies based on renewable energy since 1970s. In fact, the country is seen one of the pioneering countries in renewable

[345] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. "German Climate Policy", https://www.cop23.de/en/bmu/german-climate-policy/ (accessed on 15 June 2019)

[346] Ebner, Alexander. "The transition to a low carbon economy in Germany's coordinated capitalism", In Hübner, Kurt (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, p. 115.

[347] Janicke, Martin. "German Climate Change Policy". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a Leader in International Climate Change Politics,* New York: Routledge, 2011, 129-146, p. 130.

[348] *Ibid.*, p. 129.

energy around the world.[349] Coal and nuclear power came into prominence economically and politically due to the energy crisis in 1970s while at the same time there emerged a growing opposition against nuclear power, which directed Germany towards research and development activities on renewable energy.[350]

After initial steps in 1970s, the arguments on transforming German energy mix by increasing the share of renewables started to be shaped in the late 1980s. Chernobyl nuclear disaster in 1986 and the arguments on nuclear safety have had a significant role in this transition.[351] Starting from 1990s, Germany has developed support mechanisms in order to increase its renewable energy capacity. In 2000, the country announced that it would phase out nuclear power and accelerated the phase out process after the Fukushima nuclear disaster in 2011 by phasing-out fossil fuels in addition to nuclear power and increasing the share of renewables. In this respect, eight old nuclear plants were closed immediately and a gradual phase out was planned which will end by 2022.[352] Phasing out nuclear power has contributed to the growing of renewable energy market by creating a further pressure for development of innovation and technology.[353]

Energiewende consists the basis of German transition policy for an LCE. Furthermore, there are national policy documents specifying the path for transition and setting targets accordingly. The most relevant ones among these will be reviewed below.

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[349] Bechberger, Mischa and Reiche, Danyel. "Renewable energy policy in Germany: pioneering and exemplary regulations", *Energy for Sustainable Development*, 8.1(2004): 47-57, p.49.

[350] Lauber, Volkmar and Mez, Lutz. "Three Decades of Renewable Electricity Policies in Germany", *Energy and Environment*, 15.4(2004): 599-623, pp. 616-617.

[351] Federal Republic of Germany Federal Foreign Office. "The German Energiewende: Transforming Germany's energy system", http://www.energiewende-global.com/en/ (accesed on 16 June 2019)

[352] *Ibid.*

[353] Janicke, Martin. "German Climate Change Policy". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a Leader in International Climate Change Politics*, New York: Routledge, 2011, 129-146, pp. 143-144.

The Energy Concept (2010) put forward a long-term strategy for energy transition. It aims to ensure energy security with affordable prices, improve energy efficiency, reach a green economy and preserve industrial competitiveness in the long-term.[354] To this end, the Concept foresees a deep transformation of the energy supply mainly through increasing the share of renewables and the level of energy efficiency up to 2050. It also includes sectoral strategies on electricity, buildings, transport and innovation. [355]

The Concept sets different targets for energy efficiency, renewable energy and emission reduction in the short, medium and long-term. In terms of energy efficiency, Germany aims to reduce its primary energy consumption by 20% from 2008 levels by 2020 and by 50% by 2050.[356] Renewable energy targets are in line with the national targets of the country under EU Renewables Directive which are an 18% share for renewables by 2020 and a 30% share by 2030.[357] In addition to these, the country has long-term national targets of 45% by 2040 and 60% by 2050.[358]

The targets for reducing its GHG emissions compared to 1990 levels include a 40% reduction by 2020, 55% by 2030, 70% by 2040 and 80-95% by 2050.[359] In line with EU targets, by 2020 Germany is required to cut its emissions in ETS sectors by 21% and its emissions in non-ETS sectors by 14% from 2005 levels while the 2030 targets

[354] Federal Ministry of Economics and Technology and Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, "Energy Concept for an Environmentally Sound, Reliable and Affordable Energy Supply", 2010, https://www.osce.org/eea/101047?download=true (accessed on 16 June 2019)

[355] *Ibid.*

[356] *Ibid., p. 5.*

[357] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources", 2018, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=EN (accessed on 20 June 2019)

[358] Federal Ministry of Economics and Technology and Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, "Energy Concept for an Environmentally Sound, Reliable and Affordable Energy Supply", 2010, p. 5, https://www.osce.org/eea/101047?download=true (accessed on 16 June 2019)

[359] *Ibid.*, pp. 4-5.

are 43% in ETS sectors and 38% in non-ETS sectors.[360] Though, the country does not seem on track towards its 2020 targets, neither the national nor the EU-level one, because GHG emissions have increased in some sectors like manufacturing industries, construction and transport although they have mainly decreased in energy industries.[361] Furthermore, according to the recent report of the EC, Germany is required to use flexibilities since it exceeded its AEAs and it will miss its 2030 emission reduction target under Effort Sharing Decision with 16 percentage point.[362]

In 2014, Germany launched **Climate Action Programme** in order to meet its 2020 target. The Programme includes lots of measures in various fields including emissions trading, electricity generation from renewables, climate-friendly building and clean transport sector.[363] However, these efforts do not seem enough to meet the target. According to recent national estimates, Germany realised around 31% emission reduction from 1990 levels by 2018 and it is expected to reach 32% by 2020.[364] In this respect, it is expected that Germany would buy emission certificates from other Member States as the EU regulations require.[365]

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[360] EC. "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 30 June 2019)

[361] Clean Energy Wire. "Germany's greenhouse gas emissions and climate targets". 6 June 2019, https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets (accessed on 15 June 2019)

[362] EC. "Report from the Commission to The European Parliament and The Council, EU and Paris Climate Agreement: Taking stock of progress at Katowice COP", COM (2018) 716, 2018, pp. 7-8, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0716&from=EN (accessed on 15 June 2019)

[363] Federal Ministry fort he Environment, Nature Conservation, Building and Nuclear Safety. "The German Government's Climate Action Programme 2020". 2014. https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/aktionsprogramm_klimaschutz_2020_broschuere_en_bf.pdf (accessed on 14 June 2019)

[364] Clean Energy Wire, "Germany's greenhouse gas emissions and climate targets", 6 June 2019, https://www.cleanenergywire.org/factsheets/germanys-greenhouse-gas-emissions-and-climate-targets (accessed on 15 June 2019)

[365] Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. "Climate Action in Figures: Facts, Trends and Incentives for German Climate Policy". 2018, p. 23, https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutz_in_zahlen_2018_en_bf.pdf (accessed on 16 June 2019)

As required by Paris Agreement, Germany prepared and submitted a long-term GHG emissions strategy to the UNFCCC Secretariat in 2016. **Climate Action Plan 2050** sets out strategies and targets in order to reach an extensively GHG neutral Germany by 2050. In addition to its 2050 target, the Plan reaffirms 2030 emission reduction target as at least 55% compared to 1990 levels and presents target ranges and transition pathways for individual sectors including buildings, energy, industry, transport, agriculture and others.[366] The distribution of targets for the individual sectors enables Germany to review possible interactions and conflicts among these sectors. The Plan was prepared as a result of a dialogue process which included different levels of public authorities, various associations and the general public.[367]

Moreover, Germany submitted its **draft NECP** as required by Regulation (EU) 2018/1999. In line with the general framework under the Regulation, draft NECP includes national policies, strategies and targets related to decarbonisation, energy efficiency, energy security, internal energy market and research, innovation and competitiveness. In other words, the document goes over the main transition policies and strategies in national documents from an integrated point of view. Besides, it presents the present course of and projections on existing policies and impact assessment for future policies.[368]

The fact that Germany has a highly industrialised economy and intense use of coal cause Germany to conduct its transition process "in a challenging and highly

[366] Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. "Climate Action Plan 2050: Principles and goals of the German government's climate policy". 2016, pp. 7-8, https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutzplan_2050_en_bf.pdf (accessed on 29 July 2019)

[367] Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety. "Broad dialogue on the German government's Climate Action Plan 2050", 2017, https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/ksp_2050_dialog_en_bf.pdf (accessed on 16 June 2019)

[368] "Germany's Draft Integrated National Energy and Climate Plan", 2018, https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_de_necp.pdf (accessed on 24 June 2019)

politicised industrial context".[369] Yet, the country has been discussing to **phase out coal** by 2038, even by 2035 if it would be possible. Commission on Growth, Structural Change and Employment, composed of policymakers, NGOs, industry and civil society, conducted studies on the structural changes in energy and climate policies and published a report at the beginning of 2019. The report presents a phase out pathway including the measures to be taken in this process in the fields of energy prices, competitiveness, employment and regional development.[370] Since the Commission has only an advisory task, the phase out plan is under consideration of the government now.[371]

As another recent development, Germany has been working on the draft of a **Climate Change Act** that will make climate targets legally binding as they are in the UK. This step aims to ensure that the targets are protected from the changes in the government and each ministry do its part to meet the targets. With this respect, the draft law foresees some sort of sanctions like introducing financial sanctions or requiring emergency programmes for those ministries that fail to meet sectoral targets.[372] The fate of the law is expected to become clear before the end of 2019, however, it is known that there are some political objections regarding the law.[373]

Although Germany is seen as a pioneering country in renewable energy policies, its interaction with EU level policies are criticised on the grounds that the country

[369] Ebner, Alexander. "The transition to a low carbon economy in Germany's coordinated capitalism", In Hübner, Kurt (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, p. 122.

[370] Federal Ministry for Economic Affairs and Energy. "Commission on Growth, Structural Change and Employment: Final Report", 2019, https://www.bmwi.de/Redaktion/EN/Publikationen/commission-on-growth-structural-change-and-employment.pdf?__blob=publicationFile&v=3 (accessed on 15 June 2019)

[371] Clean Energy Wire. "German comission proposes coal exit by 2038", 17 May 2019, https://www.cleanenergywire.org/factsheets/german-commission-proposes-coal-exit-2038 (accessed on 4 July 2019)

[372] Clean Energy Wire. "Germany's Climate Action Law takes shape", 28 May 2019, https://www.cleanenergywire.org/factsheets/germanys-climate-action-law-begins-take-shape (accesed on 15 June 2019)

[373] *Ibid.*

resisted policies on harmonizing renewable energy support schemes (in the form of Tradable Green Certificates) across EU instead of leading such a process through its national policy experience.[374] The reasoning behind this attitude is explained as the fear that EU-wide schemes would undermine national scheme of feed-in tariffs.[375] On the other hand, this trend has recently reversed as Germany has experienced a shift in its support scheme and started to be affected by the EU.[376] Still the country is criticised as it has been indecisive about adopting more ambitious targets during the negotiations on EU's Energy and Climate Package.[377]

As national policies and strategies indicate, renewable energy transition and sector specific measures have a significant place in the transition process of Germany. The policy instruments that Germany use in order to implement these policies and meet aforementioned targets will be examined below.

5.4.Policy Instruments

Germany has certain policy instruments including EU ETS, energy taxes, incentives and support schemes within its transition framework. As the largest emitter of the EU, Germany has the highest number of installations and largest share (25%) of total emissions in **EU ETS**.[378] ETS emissions have declined by around 18% in Germany

[374] Solorio, Israel, Öller, Eva and Jörgens, Helge. "The German Energy Transition in the Context of EU Renewable Energy Policy". In Brunnengraber, A. and Di Nucci, M. R. (eds.), *Im Hürdenlauf zur Energiewende*. Wiesbaden: Springer, 2014, 189-200, pp. 191-192.

[375] Solorio, Israel, Öller, Eva and Jörgens, Helge. "The German Energy Transition in the Context of EU Renewable Energy Policy". In Brunnengraber, A. and Di Nucci, M. R. (eds.), *Im Hürdenlauf zur Energiewende*. Wiesbaden: Springer, 2014, 189-200, pp. 191-192.

[376] Vegolpohl, T., Ohlhorst, D., Bechberger, M. and Hirschl, B. "German renewable energy policy: independent pionerring versus creeping Europeanization?". In Solorio, Israel and Jörgens, Helge (eds.), *A Guide to EU Renewable Energy Policy*, Cheltenham: Edward Elgar Publishing, 2017, 45-64, p. 58-60.

[377] Climate Action Network Europe (CAN Europe), "Off target: Ranking of EU countries' ambition and progress in fighting climate change", CAN Europe, Brussels, 2018, p. 8, http://www.caneurope.org/docman/climate-energy-targets/3357-off-target-ranking-of-eu-countries-ambition-and-progress-in-fighting-climate-change (accessed on 15 June 2019)

[378] German Environment Agency, German Emissions Trading Authority (DEHSt). "The European Emissions Trading System and Its Implementation in Germany",

in comparison to 2005 levels; however, the decline in ETS emissions has lost its momentum over the period 2013-2018 in line with the general trend across the EU.[379]

EU ETS is the only carbon pricing instrument in Germany. Although there emerged some discussions on a future carbon tax, currently it seems off the agenda. Germany's environment minister Svenja Schulze has explained her desire to introduce a carbon tax that would include transport and heat sectors on the grounds that German energy transition support policies have only covered the electricity sector and it had not been enough so far for the targeted emissions reductions.[380] On the other hand, German Finance Ministry stated that introduction of such a policy instrument was not considered as it could create an additional burden for citizens.[381]

As indirect carbon pricing instruments, energy taxes have a role among the policy instruments of Germany in its transition process. Germany has used taxation as an early measure by introducing an **eco-tax reform** in 1999. In addition to creating an awareness within the market through price signals, it has contributed to employment as most of the tax revenue has been used in order to reduce the pension contributions.[382] Eco-tax mainly includes energy, motor vehicle and electricity taxes

https://www.dehst.de/EN/understanding-emissions-trading/implementation/implementation_node.html (accessed on 4 July 2019)

[379] German Environment Agency, German Emissions Trading Authority (DEHSt). ""Emissions trading 2018: German installations cut emissions by 3.5 per cent", 4 June 2019, https://www.umweltbundesamt.de/en/press/pressinformation/emissions-trading-2018-german-installations-cut (accessed on 4 July 2019)

[380] Clean Energy Wire. "German environment minister plans CO_2 price concept to boost climate action", 12 November 2018, https://www.cleanenergywire.org/news/german-env-minister-plans-co2-price-concept-boost-climate-action (accessed on 16 June 2019)

[381] Clean Energy Wire. "Finance ministry: no plans to introduce a CO_2 price, environment ministry says "no priority", 12 November 2018, https://www.cleanenergywire.org/news/finance-ministry-rejects-co2-price-plans-solar-power-bicycle-lane/finance-ministry-no-plans-introduce-co2-price-environment-ministry-says-no-priority (accessed on 16 June 2019)

[382] Green Budget Germany (FÖS). "Environmental Tax Reform 1999-2003", http://www.foes.de/themen/oekologische-steuerreform-1999-2003/ (accessed on 5 July 2019)

and applied for the unit of energy. From the highest to the lowest level of tax revenue is gathered through energy tax, motor vehicle tax and electricity tax respectively.[383]

According to OECD data, the highest level of taxation is applied in the road transport sector which mainly includes energy tax on petrol and diesel with a higher rate for petrol than diesel in line with its higher potential for emissions.[384] Vehicle taxes, on the other hand, incentivise petrol cars by applying higher level of tax rates for diesel ones. Fossil fuel use is taxed within industry, agriculture and fishing yet there are some exemptions and refunds, which conflicts with the aim of reducing fossil fuel use.[385]

Since increasing the share of renewables consists a highly critical part of German transition policies, policy instruments incentivising renewables carry a special significance for the success of the transition. The **feed-in tariff system** provides preferential access for the electricity generated from renewables to the grid. The country has recently started to use auctions instead of fixed price rates in order to create a more competitive and cost-effective support scheme.[386] It funds renewable energy through auctions where lowest bid determines the amount of funding. Besides, it is also regulated that the auctions for 5% of newly installed renewables capacity each year can be open to bids from other EU Member States.[387] Another effective supporting scheme for renewables is "**funding for landlord-to-tenant electricity**".

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[383] German Environment Agency. "Indicator: Taxes related to the environment",4 July 2019, https://www.umweltbundesamt.de/en/indicator-taxes-related-to-the-environment#textpart-2 (accessed on 5 July 2019)

[384] OECD. "Taxing Energy Use 2018: Germany", 2018, https://www.oecd.org/tax/tax-policy/taxing-energy-use-2018-germany.pdf (accessed on 17 June 2019)

[385] OECD. "Taxing Energy Use 2018: Germany", 2018, https://www.oecd.org/tax/tax-policy/taxing-energy-use-2018-germany.pdf (accessed on 17 June 2019)

[386] Ebner, Alexander. "The transition to a low carbon economy in Germany's coordinated capitalism", In Hübner, Kurt (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, p. 143.

[387] Federal Ministry for Economic Affairs and Energy. "Funding for the expansion of renewable energy sources: national and European auctions", https://www.bmwi.de/Redaktion/EN/Textsammlungen/Energy/funding-for-the-expansion-of-renewable-energy-sources.html (accessed on 16 June 2019)

It is provided for the solar installations which are not connected to a public grid but located on the rooftop of a residential building and used by the residents of that building or those in close proximity.[388]

As stated above, buildings sector is one of the priorities of German low-carbon transition policies. The country aims to create a climate-neutral buildings stock through **zero-energy building standard** for new buildings will be in force by 2021 and energy standards for existing buildings will be developed after 2030.[389] **Market Incentive Programme** is one of the supportive instruments of this strategy. It enables support mainly for existing buildings' heating systems so that the share of renewables would increase in heating sector.[390]

Environmental technology is approached as a significant component of the transition process. For Germany, environmental technology market is highly critical for both domestic economy and international dimension. The main **green tech markets** are energy efficiency, environmental-friendly power generation, storage and distribution, sustainable mobility, material efficiency, sustainable water management and waste management and recycling.[391]

5.5.Conclusion

In conclusion, this part examined the transition process of Germany through policies, and policy instruments in the light of its national conditions. Germany stands as an

[388] Federal Ministry of Economic Affairs and Energy, "The next phase of the energy transition: The 2017 Renewable Energy Sources Act", https://www.bmwi.de/Redaktion/EN/Artikel/Energy/res-2017.html (accessed on 16 June 2019)

[389] Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, "Climate Action Plan 2050", 2016, p. 47, https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/klimaschutzplan_2050_en_bf.pdf (accessed on 17 June 2019)

[390] Federal Ministry for Economic Affairs and Energy, "Renewable Energy", https://www.bmwi.de/Redaktion/EN/Dossier/renewable-energy.html (accessed on 18 June 2019)

[391] Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, "Green Tech made in Germany in 2018: Environmental Technology Atlas for Germany", 2018, p. 9, https://www.bmu.de/fileadmin/Daten_BMU/Pools/Broschueren/greentech_2018_en_bf.pdf (accessed on 16 June 2019)

interesting case with its fame on both energy transition and coal production. Nuclear phase out and supports for renewables seem as the highlighted parts of its transition. Germany has ambitious GHG reduction targets both at EU and national level, which is not surprising considering the fact that it is the largest economy with highest level of GHG emissions among the EU-28. However, the current path and discussions point that it requires additional policies and measures in order to meet these ambitious targets.

CHAPTER 6

POLAND

6.1.Introduction

Poland is a significant example as a country experienced deep economic and political transformations recently. Besides, it is one of the outstanding Member States in terms of its carbon-intense economy and reactions to EU level transition policies. In this chapter, a general overview in terms of its economy, energy, emissions and climate change profile will presented in order to illustrate the national conditions of the country. Then, the transition process of Poland will be examined through national policies, strategies, targets and policy instruments with a special emphasis on the enthusiasm of the country towards an LCE in a comparative manner to that of the EU.

