EU Climate and Energy policies: opportunities and challenges in Southern European Member States

Europe's Climate and Energy Crossroads – First Seminar

5 November 2014, Brussels

Institute for European Environmental Policy

Europe's Climate and Energy Crossroads Seminars

This briefing note has been prepared by the Institute for European Environmental Policy (IEEP) as a contribution to a seminar for Members of the European Parliament in the Environment and Industry Committees, as part of the "Europe's Climate and Energy Crossroads" series. The aim of these seminars is to provide a balanced overview of some key climate and energy issues that the European Union will face in the coming years, giving new Members of the committees in particular an opportunity to discuss the context and likely objectives of forthcoming legislative proposals.

This first seminar provides background information and an opportunity for discussion on the current climate and energy policies in Southern European Member States, as well as opportunities and challenges in the future in relation to the proposed 2030 EU energy and climate targets. It offers a discussion of the case for action consistent with latest literature available; and provides pointers to sources of further information.

Further seminars in a series of three will address the challenge of the implementing of the 2030 targets once agreed by the European Council and the likely policy questions facing the co-legislators.

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Summary and Key Messages

- Southern European countries are particularly exposed to droughts and water scarcity exacerbated by climate change. Putting climate change mitigation and adaptation at the heart of the region's policymaking could be strategically beneficial.
- Policy and regulation changes after the rapid growth in photovoltaic sectors in Spain and Italy are reported to have dented investors' confidence in the market. Investor confidence is an important factor in securing progress on renewables and energy efficiency.
- The challenging macroeconomic situation has resulted in finance becoming increasingly scarce and more expensive in general. Creating sustainable financing structures for investment is expected to remain a major challenge to the energy sector over the next few years.
- 2030 Climate and Energy Package could boost investment in Southern EU Member States contributing to the transition from coal and gas-based energy generation towards renewable energy sources enabled by the reinforced energy infrastructure.
- The expansion and upgrading of interconnections could contribute to the further uptake in renewables and for energy security in the region. It could also catalyse the region's energy markets integration with the rest of the EU and accelerate the completion of the Internal Energy Market.
- In the longer term, Southern EU Member States could benefit significantly from successful climate change mitigation; they would avoid costs of repairing climate damage
- Avoided costs of health care, associated with polluting fossil fuels, are a potentially significant co-benefit of the climate action.
- Spain and Italy could become net electric energy exporters to the neighbouring EU Member States thanks to the energy imports from North Africa, provided the interconnection capacity is further developed.

Southern European Member States covered in this briefing note

1. Background Information

1.1. Regional profiles

This briefing covers **Portugal, Spain, Italy, Slovenia, Croatia, Greece, Malta, and Cyprus**. The region is inhabited by over 136 million people – 27 per cent of the EU total. Half of the region's countries joined the EU in and after 2004, with Croatia joining in 2013. The share of renewable energy sources (RES) in final energy consumption is rising in all the Southern Member States (MSs), with the highest share of RES in Portugal and the lowest in Malta. Basic key economic and energy indicators are set in Table 1 below.

Table 1: Key economic and energy indicators in nine Southern MSs, Eurostat[1]

Member State	Population (mln, 2014)	GDP in PPS (bln, 2014)	GDP per capita in PPS (EU-27=100, 2014)	Total primary energy production (mln toe, 2012)	Total final energy consumption (mln toe, 2012)	Energy intensity (kg of oil eq. / €1 000, 2012)	Energy dependence (%)
Cyprus	0.4	20	91	0.1	1.8	167.0	97.0
Croatia	4.2	67	61	3.5	5.9	225.6	53.6
Greece	11.0	216	76	10.4	16.3	165.7	66.6
Italy	60.8	1561	100	31.8	119.0	117.3	80.8
Malta	0.9	9	86	0.0	0.4	147.4	100.5
Portugal	10.4	205	76	4.6	16.2	146.5	79.5
Slovenia	2.1	44	84	3.5	4.9	227.7	51.6
Spain	46.5	1125	95	33.2	83.2	136.4	73.3
EU-28	507.4	12970	100	794.3	1103.4	143.2	53.4

Energy intensity[2] varies considerably in the region: Spain's and Italy's energy intensity is lower than the EU average; Portugal, Greece, Malta and Cyprus oscilate around the EU average; Slovenia's and Croatia's energy intenisty is almost twice as high as the EU average.

