Case study 1

Apulia

FONDAZIONE PER LO SVILUPPO SOSTENIBILE

Sustainable Development Foundation

*This case study was authored by **Chiara Montanini** and **Andrea Barbabella** from Fondazione per lo sviluppo sostenibile (Sustainable Development Foundation).*

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)

1. NATIONAL CONTEXT

1.1 Socio-economic development

Italy is the third biggest economy in the EU27[1], with a GDP of 1,480 billion €$_{2010}$ in 2020, after Germany (2,836 billion €$_{2010}$) and France (2,062 billion €$_{2010}$)and before Spain (1,058 billion €$_{2010}$), and is **second only to Germany in industrial production**. **Italy ranks 11th among the EU27 countries in terms of GDP per capita**[2], with a level of 26,640 €$_{2010}$ in 2020, just below the EU27 average (26,230 €$_{2010}$). Italy's GDP growth was already very slow even before Covid-19, and **in 2020 Italy was the second-most hit country from Covid-19 in EU in terms of GDP** (-8.9% with respect to 2019), after Spain (-10.9%). As a result, Italy has now entered an economic recession (-8.2% of GDP between 2010 and 2020), and the same figures appear when looking **at GDP per capita, with Italy showing the sharpest reduction** (-8.5% between 2010 and 2020), while EU27 average shows an increase of 6.8%.

[1] Gross domestic product at market prices, Chain linked volumes (2010), Eurostat (last update 19.05.2021)

[2] Gross domestic product at market prices, Chain linked volumes (2010) euro per capita, Eurostat (last update 20.05.2021).

When looking at income inequalities, the latest figures from 2019 show **Italy ranking 22nd among the EU27 in terms of Gini coefficient**[3]. **Income inequality conditions have worsened in the last 10 years in Italy** (+3.1%), while the EU27 registers a stagnation (+0.3%).

Italy has the 3rd highest unemployment rate[4] **among the EU27** (after Greece and Spain), reaching 9.2% (and 2.3 million unemployed people) in 2020, against an EU27 average of 7.1%. **Unemployment has also dramatically risen in the last 10 years**, with a 21% increase in absolute terms and a 10% increase in unemployment rate.

As for **education**[5], in 2020 the population share that attained at least an upper-secondary level in **Italy (62.9%) remains well below the EU27 average** (79.2%), ranking as the third-worst share after Portugal and Malta. The recent trend, however, has been more positive for Italy (+12% from 2011 to 2020) than for the EU27 average (+8%).

Latest figures from 2019 show that **the expectancy of a healthy life**[6] **in Italy is among the top 5 countries in EU27**, with 68.3 years at birth, against an EU27 average of 64.6. The 10-year trend is more positive for Italy (+9% between 2010 and 2020) than for EU27 average (+6%).

1.2 Extent of renewable energy deployment nationally

Italy's renewable share (RES share) of total final energy consumption was 18.2% in 2019, **among the highest in the EU27 biggest economies** (just after Spain, with 18.4%), although lower than the EU27 average (19.7%). The main drivers of Italy's renewables performance are: **hydropower**, which historically is a main electricity source (around 15% of total domestic generation); **PV**, whose growth in Italy has been very notable thanks to high resource availability and massive incentives that financed the market between 2005 and 2013 (which led Italy to hold for many years the record for highest PV share in electricity demand in the world); **geothermal energy**, both for electricity and heat, for which Italy holds by far the largest availability in Europe (and ranks 8th in the world for installed capacity); and **bioenergy**, which today represents 12% of

[3] Gini coefficient of equivalised disposable income, scale from 1 to 100, Eurostat-SILC (last update 19.05.2021)

[4] Unemployment by sex and age, thousand persons and percentage of active population from 15 to 74 years, Eurostat (last update 13.04.2021)

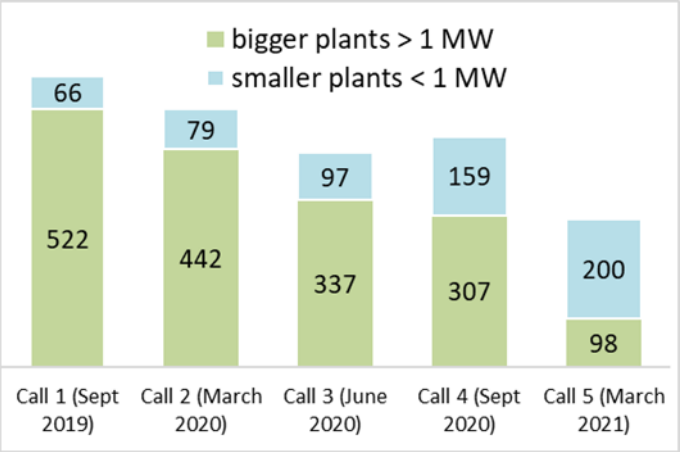
[5] Upper secondary, post-secondary non-tertiary and tertiary education (levels 3-8), percentage of total population between 25 and 64 years old, Eurostat (last update 21.04.2021)

[6] Healthy life years in absolute value at birth, years, Eurostat (last update 11.03.2021)

heating/cooling consumption (in line with the EU average) and around half of total RES consumption in Italy.

