



Empowering Mediterranean regulators for a common energy future.

Working Group on Environment, RES and Energy Efficiency



Benchmarking Assessment

MED17-24GA-5.3.1
FINAL REPORT
DECEMBER 2017



MEDREG is co-funded by the European Union

Acknowledgements

This report is the result of a work carried out by the MEDREG Renewable Working Group (RES WG) in the period November 2015-May 2017.

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Table of Content

1	BASIC INFORMATION	5
1.1	General trends	5
1.2	RES generation by states and sources	5
1.3	Evolution over the years.....	8
1.4	Overall CO2 emissions and intensity.....	9
2	LEGISLATIVE AND REGULATORY FRAMEWORK.....	11
3	AMENDMENTS BY MEMBER STATES	13
3.1	CYPRUS 2016	13
3.2	GREECE 2016.....	17
3.3	SPAIN 2016	17
3.4	ITALY 2016.....	18
3.5	ISRAEL 2016	19
3.6	EGYPT 2016.....	20
3.7	PORTUGAL 2016	22
3.8	JORDAN 2016	22

The information contained in this document is based on the following members who responded to the questionnaire:

<u>MEMBERS</u>	Response to the questionnaire
Algeria (ALG)	<input checked="" type="checkbox"/>
Albania (ALB)	<input checked="" type="checkbox"/>
Croatia (CRO)	<input checked="" type="checkbox"/>
Cyprus (CYP)	<input checked="" type="checkbox"/>
Greece (GRE)	<input checked="" type="checkbox"/>
Israel (ISR)	<input checked="" type="checkbox"/>
Italy (ITA)	<input checked="" type="checkbox"/>
Jordan (JOR)	<input checked="" type="checkbox"/>
Malta (MAL)	<input checked="" type="checkbox"/>
Montenegro (MON)	<input checked="" type="checkbox"/>
Portugal (POR)	<input checked="" type="checkbox"/>
Spain (SPA)	<input checked="" type="checkbox"/>
Egypt (EGY)	<input checked="" type="checkbox"/>
Palestine (PAL)	<input checked="" type="checkbox"/>
Turkey (TUR)	<input checked="" type="checkbox"/>

1 Basic Information

1.1 General trends

The participation of members in MEDREG questionnaire response has been average. In total, 15 MEDREG members replied to the questionnaire, in comparison to 13 replies for the 2014 questionnaire.

In the 2015 benchmarking, a revision of the questionnaire was applied, which enables us to provide some new comparisons on different characteristics of member's electricity markets (such as carbon emissions and intensity). However, the change in format prevented the integration of previous data by members who did not respond to the questionnaire this year.

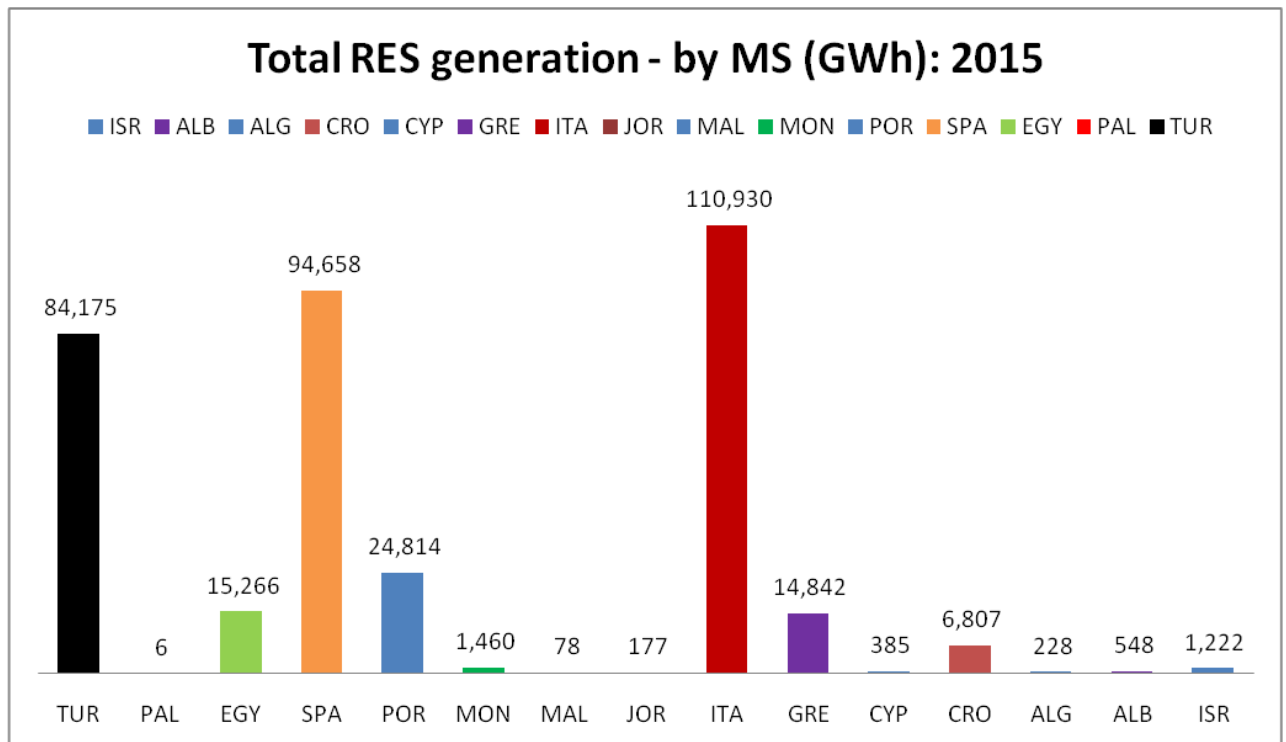
By analysing the data, tables and graphs available, and making comparison with previous benchmarking exercises, some general trends can be observed:

