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The Socio-Economic Impact of Renewable Energy Deployment in Mecklenburg-Western Pomerania



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Abbreviations

CDU	Christian Democratic Union
CSU	Christian Social Union
EEG	Erneuerbare Energien Gesetz
GDP	Gross Domestic Product
GHG	Greenhouse Gas
PISA	Programme for International Student Assesment
PV	Photovoltaic

1 A brief overview over the German context

1.1 Germany's socio-economic conditions

Germany is a highly industrialised country, with the European Union's biggest economy. Its nominal GDP per capita was 40,120 Euro in 2020, the 8th highest out of all Member States, about 10,000 Euro more than the European average. The German GDP continuously increased in the years between 2010 and 2019, by 1.9% on average¹. Moreover, only 5.9% of the active population were unemployed in 2020. The share has been continuously declining in the last ten years, with the exception of a slight increase in 2020 due to the COVID-19 pandemic.²

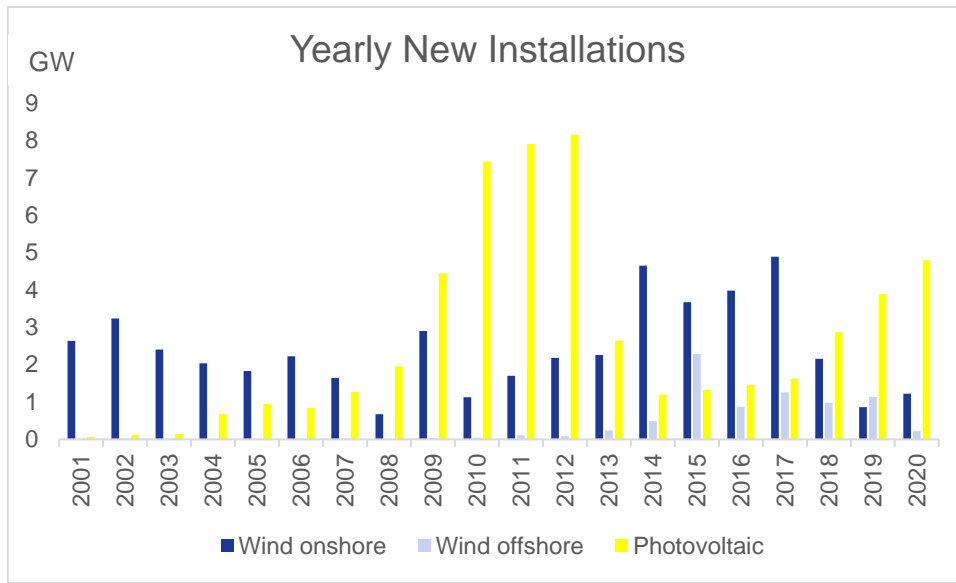
Despite the strength of its economy, Germany has a relatively high income inequality (ranking 16th in the EU when measured by Gini coefficient) and comparatively low social mobility. The Programme for International Student Assessment (PISA) study, which evaluates education systems in a variety of countries, found that in Germany the influence of the parent's socioeconomic background on academic performance is bigger than the surveyed countries' average.³

The conservative party Christian Democratic Union (CDU) and the Christian Social Union (CSU) under Chancellor Angela Merkel have governed Germany in varying coalitions since 2005. However, federal elections in autumn 2021 will bring a change in administration, as Angela Merkel will not be running for office again.⁴

1.2 Renewable energy deployment in Germany

Germany has a comparatively high share of renewables in its electricity mix: Renewable energies generated 47% of electricity in 2020, the highest individual share of any energy source being wind with 26%⁵. However, at about 19%, the share of renewables in total energy in final energy consumption is considerably lower.⁶ There are significant regional disparities: while the North of Germany has a very high share of renewables, especially because of wind energy, the South's share is markedly lower, with its renewable market being dominated by solar, hydro and biomass.⁷ This leads to a skewed balance, with the North oftentimes producing high amounts of renewable electricity and the South consuming a large share of it.⁸

Figure 1: Annual renewable energy installations in Germany



Source: Own presentation based on Arbeitsgruppe Erneuerbare Energien (2021)⁹

While the German energy transition (*‘Energiewende’*) was once role model for its innovativeness and speed, the uptake of renewables has not met expectations, the deployment of wind energy has even stalled (see Figure 1). This is mainly attributed to the change of the incentive structure of the Renewable Energy Act (*‘Erneuerbare-Energien-Gesetz EEG’*, original version is from 2000)¹⁰ to an auctioning system, which impedes smaller suppliers from participating and puts a de-facto cap on the amount of big-scale renewables that can be deployed;¹¹ complex licensing procedures, as well as increasing local opposition and lawsuits blocking building permits.¹²

1.3 Political governance structures regarding the deployment of renewable energies in Germany

The central legislative instrument for the uptake of renewable energies in electricity is the EEG, which regulates the incentive structure as well as the indicative trajectory for the installation of renewables.¹³

The EEG defines the main policy instruments to regulate and incentivise renewable energy uptake. Those have largely shifted from fixed feed-in-tariffs to auctions with the most recent amendments of the regulation in 2017 and 2021. Energy producers wanting to install renewable energy plants (biomass, photovoltaic (PV), wind onshore and offshore) have to participate in auctions in order to be able to connect to the grid and receive a guaranteed support level. Small Onshore wind, PV and biomass plants can still receive a feed-in-tariff, if their installed capacity is below a certain threshold value (750 kW for PV, 150 kW for Biomass, 750 kW for wind onshore).¹⁴

The EEG furthermore sets the target of achieving a share of 65% renewable energies in electricity generation by 2030. Within the EU’s Renewable Energy Directive, the target share in gross final energy consumption – i.e. for all energy consumption including transport and heat – was set at 30%. Both targets have been confirmed and elaborated through the country’s National Energy and Climate Plan (NECP).¹⁵ Additionally, the Climate Protection Law of 2019

specified CO₂ reduction targets of the energy sector from 61-62% compared to 1990 levels by 2030¹⁶ on the basis of the Climate Protection Programme 2050.¹⁷ In May 2021, however, in the aftermath of a landmark decision by Germany's constitutional court in favour of stronger climate protection, the federal government announced an increase in total emission reduction targets from 55% to 65% by 2030 and a long-term goal to achieve climate neutrality by 2045 instead of 2050.¹⁸ It remains to be seen how this change will affect the specific targets for the energy sector.

The legislative powers in the energy sector are almost exclusively located at federal level, as the energy policy is part of the so-called 'concurrent legislation', meaning federal law has the prerogative over state law. This is especially relevant for the electricity sector, where the parliament at federal level decides on the regulatory framework for both renewables and conventional energy technologies. Nevertheless, federal states also have some competences, mainly in regard to spatial planning, local energy supply, energy efficiency, district heating and heating in general.¹⁹ Thus, federal and state level governance differs. While federal regulation is ubiquitous, federal states focus on spatial factors regarding the installation of renewables, such as nature conservation sites, minimum distance requirements from residential areas and conflict management with residents.²⁰ It is important to note, however, that the North Sea and Baltic Sea constitute limits to these competencies, as their spatial development plan has been developed on federal level.²¹

Apart from state regulations, federal states have the possibility to influence national policy making through the German Federal Councils ('*Bundesrat*'). This option is limited, however, as the amendments of the EEG only allow for a suspensive veto.²²

2 Mecklenburg-Western Pomerania's socio-economic development and renewable energy deployment

2.1 Mecklenburg-Western Pomerania's socio-economic conditions

There are significant regional disparities in Germany. Especially the federal states that formerly belonged to the German Democratic Republic (GDR) are still struggling to bring their economic development up to speed with former West Germany. The average income with equal qualification in the eastern and western parts of the country still differs by 17%²³ and unemployment is generally higher in the eastern part.²⁴ Few economic opportunities caused a wave of domestic migration from the former GDR into former West Germany after the reunion in 1990. Especially younger people left, leading to the remaining population being considerably older on average. As a consequence, the workforce is smaller than in the West.²⁵ As Mecklenburg-Western Pomerania is part of the former GDR, it is also part of this dynamic.