However, **deployment in the renewables sector has been limited in the recent years**, with the RES share increasing by 6.4% in Italy between 2014 and 2019, against an EU27 average of +12.9% and substantial growth (between 13% and 20%) across all of the EU's other biggest economies[7]. As for renewables in electricity, Italy went from installing 5 GW/year on average between 2009 and 2014[8], to less than 1 GW/year between 2014 and 2019. The reasons behind this critical slowdown are, on one hand, related to the **sharp cut of supporting schemes**. On the other hand, **bureaucracy and permitting procedures** have become more and more unbearable for operators and are hampering the deployment of new renewable power plants in Italy. In the electric sector, results from the long-awaited, new supporting scheme[9] (so-called "DM FER"), launched in July 2019, have confirmed the issue: as of May 2021, auctions have been increasingly avoided by operators and only 2.3 GW have been allocated, out of a total of 4.5 GW capacity offered (both for new and renewed plants). In the last auction, only 12% of all available capacity was allocated.

Total allocated capacity (GW) from DM FER across the first 5 auctions



Source: GSE

With regard to bioenergy, regulatory constraints have been introduced and incentives have decreased in recent years, due to associated negative impacts on

[7] SHort Assessment of Renewable Energy Sources, Summary results (2019), Eurostat (last update 02.04.2021)
[8] Dati Statistici sull'Energia elettrica (2019), Terna
[9] Decreto 4 luglio 2019 del Ministero per lo sviluppo economico "Incentivazione dell'energia elettrica prodotta dagli impianti eolici on shore , solari fotovoltaici, idroelettrici e a gas residuati dei processi di depurazione".

air quality. This is also because the Po Valley (Pianura Padana), one of the most relevant hotspots for air quality in the EU, is located in Northern Italy. In 2020 the European Court of Justice ruled that the Italian state was violating the EU Air Quality Directive (Directive 2008/50/EC) in the area, in particular for exceeding PM10 limits, whose main cause is local biomass combustion to produce bioenergy – according to the Italian Institute for Environmental Protection and Research (ISPRA). The role of modern bioenergy in the Italian energy transition continues to be a matter of broad discussion among all state and non-state actors (including civil society, local governments, bioenergy industry, environmental associations, etc.).

Current policy plans and targets are set at national level by the NECP, which will have to be revised in light of the new EU Fit-for-55% package. The current Italian NECP identifies a 30% RES share target for overall final energy consumption, including a 55% RES share in the electricity sector (+3,7 GW/year) by 2030. As is well known, both targets will have to increase to comply with the new 55% emissions reduction target, and this process might translate for Italy into a 40% overall RES target, and 65-70% RES-E target (+7 GW/year) by 2030, according to recent studies[10]. Sectoral experts agree[11] that Italy's renewable energy growth is falling far behind the necessary deployment trends, mostly because of permitting and bureaucracy, and if the issue is not addressed properly, Italy will reach its revised 2030 energy targets in 2085.

1.3 Overview of the political governance structures

Energy governance in Italy is fairly complex. After the 2001 Constitutional reform[12], energy has formally become a matter of shared competence between central government and the regions. Central government maintains a certain level of supremacy, given the EU policy framework and the many interpreting judgements in the past 20 years. However, most of relevant decisions are actually made at regional level, including regional planning (through the Regional Energy and Environment Plans), and permitting processes for all small- and medium-scale energy plants (since only the big plants are of national interest, and therefore of national competence).

[10] Italy Climate Report (2020), Italy for Climate - Fondazione per lo sviluppo sostenibile

[11] Il disegno del sistema autorizzativo per decarbonizzare e rilanciare gli investimenti (2021), Elettricità Futura e Althesys

[12] Legge costituzionale 18 ottobre 2001 n.3, "Modifiche al titolo V della parte seconda della Costituzione"

Until a few months ago, the Ministry for Economic Development (MISE) held the main competences concerning the energy sector, such as: planning and permitting of energy infrastructure, energy security, monitoring, and management of renewables incentives. MISE is thus responsible for coordinating and implementing the Italian NECP. On several energy matters, such as regulation of energy incentives, MISE works in strict cooperation with the Ministry of Environment (but also with others involved, such as the Ministry for Culture or Ministry for Agriculture Policy and Forestry). This is because the Ministry of Environment is in charge of climate policy, including international agreements, management of EU-ETS revenues, etc. Earlier in 2021, the new Government formed a new "Super" Ministry, the Ministry for Ecological Transition (MITE), also in light of implementing the National Recovery and Resilience Plan (PNRR). MITE now holds all competences from the former Ministry of Environment plus competences on most energy matters (previously held by MISE). As a result, climate and energy matters are all unified in a single Ministry.

The authority in charge of supporting the deployment of renewables in Italy is GSE (Gestore dei Servizi Energetici), previously owned by MISE and now by MITE. In 2020, GSE provided 15.2 billion euros of funding to the renewable sector, of which 11.9 went to RES in the electricity sector. Funding is not provided through regions but is delivered directly to the beneficiary actor who owns the renewable plant. Regions might also provide their own public incentives through dedicated mechanisms, however regional funding in Italy remains very low compared to national funding.