6.2.General Overview

Country-specific characteristics of Poland are highly critical to understand the strategies and policies of the country in its transition process. With the beginning of 1990s, Poland has started to elude the impact of Soviet era and experienced a transformation towards a more democratic and a market-oriented phase. The country has experienced impressive progress in economic and environmental issues since it joined the EU in 2004.[392]

Table 5 shows some major data on Poland's socio-economic and energy indicators. Poland is the sixth most populous Member State of the EU with its 38 million

[392]. Kundzewicz, Zbigniew W. and Matczak, Piotr. "Climate Change Regional Review: Poland", *Wiley Interdisciplinary Reivews: Climate Change*, 3.4 (2012): 297-311

population which accounts for almost one-tenth of EU's whole population.[393] Despite being a transition economy, Poland is the sixth largest economy among EU28.[394] Polish economy has kept growing with a higher level than EU-28 average almost every year since the transformation in 1990. Poland has experienced a resilient performance throughout 2009 financial crisis. In fact, it was the only EU Member State that could preserve its GDP activity at pre-crisis levels.[395] In 2017, total GDP of Poland was composed of services sector by 57,4%, industry by 40,2% and agriculture by 2,4%.[396]

Table 5. Poland Country Profile

Population (2017)	37,975,841
GDP (2017, constant 2010 US$)	600,876,081.84
GHG emissions (2017, without LULUCF, in $ktCO_2e$)	413,781.4
GHG emissions per capita (2016, tCO_2e per capita)	10.5
CO_2 emissions (2017, without LULUCF, in $ktCO_2e$)	336,556.8
Sectoral shares of GHG emissions (2016, without LULUCF)	Energy – 82.7%, Agriculture – 7.7%, Industrial Processes and Product Use – 6.5%, Waste – 3.2%

Source: World Bank Data, UNFCCC, Eurostat

[393] IEA, "Energy Policies of IEA Countries: Poland 2016 Review", OECD/IEA, 2017, p. 17, https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 28 May 2019)

[394] The first five largest economies in the EU are Germany, UK, France, Italy and Spain. The calculation is on the basis of GDP, PPP (purchasing power parity). Please see; The World Bank. "GDP, PPP (current international $)". https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD?year_high_desc=true (accessed on 03 March 2019)

[395] The World Bank, "Poland – Country Overview", http://www.worldbank.org/en/country/poland/overview (accessed on 3 May 2019)

[396] CIA, "World Factbook: Poland", https://www.cia.gov/library/publications/the-world-factbook/geos/pl.html (accessed on 14 June 2019)

Despite its deep transformation, Poland kept its high level of energy use and low level of energy efficiency as a "legacy from the communist system".[397] Over the period 1990-2016, TPES and CO_2 emissions of Poland have followed a fluctuating course while economy has grown almost constantly.[398] The energy mix of the Poland has been dominated by coal. (Figure 7) In 2016, the share of coal was 51% in TPES and almost 80% in electricity production whereas the average share in electricity production was 38.3% for the world and 22.6% for EU.[399]. In the same year, Poland was ranked as ninth among the top coal producers across the world with the share of 1.8%.[400]

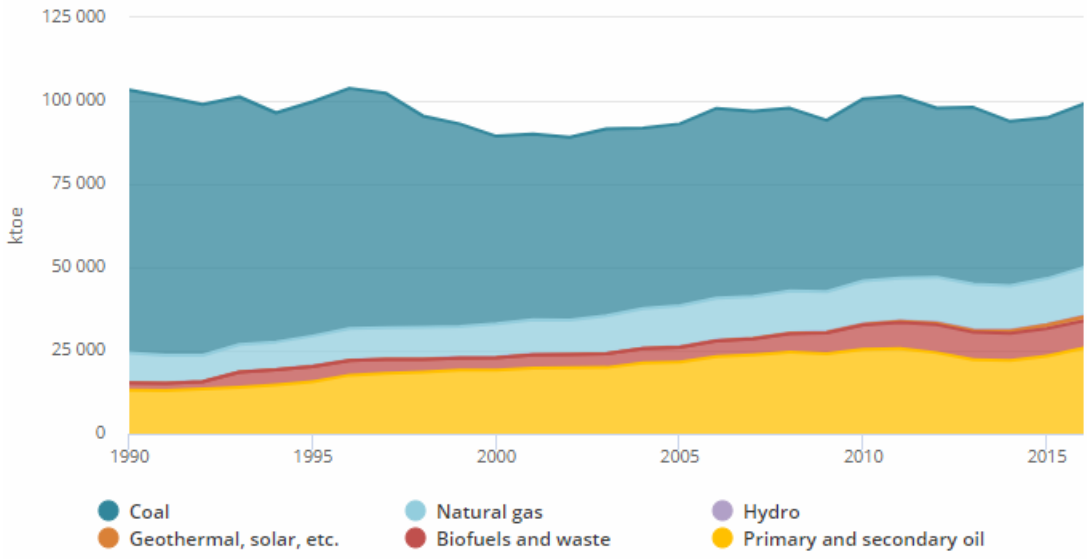

Figure 7. Total Primary Energy Supply (TPES) by source*, Poland 1990-2016

Source: IEA, "Poland", https://www.iea.org/statistics/?country=POLAND&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES (06.05.2019)
*TPES here excludes electricity and heat trade

[397] Kundzewicz, Zbigniew W. and Matczak, Piotr. "Climate Change Regional Review: Poland", *Wiley Interdisciplinary Reivews: Climate Change*, 3.4 (2012): 297-311, p. 298.
[398] IEA, "Poland", https://www.iea.org/countries/Poland/ (accessed on 30 June 2019)

[399] IEA," Statistics", https://www.iea.org/statistics (accessed on 24 March 2019)

[400] IEA, Key World Energy Statistics, 2017, p. 17, https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf (accessed on 7 July 2019)

Actually, the coal industry has been shrunk mostly due to transition to a market economy since the beginning of 1990s. As producing coal has started to lose its profitability and efficiency, some of the mines have been closed.[401] The production in hard coal sector, the type of coal with higher profitability and demand, decreased from 177.4 million tonnes in 1989 to 72.2 million tonnes in 2015. Yet, Poland is still the largest hard coal producer in Europe.[402] Employment in the coal sector has also decreased significantly since 1989. The number of workers employed in the hard coal mining decreased from about 400 thousand to below 100 thousand over the period 1990-2015.[403] On the other hand, Polish government decided to incentivise the coal industry back in 2015.[404]

The shares of oil and natural gas in TPES have increased recently but they are mostly imported sources. On the other hand, the share of renewable sources was 10% in TPES and 13% in electricity generation in 2016.[405] There is no nuclear power in Poland yet, however it is expected that the first nuclear power plant will start operating in 2033. More than half of the energy consumption in Poland is realized mainly by industry and residential sectors and the rest by transport and commercial ones.[406]

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[401] Baran, J., Lewandowski, P., Szpor, A. and Witajewski-Baltviks, J. "Coal Transition in Poland: Options for a fair and feasible transition for the Polish coal sector", IDDRI & Climate Strategies, 2018, p. 9, https://coaltransitions.files.wordpress.com/2018/09/coal_poland_final.pdf (accessed on 20 May 2019)

[402] Euracoal – the voice of coal in Europe, "Poland", https://euracoal.eu/info/country-profiles/poland/ (accessed on 23 May 2019)

[403] Baran, J., Lewandowski, P., Szpor, A. and Witajewski-Baltviks, J. "Coal Transition in Poland: Options for a fair and feasible transition for the Polish coal sector", IDDRI & Climate Strategies, 2018, pp. 9-10, https://coaltransitions.files.wordpress.com/2018/09/coal_poland_final.pdf (accessed on 20 May 2019)

[404] *Ibid., p. 10.*

[405] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, pp. 18-19. https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[406] *Ibid.*

The dominance of coal within TPES has started to be replaced by oil, gas and renewable sources but it comes at a low pace. The highest share belongs to biofuels and waste among renewables.[407] Since Poland has rich coal reserves, decreasing the share of coal and increasing the shares of oil and gas, which are mostly imported from Russia reduces the self-sufficiency of Poland and jeopardize its energy security. Poland is among the least import dependent Member States in terms of energy. The level of import dependency was 28.6% in 2015 while the EU average was 53.5% in the same year.[408]

The country tries to diversify its energy sources and country of origin to reduce its dependence on coal and assure its energy security. This requires diversification of domestic sources like investing in renewable alternatives and new technologies. Although coal is expected to preserve its dominance in the medium term, the government also takes some steps to develop alternative ways. Building the first nuclear power plants, supporting oil exploration by Polish firms, improving the storage capacity for oil and regasification efforts in liquefied natural gas (LNG) terminal are some of these steps.[409]

Despite decoupling of GHG emissions and economic growth, Poland has still a high level of carbon-intensity in its economy because of the high share of coal in the country's energy mix. [410] It GHG emissions had a mostly decreasing path over the period 1990-2002 while it has had a fluctuating course since then.[411] It seems that Polish economy has started to use a more carbon-intense growth path by the end of

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[407] *Ibid., p. 19.*

[408] Euracoal – the voice of coal in Europe, Poland, https://euracoal.eu/info/country-profiles/poland/ (accessed on 23 May 2019)

[409] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 24, https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[410] OECD, "OECD Environmental Performance Reviews: Poland: Highlights", 2015, p. 4, https://www.oecd.org/environment/country-reviews/OECD%20EPR%20Poland%202015%20Highlights%20EN.pdf (accessed on 21 May 2019)

[411] *Ibid.*

2000s due to its high dependence on power sector and abundant domestic coal resources.[412] In 2017, total GHG emissions without LULUCF amounted 413,781.4 $ktCO_2e$, 28% lower than 1990 levels.[413] Almost 83% of GHG emissions stemmed from energy sector while the remaining consisted of agriculture, industrial processes and waste sectors and 83% of total emissions consisted of CO_2 emissions.[414] According to 2018 data, Poland was the third largest CO_2 emitter of the EU.[415] Also, it was ranked twenty-first in terms of CO_2 emissions and thirty-eighth in terms of CO_2 emissions per capita globally.[416]

As a result of intense use of fossil fuels, old infrastructure and prevalence of aged fleet, air pollution is a major environmental problem in Poland.[417] Although impacts of climate change have not been so dramatic there have been some observable negative impacts in terms of agriculture and forestry.[418] Besides, there has been an increase in the number of extreme weather events like hurricanes, drought, tornadoes and hail.[419]

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[412] ESMAP, "Transition to A Low-Carbon Economy in Poland", The International Bank for Reconstruction and Development/The World Bank Group, 2011, p. 2, http://documents.worldbank.org/curated/en/106101468029666763/pdf/771610ESM0P1150LCD0Poland00BN009011.pdf (accessed on 20 May 2019)

[413] UNFCCC. "Summary of GHG Emissions for Poland", https://di.unfccc.int/ghg_profiles/annexOne/POL/POL_ghg_profile.pdf (accessed on 24 June 2019)

[414] *Ibid.*

[415] Eurostat. "Early estimates of CO_2 emissions from energy use", 8 May 2019, https://ec.europa.eu/eurostat/documents/2995521/9779945/8-08052019-AP-EN.pdf/9594d125-9163-446c-b650-b2b00c531d2b (accessed on 9 May 2019)

[416] Global Carbon Atlas, "CO_2 emissions", http://www.globalcarbonatlas.org/en/CO2-emissions (accessed on 3 July 2019)

[417] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 18, https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[418] Kundzewicz, Zbigniew W. and Matczak, Piotr. "Climate Change Regional Review: Poland", *Wiley Interdisciplinary Reivews: Climate Change*, 3.4 (2012): 297-311, pp. 299-230.

[419] Klimada, "Global warming and its impact on Europe and Poland", http://klimada.mos.gov.pl/en/climate-change-in-poland/ (accessed on 2 March 2019)

As the characteristics of its economy, energy profile and the climate change experience indicate, transition to an LCE is significant for Poland for a higher living-standard, air quality and welfare.[420] The policies and strategies that Poland develop in its transition process will be shared below.

6.3.Policies, Strategies and Targets

Poland signed UNFCCC in 1992 and ratified it in 1994, yet there have been no significant attempts to develop a climate change policy in the aftermath. It signed Kyoto Protocol in 1998 and ratified it in 2002. As an Annex I Party[421], Poland chose 1988 as base year.[422] It announced that it would reduce its GHG emissions by 6% below the base year over the period 2008-2012 and it went beyond this target with an almost 29% reduction.[423]

In terms of 2020 mitigation target of the EU, Poland is among the Member States that have right to increase their emissions in certain limits. In this context, Poland is responsible to keep its GHG emissions increase by 14% in non-ETS sectors compared to 2005 levels. On the other hand, Poland has one of the lowest levels of binding GHG emission reduction targets within the context EU's 2030 targets. While the reduction targets among Member States vary from 0% to 40% in 2030 compared to 2005 levels,

[420] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 18, https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[421] Industrialized countries that were members of the Organization for Economic Cooperation and Development (OECD) and countries with economies in transition are accepted as the Annex I Parties under the UNFCCC.

[422] In line with the Article 4.6 of the UNFCCC, Annex I Parties undergoing a process of transition to a market economy are allowed to choose a base year other than 1990 since they have already experienced significant decreases in their GHG emissions through the end of 1980s. Poland chose 1988 as the base year for CO_2, methane (CH_4) and nitrous oxide (N_2O) emissions. It determined that the base year would be 1995 and 2000 for some other gases.

[423] The Republic of Poland, The Sixth National Communication and The First Biennial Report to the Conference of the Parties to the United Nations Framework Convention on Climate Change, Warsaw, 2013, p. 56, https://unfccc.int/sites/default/files/pol_nc6.pdf (accessed on 24 May 2019)

the target for Poland is 7%.[424] Yet, Poland calls this target as "an ambitious challenge" that it may not meet under the current forecasts especially due to continuous rise in transport emissions.[425] Hence, EU warns that Poland needs to strengthen its policies for 2030 as it is projected to miss its target by 10 percentage points although it seems on track in terms of 2020 targets.[426]

Throughout its Presidency in the COP24, Poland emphasized three key priorities: use of technology for sustainable development, a fair transition process for regions and industries and the role of forest management in climate action.[427] It is remarkable that the host country did not call for more ambitious transition policies based on low-carbon energy sources. Poland rather preferred to draw attention to the social and industrial side of the transition in line with its national experiences or challenges.

OECD Environment Director Simon Upton suggests that Poland has presented a good economic and environmental performance after joining the EU and now it is expected to adopt a transition pathway towards a low-emission economy.[428] On the other hand, Polish Energy Minister Kryzstof Tchorzewski states that Polish economic system was based on coal in order to satisfy domestic energy demand after independence from the Soviet Union but now the country has difficulties in following EU climate policy,

[424] EC, "Effort sharing: Member States' emission targets", https://ec.europa.eu/clima/policies/effort_en (accessed on 4 March 2019)

[425] Republic of Poland Ministry of Energy, "Draft National Energy and Climate Plan for the years 2021-2030: Objectives and targets, and policies and measures", 4 January 2019, p. 54, https://ec.europa.eu/energy/sites/ener/files/documents/poland_draftnecp_en.pdf (accessed on 24 May 2019)

[426] European Commission, COM (2018) 716, Report from the Commission to The European Parliament and The Council, EU and Paris Climate Agreement: Taking stock of progress at Katowice COP, pp. 8-10.

[427] COP24, "Key Messages of the Polish Presidency", https://cop24.gov.pl/presidency/key-messages/ (accessed on 25 May 2019)

[428] OECD, "OECD Environmental Performance Reviews: Poland: Highlights", 2015, p. 2, https://www.oecd.org/environment/country-reviews/OECD%20EPR%20Poland%202015%20Highlights%20EN.pdf (accessed on 21 May 2019)

ensuring clean air and responding the needs of fast-growing economy in a sustainable way.[429]

Within this perspective, before following the tracks of national policies of the country, it will be useful to review its interaction with EU level policies. According to a report of Climate Action Network Europe, Poland was ranked lowest among EU Member States in terms of its ambition on climate change policies due to its "stiff opposition to climate action nationally and in the EU."[430] Therefore, Poland has been famous for its low level of enthusiasm in climate change policies at the European level.[431] Its veto on the EU Roadmaps (the Low-Carbon 2050 Roadmap and Energy 2050 Roadmap in 2012)[432] and on Doha Amendment[433] to the Kyoto Protocol, which hindered EU from ratifying the Amendment until 2018[434] can be counted among the sources of this reputation. Besides, Poland used its veto right at the EU level negotiations as a bargaining power in the case of its denial to ratify Doha amendments unless European Commission guaranteed that Poland would receive financial support from EU for its new energy investments based on coal and emission reductions.[435]

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[429] World Nuclear News, "Poland ready for nuclear energy, says minister", 21 November 2018, https://www.world-nuclear-news.org/Articles/Poland-ready-for-nuclear-power,-says-energy-minist (accessed on 13 May 2019)

[430] Climate Action Network Europe (CAN Europe), "Off target: Ranking of EU countries' ambition and progress in fighting climate change", CAN Europe, Brussels, 2018, p. 4.

[431] Jankowska, Karolina and Ancygier, Andrzej. "Poland at the renewable energy policy crossroads: an incongruent Europeanization?", In Solorio, Israel and Jörgens, Helge (eds.), *A Guide to EU Renewable Energy Policy*, Edward Elgar Publishing, Cheltenham, 2017:183-203, p. 183.

[432] Politico Europe, "Poland Blocks Energy Roadmap", 15 June 2012, https://www.politico.eu/article/poland-blocks-energy-roadmap/ (accessed on 21 May 2019)

[433] Doha Amendment refers to the amendment to the Kyoto Protocol adopted in Doha in 2012 in order to establish the second commitment period of the Protocol (2013-2020).

[434] Forbes. "Poland's Path to Tackling Climate Change: 40% Fewer Emissions, $26 Billion Annual Savings by 2050", 10 March 2018, https://www.forbes.com/sites/energyinnovation/2018/03/20/polands-path-to-tackling-climate-change-40-fewer-emissions-26-billion-annual-savings-by-2050/#35619ccb1b56 (accessed on 24 May 2019)

[435] Reuters, "Poland could sign climate deal amendment if EU backs new coal plants", 6 September 2016, https://af.reuters.com/article/africaTech/idAFL8N1BI1MN (accessed on 25 May 2019)

Poland blocked EU's low-carbon roadmap for 2050 on the grounds that having a unified long-term strategy would prevent countries from determining their own strategies.[436] The country's excuses on blocking European roadmaps include sceptical arguments in terms of transition to an LCE and carrying out this transition process at the EU level. Such that Poland objected the wordings of "decarbonisation" and "financial support for renewables" in the Energy Roadmap 2050 claiming that they exclude coal-fired power plants using CCS technology and nuclear power. [437]

Recently, Poland vetoed the long-term strategy of the EU for decarbonisation by 2050 and was supported by Hungary, Estonia and the Czech Republic. The strategy could not be adopted as it required a unanimous vote. Polish Prime Minister Mateusz Morawiecki claimed that Poland vetoed the proposal in order to "protect the interest of Polish businesses and Polish citizens". [438] On the other hand, Director of the NGO Climate Action Network Europe, Wendel Trio, stated that "It's hard to believe that these four governments, driven by the narrow interests of their polluting industries, succeeded in their opposition to a widely-supported and badly-needed increase of the EU's climate ambition".[439]

In addition to the efforts of Poland to be (or not to be) a part of the transition policies at EU level, there are national policies and strategies transforming its economy, energy and climate change. Although there is not a clear commitment and a unified and comprehensive strategy for transition to an LCE there are some policy documents that support transition in accordance with their strategies in the fields of climate, energy, economy and development.

