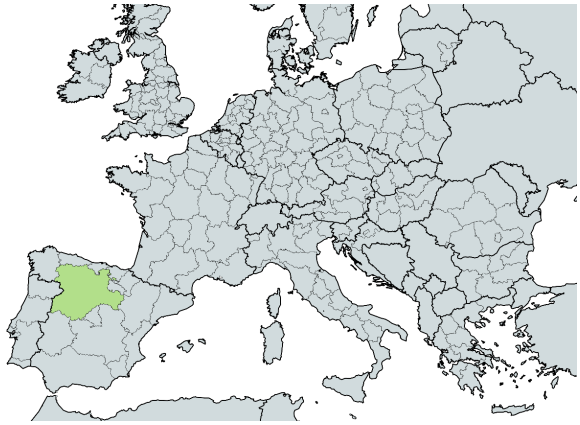
Castile and León (Castilla y León), Spain



GDP per capita	€24,261 (2020)
Population	2,394,918 (2020)
Population density	26.1/km^2
Unemployment rate	11.82% (2020)
People at risk of poverty or social exclusion	16,7%
Share of renewable energy (% of gross final energy consumption)	N/A
Total installed RES capacity	11,606 (MW) out of 12,197 (MW) (2020)
Employment in RES	1% direct (2020 est)

Socioeconomic impact of RES

According to our own rough estimation, in 2020 the workforce in the renewable energy sector could potentially amount to 8,317 workers (just under 1% of total workforce), a growth of 38% with respect to 2009. According to the JRC of the European Commission, by 2030 the sector could employ up to 21,379 workers in the renewable energy sector, mostly in the wind energy sector. This makes Castilla y Leon the region with the highest potential for job creation among the coal transition regions in the EU. Although the region lost jobs through the closure of coal mines and nuclear and coal power plants in recent years, a robust just transition plan and strong renewable energy potential mean that the region should see a net improvement in socio-economic conditions as a result of the energy transition.

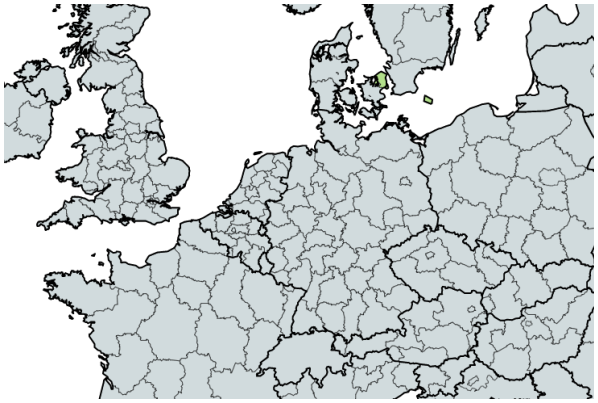
RES in the region

Castile and Leon is the region with the highest share of RES generation in Spain. In 2020, the power generation structure of the region was largely dominated by renewable energy with 87% of total power generation. By energy source, during the 2015-2021 period both nuclear and coal production virtually ended in the region while wind (51%) and solar energy power (7%) have grown. Hydropower has remained stable at 36% of total energy generated.

Key conclusions and policy recommendations

1. Public support remains one of the biggest enablers for the decarbonisation of the energy systems and the consequent socio-economic benefits. To maximise employment and other socio-economic benefits, both the regional and national governments should make sure an appropriate legislative framework is put in place in order to eliminate as much as possible administrative burdens, further incentivize the deployment of renewable energy installations and create an ecosystem that maximizes economic benefits. Recent moves to promote household ownership through tax incnetives and simplified approvals of micro-RES are a good example but more is needed.
2. Ensure a Just Transition. Public administrations and other relevant stakeholders must work together to ensure these communities can continue to prosper. This region has seen significant economic and employment disruption, but new RE opportunities should be more than sufficient to compensate if affected workers and communities are supported in retraining when possible. The regional Just Transitions Guidelines approved in November 2020 are a good example.
3. Given the potential for renewable energy of the region and the geographical position of the region, Castile and Leon can become a very important exporter of renewable energy for neighbouring regions such as Madrid and Portugal. Studies show a very significant opportunity for employment and value added regionally, particularly if the industry can develop strategic technological specialisations.