2. REGION'S SOCIO-ECONOMIC DEVELOPMENT AND RENEWABLE ENRGY DEPLOYMENT

2.1 Regional context

Apulia is located in the south-east of Italy, with a population of around 3,926,931 (2020) people, including 1.6 million families and a population density of 200 people per square kilometre. **Apulia's regional GDP was 73,064 M€$_{2015}$ in 2019. The region ranks 9th in Italy and is the third largest economy in the Mezzogiorno (i.e., in southern Italy), after Campania and Sicily. In the last 10 years regional GDP has been stagnating (+0.9% between 2009 and 2019)**, showing a trend worse than the national average (+2.5%). Before the Covid-19 pandemic, about 254 thousand companies were located in the Region, employing almost 750 thousand people (these figures only refer to private actors). The main economic sectors in terms of employed people are the commercial sector (30% of workers), manufacturing industry (16%) and tourism (10%). Apulia is one of the most attractive summer destinations in Italy and tourism is becoming an increasing source for local GDP.[13] Agriculture is also a very relevant sector in the regional economy, with Apulia registering the highest labour unit numbers in Italy (around 140 thousand units) and the second highest (after Lombardy) added value from the sector (around 3 billion euros)[14].

[13] Dati statistici per il territorio Regione Puglia (2020), Istat - Ufficio territoriale per le Marche, l'Abruzzo e la Puglia

[14] Risultati economici delle aziende agricole (2015), Istat

2.2 Socio-economic development

GDP per capita in Apulia was 18,842 €$_{2015}$ in 2019 and is much lower (-36%) than the national average, placing the region in the third last position (after Sicily and Calabria). In the last 10 years, GDP per capita has shown a better performance (+3.1% between 2009 and 2019) than the Italian average (+1.7%), **even though the performance is more likely attributable to demographic trends;** in the same period, resident population in Apulia decreased by 3%, in sharp contrast with the national trend (+0.1%), although in line with the average trend in the whole Mezzogiorno area (-2.7%).

The latest figures from Eurostat[15] show that the share of people at risk of poverty or social exclusion in Apulia is 37.4%, which is significantly higher than the national average (25.6%). Concerning the Gini coefficient, in 2018 the regional indicator (33) appears slightly lower than the national average (33.4), leading Apulia to rank 6th among all Italian regions. The 10-year trend, however, shows that the indicator is slightly worsening in the region, just like at national level. According to Istat[16], 22.4% of households in Apulia are vulnerable or poor, a much higher share than the national average (11.4%). Also, in terms of household income, the regional level (26,887 € of net income) is significantly lower than the national average (31,641 €).

The latest figures from 2020 register an unemployment rate of 14.1% in Apulia, significantly higher than the national average (9.2%), although better than the Mezzogiorno average (15.9%). The highest unemployment in Apulia is found among the younger generations (34.5% in the age group 15-24), and it decreases as the age group increases – until the lowest rate, which is found in the 55-64 group (7.5%). Difference between male and female trends are in line with the national average, with female unemployment in Apulia (16.7%) being higher than male unemployment (12.5%). In 2010 the unemployment rate in Apulia was 13.5%, thus it increased in the Region by c.a. 0.5% every year since then.

[15] People at risk of poverty or social exclusion by NUTS regions (2019), Eurostat – EU SILC (last update 19.05.2021)

[16] Reddito familiare netto (2019), Istat –Eurostat SILC

2.3 Renewable energy development

With 39,017 thousand tons of CO_2 equivalent (kt CO_2eq), Apulia is the third most emitting region in Italy (after Lombardy and Emilia-Romagna), according to latest official figures from 2017[17]. Since 1990 Apulia has always been among the top three emitting regions in Italy, **however its reduction rates have been higher than the national average**: between 2005 (emissions peak year in Italy) and 2017, Apulia cut its emissions by 35% against a national average of -25%. In terms of GHG emissions per capita, **Apulia also ranks third with 9.6 tCO_2eq per capita in 2017**, after Sardinia (12,1) and Friuli-Venezia Giulia (10), against an Italian average of 7.2 tCO_2eq. In terms of GHG emissions per GDP, in 2017 Apulia emitted 543 tCO_2eq per each million € of GDP produced in the region, which is twice the national average (256 tCO_2eq/M€) and is the second highest carbon intensity in Italy after Sardinia (608). **GHG trends in Apulia are highly affected by two extremely high carbon-intensive facilities which are located in the Region: the notable steel plant in Taranto (formerly named ILVA) and the coal-fired power plant in Brindisi,** with the former being the biggest steel production site in Europe and the latter being among the 10 biggest coal power plants in Europe. Together, these two sites are still responsible for almost a third of all regional GHG emissions (roughly 12 billion tons of CO_2 equivalent), despite the fact that activity has been decreasing in both sites (especially in the power plant, which is scheduled to be closed by 2025).

As for renewable energy**, 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)[18], ranking 14th among all Italian regions, just below the national average (16.8%). While RES consumption per capita for heating and cooling is the second-lowest in Italy (only 0.09 toe/per capita), RES-E production per capita in Apulia (0.21 toe/per capita) is just above the Italian average (0.21). **However, in absolute terms, RES-E normalized production[19] in Apulia is the 4th highest in Italy after Lombardy, Trentino-South Tyrol and Piedmont** (all regions from Northern Italy, where hydropower contributes 60-90% to RES-E production). **RES-E production in Apulia already contributes to 50% of regional electricity consumption, while the national average is around 35%**[20].