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[436] Politico, "Poland Blocks EU'S Low Carbon Roadmap", 15 June 2012, https://www.politico.eu/article/poland-blocks-eus-low-carbon-roadmap/ (accessed on 26 May 2019)

[437] Politico, "Poland Blocks EU'S Low Carbon Roadmap", 15 June 2012, https://www.politico.eu/article/poland-blocks-eus-low-carbon-roadmap/ (accessed on 26 May 2019)

[438] Forbes, "EU Decarbonisation Plan For 2050 Collapses After Polish Veto", 20 June 2019, https://www.forbes.com/sites/davekeating/2019/06/20/eu-decarbonisation-plan-for-2050-collapses-after-polish-veto/#5076c4bb30b2 (accessed on 2 August 2019)

[439] *Ibid.*

Strategy for Responsible Development 2020 – with an Outlook to 2030, adopted in 2017, draws a general framework for the new development understanding of Poland. "The strategy presents a new development model - a responsible development, i.e. one in which needs of the current generation may be met without diminishing the chances of satisfying the needs of future generations."[440]

On the other hand, **Energy Policy of Poland until 2040 (EPP2040)** is the main document regarding national energy strategy of Poland. The draft version of the EPP2040 was shared for the public consultation towards the end of 2018, which is a significant step in terms of creating public awareness of the energy challenges and policies and making all stakeholders a part of the planning process. Although the consultation process ended on 15 January 2019, the document has not been finalised yet.[441]

Within the context of the draft Strategy, the objective of the Polish energy policy is expressed as "to provide energy security, while ensuring competitiveness of the economy, energy efficiency and reduction of the environmental impact of the energy sector, and with optimum use of Poland's own energy resources".[442] It is planned to ensure energy security mainly through domestic coal reserves. In this respect, coal is expected to preserve its dominance in energy mix while its share in electricity generation is expected to decrease to 60% by 2030 by gradually increasing the use of renewables, mainly through wind and solar power as well as nuclear power by 2033.[443]

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[440] Oleksiuk, Adam. "Poland's Responsible Development Strategy – Challenges, reflections and Remarks", *Asian Journal of Science and Technology*, 9.4 (2018): 7871-7881, p. 7872.

[441] Ministry of Energy, "Draft 'Energy Policy of Poland until 2040", https://www.gov.pl/web/energia/draft-energy-policy-of-poland-until-2040 (accessed on 26 May 2019)

[442] Ministry of Energy, "Extract from the Draft Energy Policy of Poland until 2040 (EPP2040)", Warsaw, 2018, p. 2, https://www.gov.pl/documents/33372/436746/EN_Extract_EPP2040.pdf/ca2760d6-f9ab-9a87-c3a9-61063abe3681 (accessed on 26 May 2019)

[443] Republic of Poland Ministry of Energy, "Draft National Energy and Climate Plan for the years 2021-2030: Objectives and targets, and policies and measures", 2019, p. 10.

In its **National Renewable Energy Action Plan**, Poland has a national target of a 15% share of renewables in the final energy consumption by 2020 in line with the Renewable Energy Directive.[444] Besides, it has sectoral targets and trajectories for electricity, heating and cooling and transport sectors. Whether Poland could reach its 2020 target seems questionable with its current path.[445] However, according to EPP 2030 projections, it is expected to reach 15% in 2020 and 16% in 2030[446] and draft EPP 2040 has a target of 21% renewables in gross final energy consumption by 2030.[447]

In line with the Energy Efficiency Directive of the EU, Poland aims to reduce its primary energy consumption in the amount of 13.6 Mtoe over the period 2010-2020 while keeping its economic growth.[448] On the other hand, draft EPP2040 aims to improve energy efficiency by 23% by 2030 compared to 2007 forecasts.[449] The **4th National Energy Action Plan (2017)** sets out the main policy actions and measures in buildings and public institutions, industry and SMEs and transport in order to achieve energy efficiency targets.[450]

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[444] Republic of Poland Ministry of Economy, "National Renewable Energy Action Plan". 2010, p. 18, https://ec.europa.eu/energy/en/topics/renewable-energy/national-renewable-energy-action-plans-2020 (accessed on 12 June 2019)

[445] Eurostat, "Share of energy from renewable sources", http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_ren&lang=en (accessed on 27 May 2019)

[446] Republic of Poland Ministry of Economy, "Energy Policy of Poland until 2030", Warsaw, 2009, p. 13, http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/laws/1564%20English.pdf (accessed on 27 May 2019)

[447] Republic of Poland Ministry of Energy, "Extract from the Draft Energy Policy of Poland until 2040 (EPP2040)", Warsaw, 2018, p. 2.

[448] Republic of Poland Central Statistical Office (GUS) and The Polish National Energy Conservation Agency (KAPE), "National Report: Energy Efficiency trends and policies in Poland in years 2006-2016", Warsaw, 2018, p. 25, https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on 28 May 2019)

[449] Republic of Poland Ministry of Energy, "Extract from the Draft Energy Policy of Poland until 2040 (EPP2040)", Warsaw, 2018, p. 5.

[450] Republic of Poland Central Statistical Office (GUS) and The Polish National Energy Conservation Agency (KAPE), "National Report: Energy Efficiency trends and policies in Poland in years 2006-

Lastly, as required by the Regulation EU (2018/1999), Poland prepared its draft **National Energy and Climate Plan (NECP)** and submitted it to the European Commission at the beginning of 2019. The draft is also planned to submit for inter-ministerial and the public consultations. The Draft NECP presents detailed information related to the past, current and future developments on Poland's national targets, policies and measures in terms of decarbonisation, energy efficiency, energy security, internal energy market and research, innovation and competitiveness.[451] However, the document have some deficiencies in terms of meeting the general framework presented by the EU as it lacks projections and analytical basis. [452]

The strategic documents illustrate that Poland pursues to boost its economic growth while decreasing GHG emissions, improve energy efficiency, increase the role of renewables in the energy consumption and ensure energy security. However, it is questionable whether these strategies actually represent a transition pathway to an LCE. In this perspective, it could be stated that Poland does not have a clear strategy for transition, but it has supportive energy and climate policies that could be evaluated in terms of transition to an LCE.

Poland's decision to preserve the dominance of the coal in the energy sector seems as a highly critical move in terms of low-carbon transition policies of Poland and also of Europe considering lots of European states announce their coal phase out strategies as already mentioned. It might be acceptable that transition poses a further challenge for Polish economy due to its energy intensity and coal-dependence. Yet, according to the World Bank, "Poland's transition to a low-emissions economy, while not free nor simple, is affordable."[453] However, it requires to take necessary measures as early

2016", Warsaw, 2018, pp. 28-29, https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on 28 May 2019)

[451] Republic of Poland Ministry of Energy, "Draft National Energy and Climate Plan for the years 2021-2030: Objectives and targets, and policies and measures", 2019.

[452] Please see Annex I and to the Regulation (EU) 2018/1999 for the General Framework for the Integrated National Energy and Climate Plans.

[453] The World Bank Poverty Reduction and Economic Management Unit – Europe and Central Asia Region, "Transition to A Low-Emissions Economy in Poland", International Bank for Reconstruction

as possible and implement them in a coordinated manner. Besides, OECD review states that Poland has had really good progress in terms of environmental policies thanks to EU funds; however, there is still a need for long-term strategies and strong measures to promote transition to an LCE.[454]

Kundzewicz and Matczak claim that Poland is not so willing to mitigate its GHG emissions for several reasons:

1. It has a dramatic economic transition in near past.
2. The country is unaware of the impacts of climate change since they are not so observable in that geography.
3. The dominance of coal in its energy mix poses a further challenge. [455]

They also state that Poland's climate change policy is mainly shaped by international agreements and the respond that Poland showed to the EU climate policy since there was no national strategy on its own.[456] And, that means for Poland to try to change the EU policy in line with its own interests or change its economic system in line with the EU policies.[457] Hübner believes that the country has a tendency to stick to its national policy despite being one of EU-28 and this makes it have a layered economic governance structure.[458]

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and Development / The World Bank, Washington, 2011, p. 126. http://siteresources.worldbank.org/ECAEXT/Resources/258598-1256842123621/6525333-1298409457335/report_2011.pdf (accessed on 25 May 2019)

[454] OECD, "OECD Environmental Performance Reviews: Poland: Highlights", 2015, p. 6, https://www.oecd.org/environment/country-reviews/OECD%20EPR%20Poland%202015%20Highlights%20EN.pdf (accessed on 21 May 2019)

[455] Kundzewicz, Zbigniew W. and Matczak, Piotr. "Climate Change Regional Review: Poland", *Wiley Interdisciplinary Reivews: Climate Change*, 3.4 (2012): 297-311, p. 303.

[456] *Ibid.*

[457] *Ibid.*

[458] Hübner, Kurt. "Decarbonization and unlocking national pathways to low carbon emission economies". In Hübner, Kurt (ed.) *National Pathways to Low Carbon Emission Economies: Innovation Policies for Decarbonizing and Unlocking*, New York: Routledge, 2019, 1-44, p. 13.

On the other hand, Karolina Jankowska evaluates Poland's reluctant standing towards EU's ambitious policies and targets as an effort "to reshape the EU policy in order to make it possible for Poland and other Central and Eastern European countries to attain the ambitious EU targets without suffering huge economic losses".[459] In other words, it is observed that Poland has started to shape EU policies more actively together with other Central and Eastern European States in line with their domestic priorities.[460]

On the other hand, Poland is one of the countries that receive support from the European Commission under such initiatives as Coal and Carbon Intensive Regions or Coal Regions Transition. The fact that Member States which are highly dependent on coal and planning to remain that way like Poland benefit from EU funds draws criticism.[461] It is suggested that EU funds can be used for supporting the transition process of those with a clear statement for moving away from coal in their NECPs.[462]

6.4.Policy Instruments

In line with its recent policies and strategies, Poland has started to enrich its policy instruments for transition to an LCE. The main instruments are taxes, energy efficiency certificates, auction scheme and state support in forms of grants, payable aids or feed-in tariffs. In addition to its national instruments, Poland utilises **EU ETS** and plans to utilise flexibility mechanisms under EU Effort Sharing Directive such as LULUCF flexibility, banking, borrowing and transferring AEA units or security reserve.[463]

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[459] Jonkowska, Karolina. "Poland's climate change policy struggle: Greening the East?". In Wurzel, Rüdiger K. W. Connelly, James (eds.). *The European Union as a Leader in International Climate Change Politics*, New York: Routledge, 2011, 163-178, p. 163.

[460] *Ibid.*, p. 175.

[461] Flisowska, Joanna and Moore, Charles. "Just Transition or Just Talk?", CAN Europe and Sandbag, 2019, pp. 19-20, http://www.caneurope.org/docman/coal-phase-out/3545-just-transition-or-just-talk/file (accessed on 29 May 2019)

[462] *Ibid.*, pp. 21-22.

[463] "National Report: Energy Efficiency trends and policies in Poland in years 2006-2016", Warsaw, 2018, p. 56, https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on 28 May 2019)

The main **energy taxes** in Poland are the excise tax on oil products, natural gas and coal coke in all sectors and the tax on electricity output.[464] The fuels are taxed via value-added tax (VAT), excise tax and road tax (for gasoline, diesel and LPG). Excise tax is effective in shaping consumption patterns in terms of fuels and vehicles. On the other hand, the tax on passenger vehicles is not determined according to the environmental criteria, which cause increased use of old vehicles that create higher level of emissions.[465] In addition to these, there is a **carbon tax** which is one of the oldest carbon tax practices yet one of the lowest carbon price in Europe.[466] In terms of effective tax rates on energy use, road transport sector and agriculture and fishing had the highest level of effective tax rates according to 2015 data.[467] On the other hand, the effective tax rates for industry, residential and electricity sectors are really low or zero due to the exemptions in these sectors.[468]

On the other hand, Poland had the right to apply exemptions or tax reductions for a certain transitional period despite the minimum tax rates regulated under European Energy Taxation Directive. In this respect, the country enjoyed different level of tax exemptions for different energy sources and electricity up to different dates last of which was 1 January 2012. Such a privilege was entitled to Poland since it was one of the transition economies and this kind of a tax burden could create significant difficulties for its citizens and economy.[469]

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[464] OECD, "Taxing energy use 2018: Poland", OECD Publishing, Paris, 2018, p. 6, https://www.oecd.org/tax/tax-policy/taxing-energy-use-2018-poland.pdf (accessed on 25 May 2019)

[465] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 26, https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[466] Stepanov, Ilya and Albrecht, Johan. "Decarbonization And Energy Policy Instruments in The EU: Does Carbon Pricing Prevail?", HSE Working papers, WP BRP 211/EC/2019. National Research University Higher School of Economics, 2019, https://wp.hse.ru/data/2019/02/14/1192631785/211EC2019.pdf (accessed on 29 May 2019)

[467] OECD, "Taxing energy use 2018: Poland", OECD Publishing, Paris, 2018, p. 3, https://www.oecd.org/tax/tax-policy/taxing-energy-use-2018-poland.pdf (accessed on 25 May 2019)

[468] *Ibid.*, pp. 6-7.

[469] EC. "Council Directive 2004/74/EC of 29 April 2004 amending Directive 2003/96/EC as regards the possibility for certain Member States to apply, in respect of energy products and electricity,

There are ongoing **fossil fuel subsidies** in Poland which harm its transition process. Although Poland applies excise taxes on coal and natural gas since 2012 and 2013 respectively in line with the abolition of exemptions provided by EU Energy Taxation Directive (2003/96/EC), there are still significant level of exemptions on fossil fuels.[470] Household usage of coal is not subjected to environmental taxation. In this respect, OECD suggests a tax "to reinforce government's subsidy programmes to replace inefficient heating systems in households and its plans to move towards district heating."[471]

Poland has been working on replacing the old low-efficient coal-fired power plants with new ones that could support emissions reductions and sets strict environmental standards for these new plants.[472] In 2016, the country announced that it would close 8 of its 22 hard coal mines.[473] On the other hand, state support for coal still continues mainly in the form of funding pension for retired miners, recapitalisation of the mining sector and state aid on monitoring the sector. Over the period 2007-2015, the total amount of state support was 65.5 PLN (16.1 billion EUR) while contribution of the sector to the public budget was 64.5 billion PLN (15.9 billion EUR).[474]

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temporary exemptions or reductions in the levels of taxation", 2004, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004L0074&from=EN (accessed on 30 May 2019)

[470] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 26. https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[471] IEA. "Energy Policies of IEA Countries: Poland 2016 Review". 2017, p. 26. https://webstore.iea.org/energy-policies-of-iea-countries-poland-2016-review (accessed on 21 May 2019)

[472] GUS and KAPE, National Report: Energy Efficiency trends and policies in Poland in years 2006-2016", Warsaw, 2018, p. 57, https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on 28 May 2019)

[473] European Commission, Platform on Coal and Carbon-Intensive Regions: Terms of Reference, p. 5, https://ec.europa.eu/energy/sites/ener/files/crit_tor_fin.pdf (accessed on 29 May 2019)

[474] Baran, J., Lewandowski, P., Szpor, A. and Witajewski-Baltviks, J. "Coal Transition in Poland: Options for a fair and feasible transition for the Polish coal sector", IDDRI & Climate Strategies, 2018, p. 12, https://coaltransitions.files.wordpress.com/2018/09/coal_poland_final.pdf (accessed on 20 May 2019)

It is suggested that Poland could use **state support** as a compensatory tool in order to minimise the adverse effects of the transition on coal industry.[475] Using financial support for ex-miners who voluntarily quit their job and looks for a new job or creating employment options in alternative sectors like manufacturing and construction for ex-miners are proposed as alternative options in this context. [476]

In addition to price-based ones, Poland uses regulatory policy instruments as well. The main instrument here is **energy efficiency certification system (white certificate scheme)** which is applied as following;

> A statutory obligation has been imposed on energy companies selling electricity, heat or natural gas to end consumers, to carry out a project aimed at improving energy efficiency on the end-consumer side or to obtain certificates confirming specific quantities of final energy savings (white certificate) and submit them to the President of the Energy Regulatory Office (URE) for redemption. [477]

There are also other supportive schemes including **energy efficiency improvement agreements** through which public authorities can accomplish and finance enterprises while meeting their obligation to purchase and use energy efficient goods and services.[478]

On the other hand, there are some support mechanisms for renewable energy as well. Poland uses an **auction system** in order to increase the use of renewables. In this scheme, government determines total capacity for renewable energy and a price ceiling for the auction annually. The system ensures that the areas and sectors which are appropriate for renewable energy in terms of economic, environmental and climate

[475] *Ibid.*. 33-35.

[476] *Ibid.*

[477] Republic of Poland Ministry of Energy, "Draft National Energy and Climate Plan for the years 2021-2030: Objectives and targets, and policies and measures", 4 January 2019, p. 94, https://ec.europa.eu/energy/sites/ener/files/documents/poland_draftnecp_en.pdf (accessed on 24 May 2019)

[478] GUS and KAPE, National Report: Energy Efficiency trends and policies in Poland in years 2006-2016", Warsaw, 2018, p. 25, https://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-poland.pdf (accessed on 28 May 2019)

conditions take advantage of the support granted on the basis of auctions.[479] Also the support system is planned to include different forms other than actions such as feed-in tariff and feed-in premium system, grants or repayable aid.[480] Thus, it is expected to increase the share of renewables by making them attractive and affordable for producers and investors.

Transport sector carries a special importance for transition of Poland since emissions in this sector have been rising. Therefore, it is a critical area to use policy instruments effectively. Poland plans to introduce **new CO_2 emissions standards** in order to create a shift to low-carbon vehicles by encouraging manufacturers to produce electric and hybrid cars and replacing the production of the vehicles which use carbon-intense fuels gradually with the help of additional supports including fees and tariffs and investments interventions.[481]

6.5.Conclusion

In conclusion, in this chapter, transition policies and policy instruments of Poland have been reviewed in line with international developments and EU level policies. It has been seen that Poland has a differentiated place in comparison to most of the Member States including the UK and Germany both in terms of its national conditions and its interaction with EU level transition policies. Its impressive economic performance, high level of dependency on coal and low level of dependency on energy imports seems to be the main variables that shape Poland's attitude towards ambitious transition policies at EU level.

[479] Republic of Poland Ministry of Energy, "Draft National Energy and Climate Plan for the years 2021-2030: Objectives and targets, and policies and measures", 4 January 2019, p. 68, https://ec.europa.eu/energy/sites/ener/files/documents/poland_draftnecp_en.pdf (accessed on 24 May 2019)

[480] *Ibid.*, p. 69.

[481] *Ibid.*, pp. 55-86.

CHAPTER 7

TURKEY

7.1.Introduction

In this chapter, policies, strategies and policy instruments of Turkey will be examined in an LCE perspective. Turkey has a differentiating place in the scope of the study since it is a candidate state of the EU. The examination of the transition process of Turkey will be useful within the context of the study in terms of showing the interaction between EU level policies over national policy framework of a candidate country. Similar to Poland, Turkey does not have a clear commitment or strategy on transition to an LCE. Therefore, its main climate and energy policy framework will be reviewed from a low-carbon transition perspective based on its national characteristics.

7.2.General Overview

Before going into the details of national policies and policy instruments, it would be useful to illustrate general characteristics of Turkey in terms of its economic outlook, energy mix, GHG emission profile and climate challenges. Table 6 shows some major data in this perspective. Turkey had the seventeenth largest economy[482] and nineteenth largest population[483] of the world according to 2017 data. It would be the second most populous Member States after Germany if it were an EU Member.

