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Posted Date: 16 December 2025

doi: 10.20944/preprints202512.1451.v1

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Article

Evaluating the Socio-Economic Impact of Germany's Transition to Renewable Energy (Energiewende): Perspectives from Renewable Energy Experts

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Abstract

Background: Germany's pioneering energy policy, the Energiewende, seeks to fundamentally transform its energy landscape by shifting from conventional fossil fuels to renewable sources. **Aim:** This current study examined the economic and social impact of Germany's transition to renewable energy (Energiewende) since it officially started in 2000 when the Renewable Energy Sources Act (EEG – Erneuerbare-Energien-Gesetz) was passed. **Method:** Data was collected from nine renewable energy experts using semi-structured interviews. The views of the diverse experts were analyzed using a thematic approach. **Results:** The findings indicate that early policy instruments and subsidy schemes were critical in accelerating renewable energy deployment and improving cost competitiveness, especially for wind and solar technologies, though their relevance has evolved as the sector matured. Energy communities emerged as a central pillar of the transition, enhancing local participation, social acceptance, and socio-economic benefits through diverse ownership models. Economically, the Energiewende is widely perceived to have stimulated job creation, investment, and technological innovation, while also contributing to job losses in fossil fuel-dependent sectors, particularly coal. Social inequalities were identified as a significant challenge, driven by employment displacement and rising energy affordability concerns for low-income households. Public acceptance was found to vary by technology, with solar projects generally favored over wind due to noise-related concerns. **Conclusion:** This present research contributes to a more profound understanding of Germany's journey towards a green energy future and highlights the need for adaptive policy frameworks and socially inclusive strategies to support a just and sustainable energy transition.

Keywords: socio-economic; energiewende; RE policy; qualitative study; Germany

Introduction

In an era marked by escalating environmental concerns and an urgent call for sustainable practices, Germany's bold and comprehensive energy policy, known as the Energiewende, has emerged as a pioneering model for nations navigating the uncharted waters of a green energy transition. With its inception in the early 21st century, the Energiewende has propelled Germany towards a future less reliant on traditional fossil fuels and more committed to harnessing the potential of renewable energy sources (Bosch and Schmidt, 2020; Mez, 2020; Paul, 2018). Research has shown that the Energiewende has had both economic and social impact on the German population over the years (Bosch & Schmidt, 2020; Ernst and Fuchs, 2022; Kreuz and Müsgens, 2018; Sait et al., 2019). The transition has set in motion a series of intricate economic and social dynamics, reshaping the nation's energy landscape and igniting a discourse on the balance between progress and challenges.

The primary objectives of this research are multifaceted, seeking to illuminate both the economic and social impact of Germany's transition to renewable energy. Foremost, this study aims to meticulously dissect the far-reaching impact of the Energiewende on the German economy. This entails a comprehensive exploration of the investment opportunities that have materialized within

the realm of renewable energy, the transformative potential for job creation, and the evolving dynamics of energy security.

The Energiewende has not been without challenges. Over the years the energy transition has encountered a series of intricate economic challenges that demand close examination (Kemfert et al., 2018). This research seeks to identify and elucidate the key economic hurdles that have surfaced during this transition. When these complexities are unpacked, we can better appreciate the intricate interplay between aspiration and the pragmatic realities that underpin the transition to renewable energy.

Aside from the economic impact, the Energiewende has also given rise to a range of profound social implications (Renn and Marshall, 2020; Sovacool et al., 2021). Over more than two decades since its official inception, the social fabric of Germany has evolved in response to this energy transition. This study takes a comprehensive approach to assess the social impacts of the Energiewende, exploring the public's evolving acceptance of renewable energy, probing into potential social inequalities that may arise from this transition, and the role of energy communities in promoting renewable energy technologies. Through this study, we wish to unravel the intricate ways in which the Energiewende has woven itself into the societal consciousness, altering perceptions and behaviors

Studies regarding the socio-economic implications of Germany's Energiewende are limited. We observed that many studies have examined the economic and social implications of the Energiewende separately. This study was thus designed to address the paucity. In this study, we evaluated the socio-economic impact of Germany's energy transition to renewable energy. We did this through a comprehensive analysis of the Energiewende's impact on policies and subsidies, energy security, social inequalities, sentiments on wind and solar projects, income levels and renewable energy adaptation, and the development of renewable energy at the local level through energy communities. This current work contributes to a nuanced understanding of the delicate equilibrium between the aspirations and realities that are likely to be encountered on the path to a sustainable and green energy future.