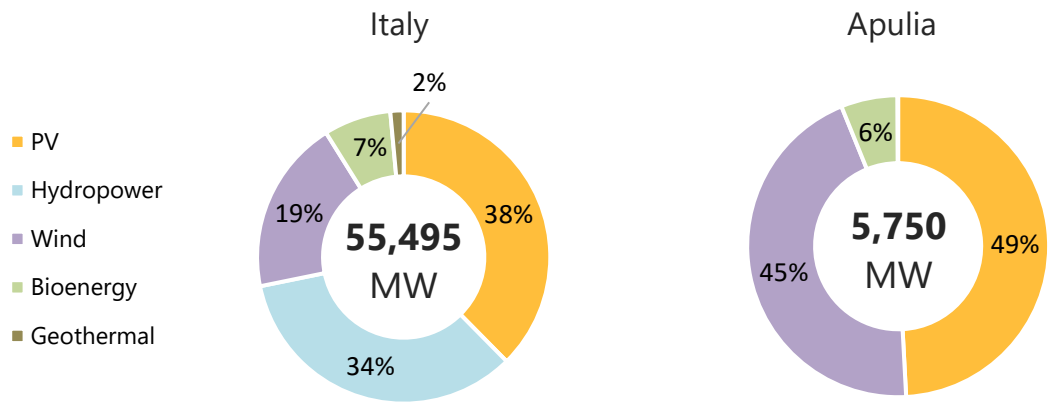
As of 2019, Apulia has installed 5,750 MW of renewable power plants, largely PV (2.827 MW) and wind (2.571 MW). Three-fourths (4,200 MW) of Apulia's current

[17] Emissioni di gas a effetto serra totali – territorio regionale (2019), ISPRA
[18] Monitoraggio Regionale (2018), GSE
[19] As of RED II accountability
[20] Own elaboration from GSE

renewable power plants were installed between 2009 and 2019 (while Italy's average is 53%), and for the majority between 2009 and 2014.

The difference between Italian average trends and RES-E mix (chart below) are explained by the fact that Apulia, like most southern regions in Italy, has a much greater availability of wind and solar energy, and no hydropower sources. As a matter of fact, **Apulia has been a main contributor to the deployment of wind and PV in Italy**.

Renewable energy mix in the electricity sector in 2019



Source: GSE

As for PV, Apulia is the first region in Italy for both installed capacity (13.5% of total national capacity) **and for electricity generation** (3,622 GWh in 2019, 15.3% of total national generation from PV). Three provinces in the region – Lecce, Brindisi and Bari – are driving PV generation and are also the first three provinces in Italy: in 2019, PV generation in Lecce alone was 962 GWh, a performance higher than 8 regions in Italy[21].

In the last 10 years, PV deployment in terms of installed capacity in Apulia has been fairly aligned with national trends. PV underwent exponential growth between 2009 and 2012, when each year the installed capacity tripled the levels from the year before, both in Italy and in Apulia. In 2011 alone, Apulia installed 1,500 MW, 16% of total installed capacity in Italy in that year (9,300 MW). In the following years, new installation trends suddenly almost stopped in Apulia (as well as in Italy), reaching stagnation between 2013 and 2018 (on average +27 MW, i.e. +1%, each year). In 2019, installation figures in Apulia were slightly more

[21] Solare fotovoltaico – Allegato tabelle provinciali (2019), GSE

positive (+175 MW, i.e. +7% compared to 2018), but they all occurred in one province (a new solar park in Foggia). As a matter of fact, Foggia also hosts the biggest solar park in Italy (capacity of 103 MW), which was connected to the grid in June 2020.

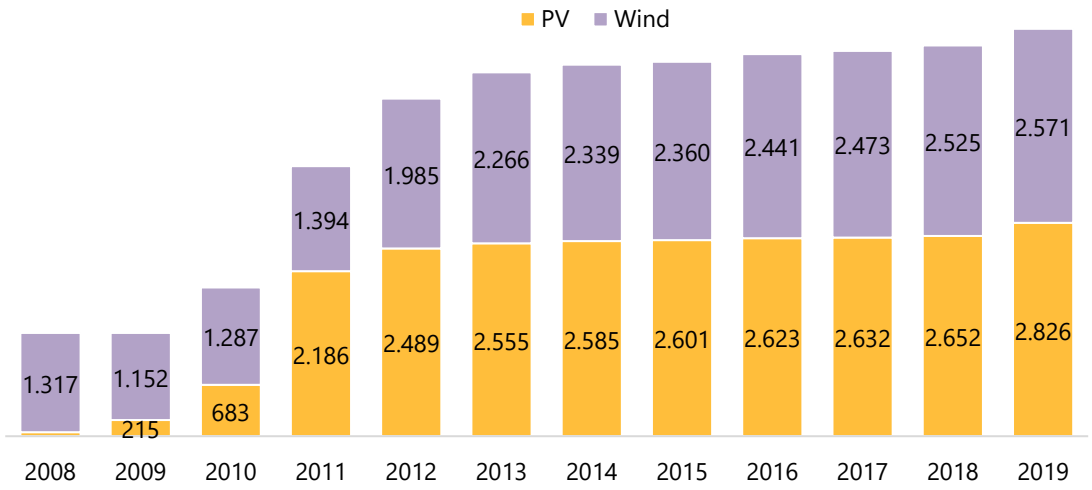
While installations trends are in line with the national context, the same cannot be said concerning the type of deployment of PV in Apulia. **The region holds by far the highest share of grounded PV (75% in 2019, while PV on buildings is limited to 25%) against a national average share of 42%**[22]. Such a share distribution is actually common among southern regions in Italy, which all hold a higher share of grounded PV, while on the contrary PV on buildings is much more prevalent in northern regions. These figures are consistent with the fact that **utility-scale PV is more widespread than small-scale PV in Apulia, where the average size is 55.2 kW**, twice the average at national level, which is 23.7 kW.