Mecklenburg-Western Pomerania is a coastal state in the northeast of Germany, located by the Baltic Sea. Its landscape is characterized by hilly lowlands, a great variety of peatlands and the Mecklenburg Lake District, which makes up a major part of the state. Due to the ecological value of its ecosystems, almost a third of Mecklenburg-Western Pomerania is under some form of nature protection.²⁶

At the end of 2019, 1.6 million people lived in Mecklenburg-Western Pomerania in an area of 23,300 km², (population density of 69/km²) making it the least densely populated state in Germany.²⁷ After the emigration of a big part of its workforce after the reunion with former West Germany, Mecklenburg-Western Pomerania has experience net immigration since 2013. However, the population is still shrinking, as the death rate exceeds the birth rates an effect that is not compensated for by migration.²⁸ Hence, an analysis of Mecklenburg-Western Pomeranians' economic conditions found an already noticeable lack of skilled workers is likely to worsen in the future.²⁹ This was corroborated by another study, which estimated that in the first semester of 2019, 40% of qualified positions could not be filled in; with smaller companies being more affected. The highest percentage was observed in the building sector and manufacturing industries. Overall, the share seems to be stagnating at a high level.³⁰

Mecklenburg-Western Pomerania has a comparatively weak economy. With a nominal GDP of 46 billion in 2020, it constitutes just 1.4% of Germany's GDP. Its GDP per capita is 28,590 Euro which is more than 10,000 Euro lower than the German average. Correspondingly, unemployment has exceeded the German mean since reunification. However, while around the year 2000 approximately 20% of Mecklenburg-Western Pomeranians were unemployed, this number has significantly dropped, to 7.9% in 2020³¹.

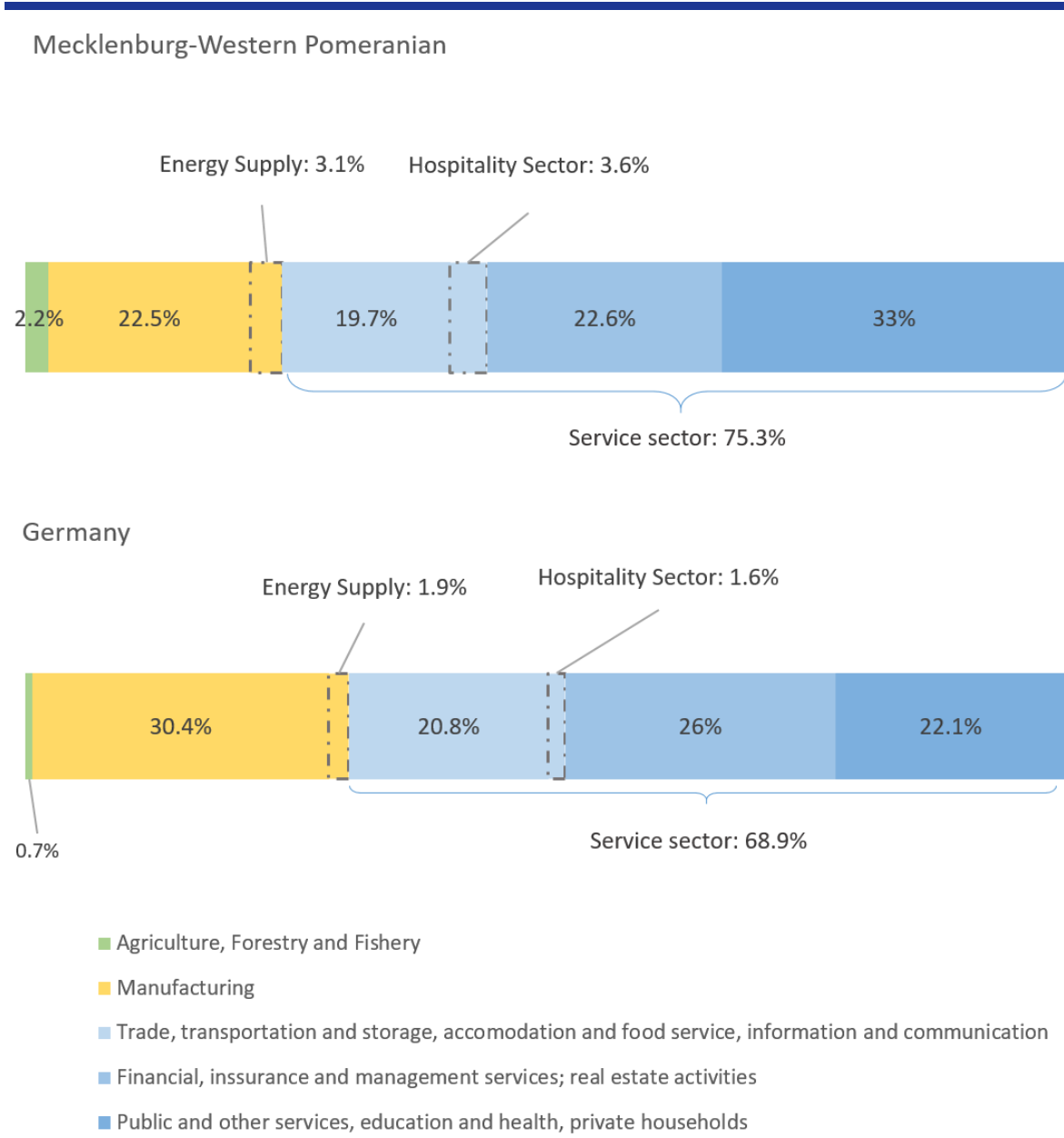
The GDP growth rate also shows a positive trend: Between 2015 and 2020 Mecklenburg-Western Pomerania had the second highest real economic growth of all the federal states, surpassed only by Berlin.³²

Its relatively weak economy is also reflected in the state's at-risk-of-poverty rate, which is at 19.4%, and thus 3.5 percentage points higher than the German average.³³ Nevertheless, the income inequality is slightly lower than in the rest of Germany, with a Gini coefficient of 0.26 vs. 0.29 for Germany.³⁴ There is no data available on energy poverty on the state level. However, the percentage of the population affected by energy poverty in all of Germany is marginal (1.5%), which is why it is likely not a prevalent phenomenon in the region.³⁵