1. In line with past benchmarking results, total demand/generation for electricity continues to remain steady or decrease in 2015 in EU countries, and continues to increase in non-EU countries.
2. Approximately 80% of RES generation in the benchmarking is attributed to three of the fifteen members in the survey: Spain, Italy and Turkey.
3. Hydropower (50%) and wind (26%) continues to be the dominant RES sources in total RES generation. The huge share of Hydro in the total RES generation and its relative volatility continues to play a major role in RES generation in the reporting MS. While total res generation fell 3% between 2013-2015 (from 366 to 356 TWh), RES without Hydro was growing at 5% in the same period (from 171 TWh to 179 TWh).
4. In weighted average terms: the total RES share of generation in the reporting states was decreasing in the past years (ranged from 29.9% in 2013, to 29.1% in 2014, and down to 28.4% in 2015) – but when excluding hydropower from the data – the trend line shows greater stability: a slight annual increase (from 14.0% to 14.1% and 14.3% between 2013-2015).
5. In non-weighted terms, the average annual increase in RES (excluding hydro) share of generation between 2008-2015 was 1%. In 2015 the increase was 0.7%.
6. Total CO₂ emissions from electricity generation is falling at an average level of 2.3% a year (2.8% in weighted terms) for the reported period (2008-2015) - similarly to carbon intensity (measured by CO₂ KG / KWh) falling at 2.9%% a year.

1.2 RES generation by states and sources

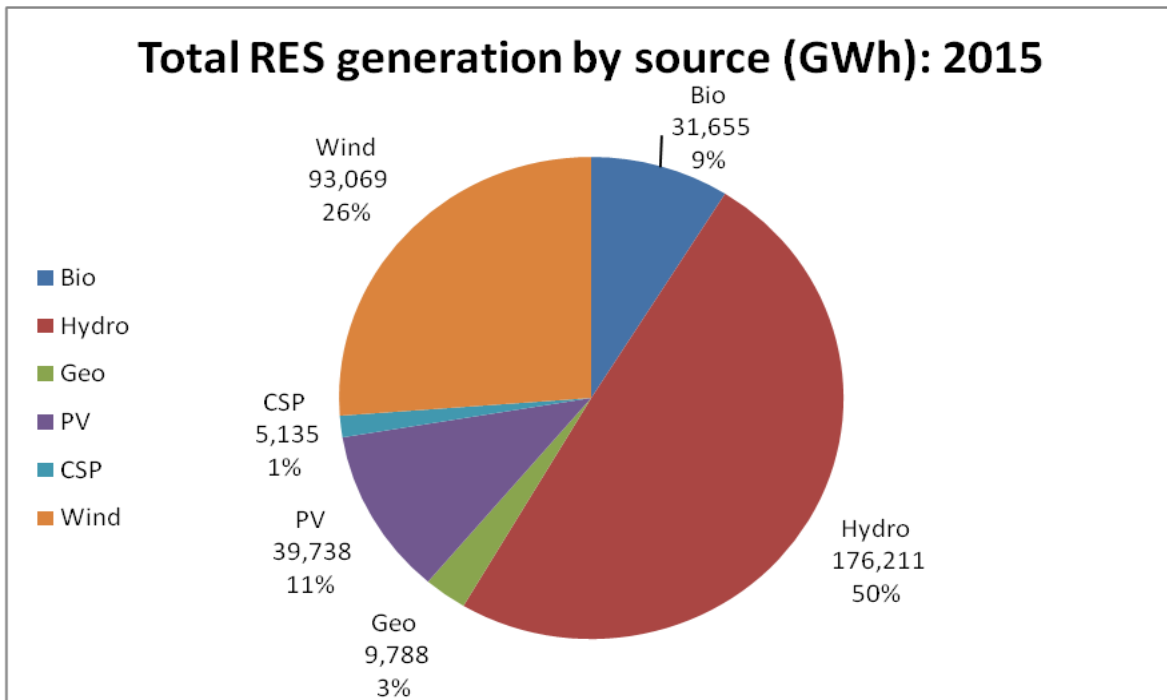
The objective of this chapter is to get a general overview of the current situation of each member of the MEDREG RES WG (Environment, Renewable Energy Sources and Energy Efficiency Working Group) who responded to the questionnaire, in terms of total RES generation, the technology mix of renewable sources, and the developments in the last years.