[482] The World Bank, "Gross domestic product 2017", https://databank.worldbank.org/data/download/GDP.pdf (accessed on 15 June 2019)

[483] The World Bank, "Population, total", https://data.worldbank.org/indicator/SP.POP.TOTL?locations=TR&most_recent_value_desc=true (accessed on 15 June 2019)

Table 6. Turkey Country Profile

Population (2017)	80,745,020
GDP (2017, constant 2010 US$)	1,206,040.06
GHG Emissions (2017, $ktCO_2e$, without LULUCF)	526,253.0
GHG emissions per capita (2016, tCO_2e per capita)	6.4
CO_2 emissions (2017, $ktCO_2e$, without LULUCF)	425,329.6
Sectoral shares of GHG emissions (2016, without LULUCF)	Energy – 72.2%, Industrial processes and product use – 12.6%, Agriculture – 11.9%, Waste 3.3%

Source: World Bank Data, UNFCCC, Eurostat

Different from previously examined countries which are all high income economies, Turkey is an upper-middle-income economy according to World Bank classification.[484] Turkey has showed an impressive performance in terms of macroeconomic indicators and fiscal stability and improved its national income level since 2000s.[485] GDP level of the country has significantly increased by an average of 6,8% over the period 2014-2017 which is way above the average growth rate of EU-28, i.e. 1,6%, over the same period.[486] The sectoral composition of GDP in 2017 included services (60,7%), industry (32,3%) and agriculture (6,8%).[487]

[484] According to World Bank's country classification by income, countries of which gross national income (GNI) per capita is between $3,996 and $12,375 are classified as upper-middle-income countries while those with GNI per capita higher than $12,375 are classified as high-income economies. For further information please visit; World Bank, " World Bank Country and Lending Groups", https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups (accessed on 9 July 2019)

[485] OECD, "OECD Economic Surveys: Turkey", OECD Publishing, Paris, 2018, p. 13, http://www.oecd.org/eco/surveys/Turkey-2018-OECD-economic-survey-overview.pdf (accessed on 9 July 2019)

[486] The World Bank, "GDP growth (annual %)", https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2017&locations=TR&start=2010&view=chart (accessed on 20 June 2019)

[487] CIA, "World Factbook: Turkey", https://www.cia.gov/library/publications/the-world-factbook/geos/tu.html (accessed on 16 June 2019)

Although it has had a remarkable economic performance over past 20 years, since 2018, Turkish economy has experienced severe challenges including a deep depreciation of Turkish Lira, high level of inflation, a significant decrease in investments and domestic demand.[488]

Over the period 1990-2016, TPES followed a similar path to economic growth and significantly increased. TPES mainly consisted of natural gas, oil and coal respectively, of which total share was almost 86% in 2016. (Figure 8) Although the share of renewables in TPES has been increasing, they are still very limited. On the other hand, renewables have started to be a significant source for electricity generation. In 2016, the share of renewables, mainly hydro and wind, was around 33% while the shares of coal and gas were around 34% and 33% respectively. [489]

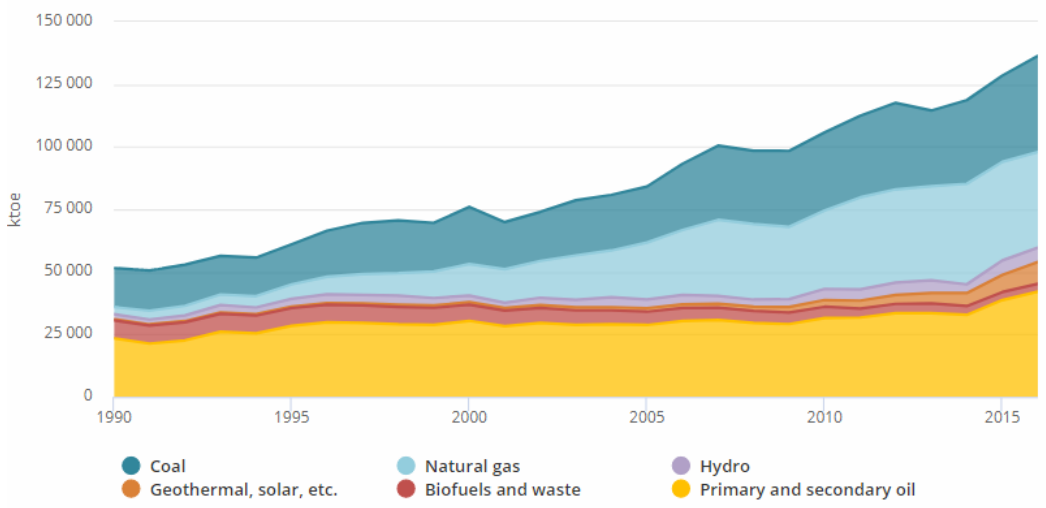

Figure 8: Total Primary Energy Supply (TPES) by source*, Turkey 1990-2016

Source: IEA, "Statistics", https://www.iea.org/statistics/?country=TURKEY&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=chart&dataTable=BALANCES (accessed on 18 June 2019)
*TPES here excludes electricity and heat trade

[488] World Bank, "The World Bank in Turkey: Country Snapshot", April 2019, http://pubdocs.worldbank.org/en/188761555342422504/Turkey-Snapshot-Spring-2019.pdf (accessed on 09 June 2019)

[489] IEA, "Statistics", https://www.iea.org/statistics/?country=TURKEY&year=2016&category=Energy%20supply&indicator=TPESbySource&mode=table&dataTable=BALANCES (accessed on 15 June 2019)

Furthermore, Turkey has took initial steps to add nuclear power among its domestic energy sources. The country initiated the construction of its first nuclear power plant, Akkuyu Nuclear Plant. It is expected that Akkuyu Power Plant begin operating in 2023 while the constructions of two other plants will start in the same year.[490] With these power plants, it is planned that around 10% of total electricity will be generated from nuclear energy.[491]

Turkey has a highly import-dependent and fossil fuel-driven energy profile, which has a negative impact on both energy security and foreign trade balance. In 2016, the country met most of its coal consumption and almost all of oil and gas consumption from imported sources.[492] (Figure 9) In the same year, Turkey was ranked as fifth among natural gas importing countries, seventh among coal importing countries and eighth among oil importing countries.[493] Although Turkey has a similarity with Poland in terms of intense usage of fossil fuels in its energy mix, different from Poland, Turkey mostly use imported sources instead of domestic reserves. In order to increase the weight of domestic resources in its energy profile, the country plans to increase the share of renewables and search for oil, natural gas and coal. [494]

[490] T.C. Enerji ve Tabii Kaynaklar Bakanlığı, "Ülkemizde ve Dünyada Nükleer Santraller", https://www.enerji.gov.tr/tr-TR/Sayfalar/Ulkemizde-ve-Dunyada-Nukleer-Santraller (accessed on 20 August 2019)

[491] Republic of Turkey Ministry of Environment and Urbanization, "Seventh National Communication of Turkey under the UNFCCC", 2018, p. 91, https://unfccc.int/sites/default/files/resource/496715_Turkey-NC7-1-7th%20National%20Communication%20of%20Turkey.pdf (accessed on 22 July 2019)

[492] IEA, "Energy Policies of IEA Countries: Turkey", OECD/IEA, 2016, s. 30, https://www.iea.org/publications/freepublications/publication/EnergyPoliciesofIEACountriesTurkey.pdf (accessed on 9 July 2019)

[493] IEA, "Key World Energy Statistics", 2017, pp. 15-27.

[494] Republic of Turkey Ministry of Development, Medium Term Programme 2018-2020, Ankara, 2017, p. 41, http://www.sbb.gov.tr/wp-content/uploads/2018/11/Medium_Term_Programme_2018-2020.pdf (accessed on 20 June 2019)

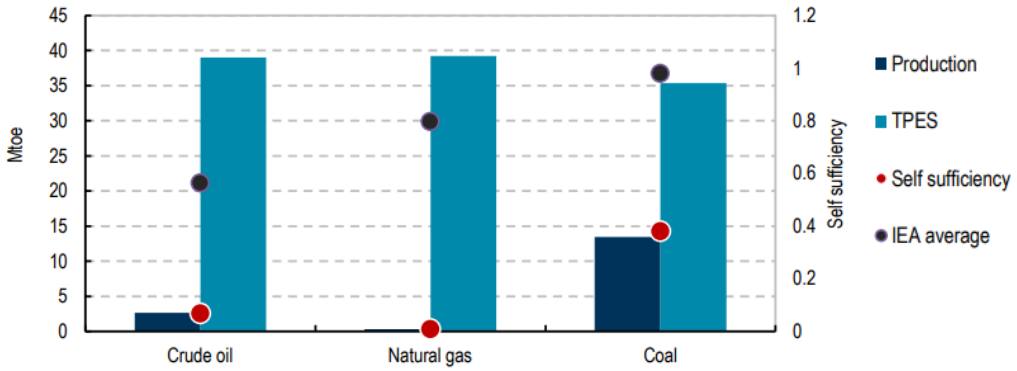

Figure 9: Production and Self Sufficiency 2015

Source: IEA, "Turkey – Energy System Overview", https://euagenda.eu/upload/publications/untitled-69960-ea.pdf (accessed on 15 June 2019)

Growing economy, population and urbanization have caused GHG emissions follow an increasing trend in Turkey.[495] OECD Environmental Performance Review for Turkey reports that "strong economic and population growth has come at the price of increasing energy consumption, GHG emissions and air pollution". [496] Although Turkey is responsible for 0.7% of total historical emissions, emissions of Turkey keeps accelerating and it does not seem to have a peak in near future according to the INDC projection.[497]

In 2017, GHG emissions of Turkey was 526,253.0 $ktCO_2e$, which shows a 140,08% increase in GHG emissions compared to 1990 levels.[498] According to details of this

[495] Technical Assistance for Developed Analytical Basis for Formulating Strategies and Actions towards Low Carbon Development, "Activity 1.1.1 Review and analysis of the status of the climate related strategies, policies, plans, and legislation (Status Report)", Ankara 2017, p. 16, http://www.lowcarbonturkey.org/wp-content/uploads/2017/12/Questionnaire-for-WG-workshop_1.pdf (accessed on 20 July 2019)

[496] OECD, Environmental Performance Reviews: Turkey 2019, OECD Publishing, Paris, 2019, p. 61, https://www.oecd.org/turkey/oecd-environmental-performance-reviews-turkey-2019-9789264309753-en.htm (accessed on 20 June 2019)

[497] "Republic of Turkey Intended Nationally Determined Contribution", 2015, p. 2, https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Turkey/1/The_INDC_of_TURKEY_v.15.19.30.pdf (accessed on 16 June 2019)

[498] UNFCCC, "Summary of GHG Emissions for Turkey", https://di.unfccc.int/ghg_profiles/annexOne/TUR/TUR_ghg_profile.pdf (accessed on 2 July 2019)

data, 72.2% of total GHG emissions was caused by energy sector while the remaining was caused by industrial processes and product use, agriculture and waste sectors. Within the energy sector, energy has an almost 41% share while transport, manufacturing industries and construction, and others respectively followed it. CO_2 emissions accounted for around 81% of total GHG emissions.[499] In 2017, Turkey was ranked fifteenth in terms of CO_2 emissions and as sixth-eighth in terms of CO_2 emissions per capita.[500]

Turkey faces some severe effects of climate change. These effects include extreme weather events, precipitation regime changes, drought and reduction of efficiency in agriculture and livestock.[501] Besides, it is expected that Turkey will be exposed to more intense effects in the future since it is located within the Mediterranean Basin.[502] Turkey has been developing certain climate and energy policies in order to mitigate such risks posed by climate change and increase its vulnerability against these risks. Following part will review these policies at national, EU and international level.

7.3.Policies, Strategies and Targets

After demonstrating the national characteristics of Turkey, a general review of its experiences with international and EU-level climate and energy policies and its national policy framework in these fields will be shared. Turkey's late participation

[499] UNFCCC, "Summary of GHG Emissions for Turkey", https://di.unfccc.int/ghg_profiles/annexOne/TUR/TUR_ghg_profile.pdf (accessed on 2 July 2019)

[500] Global Carbon Atlas, "CO_2 Emissions", http://globalcarbonatlas.org/en/CO2-emissions (accessed on 18 June 2019)

[501] The Turkish Foundation for Combating Soil Erosion, for Reforestration and the Protection of Natural Habitats (TEMA), Dünya Doğayı Koruma Vakfı (WWF), "İklim Değişikliğinin Yerel Etkileri Raporu", 2015, p. 9, http://www.tema.org.tr/folders/14966/categorial1docs/97/Yerel%20Etkiler%20Analizi_v11.pdf (accessed on 19 June 2019)

[502] International Finance Corporation (IFC), European Bank for Reconstruction and Development (EBRD) *Climate Risk Case Study: Pilot Climate Change Adaptation Market Study: Turkey*, 2013, pp. 6-7, https://www.climateinvestmentfunds.org/sites/cif_enc/files/meeting-documents/turkey-adaptation-study-final_02-2014_0.pdf (accessed on 19 June 2019)

in international climate regime and its candidate status for EU membership differentiates it from previous country examples.

The country became a Party to the UNFCCC in 2004 and to Kyoto Protocol in 2009. Initially, Turkey was included within both Annex-I and Annex-II lists as other OECD members. However, Turkey demanded to be removed from both lists on the grounds that it was not one of the industrialized countries which had a higher responsibility in historical GHG emissions as well as a "moral obligation to mitigate their emissions and provide climate finance for mitigation and adaptation in developing countries so as to better enable them to leapfrog into low-carbon, resilient economies."[503] In 2002, Turkey was removed from Annex-II and remained in the Annex-I on the condition that it has a differentiated place with special circumstances. [504] Thus, Turkey is accepted as "an Annex I country on a different development level than other OECD members".[505]

On the other hand, Turkey is not obliged to reduce or stabilize its GHG emissions under Kyoto Protocol since it was not an UNFCCC Party when the Protocol was signed.[506] Yet, later, despite being a Party to the Protocol since 2009, Turkey did not join the second commitment period (2013-2020) either. Yeldan and Voyvoda states that "When this process was combined with Turkey's fossil fuel-oriented rapid development policies and its strategy to prioritize coal use, Turkey's efforts towards climate change mitigation waned."[507]

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[503] Türkeş, Murat, "Climate change policy and the cost of inaction: an institutional account from Turkey". *New Perspectives on Turkey*. 56 (2017): 133-139, p. 134.

[504] Decision 26/CP.7 on Amendment to the list in Annex II to the Convention (9 November 2001), Report of the Conference of the Parties on its seventh session, held at Marrakesh from 29 October to 10 November 2001", FCCC/CP/2001/13/Add.4, 21 January 2002.

[505] Turhan, E. et al. "Beyond Special Circumstances: Climate Change Policy in Turkey 1992–2015," *Wiley Interdisciplinary Reviews: Climate Change*. 7.3 (2016): 448-460, p. 449.

[506] Türkeş, Murat, "Climate change policy and the cost of inaction: an institutional account from Turkey". *New Perspectives on Turkey*. 56 (2017): 133-139, p. 136.

[507] Yeldan, Erinç and Voyvoda, Ebru. "Low carbon development pathways and priorities for Turkey". WWF- Turkey and İstanbul Policy Center, 2015.

Turkey has signed Paris Agreement in 2016 but not ratified it yet.[508] Different from UNFCCC and Kyoto Protocol, Paris Agreement adopted a classification of developed and developing Parties instead of Annex system; however, the scope of the classification has not been clarified yet. That creates an uncertainty for Turkey as a developing country with special circumstances but listed among developed ones. Turkey demands two points to be clarified before it signs the Agreement: access to financial and technical support and exemption from the obligation of setting absolute emission reduction targets.[509] Since Turkey still remains in the Annex I, it has a concern about being regarded as a developed country. That's why, Turkey applied UNFCCC Secretariat for its name to be removed from Annex I last year, but throughout the negotiations on this issue during COP24, Parties could not reach an agreement.[510]

Regarding its climate change policies, Turkey constantly highlights that it pursues these policies as a developing country and its industry-based growth model requires access to climate finance in order to ensure cost-effective mitigation measures.[511] The country declared its intention to participate in collective efforts within international

https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/Low_Carbon_Development_Pathways_for_Turkey_October_2015_FullStudy.pdf (accessed on 20 August 2019)

[508] As of 21 August 2019, Turkey is one of the eleven states which have not ratified the Paris Agreement yet. For the list of states that signed and ratified the Agreement, please see; United Nations Treaty Collection. "Paris Agreement", https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en (accessed on 21 August 2019)

[509] T.C. Çevre ve Şehircilik Bakanlığı, "Bakan Kurum İklim Değişikliği ve Hava Yönetimi Koordinasyon Kurulu Toplantısına Katıldı", 8 October 2019, https://csb.gov.tr/bakan-kurum-iklim-degisikligi-ve-hava-yonetimi-koordinasyon-kurulu-toplantisina-katildi-bakanlik-faaliyetleri-25315 (accessed on 20 July 2019)

[510] İklim Haber, "Türkiye'nin Meselesi Çözüme Kavuşmadı: Türkiye, Halen EK-1 Üyesi ve Finansa Erişim Sorunu Devam Ediyor", December 2018, https://www.iklimhaber.org/turkiyenin-meselesi-cozume-kavusmadi-turkiye-halen-ek-1-uyesi-ve-finansa-erisim-sorunu-devam-ediyor/ (accessed on 21 July 2019)

[511] T.C: Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. On Birinci Kalkınma Planı (2019-2023), 2019, p. 12, http://www.sbb.gov.tr/wp-content/uploads/2019/07/OnbirinciKalkinmaPlani.pdf (accessed on 20 August 2019)

climate change regime, but again with reference to "its national circumstances and capabilities".[512] In this respect, the attitude of Turkey within international climate change regime draws criticism. Turhan et al. evaluates that;

> As an issue that could entail major restructuring in the economy and policies in various sectors ranging from energy to industry, climate change has been perceived as a profound challenge to the priorities of Turkey's developmental state. Hence, despite its reiterated willingness to contribute to global efforts, Turkey has continued to drag its feet in adopting mitigation commitments over the years. Difficulties in adjusting the country's overall policy priorities to the emerging paradigm of low carbon development can explain Turkey's foot-dragging stance.[513]

Murat Türkeş argues that Turkey has a rather distant attitude towards the general trend within the new climate regime under Paris Agreement and this could "make Turkey less vocal and less decisive on the global arena".[514] Furthermore, Semra Cerit Mazlum suggests that Turkey's choice of acting alone during climate negotiations instead of participating a group restrains it from reaching its objectives and it will get more alone if it continues to pursue a strategy on preserving its "special circumstances" under the new climate regime.[515]

On the other hand, through the beginning of this new climate regime, Turkey has made an emission reduction commitment for the first time with its **INDC**.[516]. Within this context, Turkey committed to reduce its GHG emissions up to 21% by 2030 compared to business-as-usual (BAU) scenario.[517] This target means a 356% increase in emissions compared to 1990 levels or a 150% increase compared to 2010 levels

[512] "Republic of Turkey Intended Nationally Determined Contribution", 2015, p. 1, https://www4.unfccc.int/sites/submissions/INDC/Published%20Documents/Turkey/1/The_INDC_of_TURKEY_v.15.19.30.pdf (accessed on 16 June 2019)

[513] Turhan, E. et al. "Beyond Special Circumstances: Climate Change Policy in Turkey 1992–2015," *Wiley Interdisciplinary Reviews: Climate Change*. 7.3 (2016): 448-460, p. 453.

[514] Türkeş, Murat, "Climate change policy and the cost of inaction: an institutional account from Turkey". *New Perspectives on Turkey*. 56 (2017): 133-139, p. 138.

[515] Mazlum, Semra Cerit. "Turkey and post-Paris climate change politics: still playing alone". *New Perspectives on Turkey*. 56 (2017): 145-152, p. 148.

[516] The contribution of Turkey is still called as "INDC" instead of "NDC" as it is not a Party to the Paris Agreement yet.

[517] UNFCCC, "Republic of Turkey Intended Nationally Determined Contribution", 2015, p. 2.