Denmark's Capital Region (Greater Copenhagen), Denmark



GDP per capita	€51,000 (2018)
Population	1,835,562 (2019)
Population density	720/km^2
Unemployment rate	5.1% (2019)
People at risk of poverty or social exclusion	17.5%
Share of renewable energy (% of gross final energy consumption)	17% (2015)
Total installed RES capacity	3,300 MW (2015)
Employment in RES	0.5% direct (2016)

Socioeconomic impact of RES

Denmark is a strong player in the renewable energy industry, particularly wind and bioenergy, and the green economy more broadly. Early investment into renewable energy technologies, continued R&D in the sector, and ambitious domestic climate goals have played a role in the development of this industry. However, most of the economic activity is centred in Jutland, and Denmark's Capital Region is itself under-represented in terms of jobs and turn-over in the sector mostly because it is a densely populated urban region without a large potential for renewable energy development. It imports a significant share of its electricity from other regions and will continue to do so. Nonetheless, the region is home to at least 4000 jobs in the RES industry, with a relative over-representation in R&D. A number of important bioenergy companies are based in the region. With continued planned increases in deployment regionally, particularly in rooftop solar, but also wind, there is still considerable potential for growth in employment in the industry. Denmark has a relatively strong tradition of local ownership, but most RES in the region is owned by utilities and corporate entities, partly reflecting the large biomass installations in the region, and less emphasis on community ownership in recent years.

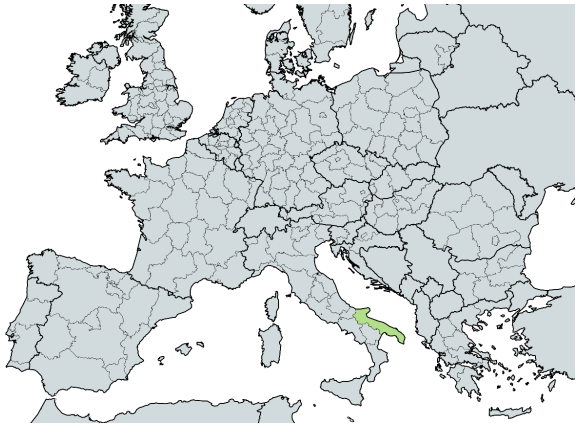
RES in the region

Denmark has a relatively high level of gross final energy consumption from renewable sources at 37% in 2019, or 4th highest in the EU. However, for the Copenhagen region it is only 17%. By far the largest source of renewable energy is biomass. The net import of electricity is a notable feature of the region, amounting to 70% of electricity, much of which was still generated by coal as of 2018.

Key conclusions and policy recommendations

1. Employment in RE is relatively low compared to other Danish regions, probably because of the relatively low level of RE deployment, itself a result of being a densely populated urban region. The renewable energy potential of the region is relatively limited, and it will remain dependent on energy imports for other regions. However, the current employment figures available likely under-count the number of jobs due to some jobs in district heating not being fully counted. Rooftop solar is also potentially a good source of jobs in the region in coming years that is so far only in its initial phase of development.
2. The region has a relatively high proportion of research-related jobs in renewable energy, and many more jobs in other "green industries" (such as related to energy efficiency) possibly as a result of urban agglomeration effects. These are areas of significant potential employment growth in coming years and are not directly linked to local RE deployment.
3. The regional distribution of jobs and economic activity in Denmark shows the importance of building up RE infrastructure and manufacturing capacity for broader employment and economic benefits as well as the first mover benefits.