As for wind power, Apulia is by far the first region in Italy for both installed capacity (2,572 MW in 2019, 24% of total national capacity) **and electricity generation** (5,236 GWh, 26% of total national generation). On-shore wind availability in Italy is highly concentrated in southern regions, however deployment of wind power in Apulia has been greater than in other southern regions (the second region for wind installed capacity in Italy is Sicilia, with 1,894 MW). Also, within the Apulian region, installed wind capacity is mostly concentrated in one single province, Foggia: with 2,110 MW, thus**, Foggia hosts 80% of total wind power plants in Apulia and 20% at national level**.

Apulia is historically the first wind region in Italy and deployment has not been following a very regular trend compared to the national context. Apulia has been driving wind power growth in Italy, especially between 2012 and 2014, where over half of total national capacity every year was installed in the region. The peak year in Apulia occurred in 2012, when 590 MW (+17%) of new wind capacity was installed, while the peak year for Italy was 2009 (+1,360 MW, +38%). Since 2014, new installation trends have sharply decreased in Apulia, just as they have overall in Italy: from 2014 to 2019, Apulia added on average around 50 MW/year, but only 10-15% of the new total installed capacity in Italy is now located in the region. Also, for wind, power plants are on average bigger in Apulia (2.2 MW) than at national level (1.9 MW).

[22] Solare fotovoltaico – Rapporto statistico (2019), GSE

Total installed capacity (GW) from PV and wind in the region between 2008 and 2019



Source: GSE

As for RES-H/C, deployment is more limited in Apulia and consumption trends appear fairly different from the national average. Only 30% of total RES consumption in Apulia was for heating and cooling in 2018 (against a national share of 52%) and most of RES-H/C consumption is from solid biomass in the residential sector (72%), while heat pumps in Apulia are less significant (17%) than the national average (24%). In addition, deployment of solar thermal energy appears slightly more significant in Apulia than at national level, even though growth remains limited.

The Renewable Energy Directive (RED, Directive 2009/28/EC) assigned to Italy a 2020 target of 17% RES share of total gross final consumption of energy. Italy reached its target already in 2014, and the RES share remains at 18.2% in 2019. **With a Ministerial Decree from MISE (so-called "DM Burden Sharing"[23]), the national RES share target was split across regions in 2012**. A burden sharing analysis was developed by a dedicated governmental research body (RSE, Research on Electric System) based on regional potential for renewable deployment. Just like the national target, regional RES shares are also the ratio between gross final consumption from RES (including RES-E and RES-H/C, excluding RES-T) and total gross final consumption of energy in the Region. Based

[23] Decreto 11 maggio 2015 del Ministero per lo sviluppo economico di concerto con il Ministero dell'ambiente e della tutela del territorio e del mare e il Ministero delle politiche agricole alimentari e forestali, "Approvazione della metodologia che, nell'ambito del sistema statistico nazionale, è applicata per rilevare i dati necessari a misurare il grado di raggiungimento degli obiettivi regionali, in attuazione dell'articolo 40, comma 5, del decreto legislativo 3 marzo 2011, n. 28."

on its regional potentials, Apulia has been assigned a 2020 RES share target of 14.2% (very similar to the national 2020 target, which reduces from 17% to 14.3% when excluding RES-T). Apulia reached its 2020 target already in 2013, the year following the DM Burden Sharing release, and has remained above the target ever since, with latest figures from 2018 registering a 16.5% RES share[24].

The regional Burden Sharing approach has only been applied to the 2020 RES target, thus for 2030 the national framework only includes an overall national RES target, which is 30% (as defined by the current version of the NECP) and will likely be revised upwards when the Fit-for-55% package will be fully designed and enter into force.

No official estimates exist on renewable potential deployment at regional level; however, some unofficial estimates have been elaborated for Apulia. Elettricità Futura[25], which is the main industrial association for operators in the power sector and thus part of national Confindustria, estimates that **overall southern Italy, including Apulia, should double its current RES-E generation by 2030**, in order to contribute to a national RES-E target which is in line with the EU Green Deal (around 70% of total RES-E generation). **According to ANEV[26]**, which is the national association for wind energy operators, **wind growth in Apulia is expected to be more limited and will come mostly from repowering existing power plants**, with capacity expected to increase from current 2.6 GW to 2.9 GW (+13%) in 2030. Such estimates might imply that potential renewable deployment in Apulia in this decade will mostly refer to PV, upon careful consideration of environmental and landscape aspects.

As for the Regional Plan for Energy and the Environment (PEAR, which is the main planning and monitoring tool at regional level), the version currently in force in Apulia traces back to 2007. A new PEAR was drafted in 2015 and it is now under public consultation for all necessary environmental impact assessments, however information on timing and procedure is not available to the public. **Such long and complex bureaucracy, which is a very common issue among Italian regions, does not appear compatible with the fast pace** at which EU and national climate and energy targets and policy are being discussed and implemented, leaving the regional planning lagging far behind its current potentials for renewable deployment.

[24] GSE Monitoraggio Regionale 2018
[25] https://www.elettricitafutura.it/
[26] https://www.anev.org/

Permitting and bureaucracy for renewable deployment in Italy are highly complex procedures, which involve multiple government bodies (including economic development, environmental protection, landscape protection, conservation of cultural heritage), also at different levels (municipalities, Regions, central government), depending on the specific RES, size and location of the new power plant, as well as on specific regional regulatory frameworks[27].