(excluding LULUCF), which causes the target to be evaluated as "critically insufficient" in line with the target of limiting global surface temperature increase by 2°C or even 1,5°C.[518] Turkey, on the other hand, states that its INDC target would facilitate its transition to a low-carbon development path.[519]

In addition to the international developments, it will be helpful to examine Turkey's energy and climate policies with reference to EU-Turkey relations. Besides being a candidate state, Turkey is a significant trade partner[520] and a critical energy transition route for the EU.[521] The country has been a part of Customs Union with EU since the Ankara Agreement signed in 1963 and of which transition phase was completed in 1996.[522] Turkey was declared as a candidate state in 1999 and accession negotiations between the EU and Turkey started in 2005. As it is known, candidate states are required to integrate certain EU legislation, called "*acquis*", into their national legal system before accession. The regulations related to energy and environment policies are included in the Chapter 15 and Chapter 27 respectively.[523]

With respect to the legislation under these chapters, the accession process has contributed to the development of the country's energy and climate policy framework

[518] Climate Action Tracker, "Turkey", https://climateactiontracker.org/countries/turkey/ (accessed on 20 July 2019)

[519] UNFCCC, "Republic of Turkey Intended Nationally Determined Contribution", 2015, p. 2.

[520] Eurostat, "Turkey-EU – international trade in goods statistics", March 2019, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Turkey-EU_-_international_trade_in_goods_statistics#EU_and_Turkey_in_world_trade_in_goods (accessed on 21 July 2019)

[521] Republic of Turkey Ministry of Foreign Affairs Directorate for EU Affairs, "Chapter 15 – Energy", https://www.ab.gov.tr/80_en.html (accessed on 22 July 2019)

[522] Republic of Turkey Ministry of Foreign Affairs Directorate for EU Affairs, "Customs Union", https://www.ab.gov.tr/customs-union_46234_en.html (accessed on 22 July 2019)

[523] Chapter 15 aims to improve competitiveness, strengthen energy security and protect the environment through regulations on state support in the energy sector, internal energy market, energy efficiency and nuclear energy. Chapter 27, on the other hand, includes legal acts on environmental protection, industrial pollution, waste management and water and air quality in order to protect the environment through preventive measures. For further information please see; EUR-Lex, "Summaries of EU Legislation", https://eur-lex.europa.eu/browse/summaries.html (accessed on 18 July 2019)

to a certain extent. Up until now, Turkey has developed new regulations in the fields of liberalizing and restructuring energy market for electricity and gas, renewable energy, energy efficiency and nuclear energy. [524] Energy has become an important topic for EU-Turkey relations since Turkey has a critical geographic role in terms of EU's energy supply coming from Eastern natural gas producing countries through interconnection projects.[525] Besides, regarding environmental policies, Turkey has adopted legislation that improves its legal and institutional capacity on water quality, industrial pollution, waste management and emission control.[526]

Furthermore, as a candidate state, Turkey has benefited from EU funds including Instrument for Pre-Accession Assistance (IPA) in order to finance its climate and energy-related policies. Turkey was the largest recipient of the climate finance provided by EU institutions over the period 2013-2016.[527] In fact, there is a recent project co-financed by EU and Turkey and called "**Technical Assistance for Developed Analytical Basis for Formulating Strategies and Actions towards Low Carbon Development**" which can be evaluated as a step getting Turkey closer to a low-carbon path. The project mainly aims to construct a basis for possible low-carbon strategies and actions in the long-term in line with relevant EU legislation. Furthermore, it is expected that this project would enable Turkey to review its current climate change policies, to prepare sectoral impact analysis for EU acquis on climate, to determine the costs and emissions reduction potentials for the buildings, waste,

[524] Republic of Turkey Ministry of Foreign Affairs Directorate for EU Affairs, "Chapter 15 – Energy", https://www.ab.gov.tr/80_en.html (accessed on 18 July 2019)

[525] *Ibid.*

[526]Republic of Turkey Ministry of Foreign Affairs Directorate for EU Affairs, "Chapter 27 – Environment", https://www.ab.gov.tr/chapter-27-environment_92_en.html (accessed on 18 July 2019)

[527] Dejgaard, Hans Peter and Appelt, Jonas. "Analysis of Climate Finance Reporting of the European Union", Act Alliance Analysis, 2018, pp. 4-5, https://actalliance.eu/wp-content/uploads/2018/04/Analysis-of-the-climate-finance-reporting-of-the-EU.pdf (accessed on 20 July 2019)

transport and agriculture sectors and to develop the required basis for a low-carbon pathway.[528]

Therefore, it is possible to say that EU accession period has contributed to modernization of Turkish energy sector. On the other hand, Turhan et al. claim that EU accession process could be seen as a driving force for the first years of the accession negotiations in terms of further efforts in Turkey's national climate change policy; however, "national developmental aspirations always overwrote climate policy ambitions."[529] Although there are ongoing projects, accession negotiations are not dynamic now as they were once. Even they "come to a standstill" as stated in the General Affairs Council decision.[530] I

As the international developments and EU accession process illustrated Turkey has a highly differentiated place from previous country examples in terms of its participation in international climate regime and its experience with low-carbon transition policies. Although there is no national strategy document or action plan on a low-carbon transition yet, there are references of such an intention or supportive actions for such a transition on various national policies and policy documents some of which will be reviewed below.

Turkey does not have a long-term strategy like previously studied countries have, except for its **Long-Term Development Strategy (2001-2023)** which is about to expire. The Long-Term Strategy aims to direct social and economic transformations that Turkey would experience on the basis of global developments and consider environmental protection within the scope of these transformations as well.[531]

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[528] Technical Assistance for Developed Analytical Basis for Formulating Strategies and Actions Towards Low Carbon Development, "Project Summary", http://www.lowcarbonturkey.org/project-summary/ (accessed on 21 July 2019)

[529] Turhan, E. et al. "Beyond Special Circumstances: Climate Change Policy in Turkey 1992–2015," *Wiley Interdisciplinary Reviews: Climate Change* . 7.3 (2016): 448-460, p. 449.

[530] Council of the European Union General Affairs Council, "Council Conclusions on enlargement and Stabilisation and Association Process", 26 June 2018, https://www.consilium.europa.eu/media/35863/st10555-en18.pdf (accessed on 7 June 2019)

However, the Strategy does not include detailed policy steps or targets towards climate and energy issues. Rather, it sets targets related to economic and social indicators like national income or population. Besides, since the period of the strategy will come to an end in the near future and international efforts are gathered around long-term transition planning, Turkey needs a new long-term strategy.

The recent national strategies also set their targets for the year 2023 as it will be the 100th anniversary of the foundation of the Republic of Turkey. There are some significant references regarding climate change and energy policies in the **Eleventh Development Plan (2019-2023)**, According to the Plan, Turkey will improve its social and economic strength against the impacts of climate change and conduct emissions mitigation policies in various sectors such as energy, industry, transportation, buildings, waste, agriculture and forestry in line with its national circumstances.[532] Furthermore, it is planned to introduce sustainable cities by developing mobilized transport systems, climate-resistant infrastructure and sustainable production and consumption scheme through joint efforts of relevant stakeholders.[533] Regarding energy sector, the Plan aims to ensure continuous, sustainable and secure energy supply with affordable prices by increasing the investments for renewable energy sources, improving its infrastructure for natural gas, adding nuclear energy to its energy mix, developing clean coal technologies and benefiting from domestic lignite reserves within environmental standards.[534]

Investing in high-carbon energy sources like coal and lignite while renewable energy sources could be used in a cost-effective manner draws criticism considering the

[531] Republic of Turkey Prime Ministry State Planning Organization, "Long-Term Strategy and Eighth Five-Year Development Plan (2001-2005)", Ankara, 2001, pp. 21-22, http://www.sbb.gov.tr/wp-content/uploads/2018/11/Eight-Five-Year-Development-Plan-2001-2005.pdf (accessed on 19 July 2019)

[532] T.C. Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. "On Birinci Kalkınma Planı (2019-2023)", 2019, p. 183, http://www.sbb.gov.tr/wp-content/uploads/2019/07/OnbirinciKalkinmaPlani.pdf (accessed on 8 August 2019)

[533] *Ibid.*, p. 170.

[534] *Ibid.*, pp. 118-121.

global requirement of reducing the share of coal in electricity generation.[535] Besides, unlike the current trend of replacing the most carbon-intense sources with least-carbon intense ones, Turkey aims to replace gas with renewables in electricity generation while increasing the share of coal.[536]

National Climate Change Strategy (2010-2023) can be seen as a base document for low-carbon transition of Turkey. The Strategy explains climate change vision of Turkey as follows:

> Turkey's national vision within the scope of climate change is to become a country fully integrating climate change related objectives into its development policies, disseminating energy efficiency, increasing the use of clean and renewable energy resources, actively participating in the efforts for tackling climate change within its special circumstances and providing its citizens with a high quality of life and welfare with low carbon intensity.[537]

Within this context, it is targeted to construct a green growth policy integrating economic, environmental and social sustainability and handling development policies in the light of these three dimensions.[538] One of the targets set out in the Strategy is a 7% reduction in GHG emissions from electricity sector by 2020 according to the reference scenario.[539] The Strategy also sets one of its medium term finance targets as following: "Transition to low carbon economy will be accelerated by ensuring support for technology renewal, emission control, climate friendly technology production,

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[535] Climate Action Tracker, "Turkey", https://climateactiontracker.org/countries/turkey/ (accessed on 19 July 2019)

[536] T.C: Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. "On Birinci Kalkınma Planı (2019-2023)", 2019, p. 185, http://www.sbb.gov.tr/wp-content/uploads/2019/07/OnbirinciKalkinmaPlani.pdf (accessed on 8 August 2019)

[537] Republic of Turkey Ministry of Environment and Urbanisation, "National Climate Change Strategy 2010 – 2023", 2010, p. 8, https://webdosya.csb.gov.tr/db/iklim/editordosya/iklim_degisikligi_stratejisi_EN(2).pdf (accessed on 26 June 2019)

[538] Republic of Turkey Ministry of Environment and Urbanisation, "Climate Change and Turkey", 2012, http://webdosya.csb.gov.tr/db/iklim/banner/banner597.pdf (accessed on 6 June 2019)

[539] Republic of Turkey Ministry of Environment and Urbanisation, "National Climate Change Strategy 2010 – 2023", 2010, p. 21.

clean product design and cleaner production technologies."[540] The strategy carries a special significance as a national document targeting transition to an LCE; however, it "lacks timebound, quantifiable targets and only frames the contours of climate policy within a new discourse."[541]

National Climate Change Action Plan (2011-2023) sets various targets and actions to support GHG emission reduction efforts in different sectors including energy, buildings, industry, transportation, waste, agriculture, land use and forestry and cross-cutting issues. [542] Besides, it identifies sector-specific climate actions for adaptation. There are some actions presented in the Plan regarding carbon markets such as starting efforts on preparing a legislative framework or developing infrastructure for an emission trading system.[543] Even though the Plan includes some references to low-carbon policies, these do not clearly refer to a process of transition to an LCE.

National Renewable Energy Action Plan (2013-2023) was prepared based on the methodology presented in the Renewable Energy Directive 2009/28/EC and finalized through consultations across major stakeholders. Under the Action Plan, Turkey aims to reach a 30% share in total electricity generation and a 10% in transportation sector by 2023.[544] As the statistics explained in the previous part show, Turkey has already

[540] *Ibid.*, p. 37.

[541] Turhan, E. et al. "Beyond Special Circumstances: Climate Change Policy in Turkey 1992–2015," *Wiley Interdisciplinary Reviews: Climate Change.* 7.3 (2016): 448-460, p. 450.

[542] Republic of Turkey Ministry of Environment and Urbanization, "Climate Change Action Plan 2011-2023", Ankara, 2012, https://webdosya.csb.gov.tr/db/iklim/editordosya/file/eylem%20planlari/iklim_degisikligi_eylem_plani_EN_2014.pdf (accessed on 21 July 2019)

[543] Republic of Turkey Ministry of Environment and Urbanization, "Seventh National Communication of Turkey under the UNFCCC", 2018, https://unfccc.int/sites/default/files/resource/496715_Turkey-NC7-1-7th%20National%20Communication%20of%20Turkey.pdf (accessed on 22 July 2019)

[544] Republic of Turkey Ministry of Energy Natural Resources, "National Renewable Energy Action Plan for Turkey", December 2014, http://www.yegm.gov.tr/document/20180102M1_2018_eng.pdf (accessed on 20 July 2019)

reached its renewable energy target in electricity generation. Therefore, The Eleventh Development Plan updated the target as a 38,8% share.[545]

National Energy Efficiency Action Plan (2017-2023) aims to reduce the primary energy consumption by 14% over the period 2017-2023 through 55 actions in six categories including buildings and services, energy, transport, industry and technology, agriculture and cross-cutting areas.[546] Furthermore, the Plan was prepared through the contributions of public institutions, NGOs and sectoral stakeholders and it is in line with the framework of EU Energy Efficiency Directive 2012/27/EU.[547]

EU criticises Turkey on the grounds that the current national strategy and action plan do not provide a comprehensive and long-term perspective for climate change mitigation and there is no national strategy in line with EU 2030 climate and energy package.[548] Besides, it is stressed that there are various EU regulations that Turkey has not adopted yet. Although there are also EU legislation to be adopted under the energy chapter, EU assesses that Turkey has had "good progress" in terms of security of supply through gas transmission and interconnection projects, renewable energy and energy efficiency. [549]

7.4.Policy Instruments

Similar to the policies and strategies, policy instruments of Turkey do not point a clear vision towards a low-carbon transition. However, the policy instruments promoting

[545] T.C: Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı, "On Birinci Kalkınma Planı (2019-2023)", 2019, p. 121, http://www.sbb.gov.tr/wp-content/uploads/2019/07/OnbirinciKalkinmaPlani.pdf (accessed on 8 August 2019)

[546] Republic of Turkey Ministry of Energy and Natural Resources, "National Energy Efficiency Action Plan 2017-2023", Ankara, 2018, http://www.yegm.gov.tr/document/20180102M1_2018_eng.pdf (accessed on 24 June 2019)

[547] *Ibid.*, pp. 1-3,

[548] EC, "Turkey 2019 Report", SWD (2019) 220, 2019, p. 93, https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/20190529-turkey-report.pdf (accessed on 20 July 2019)

[549] *Ibid.*, p. 79.

emission reductions, renewable energy and energy efficiency will be reviewed from a low-carbon perspective.

Firstly, Turkey does not have a carbon pricing instrument yet. However, it has been participating **voluntary carbon markets** since 2005, which can be seen as a significant opportunity for a future inclusion in carbon markets.[550] Besides, Regulation on "Greenhouse Gases Emission Monitoring" came into force in 2012 and revised in 2014. Also "Comminique of Monitoring and Reporting Greenhouse Gas Emissions" and "Comminique on Verification of Greenhouse Gas Emissions and Accreditation of Verifiers" entered into force in 2014 and 2017 respectively. [551] These legislative regulations are significant in terms of constituting a **monitoring, reporting and verification (MRV) system** that can control the GHG emissions and have an initial base for further action in this field.

On the other hand, Turkey has been a part of the World Bank's project, **Partnership for Market Readiness (PMR)** since 2013. Within this context, various activities have been conducted in terms of capacity building and impact assessment on different carbon pricing instruments like ETS and carbon tax and mitigation schemes like white and green energy certificates, scaled-up crediting mechanism and result-oriented finance.[552] During the studies and workshops under the project, different market-based instruments across different sectors were examined and some of these such as a carbon tax in electricity generation sector or a renewable energy certificate system in electricity sector were determined as the possible prior options for Turkey.[553]

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[550] Republic of Turkey Ministry of Environment and Urbanisation, "Sixth National Communication of Turkey Under the UNFCCC", 2016, p. 102. https://unfccc.int/files/national_reports/non-annex_i_natcom/application/pdf/6_bildirim_eng_11_reducedfilesize.pdf (accessed on 18 June 2019)

[551] In fact, "Comminique on Verification of Greenhouse Gas Emission Reports and Authorization of Verifiers", entered into force in 2015, was the initial regulation in this field but it was repealed and replaced by this new communique.

[552] PMR Turkey, http://pmrturkiye.org/en/pmr-turkey-2/ (accessed on 16 May 2019)

[553] Johnson, M. et al. "Assessment of Market Based Climate Change Policy Options for Turkey - Final Report", Ministry of Environment and Urbanization, 2017, http://pmrturkiye.org/wp-

In terms of **taxation practises on energy and motor vehicles**, Turkey applies special consumption tax (SCT) and motor vehicles tax (MVT). SCT is applied to the motor vehicles once and before their first registration on the basis of type, value and engine capacity (cylinder volume) of the vehicle. SCT is not designed as an emission-based tax. However, it has a dimension supporting expansion of low-carbon vehicles as the tax rate is higher for vehicles with higher engine capacity that cause higher levels of CO_2 emissions.[554] Therefore, applying lower levels of taxes on these vehicles makes them more attractive for consumers and create an indirect impact on transformation of the vehicle market.[555] Furthermore, electric and hybrid vehicles are taxed at lower rates.[556]

MVT is an annual tax calculated on the basis of certain characteristics of the vehicle such as engine capacity, engine power, age, type, number of seats, value, minimum total weight and minimum take-off weight.[557] The tax does not reflect the social costs of using motor vehicles as the type of fuel and emission volume of the vehicle is not taken into consideration while determining the tax rate. Besides, tax rate declines when the vehicle gets older although older vehicles cause higher level of pollution. On the other hand, MVT has an indirect environmental dimension since it takes engine capacity as one of the criteria. Furthermore, a recent regulation providing a tax reduction for the electric vehicles also supports clean technologies in the motor vehicles markets.[558]

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content/uploads/2018/12/PMR-Turkey-Assessment-of-Market-Based-Climate-Change-Policy-Options-for-Turkey-Final-Report.pdf (accessed on 19 July 2019)

[554] 4760 Sayılı Özel Tüketim Vergisi Kanunu, II Sayılı Liste, https://www.gib.gov.tr/fileadmin/mevzuatek/otv_oranlari_tum/ozeltuketimoranlari-OpenPage.htm (accessed on 24 June 2019)

[555] Güngör, Kamil. "Avrupa Birliği Üyesi Ülkelerde Yeşil Vergi Reformu ve Türkiye", *Journal of Current Researches on Business and Economics* 7.1 (2017): 111-132, p. 124.

[556] 4760 Sayılı Özel Tüketim Vergisi Kanunu, II Sayılı Liste, https://www.gib.gov.tr/fileadmin/mevzuatek/otv_oranlari_tum/ozeltuketimoranlari-OpenPage.htm (accessed on 24 June 2019)

[557] 197 Sayılı Motorlu Taşıtlar Vergisi Kanunu, Madde 5, I Sayılı Tarife, https://www.gib.gov.tr/gibmevzuat (accessed on 24 June 2019)

Another taxation practice in this field is the SCT on fuels which depends on the fuel type. Among OECD member countries, Turkey has one of the highest level of fuel taxes in road transport sector, yet similar to the common practice in OECD countries fuels are not taxed in line with their carbon intensity.[559] There is a price differentiation between diesel and gasoline that encourages diesel use. This policy sends price signals that highlighting a more polluter fuel to the market and creates an obstacle for the transition process.[560]

As it can be understood from the practices, energy taxes do not function in a way that supports transition to an LCE. OECD report notes that these taxes do not exactly reflect environmental costs of the energy use.[561] The report also states that Turkey was behind the other OECD countries in terms of using cost-effective policies for transition to an LCE; however, it "has lower carbon intensity due to factors such as lower levels of car ownership, greater use of renewables in electricity generation and lower energy use intensity per capita".[562]

In recent years, **support mechanisms** both in the form of tax reductions or exemptions and regulatory schemes towards domestic production, energy security, energy efficiency and renewable energy has become prevalent. There are two main support schemes for renewable energy, namely **Renewable Energy Support Scheme (YEKDEM)** and **Renewable Energy Resource Area (YEKA)**. YEKDEM is a scheme that regulates the support for legal entities that engage in production activities

[558] 197 Sayılı Motorlu Taşıtlar Vergisi Kanunu, 7103 Sayılı Kanunun 18 inci maddesiyle eklenen fıkralar; Yürürlük: 01.01.2019., https://www.gib.gov.tr/gibmevzuat (accessed on 24 June 2019)

[559] OECD, "Economic Surveys: Turkey: July 2018 – Overview", 2018, p 62, http://www.oecd.org/eco/surveys/Turkey-2018-OECD-economic-survey-overview.pdf (accessed on 9 June 2019)

[560] 4760 Sayılı Özel Tüketim Vergisi Kanunu, I Sayılı Liste. https://www.gib.gov.tr/fileadmin/mevzuatek/otv_oranlari_tum/ozeltuketimoranlari-OpenPage.htm (accessed on 24 June 2019)

[561] OECD, "Environmental Performance Reviews: Turkey 2019", Paris: OECD Publishing, 2019, pp. 107-108.