Apulia (Puglia), Italy



GDP per capita	€18,842 (2019)
Population	3,926,931 (2020)
Population density	200/km^2
Unemployment rate	14.1% (2020)
People at risk of poverty or social exclusion	37.4%
Share of renewable energy (% of gross final energy consumption)	16.5%
Total installed RES capacity	5,750 MW (2019)
Employment in RES	0.5% (direct & indirect 2020)

Socioeconomic impact of RES

The latest figures on socio-economic impacts of renewables in Italian regions refer to 2016 and rank Apulia as the top region for investments in the sector. As for employment figures, which include both direct and indirect jobs in the RES sector, Apulia is the Italian region with the highest number of temporary workers (3,200 Annual Works Units – AWU), while ranking fourth in terms of permanent workers (also 3,200 AWU). Apart from exceptional cases, most RES-related employment in Apulia seems to be located in subsectors such as planning and permitting sectors, products assembling, installation, and Operations & Maintenance of power plants.

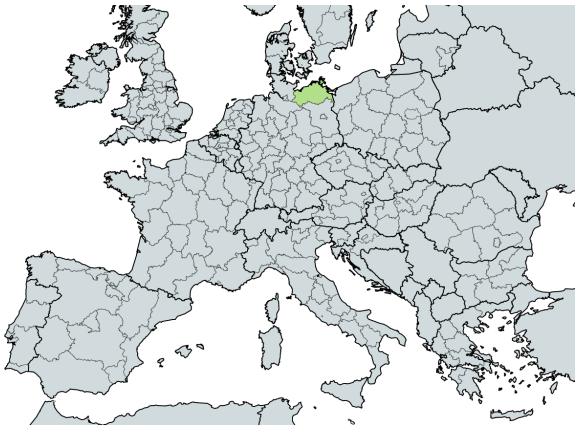
RES in the region

As for renewable energy progress in the region, the Apulian RES share (including RES-E and RES-H/C, excluding RES-T) of final energy consumption was 16.5% in 2018 (latest year for official figures). RES-E production in Apulia already contributes to 50% of regional electricity consumption, while the national average is around 35%. The biggest source of renewable energy is PV, followed by wind and bioenergy. It is notable that the coal power plant in Brindisi is among the 10 largest in Europe, but is scheduled to close by 2025.

Key conclusions and policy recommendations

1. The main factor hampering a strong RES growth in the region today is not economic costs, but rather bureaucracy and permitting procedures. The relatively high potential of the region for both RES deployment and the its socio-economic benefits is not being fully exploited as a result. In Italy, a key role in this issue is played by the Ministry of Culture and linked regional authorities, who have been particularly restrictive. Another key role is played by local communities and citizens, who often delay the deployment of RES because they have faced some negative consequences for past planning and procedural mistakes; there is need for a broad and dedicated involvement of citizens for them to fully understand the potential of RES deployment in the region.
2. Wind power growth in Apulia is mostly about replacing many outdated power plants. For PV, deployment efforts will need to be driven both towards small-scale deployment as well as large-scale plants; for the latter, it will be crucial to support the deployment of large-scale PV power plants in rural areas by means of a careful regulation, in order to avoid conflicts with primary production and consent complications. Small-scale PV is relatively underdeployed, considering the potential, and could be a very important factor in increasing the local ownership of RES in order to promote socio-economic benefits in the region.
3. The key role that regions play in the transition towards climate neutrality, particularly in the Italian context, including for RES deployment, needs to be made clear and enhanced. A new regional effort sharing scheme would be a solution for a broader and more effective involvement of regions in climate and energy targets. Our case study shows that there is no monitoring and no enhancement of the great local spill overs in terms of jobs and economic growth from the RES sector, despite the great potential of the region. Apulia, just like many other Regions in Italy still lacks of a local strategy for industrial development in the RES sector, which would be essential to maximize socio-economic benefits in the region.