The Guidelines for RES power plant authorizations[28] were released in 2010 by MISE, in cooperation with the Ministry of Environment and Ministry of Culture, and identify the overall national framework for authorization processes. The Guidelines have been further integrated with indications for power plants that are subject to environmental impacts assessment (VIA) in Regions and Autonomous Provinces[29]. For instance, for wind power plants with a capacity between 60 and 1,000 kW the VIA procedure is managed at regional level only under specific conditions (e.g., if they are located in protected areas or Natura 2000 sites); wind power plants with a capacity between 1 and 30 MW are always subject to VIA at regional level, while for capacity higher than 30 MW the VIA is managed at national level. Concerning PV, the guidelines allow Regions to extend simplified authorization processes also for bigger power plants (up to 1 MW); this simplified authorization is managed by municipalities with a timing of just 30 days. As explained also in section 3.3, this aspect has particularly influenced the deployment of PV in Apulia. Just like most Regions in Italy, the regional government in Apulia is responsible for releasing the overall authorizations (Autorizzazione Unica), while the VIA is managed both at regional and provincial level.

Regarding the ownership/benefit sharing arrangements used for renewable energy, providing specific and quantitative information remain difficult. Only 7% of total installed capacity in 2019 is located in the residential sector (against a national average of 16%) and only 10% in the commercial and services sector (against a national average of 22%). The share of capacity in industry (78%) in the region is much higher than national average (49%). It can thus be concluded that, also in light of the higher-than-average size of power plants in Apulia, that renewable investors in the region are mostly big operators and companies from the energy sector.

---

[27] An overview of updated regulatory frameworks in the RES sector is provided by GSE at this link

[28] Linee guida per l'autorizzazione degli impianti alimentati da fonti rinnovabili (2010), Ministero per lo sviluppo economico

[29] Linee guida per la verifica di assoggettabilità a valutazione di impatto ambientale dei progetti di competenza delle Regioni e delle Province Autonome, Ministero per lo sviluppo economico

3. ANALYSIS AND CONCLUSIONS

3.1 Key factors analysis

As numbers have shown, Apulia is one of the most relevant regions in Italy with regard to renewable deployment, especially for PV and wind power. A key factor is of course due to the geography of the Region and the very high resource potential. This is particularly true for wind, as many of the windiest areas in Italy are located in the Region, but also for PV, given that Apulia holds a very high solar radiation factor – and thus PV potential.

Besides geography, another key factor that has been driving renewable deployment in Apulia, just like in Italy overall, is related to incentives and supporting schemes, which have been mostly defined at national level. As reported in section 1.2, successive supporting mechanisms have led to different phases of renewable deployment: the great increase that Italy (and Apulia) registered in the early 2010s stopped abruptly after 2014, when new limitations to regulation and funding were introduced, especially for bigger power plants. The current supporting scheme in place, DM FER, was supposed to relaunch PV and wind deployment in Italy but has not been working appropriately (see Chart 1). The underlying reasons mostly concern bureaucracy and administrative aspects, rather than funding. Procedural requirements multiply and timelines often extend for much longer than required by law, with many projects losing competitiveness and many procedures remaining in litigation especially with regional bodies. This situation is evenly spread across regions in Italy; thus, Apulia is no exception.

According to sectoral experts, a main reason lying behind the disfunction of recent support schemes (section 1.2) is two-fold: on one hand, regions are not highly committed to renewable deployment, since they do not have any burden sharing targets for this decade (section 2.3); on the other hand, the Ministry of Culture has been particularly restrictive on renewable deployment for landscape protection reasons, and it is in fact hampering many authorization processes: according to ANEV, a wind capacity as high as 9 GW is currently in litigation (and thus blocked) by the Ministry of Culture.

As a consequence, permitting procedures for bigger wind power projects (which occur at national level) have been taking on average 5 years to complete, against a national law requirement of 2 years[30]. At the moment, also in light of the massive green investments that PNRR has scheduled for the upcoming years, the Italian

[30] The study is not available to the public, but results have been presented during this Event

Government is setting a new law (so-called Decreto Semplificazioni[31]) which aims specifically to simplify bureaucracy and reduce authorization timing. For instance, in order to accelerate the authorization process for PV parks (power plants bigger than 10 MW), this law proposes the VIA to be managed at national level (and not anymore at regional or province level).

With regard to RES-H/C, a dedicated support scheme (so-called Conto termico) promotes renewable deployment (as well as energy efficiency interventions) across governmental bodies and companies. Results so far have been limited, because of knowledge gaps and, most likely, also because of technical difficulties (the procedure actually requires the approval of the whole project). According to GSE, in 2020 only €229 million were spent for this mechanism to support interventions across companies (out of a 700 million € annual available fund), and €74 million were spent across governmental bodies (out of a total €200 million available).

For Apulia specifically, a key factor for the deployment of PV relates to the specific regional application of the national guidelines for renewable deployment (see section 2.3). Apulia has been one of the first Italian regions to extend the simplified procedure to power plants up to 1 MW, thus attracting many investments and fostering the deployment of bigger PV power plants. At the same time, experts believe that this has created some issues in terms of local acceptance of renewable deployment in the Region.