The comparison of the economic sectoral division of Germany and Mecklenburg-Western Pomerania shows several differences (see Figure 2): The service sector of the northern state is considerably bigger than in the rest of Germany, mainly due to the larger public sector. The share of the manufacturing sector is about 30% smaller than in the rest of Germany, whereas the share of agriculture, fishery and forestry is almost four times higher.³⁶ Historically, the Mecklenburg-Western Pomeranian economy has been dominated by agriculture; while its economic weight has been declining since reunification, the manufacturing of agricultural products is still very important to the region.³⁷ Two sectors that stand out are the hospitality sector and the energy supply sector, whose shares are 1.5 times and 2 times higher than in the rest of Germany, respectively.³⁸

The structure of its economy is largely dominated by small and medium-sized enterprises; the major part of companies (89.1%) have up to nine employees and only 0.3% have more than 250 employees. However, there is an ever so slight increase in the amount of bigger companies: While only 168 companies with more than 250 employees existed in Mecklenburg-Western Pomeranian in 2008, their number rose to 203 in 2017.³⁹ Among the bigger enterprises are retail chains, travel companies and energy suppliers, but few industrial enterprises.⁴⁰

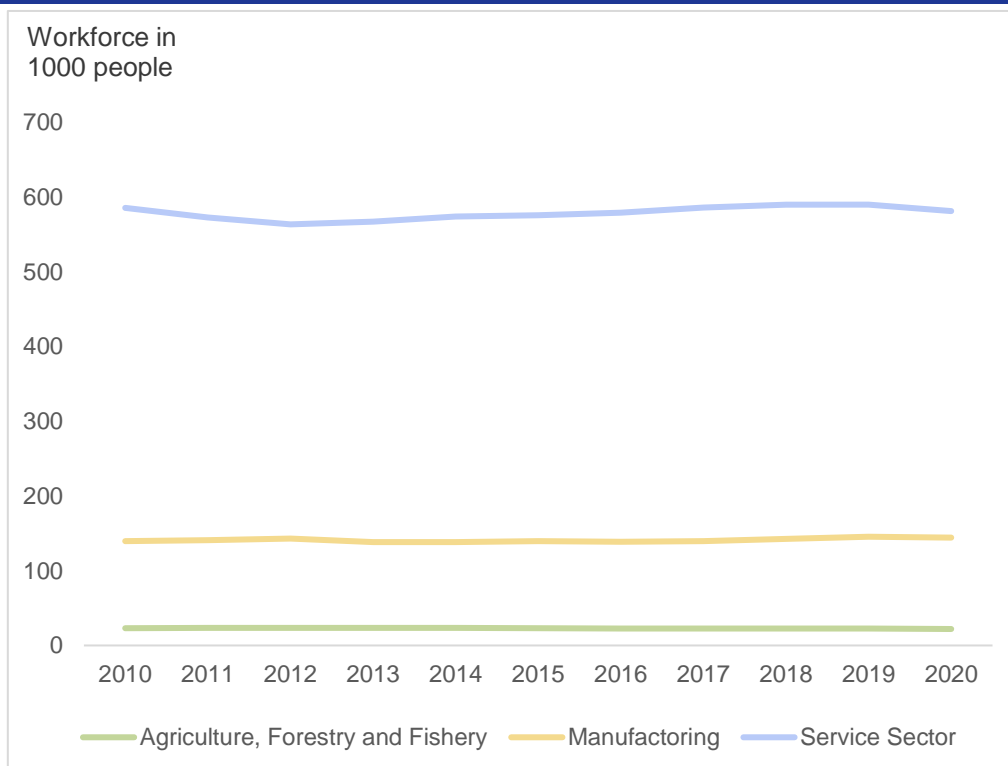
Figure 2: Gross value added by sector in Mecklenburg-Western Pomerania and Germany in 2017



Source: own presentation, based on data from Federal Statistical offices of the statistical offices of the Länder (2021)⁴¹

In the distribution of the workforce, there has been relatively little change in the three main areas of the economy between 2010 and 2020 (see Figure 3). The service sector employed the biggest share of the workforce with about 580,000 people in 2020, while the manufacturing sector employed 145,000 people and the agricultural, fishery and forestry sector about 22,000. The biggest change, in relative terms, happened in the agricultural, fishery and forestry sector, the workforce of which declined by 4.8% between 2010 and 2020. The manufacturing sector increased by 3.5% in the same timeframe, while the service sector declined only slightly by 0.7%. In the growing sectors energy supply and hospitality, the amount of jobs rose between 2010 and 2018 by 18.1% and 4.9%, respectively.⁴²

Figure 3: Workforce development by economic sector in Mecklenburg-Western Pomerania



Source: own presentation, based on data from Federal Statistical offices of the statistical offices of the Länder (2021)⁴³

2.2 Mecklenburg-Western Pomerania – Context for renewable energy

2.2.1 Greenhouse gas emissions and renewable energy deployment in Mecklenburg-Western Pomerania

Mecklenburg-Western Pomerania's greenhouse gas (GHG) emissions amounted to 15 461 kilotons CO_{2e} in 2016 (excl. LULUCF, agriculture and international aviation). Its per capita GHG emissions tend to be lower than the German average, by about 13% in 2016. They have declined by 16% compared to 1990 levels.⁴⁴

Complete data on the sectoral split of emissions is not available. However, energy generation and Land Use, Land Use Change and Forestry (LULUCF) stand out: Emissions of primary energy generation made up 10,645 kilotons CO_{2e} in total in 2016, and have, in spite of the high share of renewables in the states' electricity generation, not been declining since 1991. The share of LULUCF in Mecklenburg-Western Pomerania is the second highest of all German states and the state is one of the few, where the sector is emitting and not capturing carbon, with 4 074 kilotons CO_{2e} emissions in 2016.⁴⁵

Mecklenburg-Western Pomerania prides itself on being on the forefront of the energy transition because of its high share of renewables in energy generation.⁴⁶ And indeed, its share of renewables in total primary energy demand was 39% in 2016, by far the highest out of all federal states.⁴⁷ Additionally, Mecklenburg-Western Pomerania was the state with the second highest increase of renewables in energy generation between 2013 and 2016.⁴⁸

In electricity consumption, the share of renewable energy was at 72%; in gross electricity generation, it was at 173%, both the highest values out of all federal states.⁴⁹ Thus, the state has