[562] *Ibid.*, p. 110.

based on renewable energy sources with a production licence. A feed-in tariff scheme is applied to the solar, wind, hydro, geothermal and biofuel plants and higher rates of feed-in tariffs are applied for the power plants using domestic equipment.[563] YEKA refers to the large scale public lands which are assigned for renewable energy projects through auctions regulated by the Ministry of Energy and Natural Resources. This way, it mobilises investments towards renewable energy in a competitive environment and develop local technologies for renewable energy generation.[564]

Furthermore, there are more specific supportive policy measures like tax exemptions or reductions. For example, those who delete the registry of vehicles older than 16 years old and register them as scrap can benefit from an SCT reduction when they buy a new vehicle in the same type.[565] This regulation will be effective until the end of 2019 and it is expected to affect more than six million vehicles causing emissions at the amount of 15 million tCO_2.[566] Also, a recent regulation adopted in 2018 provides that those residents who sell the residual electricity generated through the solar panels on their roofs are exempted from income tax. [567]

In terms of energy efficiency, there are regulations on eco-design and eco-labelling for energy-related products in line with relevant EU legislation.[568] Also, there are

[563] 5346 Sayılı Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına ilişkin Kanun, Resmi Gazete Tarih/Sayı: 18.05.2005/25819, http://www.resmigazete.gov.tr/eskiler/2005/05/20050518-1.htm (accessed on 24 June 2019)

[564] Yenilenebilir Enerji Kaynak Alanları Yönetmeliği, Resmi Gazete Tarih/Sayı: 09.10.2016/29852, http://www.resmigazete.gov.tr/eskiler/2016/10/20161009-1.htm (accessed on 24 June 2019)

[565] 7103 Sayılı Vergi Kanunları ile Bazı Kanun ve Kanun Hükmünde Kararnamelerde Değişiklik Yapılmasına Dair Kanun, Resmi Gazete Tarih/Sayı: 27.03.2018/30373 (2. Mükerrer), Geçici Madde 1, http://www.resmigazete.gov.tr/eskiler/2018/03/20180327M2-1.htm (accessed on 24 June 2019)

[566] CNN Türk, "Hurda Araç Teşviki Havayı da Temizleyecek", 09.06.2018, https://www.cnnturk.com/ekonomi/hurda-arac-tesviki-havayi-da-temizleyecek (accessed on 9 June 2019)

[567] 193 Sayılı Gelir Vergisi Kanunu, Madde 9, https://www.gib.gov.tr/gibmevzuat (accessed on 24 June 2019)

[568] T.C. Avrupa Birliği Bakanlığı, "Avrupa Birliği Sürecinde Enerji Faslı", https://www.ab.gov.tr/files/SEPB/yayinlarveraporlar/enerjikitap.pdf (accessed on 19 July 2019)

support mechanisms like Efficiency Increasing Projects[569] for industrial enterprises and regulatory tools like efficiency criteria in public procurement[570] in different fields including buildings, heating or cooling mechanisms, and technological devices like computers or printers. Furthermore, it is planned to use public procurement as an effective tool to promote sustainable production and consumption by supporting goods and services based on renewable energy, clean technologies, innovation and domestic inputs.[571]

On the other hand, there are **fossil fuel supports** in the forms of direct aids, investment subsidies, feed-in tariffs and coal aids.[572] The supports are mainly used for production and consumption of domestic coal in order to reduce import dependency. The amount of financial support for production of hard coal was around 896 million TRY in 2017 for example.[573] Fossil fuel subsidies cause a reduction in financial support that could be directed towards mitigation and decarbonisation activities and also create additional burden on public budget.[574] Furthermore, Acar and Yeldan revealed that

[569] These are the projects which are prepared in order to implement necessary measures for elimination of energy wastes, losses and inefficiencies. Industrial enterprises prepare such projects and apply for support. For further information please see; Republic of Turkey Ministry of Energy and Natural Resources Energy Affairs General Directorate, "Efficiency Increasing Projects", http://www.yegm.gov.tr/verimlilik/d_VAP.aspx (accessed on 10 June 2019)

[570] Ministry of Energy and Natural Resources Energy Affairs General Directorate, "Energy Efficiency Criteria in Public Procurement", http://www.yegm.gov.tr/duyurular_haberler/enver_kriter.aspx (accessed on 10 June 2019)

[571] Republic of Turkey Ministry of Development, "The Tenth Development Plan 2014-2018", 2013, pp. 101-137, http://www.sbb.gov.tr/wp-content/uploads/2018/11/The_Tenth_Development_Plan_2014-2018.pdf (accessed on 24 June 2019)

[572] Acar, Sevil, Kitson, Lucy and Bridle, Richard. "Türkiye'de Kömür ve Yenilenebilir Enerji Teşvikleri", 2015, p.12, https://www.iisd.org/gsi/sites/default/files/ffsandrens_turkey_coal_tk.pdf (accessed on 26 June 2019)

[573] OECD, "Fossil Fuel Support Country Note: Turkey", April 2019, http://stats.oecd.org/wbos/fileview2.aspx?IDFile=0144c270-446f-48db-88f0-4ea1542244a5 (accessed on 19 July 2019)

[574] Acar, Sevil, Kitson, Lucy and Bridle, Richard "Türkiye'de Kömür ve Yenilenebilir Enerji Teşvikleri", International Institute for Sustainable Development, 2015, pp. 24-26.

abolition of coal subsidies could have create a 5,5% reduction in GHG emissions over the period 2015-2030.[575]

7.5.Conclusion

In this chapter, climate change and energy policies of Turkey and the instruments it uses to apply those policies have been reviewed from a low-carbon perspective. Turkey has a differentiated place in international climate regime, and it is not a part of common transition framework of EU since it is a candidate state. Like Poland, Turkey does not have a specific strategy on transition to an LCE. Rather, it has dispersed policy documents that could support a possible transition. Although Turkey has measures on improving energy security, diversifying energy sources, increasing energy efficiency and investing in clean technologies, transition to an LCE is still a challenging path for Turkey.[576]

[575] Acar, Sevil and Yeldan, Erinç. "Environmental Impacts of Coal Subsidies in Turkey: A General Equilibrium Analysis", *Energy Policy*, 90 (2016):1-15.

[576] OECD, Environmental Performance Reviews: Turkey 2019, OECD Publishing, Paris, 2019, p. 62, https://www.oecd.org/turkey/oecd-environmental-performance-reviews-turkey-2019-9789264309753-en.htm (accessed on 20 June 2019)

CHAPTER 8

CONCLUSION

This thesis aims to examine the dynamics of transition to an LCE across Europe throughout the interaction between EU level and national level transition policies. Unlike the common approaches in transition literature which mainly study transitions as purely national processes, this thesis focuses on both international and national dimensions of low-carbon transitions. Contrary to the arguments of some transition scholars who neglect the international dimension of transition processes, this thesis argues that low-carbon transitions have an international dimension because they address a global problem called climate change and that's why they require to be studied from an IR perspective with respect to national circumstances and international dynamics.

Accordingly, the thesis has reviewed IR theories of neorealism, liberal institutionalism and neoclassical realism and suggested that it is neoclassical realism that presents the most relevant arguments for analysing the dynamics of transition to an LCE. From such a perspective, the transition processes of the EU and four nation states, UK, Germany, Poland and Turkey, were examined through their policies, strategies, targets and policy instruments and on the basis of their specific characteristics as well as their reactions to international developments and EU-level cooperation efforts. In this way, transition processes of these actors were reviewed in a comparative manner by focusing on what motivates or demotivates them for transition and what are the reflections of domestic characteristics and international cooperation environment presented by EU on their transition framework.

Before examining the transition frameworks of those actors, the thesis tried to demonstrate what exactly transition to an LCE meant. The scientific knowledge on global warming and climate change has helped to illustrate its emergence and

relevance while arguments in the literature has demonstrated what kind of a process it is by revealing its basic characteristics, dynamics and the policy framework through which it is realized. Scientific studies point that population and economic growth have had a significant impact on global warming and climate change by causing high levels of GHG emissions. These emissions are mainly created by energy-related activities of human beings and they create climate-related impacts like extreme weather events, rising global average sea level, more frequent floods and droughts and increasing risks for water, food and energy security, which threatens the socio-economic system across the world in addition to the ecosystems.

In this respect, it is evident that climate change poses a global threat and requires a global action to be managed. Therefore, scientific world calls for collective action in order to limit the rise in global average surface temperature and fight against climate change through adaptation and mitigation measures. Transition to an LCE is a concept that emerged within this framework as fighting against climate change requires deep transformations in emission-related sectors like energy, industry, transport, building and agriculture. It means decarbonizing the way we live and transforming our socio-economic system into a new one based on low-carbon energy sources, clean technologies and sustainable production and consumption patterns.

Within this perspective, an international climate regime has been constructed through international negotiations and commonly agreed documents including UNFCCC, Kyoto Protocol and Paris Agreement. This regime is based on the principle of common but differentiated responsibilities and respective capabilities since countries have had different levels of historical contributions in global GHG emissions and have different economic and technological capacities to fight against climate change.

On the one hand, it is clear that climate change deals with a common problem and involves a common interest. Besides transition policies of countries highly affect each other in the sense that there can emerge free-riders, carbon leakages or disadvantages in terms of competition. There have been increasing efforts for collective action in order to avoid such negative effects. On the other hand, it could be really challenging to ensure international cooperation in terms of transition to an LCE since the process

includes highly critical policy fields and conflicting interests. It is a deep, comprehensive and complex process that includes different sectors like energy, industry, agriculture or transportation and various actors like international organisations, nation states, local authorities, civil society, businesses and scientific world. Unsurprisingly, there emerges struggles among these actors and sectors due to their differentiated interests and priorities. Since such interests and priorities vary significantly across countries, transition policies that reflect them should be evaluated with respect to these country-specific conditions.

Both academic literature and reports of international institutions state that low-carbon transitions are mainly planned and realized through policy frameworks of states. These frameworks basically include policy measures and instruments like ETS, carbon tax, energy taxes, subsidies and regulatory schemes that could help a cost-effective transition process to be built. In order to conduct an effective transition process, it is highly important to design and implement a consistent policy framework in both national and international politics.

Based on these arguments, transition processes of the EU, UK, Germany, Poland and Turkey were examined through their policies, strategies, targets and policy instruments. Throughout the examinations, their specific characteristics including economic outlook, energy mix, GHG emission profile and experiences with climate challenges were also taken into consideration. Moreover, states' reactions to international and EU level developments were demonstrated over examples.

In terms of the conclusions reached as a result of these examinations, it could be better to share the individual experiences of these actors first and then general impressions on dynamics of transition to an LCE by comparing them in different groups. This way, it would be easier to illustrate what their individual transition processes look like and how the EU level and national level processes interact with each other.

It is challenging for EU to design a transition framework that could fit the domestic conditions of each Member State considering that it consists of twenty-eight Member States with highly differentiated characteristics in terms of their economic indicators,

energy mixes and GHG emission profiles. Yet, EU has pursued ambitious transition strategies and targets with the aim of leading the world in this field. The policy framework that EU constructed for the transition process can be evaluated as a strong, ambitious, comprehensive and dynamic one. It includes lots of strategy documents, short-term and long-term targets and supportive policy instruments.

The fact that EU represents its twenty-eight Member States through unified commitments in international climate negotiations creates a further strength for its framework. Overall mitigation commitment of the Union is shared among Member States in line with their relative wealth. In this way, Union-level efforts reflect relative power and capabilities of states. Besides, the same methodology is followed for distribution of 2020 and 2030 targets of the Union under Effort Sharing legislation as well. Also, there are regulations that enables flexibility to Member States for determining their transition policies with respect to their national circumstances as long as they support general aims of EU-level transition.

On the other hand, if national policies do not reflect the same level of strength and ambition, the global leadership image of EU in transition to an LCE could be damaged. The emphasis of a fair and inclusive transition in EU's recent strategies and statements demonstrates that there is a concern regarding the existence of discrepancies among the transition processes of Member States. In the light of recent developments examined throughout the third chapter, EU seems to adopt a conscious behaviour in this respect by generating further measures to ensure that Member States could benefit benefits and bear the costs of transition in a fair way.

Accordingly, the recent statements and policies of EU that invites each Member State, candidate state and potential candidate state to participate in transition efforts, point that EU is aware of the importance of cooperation and collective action in transition to an LCE. Yet, there are still challenges in terms of adopting and implementing common transition policies and policy instruments. For example, requiring NECPs from all Member States in a similar format is a good way to see the national transition frameworks in a comparative manner. However, the initial drafts have shown that Member States have had compliance issues in terms of the general framework and

content. Besides, national policy reflections like coal phase out policies or fossil fuel subsidies point that no matter how strong the EU's transition framework is, Member States could pursue policies and strategies that would comply with their national interests in addition to internalising EU legislation.

UK is a special case as the inventor of the term of LCE and as an almost-ex Member State of the EU. The country has a well-developed policy framework with strong commitments and a wide range of policy instruments. It can be said that transition framework of the UK is way beyond that of the EU considering its early efforts, ambitious targets and detailed policy instruments. Besides, the fact that UK has a prominent role in shaping EU level transition policies although it mostly has a sceptic look towards EU level policies show the level of its ambition in this field. In this respect, the country suggests that its transition process will not be affected by Brexit. On the other hand, the ambitious transition framework is not the only thing that UK is famous for. The country leads European countries in terms of fossil fuel subsidies and supports fossil fuel investments in developing countries for the sake of its export markets. Its contradictory attitude in this context draws significant criticism.

Germany is the largest emitter of the EU besides having the largest economy and population among Member States. It is one of the leading figures of transition policies although industrial production has still a significant place for its economy. Its policies are mainly based on phasing out nuclear energy and increasing the use of renewables. In this respect, the country has ambitious targets both at the EU level and national level. However, it seems that it needs a more developed transition framework in order to meet those targets. Yet, domestic political disputes regarding a possible carbon tax and the draft climate change law seem to hinder the development of further policies and policy instruments. Moreover, it is surprising for Germany as a country famous for its renewable energy transition policies to continue using lignite as a dominant energy source.

As an emerging economy, Poland has had a significant progress in terms of its economy and climate policies after EU accession. The country still highly depends on domestic coal reserves in order to maintain accelerating economic activity. It has

developed a policy framework that diversifies energy sources through renewables and nuclear power and supports energy efficiency measures; however, its policy framework does not reflect the country's clear commitment on transition to an LCE. Yet, it is a part of the transition framework of the EU as a Member State although it tries to loosen it as well. In contrast to the positive impact of EU policies over Poland, the country has started to shape EU-level transition policies mostly as a veto power. As the statements of Polish politicians point, the reactions of Poland regarding EU-level policies reflect its concerns regarding the possibility that these policies would harm its national interests. On the other hand, as the processes vetoed by Poland demonstrate, this attitude seems to harm the development of EU-level policies in addition to national ones.

Different from previously examined countries, Turkey is not a part of the common transition framework under the EU since it is not a Member State yet. Like Poland, Turkey does not have a specific policy framework for transition to an LCE. Rather it has certain climate and energy policies which were shaped in line with its development policies and on the basis of the argument that Turkey needs international finance and technology support as a developing country. Currently, the country plans to increase its GHG emissions without a peak and continues supporting fossil fuels while increasing the share of renewables in its energy mix and introducing nuclear energy. Being a candidate state has contributed to the development of this framework since EU policy framework stands as a guide for Turkey. Accession process also helps capacity building in various fields through EU's financial and technical assistance. However, since it has been a stagnant process recently, it will be clear in time whether the aim of EU accession would direct Turkey towards an ambitious low-carbon path or not.

Transition strategies of the EU and four states showed that there might be several motivations to adopt a low-carbon transition pathway: fighting against climate change, ensuring energy security, leading a new international movement or participating in the economic and technological rivalry. Among these, adopting a leadership role and ensuring energy security seem more relevant considering the

dynamics of the examined transitions. As it was illustrated through the transition processes of the EU, UK and Germany, ambition to adopt a leadership role seems as a significant motivation in transition processes. Such an ambition is reflected by general climate and energy policies in the EU, low-carbon strategies in the UK and renewable energy technologies in Germany. This kind of a leadership role provides a competitive advantage in both political and economic manner, which reflects the international dimension of such transitions. Therefore, the fact that industrialised countries with strong economies have a relative power vis-à-vis other states and this could make them engage in ambitious policies and lead the transition policies.

Regarding energy security, country studies show complex signals. The case of Germany is significant to illustrate energy security as a driver for low-carbon transition. Concerns of nuclear safety and ensuring sustainability of energy sources have directed Germany towards a deep transition path. The case of Poland, on the other hand, presents how energy security can be a counter argument not to follow an ambitious transition path. As a country with large domestic coal reserves, Poland is not willing to replace fossil fuels with renewable energy. Turkey has a similar situation with Poland in terms of being dependent on fossil fuels. However, it depends on imported fossil fuels and keeps investing in exploration of domestic reserves in addition to low-carbon energy sources.

On the other hand, as it was demonstrated through the examples of Poland and Turkey, national characteristics, priorities, interests and capabilities could generate demotivation for transition to an LCE. Country-specific characteristics like energy-intense economic structure, fossil-fuel based energy system, large domestic reserves of fossil fuels, need for financial and technological support and prioritized development concerns seem to explain some of the reasons why these countries have a reluctant standing against transition to an LCE and engaging in international efforts on such a transition.

Furthermore, as it was reviewed through the country studies, planning the transition process mostly includes a multi-layered structure of strategies and targets. There are national, international and sometimes supranational reflections of these in the form of

strategy documents, targets and policy instruments. It is understood that transition policies and strategies for an LCE mainly focus on mitigating emissions, improving energy efficiency, increasing the use of renewables and developing clean technologies through sector-specific policies and different economic and regulatory instruments. Moreover, reviewing national policies, policy instruments and related political discourses is useful to follow the interaction between international and EU level developments with national ones. This way, policy contradictions like following an ambitious transition pathway while keeping subsidizing fossil fuels can be analysed in line with internal and external dynamics.

Country studies also demonstrate that EU membership has different implications for states. In terms of the UK, both historical experience and current statements point that UK's ambition in its transition pathway will not be affected by Brexit process. On the other hand, different from the case of UK, it might be highly possible for Poland to leave its transition path if it were the one leaving the Union. Furthermore, like the current standing of Poland, it might be also possible for Turkey to veto ambitious transition policies on the grounds that Union level policies contradict with its national interest if it were a Member State. German example does not indicate a certain impression regarding the impact of EU membership in its transition process but seems to reflect domestic circumstances. Because it is known that there are national strategies which can go beyond EU level ones such as *Energiewende* while there were also debated issues between Germany and the EU like renewable energy support schemes in the past.