The next chart shows the total RES generation in 2015 (in GWh) by member states. As demonstrated in the chart, around 80% of RES generation in the reporting MS (in absolute terms) is attributed to Three states – Spain, Italy and Turkey. For that reason it would be useful to present the trends in generation in the report both in weighted and non-weighted terms.



The total share of RES generation (in 2015) in the reporting MS was 28.4% (29.8% in non-weighted terms) of which 27% is attributed to hydropower:

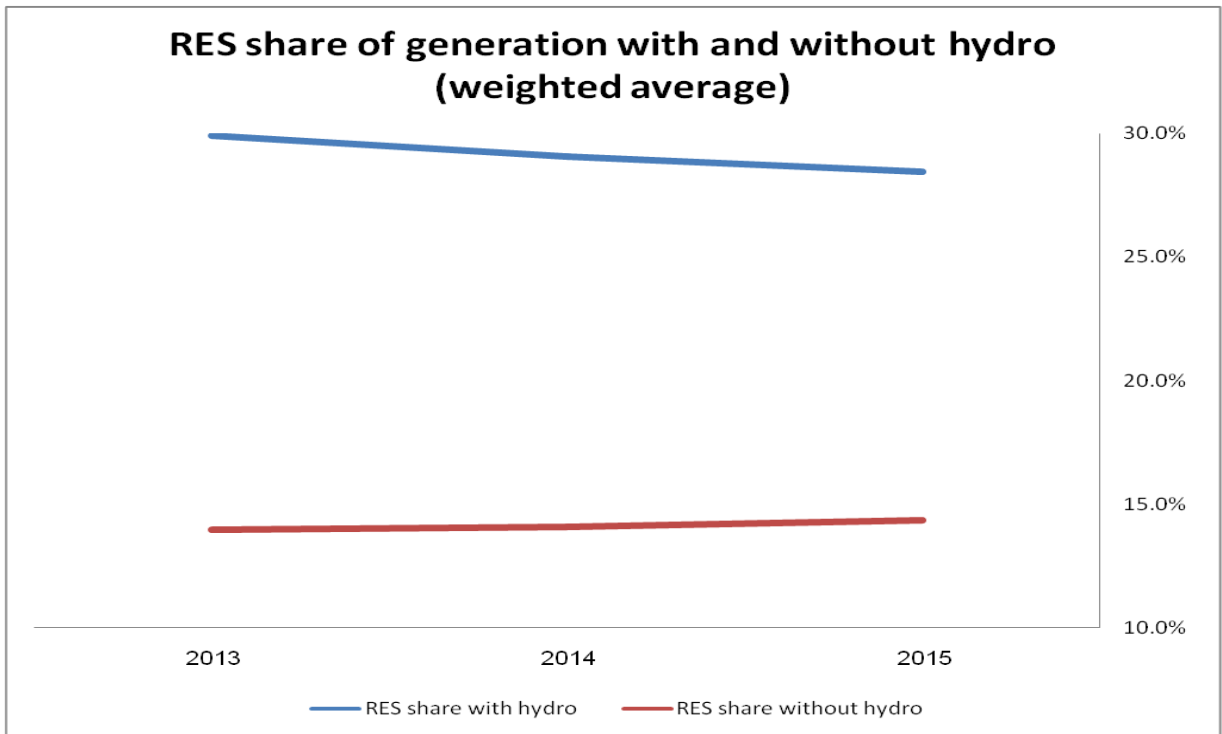
RES share of generation			
<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>MS</u>
1.9%	1.4%	0.9%	ISR
100.0%	100.0%	100.0%	ALB
0.4%	0.4%	0.3%	ALG
53.9%	61.0%	61.0%	CRO
8.5%	7.0%	7.6%	CYP
31.3%	26.3%	26.6%	GRE
39.3%	43.7%	39.3%	ITA
0.9%	0.0%	0.0%	JOR
3.4%	3.0%	1.7%	MAL
50.8%	56.5%	65.6%	MON
49.8%	62.8%	60.7%	POR
36.0%	41.5%	40.9%	SPA
8.7%	8.9%	9.2%	EGY
1.6%	N/A	N/A	PAL
32.2%	21.0%	28.9%	TUR
28.4%	29.1%	29.9%	Total (Weighted)
29.8%	31.0%	31.6%	Total (Non-Weighted)