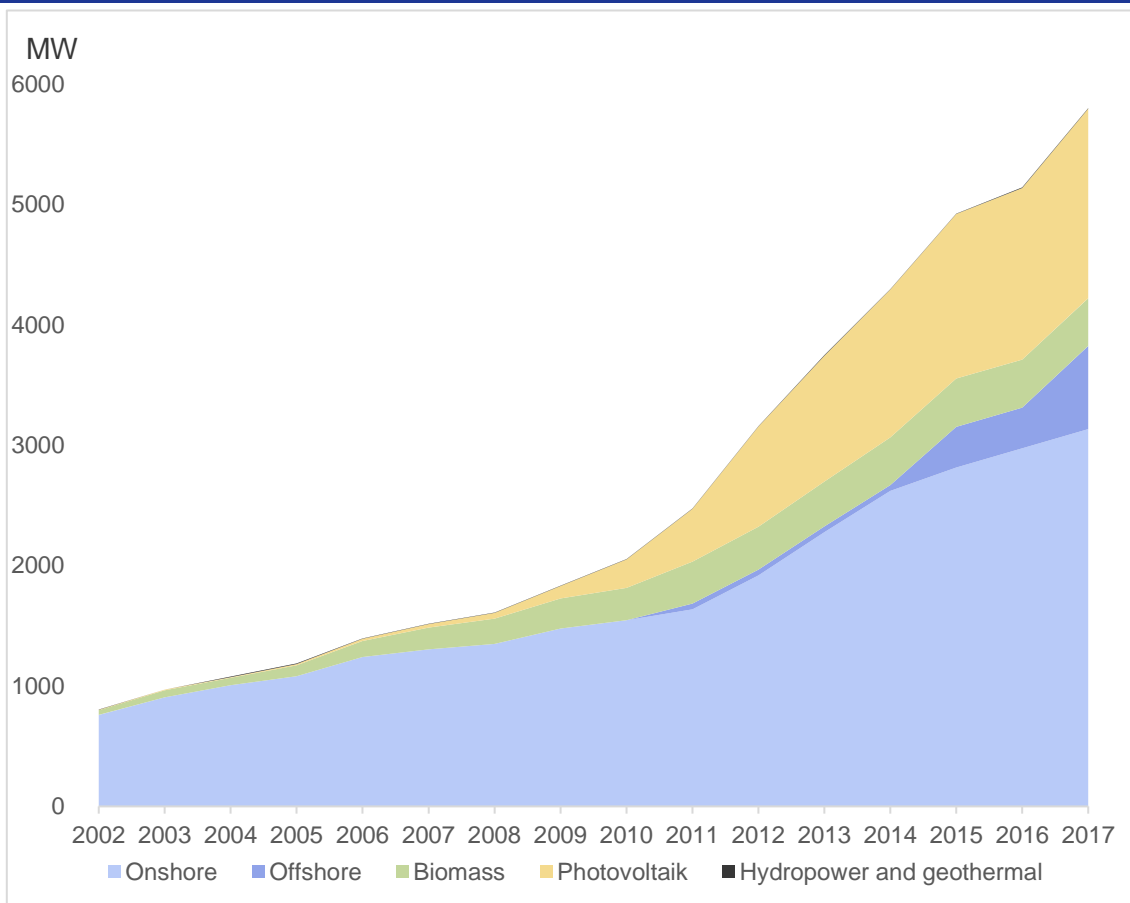
developed into a net electricity exporter. While this is not a recent phenomenon, the extent of exports has increased in over the last few years.⁵⁰

The most relevant electricity source is wind, which constitutes 48.2% of electricity production in 2017 - 39.1% of it onshore and 9.1% offshore. Other renewable energy sources are biomass (15.6%), photovoltaic (8.1%). Non-renewable electricity sources are mainly hard coal (19.6%) and natural gas (7.9%). In comparison, in the heating sector only 21.6% of energy used for heating stems from renewables, the rest of it being primarily natural gas (65.6%) and hard coal (9.5%).⁵¹ Nevertheless, the share of renewable energy in heating is still above the German average.⁵²

The amount of renewable energy used has been continuously increasing in the last twenty years (see Figure 4). Nevertheless, the recent development in renewable energies is mirroring the one on the federal level: In Mecklenburg-Western Pomerania the installation of new onshore wind energy capacity is declining in speed, albeit to a slightly lesser extent than in the rest of Germany. The combined numbers for wind, which are available for more recent years, seem to confirm this trend: while the amount of new installations peaked at 513 MW in 2017, in the years 2018 and 2019 brought only 296 MW and 286 MW of new installations, respectively.⁵³ Solar energy installation is regaining traction after a slump in the middle of the last decade whereas the installation of additional biomass capacity has come to a hold (see Figure 5).

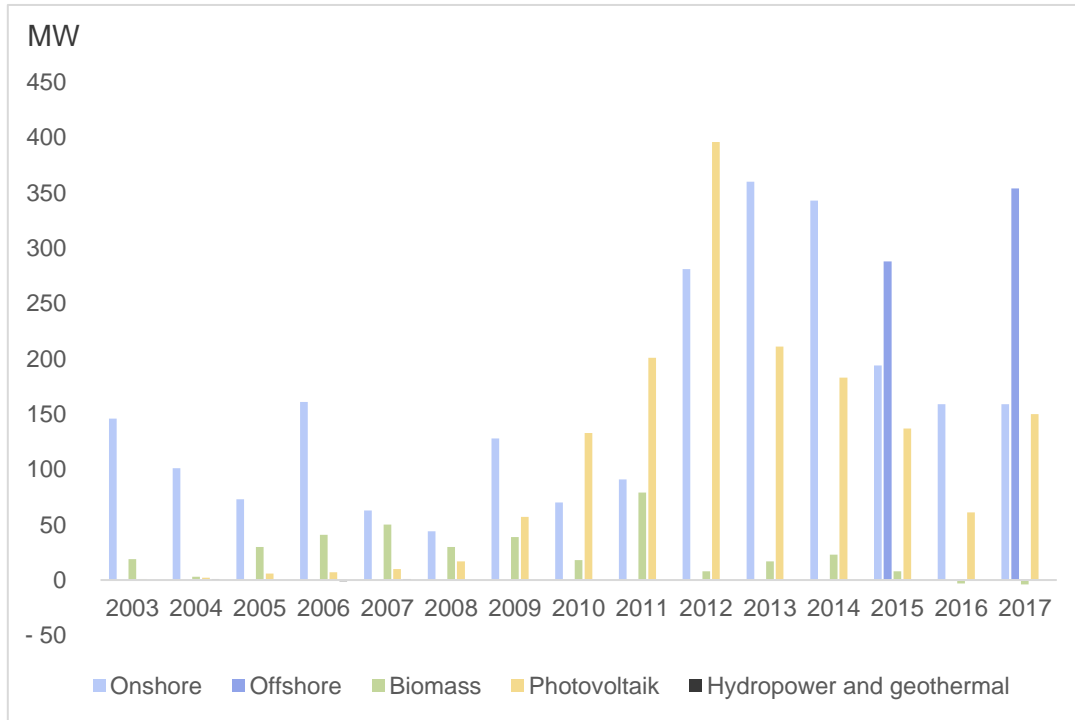
Deviating from the federal trend, offshore installations have been increasing since the middle of the last decade in the northern state.

Figure 4: Installed capacity for electricity from renewables in Mecklenburg-Western Pomerania



Source: own presentation, based on data from the Statistical Office Mecklenburg-Western Pomerania⁵⁴