In recent years Apulia has also implemented regional support schemes, starting from a Regional Call[32] that aims to promote energy efficiency and RES uptake, especially among SMEs. This supporting mechanism is of great interest indeed because it addresses SMEs, for which access to incentives in the sector is much more challenging in Italy, as shown in a recent survey carried out by the Sustainable Development Foundation and CNA (a major association for craftsmanship and SMEs in Italy) [33].

---

[31] Decreto-legge 31 maggio 2021, n.77, "Governance del Piano nazionale di rilancio e resilienza e prime misure di rafforzamento delle strutture amministrative e di accelerazione e snellimento delle procedure"

[32] Regolamento generale dei regimi di aiuto in esenzione n. 17 del 30 settembre 2014 e s.m. e i. (in attuazione del Regolamento (CE) 651/2014 del 17.06.2014 e s.m. e i.) – Titolo VI - "Aiuti per la tutela dell'ambiente" - Avviso per la presentazione delle istanze di accesso ai sensi dell'articolo 6 del Regolamento e dell'Accordo di finanziamento sottoscritto tra la Regione Puglia e Puglia Sviluppo spa in data 24/07/2014.

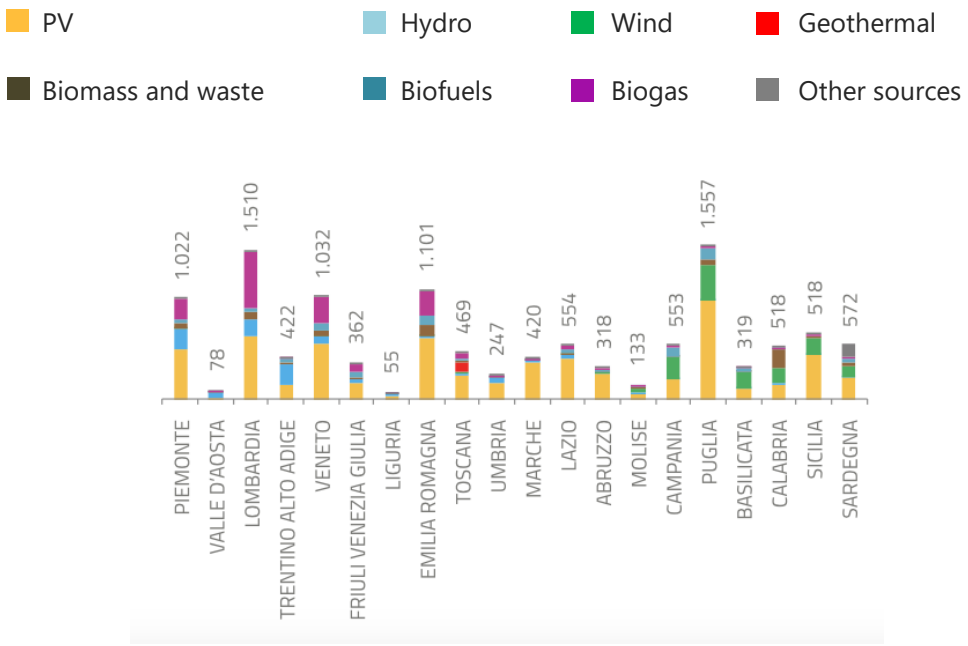
[33] Non senza le PMI (2021), Fondazione per lo sviluppo sostenibile

3.2 Socio-economic impacts of renewable energy

The latest figures from GSE on socio-economic impacts of renewables in Italian regions refer to 2016 and rank Apulia as the first region for investments in the sector (€350 billion in the year), and the second for O&M expenditures (€390 million in the year, after Lombardy).

It is also worth mentioning that, according to GSE[34], Apulia is the Italian region receiving the highest share of RES-E funds from incentive schemes (the ones that are paid through the A component of the energy bill): out of a total €12 billion funds in Italy, €1.56 billion are paid to power plants located in Apulia, mostly PV but also wind energy (see chart below).

Distribution of RES-E funds paid through the A component of the energy bill in Italy, by source and region (2020)



Source: GSE, Rapporto delle attività 2020

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).

[34] Rapporto sulle attività (2020), GSE

According to a recent study from ANEV, current workers in the wind sector (including direct, indirect and related AWU) amount to 4,500, of which 1,500 are direct AWU. 970 workers are employed in VESTAS production sites (which are located in Taranto), which is the main RES production site in the Region. Potential synergies might be occurring between supply chains from the wind sector and the naval sector (with the latter being a local, traditional supply chain in the region) concerning the production of fiberglass materials.

Apart from exceptional cases, such as the vast Vestas sites, most of RES-related employment in Apulia seems to be located more in other subsectors such as planning and permitting sectors, product assembly, installation, and O&M of power plants. Considering the overall Italian business structure, this means socio-economic impacts in the RES sector mostly affect SMEs. In this regard, it can be said that renewable deployment in Apulia has certainly brought positive impacts to local supply chains and expertise concerning planning, components, installations and O&M.

According to ENEA[35], by means of tax credits, in 2019 Apulia received €1.4 million funds for solar thermal projects and €2.4 million for biomass energy plants[36].

3.3 What are the key factors that have determined – or may in the future determine – socio-economic impacts associated with renewable energy deployment?