The energy supply of Southern Europe differs substantially from the rest of EU. Southern MSs' dependence on imported energy is high, with only Slovenia and Croatia having an energy dependence ratio close to the EU average of 53 per cent[3]. Malta and Cyprus[4] are almost totally dependent on imported energy, mainly oil, driving the GHG emissions from energy generation in both countries to the highest levels in Southern MSs[5]. Power generation in the rest of the region relies heavily on imported gas. High energy dependence

[1] Eurostat, Energy database, and General database, 2014

[2] Energy intensity indicator is calculated as a ratio between the gross inland consumption of energy and the gross domestic product (GDP) for a given year

[3] Eurostat, Energy dependence, tsdcc310.

[4] Cyprus energy dependence could decrease after the significant hydrocarbon reserves in the country's Exclusive Economic Zone have been discovered. Cyprus strategic plan is to become the energy hub in the Eastern Mediterranean,http://www.cyprusprofile.com/en/sectors/energy-and-environment

[5] Eurostat, Greenhouse gas emissions intensity of energy consumption,tsdcc 220.

makes the region exposed to geopolitical tensions and commodity price volatility. Fossil energy generation contributes significantly to the emissions of greenhouse gases (GHG), which have grown between 1990 and 2011 in all of the Southern European MSs, contrasting with decreasing level of emissions in other EU MSs.[6]

Energy interconnectors in the region, especially between the Iberian peninsula and the rest of the continent, are underdeveloped[7]. The isolation from the rest of EU energy markets, aggravates the problem of energy dependency on external suppliers and generation adequacy considerations stemming from growing grid integration of variable RES.

The economic downturn has heavily affected households and industry in the region. On the one hand, the slowdown decreased energy consumption and thereby reduced GHG emissions. On the other hand, the crisis drove down private investment in energy infrastructure, which is an essential building block for future climate and energy targets, and for energy security.

Renewable energy sources developed in the region are predominantly hydro, wind and solar. In 2012 there was almost 53 GW of hydro power installed capacity in Southern Europe (out of 150 GW in EU-28)[8], but the contribution of water resources to energy generation may be put at risk due to **the increasing temperatures and desertification in the region**. Potentials of hydro energy in Slovenia and Croatia are still largely untapped[9]. Solar radiation is much bigger than in the Northern part of the continent, resulting in very high solar electricity potentials[10]. Italy and Spain are major contributors, just behind Germany, to the EU's strong position in global use of solar power.

1.2. Current policy on climate and energy

Climate and enery policies in Southern Europe vary from country to country, and although not coordinated, they reflect shared regional challenges related to the heavy dependence on imported fossil fuels, underdeveloped grid infrastructure and climate conditions. Current effectiveness of climate and energy policies can be assessed partly on the basis of the progress made in terms of RES share in energy generation mix.

[6] UNFCC, National greenhouse gas inventory data for the period 1990–2011, Total aggregate anthropogenic emissions of CO2, CH4, N2O, HFCs, PFCs and SF6 including emissions/removals from land use, land-use change and forestry, 1990, 2000, 2005, 2010 and 2011, October 2013.
[7] Interconnection is the physical linking of electricity or gas transmission systems across borders.
[8] Eurostat, Energy pocket book, 2014.
[9] Š. Bojnec, D. Papler, Obnovljivi izvori energije: hidro električna energija u Sloveniji, Technical Gazette 19, 4(2012), 795-800.
[10] JRC, PV Solar Electricity Potential in European Countries, 2006.