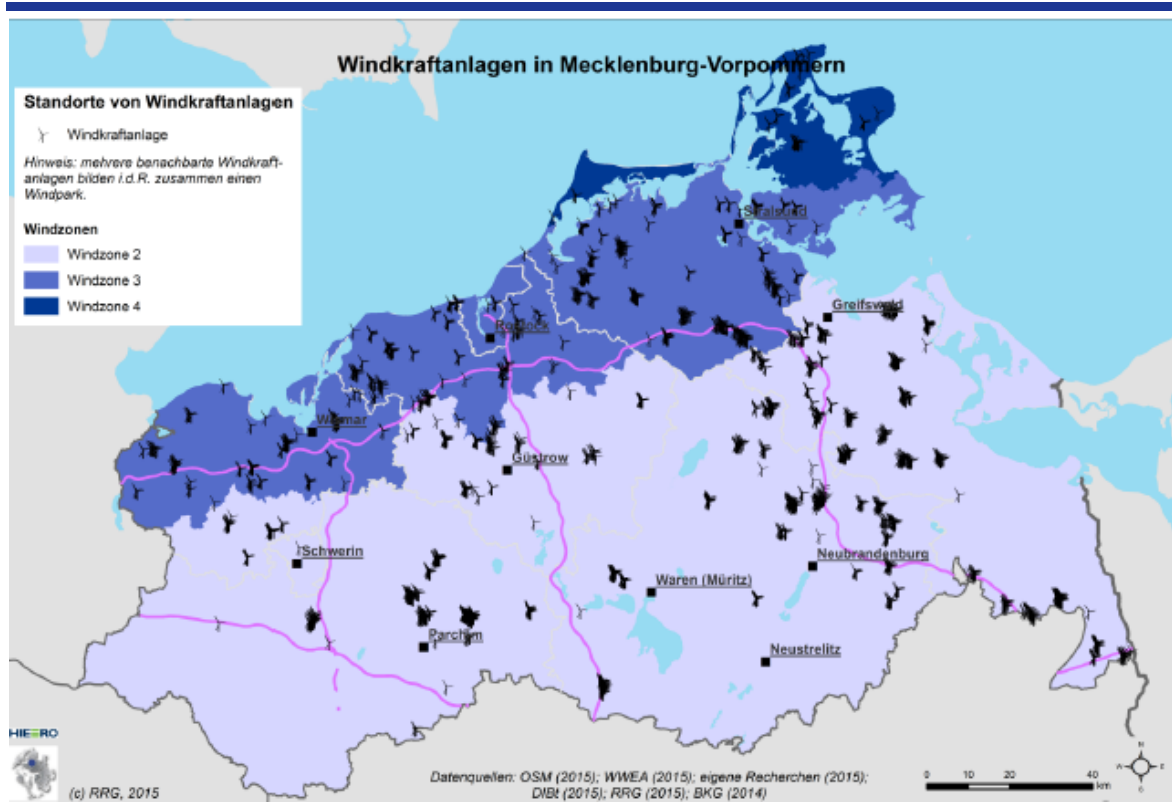
Figure 5: Yearly Installed capacity for electricity from renewables in Mecklenburg-Western Pomerania



Source: own presentation, based on data from Statistical Office Mecklenburg-Western Pomerania⁵⁵

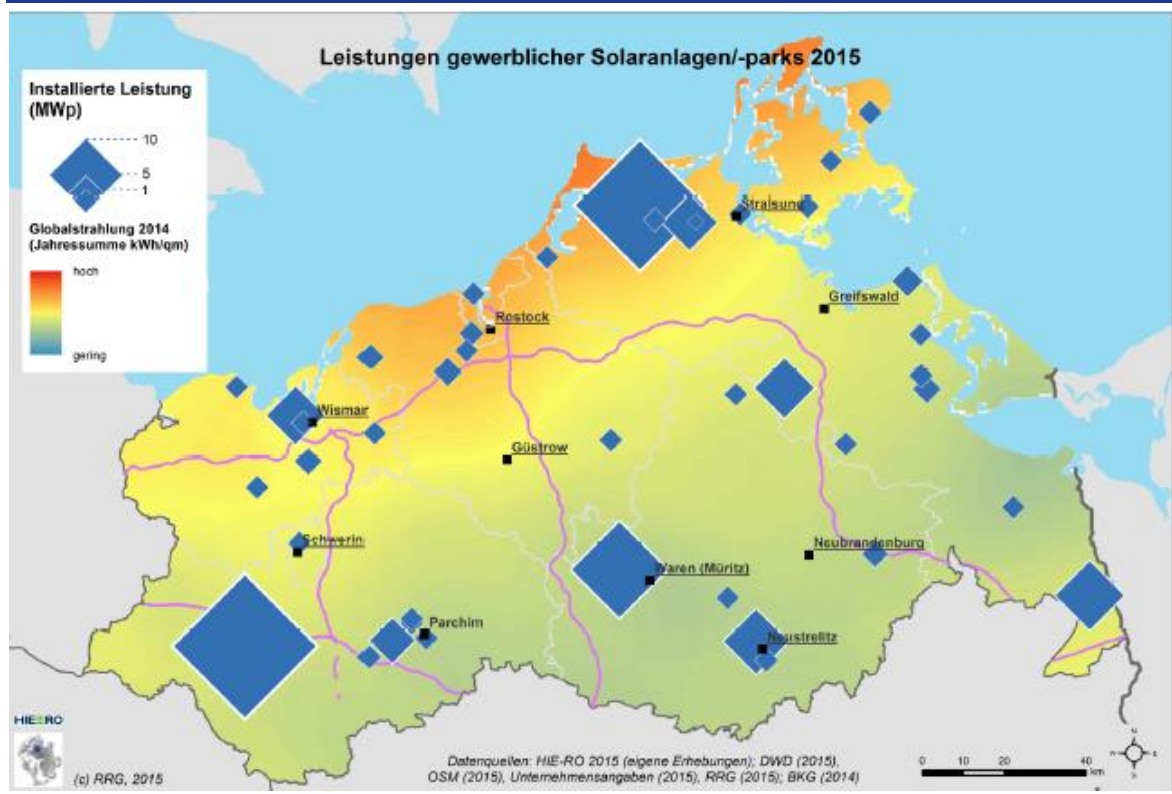
In terms of spatial distribution, Figure 6 shows that wind power plants tend to cluster on the coast, while solar is more or less evenly distributed (see Figure 7) and biomass centers around bigger settlements (see Figure 8).

Figure 6: Wind power plants in Mecklenburg-Western Pomerania



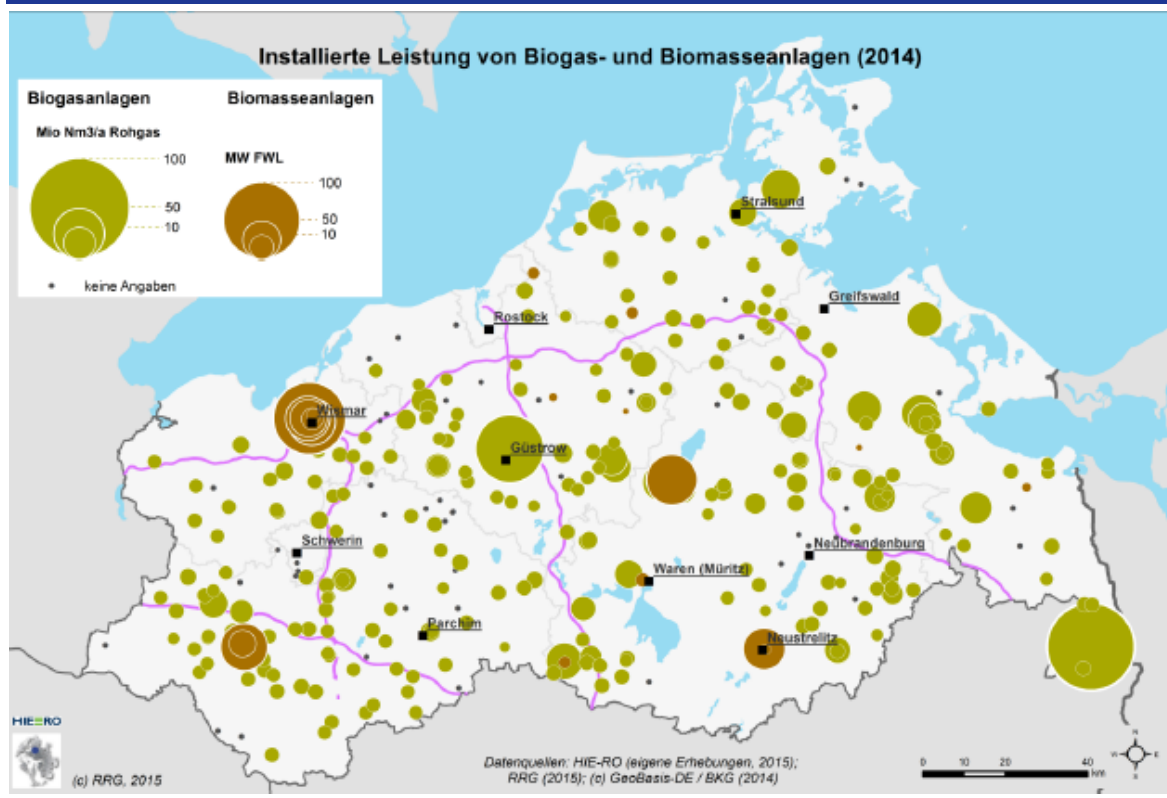
Source: Laschewski, L., Peters, M., Braun, G., Warszycki, P. (2015).⁵⁶