Mecklenburg-Western Pomerania (Mecklenburg-Vorpommern), Germany



GDP per capita	€28,590 (2020)
Population	1,609,675 (2018)
Population density	69/km^2
Unemployment rate	7.9%
People at risk of poverty or social exclusion	23.2% (Eurostat)
Share of renewable energy (% of gross final energy consumption)	39%
Total installed RES capacity	5,796 MW (2017)
Employment in RES	2.7% (direct & indirect)

Socioeconomic impact of RES

Renewable energy companies in Mecklenburg-Western Pomerania constitute almost 2% of all companies, the highest share out of all German federal states. A study shows that in 2016, 2.71% 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. A study commissioned by the German Ministry for Economic Affairs and Energy found that in total, 14 870 people were employed directly or indirectly in the renewable energy sector in the state in 2016. 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 (7.47%). Synergies with existing industries such as ship building have enhanced the role of renewable energy in the region's economy.

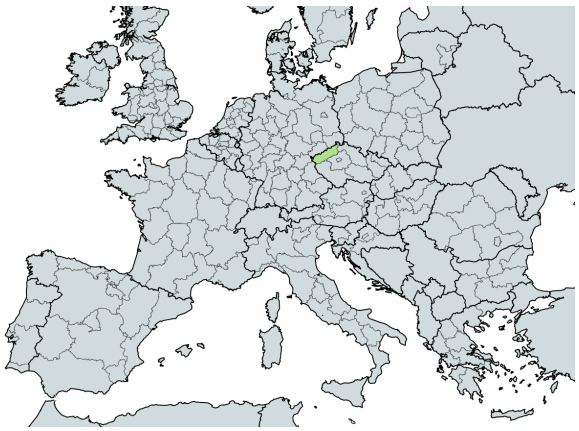
RES in the region

Mecklenburg-Western Pomerania's share of renewables in total primary energy demand was 39% in 2016, by far the highest out of all federal states. 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. Thus, the state has developed into a net electricity exporter. 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%) and hydropower (0.1%).

Key conclusions and policy recommendations

1. The renewable energy sector has been expanding in Mecklenburg-Western Pomerania during the last decade. 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.
2. Figures support the contention that RE's effects are more important in terms of overall value added or GDP growth than in terms of employment, although employment benefits are also significant in the region.
3. Correspondingly, the renewable energy sector has been identified as a growth factor in the region by the Mecklenburg-Western Pomeranian government. It especially supports the expansion of wind energy industry for the state to become a key electricity producer in Germany. While the political focus lies strongly on promoting the wind sector onshore and offshore, more focus is needed for other renewable sources, especially solar.
4. In general, federal policies, a shortage of skilled workers, permission procedures, local resistance and lack of public support could be factors that hamper the expansion of the sector. National laws to promote local ownership have so far not achieved their objective to the extent desired.

North-western Czech Republic (Severozápad), Czech Republic



GDP per capita	€19,200 (2018)
Population	1,115,629 (2020)
Population density	128/km^2
Unemployment rate	4%
People at risk of poverty or social exclusion	21.5%
Share of renewable energy (% of gross final energy consumption)	N/A
Total installed RES capacity	1,549 (GWh) out of 29,522 (GWh) (2019)
Employment in RES	0.1-0.7% (est)

Socioeconomic impact of RES

The socio-economic impact of RE deployment is minimal today due to very low levels of deployment. The JRC estimated the number of potential jobs created by RES-E development under the maximum technology deployment projection of around 828 FTE jobs in wind power deployment, 194 FTE jobs in deployment of photovoltaics and 1305 in bioenergy for a total of 2327. Compared with around 10,000 jobs in the coal industry today, this shows that RE deployment alone will not compensate for jobs lost in the low-carbon transition. However, other opportunities exist within heating, sustainable transport and in other areas of decarbonisation such as energy efficient housing. It is thus a region that needs significant support to develop alternative economic development pathways to ensure a just, successful energy transition.

RES in the region

Today, the highest share of electricity production is produced by lignite power plants, and RES sources produce only 5.2% of electricity in the region. The region is very important for national electrical production, producing 34% of the national total. The region produces 14% of total national RES for electricity, which is a considerable proportion of the national total. 46% of the Czech installed capacity of wind energy was installed in the Northwest region, while this region accounted for 9% of the total installed capacity of photovoltaics. The level of installed capacity has not changed considerably since 2010, in the case of photovoltaics it even decreased.