In this regard, the examples show that being a part of international institutions, i.e. organizations, norms, rules and procedures, does not necessarily mean being a part of cooperation. Poland vetoes further efforts of EU-level transition framework of which it is a part. Turkey tries to create a differentiated position for itself within international climate regime. On the other hand, UK states that it will keep its motivation and ambition for transition to an LCE even though it leaves the Union.

The international dimension of transition to an LCE motivates states to adopt transition policies even though this motivation mainly stems from ambition for

leadership, competition or international support. On the other hand, national dimension generally constitutes the reason why states do not engage in transition processes. Their internal dynamics like energy and fossil fuel dependency of their economies, development concerns, further financial or technological needs, or sectoral shares highly affect their intentions towards transition to an LCE as in the cases of Poland and Turkey. Also, country examples have demonstrated that they could continue their high carbon activities together with ambitious transition policies as they pursue their self-interest, which shows that their attitude is limited with their domestic constraints.

In conclusion, this thesis examined the dynamics of transition to an LCE across Europe through policy frameworks of the EU and four nation states in a comparative perspective and searched for the reflections of internal and external variables that shape their attitude regarding international cooperation within such transition processes. It is true that EU-level transition framework supports collective action among states. However, states show different reactions in terms of participating or not in this collective action. They can lead such an action by developing ambitious policies, they can veto further cooperation, or they can abstain from collective action. The examinations throughout the thesis suggest that states develop their reactions in this field in line with their relative powers, which stem from an industrialised or strong economy, and domestic circumstances including economic outlooks, sectoral shares, energy mixes, energy security concerns, GHG emission profiles and national priorities in such fields. In this respect, arguments of neoclassical realism help to analyse states' behaviour in terms of pursuing collective action or not for transition to an LCE.

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APPENDICES

APPENDIX A: TURKISH SUMMARY / TÜRKÇE ÖZET

Sanayi Devrimi sonrasında enerji ve ekonomi gibi alanlar ile ve üretim ve tüketim modellerinde köklü değişiklikler yaşanmıştır. Artan talebin karşılanması enerji tüketiminde büyük bir artış meydana getirmiştir. Bilimsel çalışmalar, sanayileşme döneminden itibaren atmosferde biriken sera gazı emisyonlarının ve yerkürenin ortalama küresel sıcaklığının önemli ölçüde arttığını ve bu artışta insan kaynaklı emisyonların da ciddi oranda etkili olduğunu göstermektedir. İnsan kaynaklı sera gazı emisyonlarının; ekonomik faaliyetler, nüfus artışı, enerji kullanımı, hayat tarzı, arazi kullanımı ve endüstriyel süreçler gibi etkenlerden kaynaklandığı bilinmektedir.

Artan sera gazı emisyonları ve küresel ortalama sıcaklık "iklim değişikliği" ve "küresel ısınma" olarak adlandırılan problemleri ortaya çıkarmıştır. Bu kapsamda, yerkürenin çeşitli bölgelerinde aşırı hava olayları ve doğal felaketler gerçekleşmekte ve bunlar ekosistemin yanı sıra sosyo-ekonomik düzeni de tehdit etmektedir. Küresel bir problem olan iklim değişikliği ile mücadele; bu soruna yol açan sera gazı emisyonlarının azaltılarak ortalama küresel sıcaklık artışının sınırlandırılmasını, iklim değişikliğinin etkilerine yönelik uyum tedbirleri geliştirilmesini ve çeşitli sektörlerde dönüşümler gerçekleştirilmesini gerektirmekte ve bunların küresel bir çaba ile yapılmasına ihtiyaç duyulmaktadır. Bu mücadele çerçevesinde ortaya çıkan görece yeni bir kavram olan "düşük karbon ekonomisine geçiş" henüz literatürde sınırlı bir yere sahip olmakla birlikte bu kapsamda geliştirilen uygulamalar git gide yaygınlaşmaktadır.

Bu tezin amacı, Avrupa'da düşük karbon ekonomisine geçişin dinamiklerini ulusal ve uluslararası boyutları ile ele alarak ülkelerin geçiş süreçlerinde iş birliğine ve ortak hareket etmeye yönelik yaklaşımlarını, bu yaklaşımların arkasındaki nedenleri ve

Avrupa Birliği (AB)'nin bu kapsamdaki rolünü sorgulamaktır. Bu doğrultuda tez, AB'nin ve düşük karbon ekonomisine geçiş açısından önem taşıyan dört Avrupa devletinin, yani Birleşik Krallık, Almanya, Polonya ve Türkiye'nin, geçiş süreçlerindeki politika çerçevelerini karşılaştırmalı bir incelemeye tabi tutmaktadır. Bahse konu inceleme gerçekleştirilirken söz konusu aktörlerin ekonomik koşulları, enerji kaynakları, emisyon profilleri ve iklim değişikliğine ilişkin tecrübeleri gibi özellikleri ve uluslararası çabalara ilişkin tutumları da göz önünde bulundurulmaktadır.

Literatürde, geçiş süreçleri farklı disiplinlerden görüşlerle ve farklı bakış açılarıyla incelenmiştir. Bunlar arasında en eski ve temel yaklaşım sosyo-teknik geçiş yaklaşımıdır. Bu kapsamdaki çalışmalarda, geçiş süreçleri çok katmanlı rejim değişiklikleri olarak ele alınmış ve çoğunlukla sosyolojik ve teknolojik bakış açılarıyla incelenmiştir. Bu alandaki ilk çalışmalarda geçiş sürecinde güç ve politika gibi olguların etkisinin irdelenmemesi eleştirilere konu olmuştur. Daha sonraki çalışmalar geçiş süreçlerinde güç ve politikanın etkisine odaklanmaya başlasa da geçiş süreçleri genellikle ulusal süreçler olarak ele alınmış ve konunun uluslararası boyutu göz ardı edilmiştir. Geçiş kavramının "sürdürülebilir geçiş" olarak incelenmeye başlanması ile düşük karbon ekonomisine geçişe yönelik çalışmalar genişlemiştir. Her ne kadar sürdürülebilir geçişlerin uluslararası ve hatta küresel bir boyutunun olduğu kabul edilse de bu bağlamda yapılan çalışmalar da konuya ekonomi, politika, yönetişim ve kurumsalcılık gibi perspektiflerden yaklaşmıştır. Sürdürülebilir geçiş çalışmalarından ve iklim değişikliğine yönelik genel yaklaşımlardan yola çıkılarak düşük karbon ekonomisine geçiş sürecinde küresel bir sorunla mücadele edildiği ve bu mücadelenin ortak hareket ve uluslararası iş birliği gerektirdiği sonucuna ulaşmak mümkündür.

Bu kapsamda, tez, literatürdeki genel algının aksine, düşük karbon ekonomisine geçiş sürecinin uluslararası iş birliği gerektiren bir süreç olduğunu ve bu boyutu ile ele alınarak uluslararası ilişkiler teorileri çerçevesinde incelenmesinin yerinde olacağını savunmaktadır. Bu doğrultuda, uluslararası iklim politikaları açısından açıklayıcı argümanlara sahip olan uluslararası ilişkiler teorileri arasında yer alan neorealizmin,

liberal kurumsalcılığın ve neoklasik realizmin temel argümanları gözden geçirilmiştir. Neorealizm; devletlerin kendi çıkarlarını düşünen aktörler olduğunu ve ortak çıkarları olsa dahi uluslararası sistemin belirsiz ve güvensiz doğası gereğince iş birliğine olumsuz yaklaştıklarını savunmaktadır. Liberal kurumsalcılık, ortak çıkarların varlığının yanı sıra devletleri iş birliğinin gerekliliğine ve sonuçlarına dair doğru şekilde bilgilendirebilecek uluslararası kuruluşların (kurumlar, kurallar, prosedürler ve prensiplerin) var olması halinde uluslararası iş birliğinin mümkün olduğunu iddia etmektedir. Bu alandaki bir diğer kuram olan neoklasik realizm ise, devletlerin uluslararası politikalara yönelik tutumlarının hem iç hem de dış etkenlerle şekillenebileceği savı üzerine kuruludur. Bu teoriye göre, devletler uluslararası politikalara yönelik farklı tutumlar sergilemektedir. Dolayısıyla devletlerin tutumları incelenirken uluslararası sistemin dinamiklerinin yanı sıra devletlerin kendi iç değişkenlerinin de ele alınması gerekmektedir.

Tezin temel argümanı, düşük karbon ekonomisine geçiş sürecinin uluslararası iş birliğini gerektiren bir süreç olduğu ve ülkelerin bu alanda iş birliğine ilişkin davranışlarının neoklasik realizm perspektifinde incelenebileceği yönündedir. İncelenen örnekler göstermiştir ki ülkelerin düşük karbon ekonomisine geçiş sürecinde uluslararası gelişmelerin ve AB seviyesindeki politika çerçevesinin destekleyici bir etkisi bulunmakla birlikte ülkelerin bu kapsamdaki tutumları göreceli güç düzeylerine ve kendi iç dinamiklerine göre şekillenmektedir.

Tez kapsamında düşük karbon ekonomisine geçişin dinamiklerini çalışmak üzere Avrupa'nın seçilmesi; Avrupa devletlerinin ve AB'nin bu tür geçiş politikalarında öncü olmasının yanı sıra Avrupa devletlerinin geçiş politikalarında ortak hareket etmek ve uluslararası işbirliğini desteklemek üzere eşsiz bir uluslararası yapı olan AB'ye sahip olmasından kaynaklanmaktadır. AB gerek ulusüstü ve hükümetlerarası özellikler barındıran kurumsal yapısı gerek düşük karbon ekonomisine geçişte ortak hareket etmeyi kolaylaştırıcı nitelikteki Avrupa Tek Pazarı ve Enerji Birliği gibi mekanizmalara sahip olması dolayısıyla bu alanda incelenmeye değer bir örnek teşkil etmektedir.

Bu kapsamda, tez, Avrupa'da düşük karbon ekonomisine geçişin dinamiklerinin, Avrupa Birliği'nin ve Avrupalı devletlerin geçiş politikaları doğrultusunda araştırılmasını amaçlamaktadır. Söz konusu araştırma için emisyon profilleri ve AB ile ilişkileri açısından kritik öneme haiz olmaları nedeniyle Birleşik Krallık, Almanya, Polonya ve Türkiye'nin incelenmesi tercih edilmiştir. Bu üç AB üyesi, en fazla karbondioksit emisyonuna neden olan AB devletleri olduğundan, Türkiye ise sebep olduğu emisyon oranının yanı sıra AB üye devletleri arasındaki genel eğilimin aksine devamlı artan bir emisyon profiline sahip olduğundan incelemeye değer görülmüştür. Ayrıca, Birleşik Krallık'ın AB'den ayrılmak üzere olan bir üye devlet olması, Almanya'nın Birlik'teki kurucu devletler arasında yer alması, Polonya'nın görece yeni bir üye devlet olması ve Türkiye'nin adaylık sürecindeki bir devlet olması da bu ülkeleri çalışma açısından özel kılmaktadır. Bu şekilde bir inceleme ile düşük karbon ekonomisine geçişin dinamiklerinin uluslararası gelişmeler, AB'nin sunduğu iş birliği platformu ve ülkelerin kendilerine has özellikleri doğrultusunda ele alınması amaçlanmaktadır.

Bu tezde kitap ve makalelerin yanı sıra; Hükümetlerarası İklim Değişikliği Paneli, Dünya Bankası, Uluslararası Enerji Ajansı, Avrupa İstatistik Ofisi gibi uluslararası kuruluşların rapor ve istatistikleri, AB'nin ve ülkelerin yasal düzenlemeleri, politika belgeleri, resmi verileri ve açıklamaları ile basında yer alan haberlerden yararlanılmıştır.

Tez sekiz ana bölümden oluşmaktadır. Giriş bölümünün ardından, ikinci bölümde düşük karbon ekonomisine geçiş kavramı; ortaya çıkışı, anlamı, kapsamı, temel özellikleri ve içerdiği politika çerçevesi açısından ele alınmaktadır. İlerleyen bölümlerde AB, Birleşik Krallık, Almanya, Polonya ve Türkiye'nin düşük karbon ekonomisine geçiş süreçleri; aktörlerin kendilerine has özellikleri ve koşulları da göz önünde bulundurularak bu süreçteki politika, strateji, hedef ve politika araçları üzerinden karşılaştırmalı bir yaklaşımla incelenmektedir. Son olarak incelemeler neticesinde elde edilen bulgular, literatürdeki argümanlar da göz önünde bulundurularak sonuç bölümünde paylaşılmaktadır.

Düşük karbon ekonomisine geçiş kavramına ilişkin olarak üzerinde anlaşılmış net bir tanım olmamakla birlikte literatürde çeşitli tanımlar bulunmaktadır. Mevcut yaklaşımlardan yola çıkılarak düşük karbon ekonomisine geçişin; enerji, endüstri, taşımacılık, inşaat ve tarım gibi emisyon artışına neden olan sektörlerin ve daha geniş ölçekte yaşam tarzlarımızın ve sosyo-ekonomik sistemimizin karbonsuzlaştırılması ve bu kapsamda karbon yoğun üretim ve tüketim kalıplarından düşük karbonlu üretim ve tüketim kalıplarına geçilmesi olarak anlaşılması mümkündür. Bununla birlikte, kavrama enerji güvenliğini ve ekonomik refahı artırma potansiyeli bulunan bir yöntem ya da aynı zamanda yeni bir "sanayi devrimi" veya rekabet alanı olarak yaklaşanlar da bulunmaktadır.

Düşük karbon ekonomisine geçiş, iklim değişikliği ile mücadelenin bir parçası olarak tıpkı bu mücadelenin gerektirdiği gibi küresel bir çabayı yani uluslararası iş birliğini gerektirmektedir. Her ne kadar sanayileşmiş ülkeler sera gazı emisyonlarındaki artışta daha fazla tarihi emisyona sahip olsa da gelişmekte olan ülkeler de sanayileşme süreçlerinde benzer bir yol izlemeleri halinde hızla artan emisyon profillerine sahip olacaktır. Ayrıca iklim değişliğinin etkilerini yerkürenin geneli üzerinde gösterdiği göz önünde bulundurulduğunda tüm ülkelerin yapabildikleri ölçüde gerekli tedbirleri almalarının önemi ortaya çıkmaktadır. Ancak ülkelerin iklim değişikliği ile mücadelede ve düşük karbon ekonomisine geçiş sürecinde farklı önceliklere ve kapasitelere sahip olduğu da göz önünde bulundurulmalıdır. Bu kapsamda, uluslararası iklim rejimi Birleşmiş Milletler İklim Değişikliği Çerçeve Sözleşmesi, Kyoto Protokolü ve Paris Anlaşması gibi bileşenleri ile iklim değişikliği ile mücadelede "ortak fakat farklılaştırılmış sorumluluklar ilkesi" doğrultusunda uluslararası iş birliğini desteklemektedir.

Düşük karbon ekonomisine geçiş sürecinin tam olarak nasıl işlediğini anlamak üzere örnek uygulamalara geçmeden önce literatürdeki görüşlerden ve uluslararası kuruluşların tavsiyelerinden yararlanılarak bu konuda genel bir çerçeve çizilmeye çalışılmıştır. Bu kapsamda, düşük karbon ekonomisine geçiş süreçlerinin temel olarak devletlerin politika çerçeveleri aracılığıyla planlandığı ve uygulandığı anlaşılmıştır. Tezde politika çerçevesi ile kastedilen; geçiş sürecine ilişkin politikalar, stratejiler,

tedbirler ve politika araçlarıdır. Geçiş sürecinde kullanılan piyasa temelli ve düzenleyici nitelikteki politika araçları sürecin maliyet-etkin bir şekilde yürütülmesini ve piyasadaki aktörlere doğru sinyallerin verilmesini sağlamaktadır. Bu noktada, uluslararası ve ulusal politikaların şeffaf ve tutarlı olmasının önemine dikkat çekilmektedir. Ayrıca, bu tür süreçlerin çok sayıda aktörü ve sektörü içermesinden ötürü bunlar arasında yaşanabilecek çıkar çatışmalarına karşı tedbirli davranılması da sürecin etkililiğini etkileyen bir diğer önemli unsur olarak karşımıza çıkmaktadır.

Tezin ilerleyen bölümlerinde düşük karbon ekonomisine geçiş sürecinin pratikte nasıl işlediği ve bu sürecin Avrupa'daki dinamikleri, AB ve devletler seviyesindeki politika çerçeveleri ve bunlar arasındaki etkileşim üzerinden yansıtılmaya çalışılmıştır. Bu doğrultuda, AB'nin ve devletlerin ekonomi, enerji, çevre vb. konularda kendilerine has özelliklerinden oluşan genel profilleri sunulmuş, daha sonra düşük karbona geçiş kapsamında değerlendirilebilecek politika, strateji, hedef ve politika araçları ele alınmıştır. Ayrıca aktörlerin uluslararası iklim rejimindeki konumuna ve bu alandaki uluslararası gelişmelere yönelik tepkilerine de yer verilmiştir.

AB gerek kendine özgü yapısı gerek üye devletleri arasındaki derin farklılıklar nedeniyle düşük karbona geçiş politikalarının incelenmesi açısından geniş ve özgün bir yelpaze sunmaktadır. AB'nin düşük karbon ekonomisine geçiş süreci iki temel husus etrafında şekillenmektedir: bir tarafta birbirinden oldukça farklı ulusal dinamiklere sahip üye devletlerin bireysel arzuları, çıkarları ve kapasiteleri, diğer tarafta ise AB'nin düşük karbon ekonomisine geçişte küresel liderlik arzusu ve bu çerçevede geliştirilen iddialı politikalar. Üye devletler arasında; ekonomik göstergeler, nüfusun büyüklüğü, fosil yakıt bağımlılığı, enerjide dışa bağımlılık oranı ve emisyon miktarı gibi hususlarda derin farklılıklar bulunmaktadır. Diğer taraftan, AB seviyesindeki politika çerçevesi bu doğrultuda değerlendirildiğinde; ortaya oldukça kapsamlı, kapsayıcı, güçlü ve dinamik bir çerçeve çıkmaktadır. AB seviyesindeki politika çerçevesi; çok sayıda politika belgesini ve stratejiyi, kısa ve uzun vadeli hedefleri ve destekleyici politika araçlarını kapsamaktadır.

AB, politika çerçevesini iç ve dış gelişmeler doğrultusunda sürekli olarak geliştirmekte olup, özellikle son dönemdeki açıklamalar göz önünde

bulundurulduğunda, söz konusu politikaların ulusal seviyedeki yansımalarının aynı oranda güçlü ve hırslı olmadığı anlaşılmaktadır. Zira AB, düşük karbona geçiş sürecinin tüm devletler için adil ve kapsayıcı bir şekilde yürütülmesi gerektiğini vurgulamakta ve güncel stratejilerini bu yönde şekillendirmektedir. Bunu yaparken tüm üye devletleri sürecin bir parçası olmaya davet etmekte ve geliştirdiği düzenlemeler ile bunu sağlamayı amaçlamaktadır. AB'nin bu çabası, geçiş sürecinde iş birliğinin ve ortak hareket etmenin önemini vurgulaması ve devletleri bu yönde aksiyon almaya teşvik etmesi açısından dikkat çekicidir.