Figure 7: Solar power capacity in Mecklenburg-Western Pomerania



Source: Laschewski, L., Peters, M., Braun, G., Warszycki, P. (2015).⁵⁷

Figure 8: Biomass capacity in Mecklenburg-Western Pomerania



Source: Laschewski, L., Peters, M., Braun, G., Warszycki, P. (2015).⁵⁸

The most frequently cited study on the potential of renewable energies is the 'Landesatlas für erneuerbare Energien' (2011).⁵⁹ It estimates the technical potential of using renewable energy for electricity generation in Mecklenburg-Western Pomerania to be at 8,400 GWh for onshore, 13 600 GWh for offshore (considering the exclusive economic zone), 26 000 GWh for photovoltaic, 14 GWh for hydropower, 2 100 GWh for biogas, 600 GWh for biomass and 400 GWh for sewer and landfill gas. For heat production, the potential is estimated to be 7 500 GWh for geothermal, 5 600 GWh for solar thermal, 1 800 GWh for biogas and 4 100 GWh for biomass.

The authors furthermore point out that crucial for the realization of the potential are not only technical, but also economic and regulatory factors. A study by the German Institute for Economic Research (DIW) found that Mecklenburg-Western Pomerania is using 33.2% of its potential in wind electricity generation, but just 5.5% of its photovoltaic potential.⁶⁰

2.2.2 Governance structures for renewable energy deployment in Mecklenburg-Western Pomerania

The state addressed the question of climate change early on; in 1997 it published its first concept for climate protection.⁶¹ There have been three version of the 'Action Plan Climate Protection' so far, which list climate protection policies, including on energy efficiency and renewable energies.⁶²

The most relevant piece of legislation for the uptake of renewable energy is the state's energy concept ('Landesenergiekonzept') of 2015, which underlines the government's ambition of making renewables a key sector of the economy. The aim of the concept is to push the expansion of renewable energy, increase participation in decision making processes as well as

economic participation, and safeguard a 'just transition'. The goal is to produce 6.5% of Germany's total energy demand, with the main focus being wind energy, which is supposed to increase to 12 TWh onshore energy generation and 8 TWh offshore generation by 2025.⁶³ Additionally, Mecklenburg-Western Pomerania joined other states in Northern Germany to pass the 'North German Hydrogen Strategy' (*'Norddeutsche Wasserstoffstrategie'*), supporting hydrogen in the region.⁶⁴

The Regional Spatial Development Programmes (*'Regionale Raumentwicklungsprogramme , RREP'*) are key for spatial planning; they set the targets for regional development in Mecklenburg-Western Pomerania, including on energy related issues. They are based on the framework set by the States Spatial Development Programme (Landesraumentwicklungsprogramme', LEP M-V).⁶⁵ There are four regional plans: Rostock (2020)⁶⁶, Westmecklenburg (public participation process for current version still ongoing)⁶⁷, Mecklenburg Lake District (process still ongoing)⁶⁸ and Vorpommern (process still ongoing).⁶⁹ These plans determine, according to the State Planning Act (*'Landesplanungsgesetz, LPIG'*) and in line with the Building Code (*'Baugesetzbuch, BauGB'*), the possible locations for onshore wind power plants (*'Windeignungsgebiete'*). The permission of municipalities is not necessary. Nevertheless, the municipality can veto individual permission processes, if they do not comply with regulations.⁷⁰

The Mecklenburg-Western Pomeranian government has furthermore expressed its support for the deployment of offshore power plants in the Baltic Sea, which lies in the hand of the federal government. There are currently four offshore wind parks, which pay 30 million Euro of business tax to the state of Mecklenburg-Western Pomeranian. Six more offshore wind parks are planned by 2026.⁷¹

In order to increase acceptance of wind energy among the population, the government of Mecklenburg-Western Pomerania passed a 'Citizen and municipality participation law' (*'Bürger- und Gemeindenbeteiligungsgesetz'*) in the year 2016. The law determined that investors have to form a limited liability company (*'Gesellschaft mit beschränkter Haftung'*), of which a share of at least 20% has to be offered to direct neighbours of wind power plants (less than 5 km radius).⁷² This legislation has been cited as innovative example to promote public ownership. However, it also has been criticized because of the law's bureaucratic implementation, lack of public participation in the policy making and the big time span between the conflict-laden planning phase and the actual pay-out. This lag is also the reason why so far, there has been no case where the law has successfully been applied, according to a study published in 2020. Additionally, there is currently a lawsuit by wind energy companies against this legislation.⁷³ On the federal level, the most recent amendment of the EEG allows the wind energy producers to pay 0.2 ct/kwh in compensation to affected municipalities.⁷⁴ Furthermore, 70% of the business taxes go to the municipality where the wind power plant is placed, and 30% to the municipality where the company is located.⁷⁵ However, this only becomes relevant about 8-10 years after the wind power plant is installed, as this is the timeframe when most credits are paid off and the wind mill becomes profitable.⁷⁶ This, together with depreciation of assets, transfer of profits, selling of plants and the use of other possibilities of changing the taxation structure, leads to the community receiving less of the share than expected.⁷⁷

Mecklenburg-Western Pomerania has been classified as a 'transitional region' by the EU commission (meaning the average income per capita is 75%-90% of the European average) and thus receives EU funding through various funds. One out of five 'priority axes' in the operational program from 2014 to 2020 is CO₂ reduction in all sectors of the economy, including the support of renewable energy deployment. In the period from 2014 to 2020, it received 967 million Euro from the European Regional Development Fund (ERDF), 384 million Euro from the European Social Fund (ESF) and 937 million Euro from the European Agricultural Fund for