Research Objectives

The study aimed at:

- assessing the economic implications of Germany's energy transition (Energiewende) to renewable energy in terms of investment opportunities, job creation, and energy security and ownership models.
- examining the social implications of the Energiewende since its inception in 2000 in terms of public acceptance of renewable energy, social inequalities stemming from the transition, and the role of energy communities.
- identifying the key socio-economic challenges associated with the Energiewende.
- Exploring the renewable energy policies in Germany.

Research Questions

- How has Germany's energy transition (Energiewende) impacted the economy in terms of job creation, investment opportunities, energy security, and ownership models since 2000?
- What are the social impacts of the energy transition (Energiewende) in terms of public acceptance and attitude towards the installation of renewable energy plants, rising social inequalities and the establishment of energy communities?
- What are the key socio-economic challenges associated with the Energiewende since its inception?

Methodology

The study aimed to investigate the socio-economic impact of the Energiewende since its inception in the year 2000. This chapter highlights how the interviewees were selected, data was collected, and analysed.

Interview Questions

The interview questions for the study were developed by the research team by reviewing related literature. The questions were put under two broad sub-topics i.e. economic implications and social implications of the Energiewende. Expert opinions were collected on investment opportunities, job creation, and energy security dynamics since the inception of the transition. Expert views were also collected on the social impact of the Energiwende, examining the public acceptance of renewable energy, the development of energy communities, the social inequalities that stemmed from the transition, and exploring the policy frameworks and the socio-economic challenges associated with the transition. In all, the interview guide contained a total of nine questions. The interview guide is in the Appendix A.

Interviewee Selection

With the research objectives clearly defined, we purposively selected nine interviewees that had the relevant experiences for the study. We did this by identifying various renewable energy experts on platforms such as LinkedIn, Google Scholar, company websites, and referrals from industry networks. Emails and messages were sent to the potential interviewees seeking their interest in participating in the study. Participants who agreed to take part in the study were scheduled for interviews. The participants were drawn from various renewable energy backgrounds – academia, engineering, management, energy policy, and project management. This was to enhance the richness and depth of the data.

Table 1. Interviewee categories and number of interviewees.

Interviewee category	Number
Academia	AC1, AC2
Engineering	EN1, EN2, EN3
Project Management	PM1, PM2
Energy Policy	EP1, EP2
Total number of interviewees	9

Data Collection

Data collection was based on a semi-structured interview approach, seeking interviewees’ views on the economic and social implications of the Energiewende since it started in the year 2000. Views on policy framework and socioeconomic challenges of the transition were also explored. The interviews were conducted through video calls. During the interviews, follow-up questions were asked outside the open-ended questions to obtain further information and clarification from the interviewees. The interviews were conducted in June and July 2023. Each interview took approximately sixty minutes to complete. Interviewees were pre-informed that the interviews were for academic purposes and would be recorded. All the interviews were recorded and transcribed verbatim using a web-based platform. A semi-structured interview is a qualitative research method that combines a pre-determined set of open-ended questions with the opportunity for the interviewer to further explore a participant’s views on the particular topic (Brown & Danaher, 2019; DeJonckheere & Vaughn, 2019; Magaldi and Berler, 2020). We opted for semi-structured interviews because they are particularly useful for exploring participants' experiences, perceptions, and viewpoints in a

detailed and nuanced manner. The method essentially provides a balance between maintaining some level of structure and allows participants to express themselves in their own words, making it well-suited for a wide range of qualitative research objectives.

Data Extraction

Data was extracted by transcribing the recorded interviews into text using a web-based platform. The transcribed data was cleaned for further analysis.

Data Analysis

To get the general overview of the data after extracting it, the data was read multiple times by the authors. Also, to ensure that we undertook the analysis systematically, the team jointly developed an initial coding framework based on the analytical framework. In this study, an inductive coding approach was adopted to develop the initial set of codes. The initial coding is the first step of the coding process which is done to identify the essence of the text. The initial coding was followed by line-by-line coding to get a more detailed understanding of the data and capture its richness. After the line-by-line coding was carried out, the authors proceeded to do test coding by coding the same interview independently. This was done to see if any of the authors could confidently produce a coding framework that could be reproducible by the other authors (Johnstone et al., 2020). The authors compared codes after the test coding to agree on a common coding framework and interpretation. To enhance the validity of our data, we performed two more rounds of independent coding and eventually achieved a coherent coding framework and coding list for the study. The rest of the interviews were coded using the agreed coding list and developed framework. All the coding activities employed in this study were human-based.