Socio-economic impacts associated with renewable energy deployment depend, in the first place, on regions' own capacity to promote RES in their territory. Given the technological and geographical features of this sector, economic and employment impacts occur, in fact, mostly at local level. To this end, priority action should focus on removing obstacles to RES growth described in section 3.1, starting with bureaucratic and administrative simplification. At the same time, efforts should be made to promote local entrepreneurship in the sector, especially for components and manufacturing, in order to amplify socio-economic benefits within the Region.

In this context, multiple civil society stakeholders should be primarily involved (alongside governmental bodies), including: industrial associations, both Confindustria (the main one) and the other sector-specific associations (such as

[35] Italian Agency for New Technologies, Energy and Sustainable Economic Development, which is in charge to manage tax credits and support schemes for energy efficiency

[36] Rapporto Detrazioni Fiscali (2020), Enea

Elettricità Futura, ANEV, ANIE[37]); SMEs associations, such as CNA or Confartigianato[38]; Universities, research centres and local districts (such as La Nuova Energia[39]); environmental associations, such as Legambiente and WWF; the main labour unions; and education and training associations for local entrepreneurship.

Apulia has recently launched some initiatives which are potentially very interesting in terms of social inclusion and value sharing, including profit sharing, from RES. However, they are both at a very early stage, thus data are not yet available to evaluate potential impacts and socio-economic benefits.

The first one relates to tackling energy poverty and promoting universal access to clean energy, for which Apulia is currently representing a best practice at the national level. In 2019, in fact, it became the first Italian region to establish by law[40] the so-called "energy income" (reddito energetico), a measure that will provide vulnerable households with small-scale renewable power plants, and thus free and clean energy. The details of how the scheme will work are still being finalised as of 2021. In February 2021, Regional authorities and GSE signed a partnership with the aim to define all necessary technical requirements and procedures to classify both beneficiaries and economic operators who will deliver the measure. The measure will be financed through regional funds, mainly by means of a dedicated revolving fund, which will be financed with the credits generated by selling unused electricity to the national market.

The second initiative refers to promoting renewable energy communities, which involve the aggregation of multiple *prosumers* who share a RES power plant, both in terms of costs and benefits. Apulia has been a pioneering Region in Italy following the approval of a dedicated regional law[41] establishing renewable energy communities in the Region. The provision also set guidelines to identify criteria for a perspective Protocol of understanding involving municipalities, and the functioning of a regional funding mechanism. As a matter of fact, Apulia's regional law has anticipated the national legislature, which established renewable energy communities just a few months later. Measures to support renewable

[37] Confindustria's branch for electronic and electrotechnical industry, including RES. More information at: https://anie.it/

[38] https://www.confartigianato.it/

[39] https://lanuovaenergia.it/

[40] Legge regionale 9 agosto 2019, n. 42 "Istituzione del Reddito energetico regionale".

[41] Legge regionale del 9 agosto 2019, n. 45 sulla "Promozione dell'istituzione delle comunità energetiche"

energy communities at national level include, among the others, a specific funding mechanism which pays an incentive fee of 110 €/MWh[42].

Local ownership and deployment of micro-RES in the residential sector remains relatively low in the region. This could potentially hamper broader economic benefits for the region and could be an avenue to explore in order to enhance the socio-ecnomic benefits regionally.

3.4 Key conclusions

1. The case study highlights that **the main factor hampering a strong RES growth in the Region today is not about economic costs, but rather about bureaucracy and permitting procedures**, which are becoming unsustainably long and complex – and thus, costly. In Italy, a key role in this issue is played by the Ministry of Culture and linked regional authorities in charge for landscape protection and conservation of cultural heritage, who have been particularly restrictive, rejecting many authorizations requests – including for power plants which are outside landscape protection constraints. Another key role is played by local communities and citizens, who often hamper the deployment of RES because they have been suffering some consequences for past planning and procedural mistakes. There is a need for a broad and dedicated involvement of citizens for them to fully understand the potentialities and urgency of strong – but still socially sustainable – RES deployment in the Region.
2. **Different technologies show different challenges and require different solutions.** Given the context and RES historical deployment, wind power growth in Apulia is mostly about repowering, as many outdated power plants are located in the Region and will need to be repowered in order not to waste the great wind availability of the Region. For PV, instead, deployment efforts will need to be driven both towards small-scale building plants as well as towards large-scale plants (again, not to waste the great solar availability of the Region); for the latter, it will be crucial to support the deployment of large-scale PV power plants also in rural areas by means of a careful regulation, in order to avoid conflicts with primary production and consent complications.

[42] Decreto 16 settembre 2020 del Ministero dello sviluppo economico, "Individuazione della tariffa incentivante per la remunerazione degli impianti a fonti rinnovabili inseriti nelle configurazioni sperimentali di autoconsumo collettivo e comunita' energetiche rinnovabili, in attuazione dell'articolo 42-bis, comma 9, del decreto-legge n. 162/2019, convertito dalla legge n. 8/2020.

3. **The key role that regions play in the transition towards climate neutrality, including for RES deployment, needs to be made clear and enhanced.** Regions need to work in full harmonization with national governments. In Italy, climate and energy targets are set at the national level but planning occurs at the local level, specifically at the regional level. However, regions do not bear any RES deployment target, not even for emissions reductions and energy efficiency progress. **A new burden sharing scheme would be a solution for a broader and more effective involvement of regions in climate and energy targets.** Ultimately, it is not just a matter of "burden" sharing, but also an occasion for "opportunities" sharing: 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 a local strategy for industrial development in the RES sector, which would be essential to maximize economic and occupational benefits in the Region.