Rural Development (EAFRD). The ERDF also invests in renewable energy projects, mainly solar and biomass, with a total project volume of about 40 million Euro. Additionally, the ESF funding includes funding for education projects related to energy.⁷⁸ The operational programme for the funding period of 2014-2020 states that without the ERDF and the ESF, Mecklenburg-Western Pomeranians BIP would have been 0.3-0.4% lower during the funding period of 2007-2013. However, an ex-ante evaluation of the 'Climate Fund' (an initially planned instrument of the priority axis 'CO₂ reduction in all sectors of the economy') of the ERDF pointed out that the demand for climate financing has been below the German average in the previous funding period. This is attributed to the already existing funding on national level with more favourable conditions as well as the structure of the Mecklenburg-Western Pomeranian economy, which is more heavily based on SMEs. Furthermore, the lack of implementation is not primarily ascribed to lack of financing, but to the lack of technically sound concepts.⁷⁹

This can be partly confirmed by the evaluation of the ERDF's implementation. It showed that out of the targeted 12 MW additional capacity by 2023 for businesses, only 2.9MW have been installed. However, a total of 11.6 MW are expected by the fund's recipients by the end of the funding period. Similarly, for public infrastructure, the target was set at 1 MW until 2023, out of which 0.2 MW have been reached so far, with 0.4 MW expected by recipients.⁸⁰

An overview over the different projects in Mecklenburg-Western Pomerania can be found [here](#).

3 Analysis and conclusions

3.1 The socio-economic impacts of renewable energy deployment in Mecklenburg-Western Pomerania

The renewable energy sector is seen as a growth market in Mecklenburg-Western Pomerania; there has been some considerable increase in the sector in the last decade, in terms of amount of companies as well as in terms of created employment. Table 1 gives a short overview over economic indicators that can be found in literature.

Table 1 Economic impacts of the renewable energy sector in Mecklenburg-Western Pomerania – Overview of literature results

	2013	2014	2015	2016	2017	2018
Turnover					3,272 million Euro ⁸¹	
Share of renewables sector BIP		3.6% ⁸²			7.7% ⁸³	
Amount of companies	1,037 ⁸⁴ / 905 ⁸⁵					1,204 ⁸⁶
Share of companies					1.9% ⁸⁷	
Employees	14,710 ⁸⁸		14,870 ⁸⁹			

Share of employees

2.7%⁹⁰

Renewable energy companies Mecklenburg-Western Pomerania constitute 1.9% of all companies, the highest share of all federal states.⁹¹ The Agency for Renewable Energies calculated, based on data from Creditreform⁹², that there were 1 204 companies in the sector in 2018, a number that rose from 1037 companies in 2015, indicating a significant upwards trend.⁹³ A study in 2015 found slightly fewer companies, 905, 578 of which were suppliers or service providers. As is typical for the company structure of Mecklenburg-Western Pomerania, by far the biggest share of companies in the renewable sector have less than ten employees. The study furthermore determined that in the wind sector, companies from all parts of the value chain are located in Mecklenburg-Western Pomerania, and the industry is more export-oriented than other sectors in the state.⁹⁴

In contrast, in the biogas sector and solar sector just parts of the value chain are represented in the state, mainly missing the production steps of planning, installation and maintenance. However, the biogas sector is directly using substrate derived from own agricultural production and the use of residual waste starts to play a more important role.⁹⁵ Currently, 200 000 ha of agricultural area are used for biomass, equivalent to a share of 20%.⁹⁶

The renewable energy sector has an impact on employment generation in the state. A study shows that in 2016, 2.7% of Mecklenburg-Western Pomeranian employees can be attributed, directly or indirectly, to the renewable energy sector, which is the second highest share among all the federal states.⁹⁷ A study commissioned by the German Ministry for Economic Affairs and Energy found that in total, 14 870 people were employed in the renewable energy sector in the state in 2016, constituting a small increase from 14 710 employees in 2013. More than half of employees were connected to the wind sector (8080), followed by the bio energy sector (5 620), and only a marginal share to the solar sector (960). In relative terms, about 22 out of 1000 people were employed in the renewable energy sector in Mecklenburg-Western Pomerania in 2016, notably more than the German average (8.6), and also more than the mean in the former GDR states (12.6).⁹⁸ It is important to note, however, that those numbers do not include the years up from 2016, during which the reduction in wind power plant deployment in Germany (see chapter 1.2) led to mass layoffs for several big players in the industry.⁹⁹ Therefore, it is possible that this would also have an effect in Mecklenburg-Western Pomerania, and limit the economic power of the sector to some extent.

The importance of the renewable energy sector also becomes visible when looking at the share that the renewable energy production has on the whole GDP. According to estimates from the DIW on the basis of data from the Federal Statistical Office¹⁰⁰, measures to enable renewable energy deployment create 3 272 Mio. Euro turnover in Mecklenburg-Western Pomerania, constituting 7.5% of the total GDP. Furthermore, this share has been increasing in the years from 2014 to 2017 by 4.1 percentage points.¹⁰¹ A simulation by Ulrich et al. estimated that the energy transition would make the Mecklenburg-Western Pomeranian economy grow 4.5% in 2030 and 6.3% in 2050 in comparison with the baseline scenario.¹⁰² A study by Sievers and Pfaff confirmed that in the state of Mecklenburg-Western Pomerania, the energy transition will have one of the biggest relative positive effects on its economy until 2030, according to their model. They explain this in part by the weaker economy of the state, which leads to the growth through the renewable sector being more impactful, and by the fact that the fossil fuel for electricity generation was never prevalent in the first place, making the costs of the fossil fuel phase-out negligible.¹⁰³

The development of the renewables industry also has effects on other sectors, one example being the shipbuilding sector. Shipbuilding is a traditional craft in Mecklenburg-Western Pomerania, which is why shipyards are a historic driving force for industrialization in the state.¹⁰⁴ This is also relevant for the offshore wind industry: Mecklenburg-Western Pomeranian shipyards have expanded their repertoire to include parts of offshore plants. For instance, the shipyards in Rostock and Wismar started producing platforms. Thus, the turnover of offshore products in ports also expanded greatly the last decade in Mecklenburg-Western Pomerania: According to the state's energy minister, the volume increased from 19,500 tons in 2009 to 1.3 million tons in 2019. He furthermore pointed out that the offshore industry's business tax in the year 2019 amounted to 30.3 million Euro.¹⁰⁵

An example of potential negative economic effects of the deployment of renewable energies might be the tourism industry. There are some concerns that the prevalent presence of wind energy plant might negatively affect the attractiveness of tourism destinations. It is difficult to ascertain if these concerns have merit, as scientific research so far is inconclusive. For example, while one survey in the South of Germany found that up to a third of participants would change their destination if feeling disturbed by wind turbines¹⁰⁶ and another one showed that 45% of participants feel disturbed by wind turbines when hiking¹⁰⁷, a study looking at empirical data did not find a decline in tourism as a consequence of wind energy installation.¹⁰⁸ In Mecklenburg-Western Pomerania, there are currently some efforts to combine the sectors, with specific tours and so-called 'wind turbine climbing'.¹⁰⁹

In summary, the renewable energy sector is an important growth factor for the state, as it creates employment and provides economic impulses. Mainly the wind energy sector is benefiting the region economically, as there are production capacities over the whole value chain present in the state. Furthermore, because fossil-fuel based electricity production was never prominent Mecklenburg-Western Pomerania, there are very few economic losses expected in that regard.