To obtain a more detailed impression of the data, we categorized the data by merging related codes and developed themes. We created an Excel sheet that contained a summary of the perspectives or views of all the interviewees and the respective themes developed. The information contained in the Excel table was used to write our findings.

Findings

In this section, the key findings of the study are presented under the various themes that emerged during the data analysis.

Economic Impact

In relation to the economic impact of the Energiewende, majority of the interviewees (8 of 9) indicated that the sector has seen a significant increase in job creation and investment opportunities since the inception of the transition. This is what one of the interviewees who believed the renewable energy sector in Germany is witnessing a remarkable increase in terms of jobs and investments said: *"the job market in renewable energy in the past years has increased exponentially"* (EN3, Engineering). Investments in the industry has equally witnessed growth. This was the response of one of the interviewees who believed said *"...due to high demand for renewable energy, renewable energy investments have sky rocketed in the last decade, for example investments to build more offshore wind turbines in the north of Germany"* (EN3, Engineering). Apart from jobs and investment opportunities, there are improvements in other areas. One of the interviewees responded that: *"the impact is significant not only in terms of job creation and investment opportunities but also in areas like technology and innovation development"* (AC2, Academia).

Two of the interviewees (EN1, Engineering and EP2, Energy Policy) stated that aside the positive impact on job creation and investment opportunities, the transition also led to job losses due to policy change, especially in the coal industry. Out of the nine interviewees, only one held the view that the Energiewende has not made any significant impact on the industry in terms of job creation and investment opportunities.

Impact of Policies and Subsidies

There were diverse responses on this topic. Policy schemes may have a positive or negative impact on an industry depending on prevailing conditions and circumstances. Under this theme, three of the interviewees stated that the policy on subsidies has been impactful since the Energiewende started in 2000. One of the interviewees said *“the subsidies have highly impacted the transition especially solar”* (PM1, Project Management). Another interviewee said *“subsidies and policy schemes have had a good impact on the growth of renewable energy since its inception”* (EN2, Engineering). Policy schemes and subsidies were perceived to be making power production cost effective. This was the response of one of the interviewees *“...subsidies through policy schemes and upgrading of renewable energy technologies such as wind and solar made them more cost effective for power production”* (EP1, Energy Policy). Meanwhile, two of the interviewees mentioned that under the circumstances, subsidies are either not needed or have not served any good. One of them said *“the cost of RE technologies have reduced in recent decades so there is no need for high subsidies”* (EP2, Energy Policy). Another interviewee responded that *“the implementation of the new policy regarding subsidies was not suitable and this has led to instability in the market”* (PM2, Project Management). The remaining three interviewees indicated that when the transition began, the policies on subsidies were attractive but the situation became different when the sector gained momentum (AC1 and AC2, Academia).

Impact on Energy Security

While some of the interviewees (4 of 9) stated that the Energiewende has positively impacted the energy security situation in Germany, others (5 of 9) mentioned that nothing much has changed. One of the interviewees who believed there has been a positive impact said *“the energy situation has improved through less reliance on fossil fuel”* (AC2, Academia). Another interviewee who believed that Germany's energy security had seen a significant improvement since the beginning of the Energiewende stated that *“the whole energy transition was started for Germany to become a global leader in renewable energy technologies”* (EN3, Engineering). One of the interviewees was convinced that in terms of short term planning, Germany was doing well with regards to energy security (EP1, Management). However, five of the interviewees said the situation has remained fairly the same. They have not witnessed any significant change in the energy security situation as a result of the Energiewende.

Energy Communities and Ownership Models

A key theme that emerged during the data analysis was the role of energy communities in the energy transition and the type of ownership models that can be adopted. All the nine interviewees indicated that energy communities are playing key roles in the Energiewende and evidently important. One of the interviewees said that *“Energy Communities encourage people to actively take part in the Energiewende at the local level”* (AC2, Academia). Another said *“Energy Communities are key for RE acceptance in the local areas and the overall success of the emerging RE industry”* (EN1, Engineering). In responding to the question on the role of energy communities in the Energiewende, one of the interviewees stated that *“Energy Communities can create local RE jobs, increase energy security and promote the adoption of RE in the local areas”* (EN2, Engineering). Energy communities have become a prominent feature in the renewable energy landscape in Germany. While other countries are concentrating mainly on big energy projects, Germany is taking advantage of the energy communities concept and making good use of them. One of the interviewees responded that *“other countries don't have the energy communities' concept; they only have big energy projects”* (EP1, Energy Policy). Regarding the interviewees' choice of ownership models, the interviewees suggested four different models. These included community-led ownership, private ownership, mixed ownership model, and public-private partnership model.