Key conclusions and policy recommendations

1. Ambition on the national level regarding new RES installations (as set in the NECP and related strategies) is low, however, external incentives (soaring price of EU ETS allowances, Modernization Fund, falling prices of new RES installations) will drive a new wave of RES deployment. The government should enable a smooth transition by removing regulatory barriers for RES deployment and related services, creating a stable environment in the RES sector, promoting local ownership, which has so far been neglected, ensuring an equitable distribution of Modernisation Fund allocations, including to community projects, and setting ambitious goals.
2. The character of support together with the legislative environment will determine the main economic beneficiaries of the transition. Past mistakes in the policy framework for the solar industry have led to public distrust and uneven and disproportionate benefits accruing to certain private actors from RES deployment in the country.
3. RES-E deployment in the Northwest region will bring around 2,300 new jobs according to the Joint Research Center of the European Commission. Although this is a somewhat conservative estimate, and does not include heating or transport, given that there are around 10,000 jobs in the Northwest coal industry, it will be necessary to create other viable economic alternatives outside the energy sector in order to compensate for the expected job losses.

	Population	Population density (people per square km)	Share of RES (as % of gross final energy consumption) (2020)	RES Capacity	Renewable energy production by type (over total energy produced)[1]	Renewable energy production by sources (over total renewable energy produced)	Employment in RES indicators[2]	GDP/capita (EUR)	Overall unemployment rate	People at risk of poverty or social exclusion (2019)
Castile and Leon	2,394,918 (2020)	26.1	N/A	11,606 MW (2020)	Wind (51%) Hydropower (36%) Photovoltaic (7%) **Total: 94%**	Wind (54%) Hydropower (38%) Photovoltaic (7%)	8,317 (direct) est. ca. 0.9% of total (2020)[3]	24,261 (2020)	11.82% (2020)	16.7%
Denmark's Capital Region	1,835,562 (2019)	720	17% (2015)	3,300 MW (2015)	Wind & Solar (1%) Biomass (18%) **Total: 19% (2012)**	Wind & Solar (6%) Biomass (94%)	4,310 (direct) (2016) 0.5% of total	51,000 (2018)	5.1% (2019)	17.5%
Mecklenburg-Western Pomerania	1,609,675 (2018)	69	39%	5,796 MW (2017)	Wind (48%) Biomass (16%) Photovoltaic (8%) Hydropower (0.1%) **Total: 72%**	Wind (55.7%) Biomass (18%) Photovoltaic (9.4%) Hydropower (0.1%)	14,870 or 2.71% of workers (direct and indirect) (2016)	28,590 (2020)	7.9% (2019)	23.2%
Apulia	3,926,931 (2020)	200	16.5%	5,750 MW (2019)	Photovoltaic (21%) Wind (19%) Bioenergy (2.6%) **Total: 43%** (of total installed capacity)	Photovoltaic (49%) Wind (45%) Bioenergy (6%) (of total installed capacity)	3,200 permanent; 3,200 temporary (AWU direct and indirect) [4] 0.5% of total	18,842 (2019)	14.1% (2020)	37.4%
North-west Czechia (Severozápad)	1,115,629 (2020)	128.4	N/A	440 MW	Wind (1%), Photovoltaic (0.6%) Biomass (2.5%) Hydropower (1%) **Total: 5.1%**	Wind (20%) Biomass (48%) Photovoltaic (12%) Hydropower (20%)	~800 (direct) est. in solar and wind; up to 3000 in biomass. [5] 0.1-0.7% of total	19,200 (2018)	4% (2020)	21.5%

[1] Excluding transport
[2] Methods of counting employment and data availability vary widely from jurisdiction to jurisdiction. Numbers reflect what is available.
[3] Estimated based on 2009 figures (latest available) and extrapolated based on growth in RES capacity
[4] Annual Work Units
[5] Estimated if region reflects the proporation of national employment figures based on regional installed capacity.

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