However, it is difficult to quantify the impact of the renewable energy sector on the overall increase of GDP and positive socio-economic development of Mecklenburg-Western Pomerania. Other sectors, such as the hospitality sector, have seen an increase in gross value added as well, which could also have been a factor in the region's economic growth. Furthermore, the development in the wind sector has been volatile in recent years, which could hamper its economic benefits.

3.2 Key factors that determine renewable energy deployment and the accompanying socio-economic impacts in Mecklenburg-Western Pomerania

There is technical potential, a strong industry and political will on the state level to support the expansion of renewable energy in Mecklenburg-Western Pomerania. However, sluggish permission procedures and local resistance hamper the expansion of the sector and could do so in the future. Additionally, changes in recent years in federal policies and an increasing shortage of skilled workers might be additional factors that could slow down renewable energy expansion.

The Mecklenburg-Western Pomeranian government, a long standing coalition between social democrats (SPD) and the CDU, has confirmed and reconfirmed their commitment to making renewable energies a key sector in the northern state's economy.¹¹⁰ However, a strong focus lies on advancing the wind sector, which leads to a lack of political attention on other forms of

renewable energy, such as solar or biomass. This could be one of the factors that leads to the sector not realising its full potential. Additionally, the state has reduced its budget for research on renewable energies and system integration to zero, which might lead to missed opportunities in the future. The government has also been critiqued for insufficient reporting on the progress of renewable energy uptake,¹¹¹ which could lead to insufficient policy development and a reduction investors' trust.

From the technical side, there still is the hurdle of developing an electricity grid that can transmit the load from the renewable energy producing north, including Mecklenburg-Western Pomerania, to the south, where there is a high electricity demand. The necessary expansion of the grid still requires considerable investment efforts as well as the acceptance of the public, who has shown resistance in the past.¹¹² A central project in that regard is 'Südlink', which aims to connect both parts of Germany by 2022 and is considered a Project of Common Interest by the European Commission.¹¹³

The shortage of skilled workers has furthermore been identified as one of the potential barriers for Mecklenburg-Western Pomerania. However, more research is needed to determine to what extent this concerns the renewable energy sector.¹¹⁴ (see also 2.1)

Other factors hampering the deployment of wind energy are in line with those affecting Germany as a whole: the changing incentive structure of the EEG¹¹⁵ (see 1.3), complex licensing procedures, as well as increasing local opposition.¹¹⁶

The question of local support has been considered key in the debate around the slowing down of wind energy deployment. According to a recent survey, most Mecklenburg-Western Pomeranians support the energy transition (86%). However, the share of people indifferent or critical towards the energy transition is among the highest in Germany (14%). Furthermore, the study showed that a significant share of people in Mecklenburg-Western Pomerania would protest against a wind power plant if deemed necessary (45%), a share that is also high in comparison with the rest of Germany and increasing since 2017. Nevertheless, only about 3% of people answered that they are currently actively trying to block the installation of a wind power plant.¹¹⁷ This opposition manifests in a variety of ways, including the creation of a political party, dedicated to combatting the deployment of wind energy called 'Free Horizon' (*'Freier Horizont'*). The party was founded by 40 citizens initiatives in 2014.¹¹⁸ Even though the party has received very little public support so far (it obtained 0.8% of votes in the last state elections¹¹⁹) it indicates an increasingly active opposition. The main arguments of people opposing wind power plants are the loss of value of real estate, visual disturbance of the landscape, health impacts through shadows and noise as well as nature protection concerns.¹²⁰ In Mecklenburg-Western Pomerania, especially the red kite, which is endemic in Germany, is oftentimes cited as being endangered by wind turbines.¹²¹ In general, an unfavourable perception seems to be that nearby communities are burdened by the disadvantages of wind energy, while the advantages, such as income and economic development, benefit external actors.¹²²

There are already measures in place to include the public in planning processes and some options for economic involvement (see 2.2.2.). Economic participation is highly favoured as a measure to increase wind energy acceptance in Mecklenburg-Western Pomerania and participatory processes for wind energy permissions are seen as important by the majority of the population (91%). At the same time, most people (82%) do not feel like they have agency in the energy transition. Thus, the expansion of those options might reduce local resistance to the deployment of renewable energy plants. Furthermore, as 64% of Mecklenburg-Western Pomeranians stated that they think the energy transition would burden them financially,¹²³ it would benefit public approval if the cost of renewable energy deployment would be designed in a way

that minimises costs for low income groups. However, this has to be decided on the federal level, through the levy that is determined by the EEG.

A central tool of resistance are lawsuits against wind power plants. Those are based in a variety of arguments, the main one being the concern that nature protection has not been sufficiently taken into account when planning the wind plant. A survey of industry actors found that 15 out of 111 approved wind energy plants were subject to a lawsuit in Mecklenburg-Western Pomerania in 2019.¹²⁴ Central actors in that regard are citizens initiatives, which organize themselves locally, or nature conservation organisations, such as the Nature and Biodiversity Conservation Union Germany (NABU).¹²⁵ The survey also found blocked permission procedures to be another important barrier to the deployment of wind energy. The blocking of permissions is caused by military concerns, as is the case for 38 wind power plants waiting for approval in Mecklenburg-Western Pomerania, or rotating radio beacons, which affects 70 wind power plants in the state. This blocking through lawsuits or delayed permissions procedures constitutes a big risk for investors, which is why they might refrain from investing and bidding in auctions.¹²⁶

In summary, there is political will to develop the industry and an already established wind industry in Mecklenburg-Western Pomerania. The sector's relative economic importance is higher than in most other German states, and models predict a positive effect of the energy transition on the state's economy in the next decade. However, the political leadership's strong focus on wind energy leaves some of the potential of other forms of renewable energy, such as solar, untouched.

Generally, increasing public resistance and delayed licensing procedures are hampering the success of renewable energy deployment and might increasingly do so in the future. Additionally, policies at federal level and a shortage of skilled workers due to an aging population might further impede renewable energy deployment.

3.3 Key Conclusions

- The renewable energy sector has been expanding in Mecklenburg-Western Pomerania during the last decade, albeit a slowing pace is noticeably in the years from 2018 onwards. Its relative economic importance is higher than in most other German states, and models predict a positive effect of the energy transition on the state's economy in the next decade.
- Correspondingly, the renewable energy sector has been identified as a growth factor in the region by the Mecklenburg-Western Pomeranian government. Thus, the political leadership especially supports the expansion of onshore and offshore wind energy for the state to become a key electricity producer in Germany. However, while the political focus lies strongly on advancing the wind sector onshore and offshore, Mecklenburg-Western Pomerania does not fully make use of its potential in other renewable sources, especially solar.
- In general, licensing procedures, local resistance and lack of public support are factors that hamper the expansion of the sector and might increasingly do so in the future. Additionally, policies at federal level and a shortage of skilled workers due to an aging population might further impede renewable energy deployment.
- Public acceptance is one key issue, as support in the region is lower in comparison with other states. The perception of not having agency in the energy transition and not reaping its benefits is prevalent in the region. A key tool to mitigate this issue would be to increase local ownership. This is not a new concept – stipulations in Federal and



state law already exist to increase public participation, but due to the manner of implementation and a time lag until benefits for the public manifest, they so far have failed to significantly impact local communities.



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