Table 2: Share of RES[11] in final energy consumption[12]

Member State	Share of RES (%, 2004)	Share of RES (%, 2012)	2020 Target (%)
Cyprus	3.1	6.8	13
Croatia	13.2	16.8	20
Greece	7.2	15.1	18
Italy	5.7	13.5	17
Malta	0.3	1.4	10
Portugal	19.2	24.6	31
Slovenia	16.1	20.2	25
Spain	8.3	14.3	20
EU 28	8.3	14.1	20

As national circumstances vary, so do the starting points and progress in terms of RES and energy efficiency development. Cyprus, Malta, Italy and Greece had initially relatively low shares of RES and their 2020 targets were therefore set below the EU average. Meanwhile, Portugal and Slovenia aim to achieve more than a 20 per cent RES share in their final energy consumption by 2020. Today all countries in the region, except Malta, are on track in meeting their 2020 RES targets (Table 2). Although in each Southern MS examples of good practice in terms of climate and energy policy can be found, a particular focus in this section has been put on positive developments in Portugal and Italy as well as a joint regional initiative – EUROMED.

Portugal –promotion of RES and interconnectors

Portugal's energy sector decarbonisation has been successful so far, and the country is a net seller of European Emission Allowances. Portugal's 2020 renewables target[13] is 31 per cent, which is higher than the EU-27 average, and it continues to show good progress. Power generation in Portugal is currently about 47 per cent from RES including large hydro, but the share of renewable energy varies yearly due to hydrological and wind conditions[14]. RES has helped drive down Portugal's dependence on imported energyy from 84 per cent in 2004 to 80 per cent in 2014[15] . Additional new capacity is planned or underway as some hydro power plants are being built and the Government has granted permission to four new gas plants that will back up the variable RES. At the beginning of 2013, the Secretary of State announced a plan to upgrade the electricity network in the Western part of the country (worth €135m). Portugal is also actively engaging in fostering delivery of Projects of Common Interest on the Iberian Peninsula. Aware of risks related to isolated, carbon-

[11] RES (renewables) is equal to the sum of hydro, geothermal, solar PV, solar thermal, tide, wind, municipal waste, primary solid biofuels, biogases, bio gasoline, biodiesel, other liquid biofuels, non-specified biofuels and charcoal energy. Industrial waste not included.

[12] Eurostat, Energy pocket book, 2014, the latest statistical data by sector of RES is available on EUObserver Barometer website.

[13] Share of RES in Gross Final Energy Consumption.

[14] Eurostat, Electricity generated from renewable sources, tsdcc330.

[15] Eurostat. Energy dependence, tsdcc310

intensive energy systems, Portugal has placed strong emphasis on the importance of interconnectors[16].

Italy – an energy efficient outlier

Italy succeeded in increasing its share of RES in gross final energy consumption impressively, from 5.7 per cent in 2008 to 13.5 per cent in 2012. The economic impact of uptake in Italian RES sector, according to IRENA, is telling: they estimate that the $16bn invested in renewable electricity technologies) in Italy in 2011 (thanks to i.a. generous state subsidies) has added $23bn to the country's GDP[17]. In 2014, according to the American Council for an Energy-Efficient Economy, Italy was the second most energy efficient country in the world. It continues to rapidly improve its energy efficiency indicators and is arguably, next to Germany, an EU outlier in this area. Such good performance is due to many elements including: introduction of smart meters on a national scale, reinforcement and expansion of the energy efficiency certificate scheme, prolongation of tax waivers for energy efficiency works in buildings, use of energy efficient gas power plants, and introduction of effective national action plans in energy efficiency, including the recent National Energy Strategy approved in 2013 and the Piano d'Azione per l'Efficienza Energetica in 2014. Climate and energy policies are high on the agenda of Italian policy makers who recognize their inherent benefits with regard to energy cost reduction, reaching EU targets, higher security of supply and industrial performance in the energy sector.

EUROMED – joint initiative to boost RES and energy efficiency

Southern EU MSs together with other countries in the Mediterranean region under the auspices of EUROMED[18], cooperate to save energy and develop RES (***Mediterranean Solar Plan***), with a special focus on wind and solar power[19]. The Mediterranean Solar Plan launched in 2008 is a flagship initiative to create a roadmap for the development of framework fostering large scale and sustainable use of RES and improvement of energy efficiency in the Mediterranean region. The ***MedRing*** initiative aims at linking EU with the non-EU Southern Mediterranean countries through electricity and gas interconnections; the Ring is considered essential to develop the region's vast solar and wind energy potentials and will enable cross-continental import and export of energy[20].