Social Inequalities

Concerning the social inequalities that have emerged as a result of the energy transition, five of the interviewees observed that job losses especially in the coal sector are part of the reasons why there are social disparities. This shows the impact job losses in the coal sector have had on the lives of people. Three of the interviewees said that the inequalities are caused by the differences in income levels and the ability of people to afford electricity. One of the interviewees stated that *"many workers in the coal sector are losing their jobs and this is causing some social disparities"* (AC2, Academia). Another interviewee said that *"low-income households have been affected by the increasing energy prices and this is causing affordability issues"* (EN2, Engineering). Out of the nine interviewees, only one attributed the social inequalities to state level regulations. The interviewee mentioned that *"regional inequalities and disparities do exist due to some state level regulations"* (EP1, Energy Policy). Most of the interviewees (6 of 9) suggested that to solve the issue of social inequality, authorities must design incentives that are targeted at low-income families.

Sentiments on Wind and Solar Projects

Several perspectives were shared by the interviewees on the deployment of wind turbines and solar panels in rural and urban areas. Seven of the interviewees indicated that solar farms are generally better perceived than wind farms. A greater number of the interviewees (7 of 9) said solar is easy to deploy and does not produce noise. They also said that people usually complain about the noise that wind turbines generate, which is why most people prefer solar projects to wind projects. One of the interviewees said *"wind turbines make too much noise"* (EN1, Engineering). One group that was really bothered about the noise levels of the turbines were older people. One interviewee said that *"usually the older people are bothered by the noise of wind turbines"* (EP1, Energy Policy).

Influence of Gender, Income Level and Educational Level on RE Adaptation

Regarding the influence of gender, income level, and educational attainment on the adaptation of renewable energy technologies, majority of the interviewees (6 of 9) did not think gender had a role to play. One of the interviewees indicated that *"it is not a gender thing but more of one's mindset"* (EN1, Engineering). The interviewee explained that cultural beliefs, government policies, and personal beliefs are more important than gender, income level, and educational attainment. Another interviewee who shares a similar perspective stated that *"gender does not have much impact, but individual awareness is what plays a crucial role"* (EN3, Engineering). While others think that it is only gender that does not influence renewable energy adaptation, one of the interviewees believed that both gender and educational level do not have any impact whatsoever. The interviewee said, *"I think that gender and educational level do not have any impact... So for me, it is really about the income levels and the economic situation"* (EN1, Engineering). However, one of the interviewees believed that gender influences renewable energy adoption. The interviewee explained that *"since women are more inclined to accept sustainability concepts and new technologies, they have the potential to become leaders in renewable energy and sustainable development"* (PM2, Project Management). Four of the interviewees believed that income levels of people play a critical role in people adapting to renewable energy technologies. One of the interviewees indicated that *"low-income people are facing more problems installing and using solar energy technologies, so this could directly impact their attitude towards renewable energy transition"* (AC2, Academia). Another interviewee also indicated that *"with low income, there is very little capacity to participate in energy projects, for example, in energy communities' projects, financial participation is required"* (PM1, Project Management). When it came to the influence of educational level, one of the interviewees said *"poor education does not only affect income levels, but there may also be some level of ignorance, which results in negative impacts"* (PM1, Project Management). Two of the interviewees indicated that renewable energy awareness in Germany is high. One of them said, *"generally speaking, the public awareness of renewable energy in Germany is much higher than in developing countries despite the educational levels of the people"* (AC2, Academia). The other interviewee stated that *"it does not matter*

whether the person is a man or a woman, most people in Germany have the basic idea of renewable energy technologies” (EP1, Energy Policy).

Discussion

This study examined the socio-economic impact of Germany’s energy transition (Energiewende) since it officially began in 2000. The study also explored the policy frameworks and the socio-economic challenges associated with the Energiewende. Seven major themes emerged from this study, explaining the socio-economic impact of the energy transition since its inception.