AB uluslararası iklim müzakerelerinde tüm üye devletlerinin adına tek bir otorite olarak beyanda bulunabilmekte ve bu kapsamda Birlik düzeyinde taahhüt edilen emisyon azaltım hedefleri üye devletler arasında devletlerin göreceli refah düzeyleri ile orantılı şekilde paylaşılmaktadır. Ayrıca, 2020 ve 2030 yılındaki hedefler için de bu şekilde bir yöntem izlenmektedir. Bu yöntem, AB'nin üye devletler için ortak hedefler belirlerken devletlerin ulusal farklılıklarını da göz önünde bulundurduğunu örnekleyen bir adım olarak yorumlanmaktadır. Bununla birlikte, üye devletlerin geçiş süreçlerindeki politika çerçevelerinin benzer dinamikler etrafında şekillendirilmesi ve karşılaştırmalı bir şekilde ilerleyebilmesi için tüm üye devletlerin belirlenen formata uygun şekilde ulusal stratejiler geliştirmelerine yönelik bir düzenleme getirilmiştir. Ancak ilk taslaklar üye devletlerin söz konusu formata bağlı kalmadığını ve AB seviyesindeki politika çerçevesi ile karşılaştırıldığında ulusal stratejilerin yeterince detaylı ve iddialı olmadığını göstermektedir.

Diğer taraftan, düşük karbon ekonomisine geçiş sürecinde kritik bir husus olan kömür kullanımı politikaları Avrupa ülkeleri arasında büyük farklılık göstermektedir. Bazı ülkeler yoğun kömür kullanımını sürdürürken diğerleri kömür kullanımından aşamalı olarak vazgeçeceklerini açıklamıştır. Her ne kadar Birlik seviyesinde bu hususta ortak bir yaklaşım benimsenmiş olmasa da yoğun kömür kullanımının AB'nin iddialı geçiş hedefleri ile çeliştiği bilinmektedir. Bu bağlamda, Birlik seviyesinde kapsayıcı, adil ve güçlü bir politika çerçevesi oluşturulmasına yönelik çabalara rağmen, üye devletlerin geçiş süreçlerinde bu politika çerçevesini içselleştirmenin yanı sıra kendi iç dinamikleri doğrultusunda hareket ettiklerini söylemek mümkündür. Devletlerin

ulusal geçiş süreçlerinin incelenmesi neticesinde oluşan izlenimler de bu kanıyı güçlendirmektedir.

Birleşik Krallık tezin konusu kapsamında özel bir ülke olarak karşımıza çıkmaktadır. Zira ülke, düşük karbon ekonomisi kavramını ve bu alandaki geçiş politikalarını geliştirme konusunda çeşitli ilklere sahip olmasının yanı sıra şimdiye kadar AB'den ayrılmaya karar veren ilk ve tek ülke konumundadır. Birleşik Krallık detaylı ve sağlam bir politika çerçevesine, iddialı hedeflere ve çok sayıda politika aracına sahip olmakla birlikte, söz konusu politika çerçevesinin geçmişi ve kapsamı göz önünde bulundurulduğunda, bu çerçevenin AB'ninkinden bağımsız olarak geliştirildiği sonucuna ulaşmak mümkündür. Ayrıca Birlik seviyesindeki politikalara karşı mesafeli bir tutum izlemesiyle ünlü Birleşik Krallık'ın AB'nin geçiş politikalarını destekleyen tutumu da ülkenin bu alanda hâlihazırda iddialı politikaları olması ile ilişkilendirilmektedir. Bu çerçevede ve son dönemdeki resmi açıklamaların ışığında, ülkenin ulusal geçiş sürecindeki yaklaşımının Brexit sürecinden etkilenmeyeceği öngörülmekle birlikte AB Emisyon Ticaret Sistemi gibi ortak politika alanlarının ve araçlarının geleceği belirsizliğini korumaktadır.

Birleşik Krallık'ın AB seviyesindeki politika çerçevesinin destekleyici bir parçası olması bu alanda uluslararası iş birliğine ve ortak hareket etmeye açık olduğunu göstermektedir. Ancak Birleşik Krallık'ın AB seviyesindeki geçiş sürecinden bağımsız olarak hâlihazırda iddialı geçiş politikalarına ve bu alanda geçmişten gelen bir liderlik tutkusuna sahip olduğu düşünüldüğünde ülkenin göreceli gücü doğrultusunda hareket ettiğini söylemek yanlış olmayacaktır. Diğer taraftan, ülke geçiş politikalarında öncü konumda olmasına rağmen fosil yakıtlara yönelik desteklerini sürdürmekte ve hatta kendi ihracat piyasalarını desteklemek üzere gelişmekte olan ülkelerde fosil yakıtlara yatırım yapmakta olup bu çelişkili tavrı ile eleştiri toplamaktadır.

Almanya, AB'nin en büyük ekonomisine, nüfusuna ve en fazla sera gazı emisyonuna sahip ülkesi konumundadır. Ülke ekonomisinde sanayi üretiminin önemli bir yeri olmasına ve kömürün yoğun kullanılmasına rağmen, Almanya düşük karbon ekonomisine geçişte derin bir geçmişe ve yenilenebilir enerji alanında geniş bir üne

sahiptir. Bu ün, ülkenin temel geçiş stratejisi olan ve nükleer enerjiden aşamalı olarak vazgeçilerek yenilenebilir enerji kaynaklarının yaygınlaştırılmasını öngören *Energiewende'*den kaynaklanmaktadır.

Öte yandan, ülke hem AB seviyesindeki hem de ulusal ölçekteki iddialı hedeflerini gerçekleştirmekte zorluklar yaşamakta ve politika çerçevesini bu doğrultuda geliştirmeye çalışmaktadır. Bu kapsamda, karbon vergisinin getirilmesine ve iklim hedeflerinin bir iklim değişikliği kanunu ile taahhüt altına alınmasına yönelik çalışmalar bulunmaktadır. Ancak politik tartışmalar ve çekinceler, Almanya'nın geçiş sürecinin güçlendirilmesine ve derinleştirilmesine yönelik adımların yakın gelecekte atılamayabileceğine işaret etmektedir. Dahası linyitin yoğun şekilde üretilmeye ve kullanılmaya devam edilmesi de ülkenin geçiş sürecindeki önemli bir engel olarak varlığını sürdürmektedir.

Bir geçiş ekonomisi olan ve AB'nin görece yeni üyeleri arasında yer alan Polonya, üyelik sonrasında ekonomi ve çevre politikalarında önemli ilerleme kaydetmiş olsa da ülkenin düşük karbona geçiş politikaları hususunda aynı başarıyı göstermediği anlaşılmaktadır. Enerji yoğun bir ekonomiye ve kömür ağırlıklı bir enerji profiline sahip olan Polonya; Almanya ve Birleşik Krallık'ın ardından AB genelinde en fazla karbondioksit emisyonuna yol açan ülke konumundadır. Her ne kadar yenilenebilir enerji kaynaklarının payını artırmaya ve nükleer enerjinin katkısıyla enerji portföyünü genişletmeye yönelik bir strateji izlese de ülkenin düşük karbon ekonomisine geçişe yönelik net bir beyanı ya da taahhüdü bulunmamaktadır. Büyüyen ekonomiyi besleyen zengin kömür rezervleri, ülkenin bu yönde bir taahhütte bulunmasını zorlaştırmaktadır.

Polonya, her ne kadar bir Üye Devlet olarak AB'nin geçiş çerçevesinin bir parçası olsa da bu çerçeveyi kendi ulusal öncelikleri ve özellikleri ile uyumlu hale getirmeye çalışmakta ve bunu Birlik seviyesindeki ortak adımları veto ederek gerçekleştirmektedir. Bu kapsamda, Polonya, ortak geçiş stratejilerinin ülkelerin kendi stratejilerini oluşturmalarının önünde bir engel oluşturduğunu ve iş çevrelerinin ve vatandaşların çıkarlarını korumak amacıyla bunlara karşı çıktığını savunmaktadır. Diğer taraftan, Polonya'nın iklim ve enerji alanındaki ulusal politikalarının ülkenin

AB seviyesinde ve uluslararası arenada gerçekleşen politikalara verdiği tepkilerle şekillendiği görülmektedir. Zira ülkenin ulusal tutumu, bu tarz uluslararası iş birliği mekanizmalarının var olmaması halinde Polonya'nın çok daha karbon yoğun bir ekonomi politikası izlemesinin mümkün olduğunu göstermektedir.

Türkiye bazı özellikleri ile incelenen diğer ülkelerden farklı bir konuma sahiptir. Bunlar, aday ülke olarak henüz AB'nin politika çerçevesinin bir parçası olmaması, gelişmekte olan bir ülke olarak uluslararası iklim rejiminde diğer ülkelerden farklı bir konumda olması ve sera gazı emisyonlarına yönelik azaltım hedefini artıştan azaltım şeklinde açıklamış olmasıdır. AB adaylığı süreci; enerji ve çevre konularında çeşitli yasal düzenlemeler gerçekleştirilmesi, kapasite geliştirme çalışmaları yapılması ve AB'nin finansal ve teknik desteğinden yararlanılması anlamında faydalı bir süreç olmuştur. Ayrıca AB'nin düşük karbon ekonomisine geçiş sürecindeki politika çerçevesi Türkiye'nin ulusal politika belgeleri için yol gösterici niteliktedir. Diğer taraftan, Türkiye ile AB arasındaki ilişkilerin dinamizmini kaybetmiş olması adaylık sürecinin Türkiye'nin geçiş sürecine olası etkilerini değerlendirmeyi güçleştirmektedir.

Polonya örneğinde olduğu gibi Türkiye'nin de düşük karbon ekonomisine geçiş üzerine kurulu net politika ve stratejileri bulunmadığından ülkenin iklim ve enerji alanındaki politika çerçevesi düşük karbona geçiş açısından incelenmiştir. Bu kapsamda fosil yakıtlara ve ithal kaynaklara bağımlı bir enerji profiline sahip olan Türkiye'nin bu alandaki politikası; yenilenebilir enerji kaynaklarının toplamdaki payını artırmak, yerli fosil kaynakları temiz teknolojiler ile kullanmak ve enerji portföyüne nükleer enerjiyi de eklemek üzerine kuruludur. Türkiye bu alandaki ulusal politikalarını kalkınma öncelikleri etrafında şekillendirmekte ve uluslararası arenada da bu önceliklerini kabul ettirmeye ve bu çerçevede uluslararası finans ve teknoloji desteğine erişim sağlamaya yönelik politikalar izlemektedir.

AB ve örnek ülkeler üzerine gerçekleştirilen incelemeler neticesinde düşük karbon ekonomisine geçiş politikalarının benimsenmesinin arkasında yer alan bazı ortak motivasyonlar olduğu anlaşılmıştır. Bunları; iklim değişikliği ile mücadele etmek, enerji güvenliğinin sağlamak, yeni bir uluslararası akıma öncülük etmek ya da bu

akımın getirdiği ekonomik ve teknolojik rekabete dâhil olmak olarak sıralamak mümkündür. Anılan motivasyonlar arasında enerji güvenliği ve liderlik arzusunun ön plana çıktığı gözlemlenmiştir.

Enerji güvenliği AB genelinde kritik bir husus olduğundan AB'nin geçiş çerçevesi açısından da kuvvetli bir motivasyon oluşturmakta ve bunun yansımaları çeşitli politika belgelerinde ve stratejilerde göze çarpmaktadır. Bununla birlikte; enerji güvenliği ile düşük karbon ekonomisine geçiş arasındaki ilişkinin ülkelerin kendilerine özgü koşullarına göre nasıl farklı yorumlanabildiği Almanya, Polonya ve Türkiye örneklerinde görülmektedir. Enerji güvenliği Almanya'daki enerji dönüşümünün ortaya çıkmasında önemli bir rol oynamıştır. Nükleer enerjiye yönelik güvenlik endişeleri ve enerji arzının sürdürülebilirliğini sağlama güdüsü, ülkeyi yenilenebilir enerji kaynaklarını artırmaya yöneltmiştir. Diğer taraftan, enerji güvenliği Polonya'nın düşük karbon ekonomisine geçişe yönelik mesafeli tutumunun sebepleri arasında yer almaktadır. Zira yerli kömür rezervlerinin enerji üretimindeki payı ve ekonomik faaliyetlere sağladığı katkı ülkenin iç politikası için oldukça önemlidir. Türkiye ise yüksek oranda dış kaynaklara bağımlı bir enerji profiline sahip olmasına ve mevcut rezervlerinin sınırlı olmasına rağmen, bu alandaki stratejisini ve yatırımlarını düşük karbonlu enerji kaynaklarının ve teknolojilerin yanı sıra yeni rezervlerin araştırılmasına ve mevcut rezervlerin temiz teknolojilerle kullanılmasına yönlendirmiştir.

Liderlik motivasyonu ise AB'nin genel politika çerçevesinde ve Birleşik Krallık ile Almanya örneklerinde görülmektedir. AB'nin iklim değişikliği politikaları ve özellikle düşük karbon ekonomisine geçiş politikaları açısından küresel bir lider olma arzusu, incelenen stratejilerde ve yer verilen açıklamalarda kendini açık bir şekilde göstermektedir. Birleşik Krallık düşük karbon ekonomisi kavramının mucidi olarak bu alanda köklü ve derin politikalara sahip olmakla birlikte stratejilerinde tıpkı Sanayi Devrimi sürecinde olduğu gibi düşük karbon ekonomisine geçiş sürecinde de diğer ülkelere öncülük etmeyi hedeflediğini vurgulamaktadır. Almanya ise daha çok yenilenebilir enerji teknolojilerinde ve sahip olduğu ihraç ürünleri kapsamında uluslararası piyasaları düşük karbona geçiş konusunda dönüştürmeye yönelik adımlar

atmaktadır. Bu bağlamda, yeni gelişen bir alan olan düşük karbon ekonomisine geçişte erken harekete geçen ülkelerin bu alanda bir rekabet üstünlüğüne sahip olabileceği ve bunun ülkeler için bir motivasyon kaynağı olduğu anlaşılmaktadır. Birleşik Krallık ve Almanya'nın düşük karbon ekonomisine geçiş sürecini gelişmekte olan bir rekabet alanı olarak görmeleri ve ekonomik ve politik çıkar sağlamak amacıyla bu alanda lider olma çabaları bu ülkelerin AB ülkeleri arasında görece güçlü ekonomiler olmaları ve sanayileşme süreçlerini hâlihazırda tamamlamış ülkeler olmaları ile yakından ilişkidir.

İncelenen örneklerde görüldüğü üzere, Avrupa'da düşük karbon ekonomisine geçiş süreci; ulusal, uluslararası ve ulus üstü seviyelerdeki politikalar, strateji belgeleri, hedefler ve politika araçları ile planlanmakta ve gerçekleştirilmektedir. Politikalar temel olarak sera gazı emisyonlarının azaltılması, enerji verimliliğinin geliştirilmesi, yenilenebilir enerjinin toplam enerji üretimindeki payının artırılması ve temiz teknolojilerin geliştirilmesi gibi hususlara odaklanmaktadır. Uluslararası iklim rejimi ve AB seviyesindeki geçiş çerçevesi, ülkeleri bu minvalde politikalar ve stratejiler geliştirmeleri için teşvik etmekte olup geliştirilen stratejiler ve bunları hayata geçirmek üzere kullanılan politika araçları ülkelerin ulusal koşulları doğrultusunda farklılık göstermektedir.

Düşük karbon ekonomisine geçiş sürecinde AB seviyesinde oluşturulan politika çerçevesinin ülkelerin geçiş süreçlerine etkileri açısından farklı sonuçlara ulaşılmıştır. Brexit tartışmalarında gündeme geldiği üzere, Birleşik Krallık'ın Birlik seviyesindeki politika çerçevesinden bağımsız olarak daha önce geliştirilen ve daha detaylı ve iddialı olduğu kabul edilen bir politika çerçevesi bulunmaktadır. Almanya'nın geçiş politikalarının temelinin Birlik seviyesindeki politikalardan daha eskiye dayanması ve bazı dinamikler açısından farklılaşması ulusal geçiş sürecinde ülkenin kendi iç sisteminin etkisinin varlığını hissettirmektedir. Diğer taraftan, Polonya'nın Birlik seviyesindeki politikalara yönelik genel tutumu göz önünde bulundurulduğunda, ülkenin AB'den ayrılma durumu olması halinde daha karbon yoğun bir ekonomiye yönelme eğiliminin bulunduğunu söylemek yanlış olmayacaktır. Türkiye'nin aday ülke olmasının ve adaylık sürecinin durgun bir dönemde olmasının etkisiyle AB'nin

politika çerçevesinin ülke politikalarına etkisinin sınırlı kaldığı görülmektedir. Bununla birlikte, Türkiye'nin düşük karbon ekonomisine geçişe yönelik mevcut tutumunun Polonya'nın tutumu ile benzerliği göz önünde bulundurulduğunda ülkenin AB'ye üye olması durumunda Polonya'ya benzer şekilde Birlik seviyesindeki ortak politikaları veto edebilecek potansiyelde olduğu görünmektedir.

Tez kapsamındaki incelemeler, neoklasik realizmin argümanları çerçevesinde değerlendirildiğinde, Birleşik Krallık ve Almanya'nın düşük karbon ekonomisine geçiş sürecinde işbirliğine ve ortak hareket etmeye istekli olmasının ardında, görece sanayileşmiş ve güçlü ekonomiler olmalarının yani diğer ülkelere kıyasla sera gazı emisyonlarını azaltma konusunda daha kolay aksiyon alabilmelerinin ve yeni gelişen bir alanda rekabet üstünlüğü sağlama arzularının bulunduğunu söylemek mümkündür. Diğer taraftan bir geçiş ekonomisi olan Polonya'nın ve gelişmekte olan bir ülke olan Türkiye'nin ekonomik ve teknolojik yeterlilikleri bakımından diğer iki ülkeye göre daha geride olması, düşük karbon ekonomisine geçiş sürecine mesafeli yaklaşmalarını anlaşılabilir kılmaktadır. Polonya ve Türkiye örneklerinde uluslararası iş birliği mekanizmalarının destekleyici rolünden sınırlı ölçüde etkilenildiği ve ülkelerin, uluslararası dinamikleri kendi iç dinamikleri doğrultusunda şekillendirmeye çalıştıkları gözlemlenmiştir.

Devletlerin geçiş politikalarını benimserken ya da benimsemekten kaçınırken diğer devletlerin, AB'nin ya da uluslararası gelişmelerin durumunu göz önünde bulundurarak liderlik arzusu, üyelik ya da uluslararası finans ve teknoloji desteği gibi etmenler doğrultusunda karar vermeleri, düşük karbon ekonomisine geçiş sürecinin uluslararası bir boyutu olduğunu göstermektedir. Ancak devletlerin bu süreçteki davranışlarını analiz etmek için ulusal koşullarının dikkate alınması ve her birinin geçiş politikalarının bu boyutuyla incelenmesi gerekmektedir. Zira her bir ülke örneğinde görüldüğü üzere, ülkelerin ekonomi, sanayi ve enerji gibi alanlardaki kendilerine özgü dinamikleri ile ulusal öncelikleri ve çıkarları düşük karbona geçiş sürecinde ulusal politikalarını olduğu kadar uluslararası yaklaşımlarını da etkiletmektedir.

Sonuç olarak, bu çalışma ile düşük karbona geçiş sürecinin dinamikleri geçiş literatüründeki diğer yaklaşımlardan farklı olarak uluslararası ilişkiler teorileri açısından ele alınmış ve Avrupa'da düşük karbon ekonomisine geçiş sürecinde AB tarafından sağlanan uluslararası iş birliği ortamı ve devletlerin iş birliğine yönelik tutumları neoklasik realizmin bakış açısıyla irdelenmiştir. AB'nin ve dört Avrupa devletinin düşük karbon ekonomisine geçiş kapsamında değerlendirilebilecek politika çerçeveleri göstermiştir ki AB bu süreçte uluslararası iş birliğini ve ortak hareketi teşvik etmek üzere kapsamlı ve kapsayıcı bir politika çerçevesi geliştirmiş olsa da ülkelerin bu çerçeveye yönelik tutumları; göreceli güç düzeylerine ve kendi iç dinamiklerine göre değişkenlik göstermektedir.

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TEZİN TÜRÜ / DEGREE**:** **Yüksek Lisans** / Master ■ **Doktora** / PhD ☐

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