2. Future opportunities and challenges

2.1. Emerging trends

There are several trends in the region that are likely to impact climate and energy policy. Some of them have been listed and briefly explained below.

[16] R. Weyndling, Portugal threatens 2030 veto over interconnection, 7 October 2014.
[17] IRENA, Rethinking Energy, 2014, p.67,
[18] The Union for the Mediterranean (EUROMED) promotes economic integration and democratic reform in the Southern Mediterranean, African and Middle Eastern EU neighbours.
[19] Mediterranean Solar Plan, Strategy Paper, February 2010
[20] A. L'Abbate et al., Regional Energy Initiatives: MedReg and the Energy Community, 2014

2.1.1. Increasing energy prices for the end-consumer

Natural gas prices[21] for households increased by more than 30 per cent from 2008 to 2012 in Spain, Italy and Portugal, and 70 per cent in Croatia[22] (). Prices of electricity for households increased over the same period by 10 per cent on average. Energy prices in Southern Europe depend on the costs of imported oil and gas and include a RES surcharge component. For example RES surcharge due to the government's protection of energy intensive industries reached more than 15 per cent of final household electricity prices in Spain in 2012, ranking among the EU highest[23].

2.1.2. Falling cost of solar and wind energy technologies

Costs of solar photovoltaic (PV) and wind electricity decrease over time and become more affordable. PV prices have fallen by 80 per cent since 2008 and are expected to keep dropping. In 2013, commercial solar power reached grid parity[24] in Italy and Spain, as well as Germany[25]. As the costs of decentralised solar PV systems are becoming lower than retail electricity prices,for example in Spain or Italy[26], PV installations for self-consumption become increasingly attractive. Whether this trend is reinforced depends on future retail electricity prices and adoption of net metering.

2.1.3. Economic stagnation and signs of revival

The economic crisis continues to overshadow climate action, especially in Greece, Portugal and Spain. Retroactive cuts in Spain's feed-in tariff schemes of support to PV power generation and scaled back RES subsidies in Italy in 2012 have had a negative impact on investor confidence[27,28]. The availability and cost of finance may remain a significant constraint for RES in Southern Europe, unless positive signals of economic revival are confirmed[29].

2.1.4. Precarious energy security and changes to gas sector

The risks of disruption to the Southern European MSs energy supply is growing. Underdeveloped interconnection with the rest of the EU energy markets puts a strain on grid stability and limits the scope for integration of intermittent RES sources. Southern MSs' RES generation mixes include growing shares of intermittent solar and wind sources. Such sources require back-up or (in the longer-term) a very good interconnecting capacity that ensures energy supply adequacy regardless of weather conditions and load profiles. Adapted (small-scale) gas-fired plants can flexibly supply power and be used to provide

[21] Measured in national currencies, all taxes excluded; EC, Energy Prices and Costs in Europe, SWD(2014) 20 final/2, March 2014.
[22] Figures for Greece, Malta and Cyprus were not available on Eurostat.
[23] EC, Energy Prices and Costs in Europe, SWD(2014) 20 final/2, March 2014.
[24] "Grid parity" is the point in time, at which a developing technology will produce electricity for the same cost as traditional technologies.
[25] IEA, Technology Roadmap: Solar Photovoltaic Energy, 2014.
[26] EC, Staff Working Document: Impact Assessment:A policy framework for climate and energy in the period from 2020 up to 2030 {COM(2014) 15 final}.
[27] EPIA, Global market Outlook For Photovoltaics 2014 – 2018, 2014.
[28] C. Hornby, A. Sisto, Italy puts new caps on renewable energy incentives, Reuters, April 2012.
[29] Linklaters, Set to revive: investing in Europe's, 2014.

back-up to variable RES; a high level of integration of PV and wind to energy systems can therefore drive changes in gas sector. The services of back-up power operators usually require an adequate remuneration (capacity payments, for example). Spain and Portugal are host significant regasification LNG capacity that is not used optimally because of low gas and electricity interconnecting infrastructure. Enabling cross-border energy flows could be one of the energy crisis management options for the EU in case of severe gas disruptions of Russian gas supply.