Our findings show that there has been a remarkable increase in jobs and investments in the renewable energy sector since the inception of the Energiewende in Germany. Since the beginning of the Energiewende, employment and investments in the have been made in the renewable energy industry in Germany (Egerer et al., 2018; Sievers et al., 2019). Our finding is also consistent with what Rogge and Johnstone (2017) found in their study. Several other studies have confirmed our finding. The Energiewende created and continues to create thousands of jobs and investments opportunities in Germany’s renewable energy sector (Aniello et al., 2019; Hartwig et al., 2017; Heinbach et al., 2018; Rechsteiner, 2021). Not only has the Energiewende paved the way for other countries that believe in transitioning to sustainable energy but has transformed the German energy landscape tremendously in the past twenty-three years. A related research conducted in the Czech Republic on renewable energy investments and job creation based on European Union (EU) benchmarks found that energy transition creates new employment opportunities and investments in the sustainable energy sector (Dvořák et al., 2017).

The rise in job and investment opportunities in the industry since 2000 could be due to the policies and incentives the German government implemented through the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) which guaranteed fixed, above-market prices for renewable energy producers has been a game changer. The introduction of feed-in tariffs through the EEG ensured the renewable energy producers, such as solar, wind, and biomass received a guaranteed payment for electricity produced. This provided a reliable income stream, attracting investors while driving the expansion of renewable energy industry. From our finding, we can confidently say that the exponential increase in jobs and investments in the renewable industry in Germany since the Energiewende began may be because of these four reasons; government policies, financial incentives, technical advancements and public support.

Energy policies have played a critical role in the socio-economic impact of the Energiewende since it officially began some twenty-three years ago. In this study, we examined the impact of the policy frameworks that have shaped German’s energy transition since 2000 when the Renewable Energy Sources Act was enacted. Policies and subsidies were widely regarded by interviewees as central to the development and progress of Germany’s *Energiewende*, though their impacts were perceived as neither uniform nor static over time. Several respondents emphasized that subsidy schemes introduced at the start of the transition in the early 2000s were highly effective in stimulating renewable energy deployment, particularly solar power and this was confirmed by Rechsteiner et al., (2021). These early policies were credited with driving market entry, accelerating technological development, and reducing the cost of renewable electricity generation. Interviewees noted that through sustained policy support and technological upgrading, renewable energy sources such as wind and solar became increasingly cost-effective, reinforcing the role of subsidies as a catalyst for long-term structural change in the energy system.

At the same time, majority of the interviews revealed growing skepticism about the continued necessity and effectiveness of subsidies under current market conditions. Some respondents argued that the substantial reduction in renewable energy technology costs over recent decades has reduced the need for high subsidy levels, suggesting that continued financial support may no longer be economically justified. In recent years, there has been significant reduction in the cost renewable energy technologies (Luderer et al., 2022). Others highlighted that recent changes in subsidy policies have not been well aligned with market realities, contributing to uncertainty and instability within

the renewable energy sector. This perspective underscores concerns about policy design and implementation rather than the principle of subsidies themselves. Collectively, the findings suggest that subsidies have been most effective as transitional instruments, with their impact shaped by technological maturity, market dynamics, and policy consistency.

Interviewees unanimously viewed energy communities as a crucial component of Germany's *Energiewende*, particularly for fostering local participation and social acceptance of renewable energy projects. Energy communities are vital to *Energiewende* (Ernst & Fuchs, 2022; Hanke & Guyet, 2023). Energy communities were seen as enabling citizens to actively engage in the transition while also delivering local benefits such as job creation, enhanced energy security, and increased adoption of renewable energy technologies. Interviewees also highlighted Germany's distinctive reliance on community-based, decentralized energy initiatives compared to other countries that prioritize large-scale projects.

The findings indicate that social inequalities have emerged as a notable challenge of Germany's *Energiewende*, primarily driven by job losses in the coal sector and rising energy affordability concerns. Majority of the interviewees identified coal-sector employment decline as a major source of social disparity, highlighting its negative impacts on workers and fossil fuel-dependent regions. Others emphasized that increasing electricity prices disproportionately affect low-income households, exacerbating income-based inequalities and this has been confirmed by Memmott et al., (2021). A smaller number of respondents pointed to state-level regulations as contributing to regional disparities. To address these issues, the majority of interviewees stressed the importance of targeted policy measures, particularly incentives and support mechanisms aimed at protecting low-income households, underscoring the need for a more socially inclusive and just energy transition.

The findings show that solar energy projects are generally better perceived than wind projects in both rural and urban areas. Majority of the interviewees highlighted that solar installations are easier to deploy and do not produce noise, which contributes to higher public acceptance. In contrast, wind turbines were frequently associated with negative sentiments due to noise concerns, which were identified as a key reason for public opposition. Older residents were particularly noted as being more sensitive to turbine noise. Overall, the findings suggest that differences in perceived social impacts, especially noise, play a significant role in shaping public acceptance of wind and solar energy projects.

The findings suggest that income level is perceived as the most influential socio-demographic factor affecting the adoption of renewable energy technologies, while the roles of gender and educational attainment are viewed as limited or context-dependent. Majority of the interviewees did not consider gender to be a significant determinant, emphasizing instead individual mindset, awareness, and broader cultural and policy factors. Although one respondent suggested that women may be more receptive to sustainability and capable of leading renewable energy initiatives, this view was not widely shared. Income-related barriers were more consistently highlighted, with low-income households facing financial constraints that limit their ability to install renewable technologies or participate in energy community projects. Views on educational attainment were mixed; while some interviewees linked lower education to reduced awareness and income, others argued that Germany's generally high level of renewable energy awareness minimizes the influence of education. In sum, the findings point to economic capacity, rather than gender or education, as the key driver of renewable energy adaptation.

Limitations of the Study

Qualitative research using a thematic approach offers a nuanced exploration of complex phenomena, but it is not without its limitations. The subjectivity inherent in thematic analysis introduces the potential for bias and varied interpretations among researchers. However, in this study, the energy experts that were recruited can be said to be representative of the population that was targeted (Phelan et al., 2024). Findings were context-specific, limiting the generalizability. The quality of the analysis heavily relied on the skills and experiences of the authors. Thematic analysis

might oversimplify intricate issues, risking the loss of data richness and complexity. Despite these limitations, qualitative thematic analysis remains a valuable tool for generating hypotheses and providing a deep understanding of intricate social phenomena. The research was designed to counter these limitations.

Conclusion and Recommendations

This study explored stakeholder perspectives on Germany’s *Energiewende*, focusing on its policy, social, and economic impacts. The findings suggest that the energy transition has been largely successful in accelerating renewable energy deployment, stimulating job creation, attracting investment, and supporting technological innovation. Early subsidy schemes were widely viewed as critical in enabling the growth and cost competitiveness of renewable technologies, particularly solar and wind. However, as the sector has matured, interviewees emphasized the need for adaptive and stable policy frameworks that reflect evolving market conditions.

Energy communities emerged as a key feature of Germany’s transition, enhancing local participation, social acceptance, and socio-economic benefits. The presence of diverse ownership models highlights the flexibility of Germany’s renewable energy governance. Despite these successes, the *Energiewende* has also generated social challenges, particularly job losses in the coal sector and affordability concerns for low-income households.

Public acceptance of renewable technologies varies, with solar projects generally perceived more positively than wind projects, largely due to noise-related concerns. Socio-demographic factors such as gender and education were viewed as having limited influence on renewable energy adoption in Germany, whereas income level was consistently identified as a key determinant shaping access and participation.

Based on these findings, policymakers should continue to recalibrate subsidy schemes, strengthen support for energy communities, and implement targeted measures to protect low-income households. Enhancing public engagement, particularly for wind energy projects, can further improve social acceptance and support the long-term success of the *Energiewende*.

Conflict of Interest Statement: The authors declare no conflict of interest.

Appendix A

Interview Guide

Evaluating the socio-economic impact of Germany’s transition to renewable energy (Energiewende): Perspectives from renewable energy experts

Economic Implications

1. How has Germany's transition to renewable energy impacted the economy in terms of investment opportunities, job creation, and energy security?
2. How has the change in policy schemes and subsidies impacted the growth of renewable energy projects in Germany? (In context with declining state and national level subsidies in the past)
3. How has the Energy Transition (*Energiewende*) influenced Germany's energy trade balance or energy security and its overall competitiveness in the global market? (In context with short-term and long-term impacts of energy security of Germany)

Social Implications

1. Have you noticed any changes in public attitudes toward energy consumption and conservation since the transition to renewable energy?
2. Are there any social inequalities or disparities that have emerged due to the transition, and if so, how are they being addressed?

3. What role could energy communities (EC) in Germany play in the transition towards renewable energy resources? Also, who should take ownership of community-level renewable energy projects?
4. What are the positive and negative sentiments people have on the deployment of wind turbines and solar panels in rural and urban areas?
5. How important do gender, income level, and individual education level affect the adoption of renewable technologies as a new energy resource?
6. What is the impact of Germany's ongoing energy transition pathway on the location of communities?

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