2.1.5. Weather extremes

Climate change has an even more severe impact on Southern Europe than it will on the rest of the continent. If GHG are emitted in line with business-as-usual global scenario, Southern Europe is predicted to face very high temperature increases[30]. According to IPCC report "climate change is very likely to increase the frequency and intensity of heat waves, particularly in Southern Europe"[31]. Water availability would further decrease causing wildfires and serious water restriction[32]. Climate change is expected to impede economic activity in Southern Europe more than in other EU regions. Scientists predict with "high confidence" that climate change will decrease yields of cereals (because of meteorological droughts), fisheries (due to higher water temperatures) and negatively affect dairy production (because of heat stress in lactating cows). High temperature increases in the Southern MSs will increase the risk of wildfires and heat-related deaths and injuries.

2.2. Perspective on climate policy in the region

National policies will reflect the commitments agreed under 2030 Climate and Energy Package. Climate policy will aim at mobilising investment in interconnecting infrastructure, RES, and energy efficiency to ensure the region's green growth and energy security. Changes to climate and energy policy with the potential to stimulate such investments include:

- introducing demanding and effective energy efficiency, RES, GHG reduction, and interconnection targets beyond 2020 to give clear signals to investors and national policy makers, avoid costs of carbon emissions allowances and energy dependency, and reap all related health benefits,
- guaranteeing stable energy prices for end consumers reflecting decreasing costs of wind and solar technologies,
- maintaining regulatory stability to attract finance and regain investors' confidence.

Costs related to the new policy measures are mostly investment capital costs and depend on national circumstances including reliance on fossil fuels and potential for domestic RES development. Any monetary estimations of such costs would not be complete without taking into account the following factors:

- investment needed in upgrading energy systems even without climate targets;

[30] S. C. Sherwood, S. Bony, J-L Dufresne, Spread in model climate sensitivity traced to atmospheric convective mixing, Nature 505, 37–42 (02 January 2014).
[31] IPPC, Assessment Report: Europe, 2014
[32] IPCC, Climate Change: Impacts, Adaptation, and Vulnerability, 2014.

- the contribution to saving health care costs resulting from a decarbonised energy supply;
- the risk of disrupted energy supply, and imports of energy at volatile prices, and
- the costs of mitigating the damage caused by extreme weather conditions.

2.3. Potential impacts of 2030 package

A recent study estimated that the currently proposed 40 per cent GHG emission reduction target would cost the EU 0.2 per cent of GDP in 2030[33]. For the Southern MSs this would translate into: 0.1 per cent of GDP for Portugal, 0.2 per cent of GDP for Greece, Malta, Slovenia and Spain, 0.3 per cent of GDP for Cyprus and Italy, and 0.4 per cent GDP for Croatia. The same study also suggests benefits of reducing local air pollution due to coal energy generation could be substantial relative to the costs incurred to abate emissions. The benefits include both the reduced energy import bill and avoided health costs related to respiratory illnesses. In terms of avoided health expenditure, Spain's benefit would range between €0.8bn and €2.2bn in 2030, in Greece it would reach between €347m and €981m in 2030, Italy's avoided spending oscilates between €240m and 685m, and Slovenia's and Portugal's avoided costs would range beteween €47m and €133m, and €43m and €122m respectively. The health benefits in remaining Southern MSs are relatively small. Southern MSs that would benfit the most from reduced energy bill, if 40 per cent GHG reduction target is in place, are Italy, Spain, Portugal, and Greece. Italy and Spain would cut their respective spendings on the imported fossil fuels by around €9bn each in 2030, and Greece and Portugal by €1.3bn and €1.5bn respectively.

The above figures show that while it would pose short-term policy and affordability challenges, at least 40 per cent binding GHG emission reduction target, as well as renewable energy, energy efficiency and interconnection targets would ensure green growth in the region, improve energy security and reduce energy import bill. Investors would contribute to the shift away from coal and gas towards RES and energy efficiency. Grid upgrades and expansion could be fostered. From longer term perspective, the EU climate action could mitigate the weather extremes and resulting damage in Southern Europe. Energy security would get stronger and the region's energy markets integrate with the rest of the EU, helping complete the Internal Energy Market.

[33] Enerdata, Costs and benefits to Member States of 2030 Climate and Energy Targets, February 2014

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