The impact of Hydro-volatility (e.g. in the decrease of RES between 2014 and 2015) over data is significant. Omitting Hydro generation from the results changes the trend line between 2013 and 2015 from a 1.5% decrease to a slight increase (0.3% in weighted terms, 0.9% in non-weighted terms):

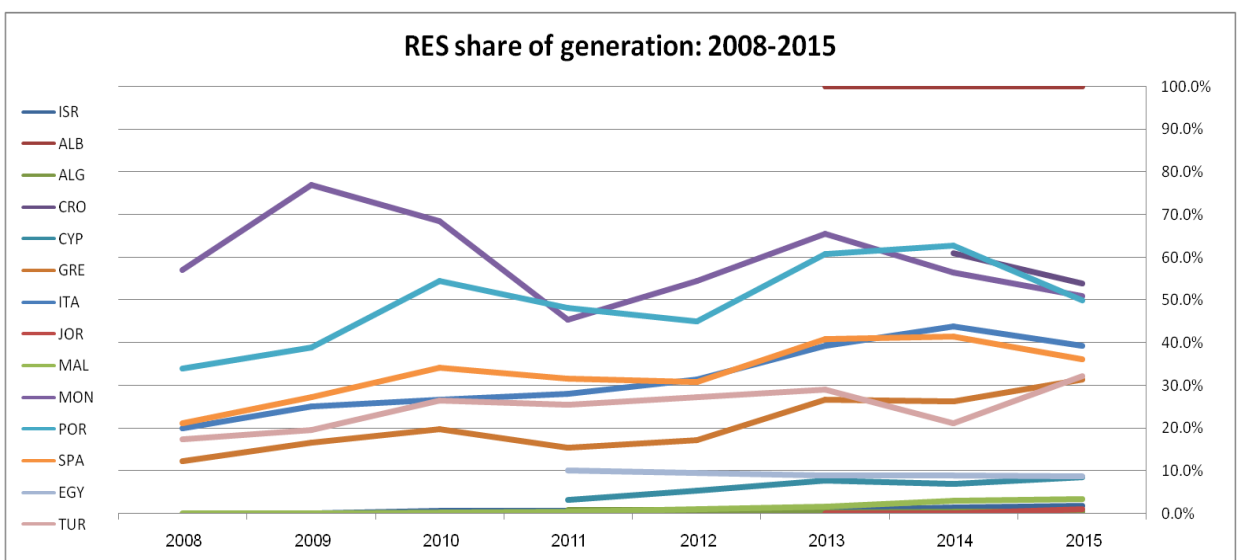
RES share of generation without hydro¹			
<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>MS</u>
1.9%	1.4%	0.9%	ISR
0.0%	0.0%	0.0%	ALB
0.1%	0.1%	0.1%	ALG
8.6%	6.0%	6.0%	CRO
8.5%	7.0%	7.6%	CYP
18.4%	16.3%	14.8%	GRE
23.3%	22.2%	20.4%	ITA
0.9%	0.0%	0.0%	JOR
3.4%	3.0%	1.7%	MAL
0.0%	0.0%	0.0%	MON
30.3%	30.6%	30.9%	POR
26.0%	27.2%	27.9%	SPA
0.8%	0.9%	1.2%	EGY
1.6%	N/A	N/A	PAL
6.5%	4.9%	4.2%	TUR
14.3%	14.1%	14.0%	Total (Weighted)
9.2%	8.6%	8.3%	Total (Non-Weighted)

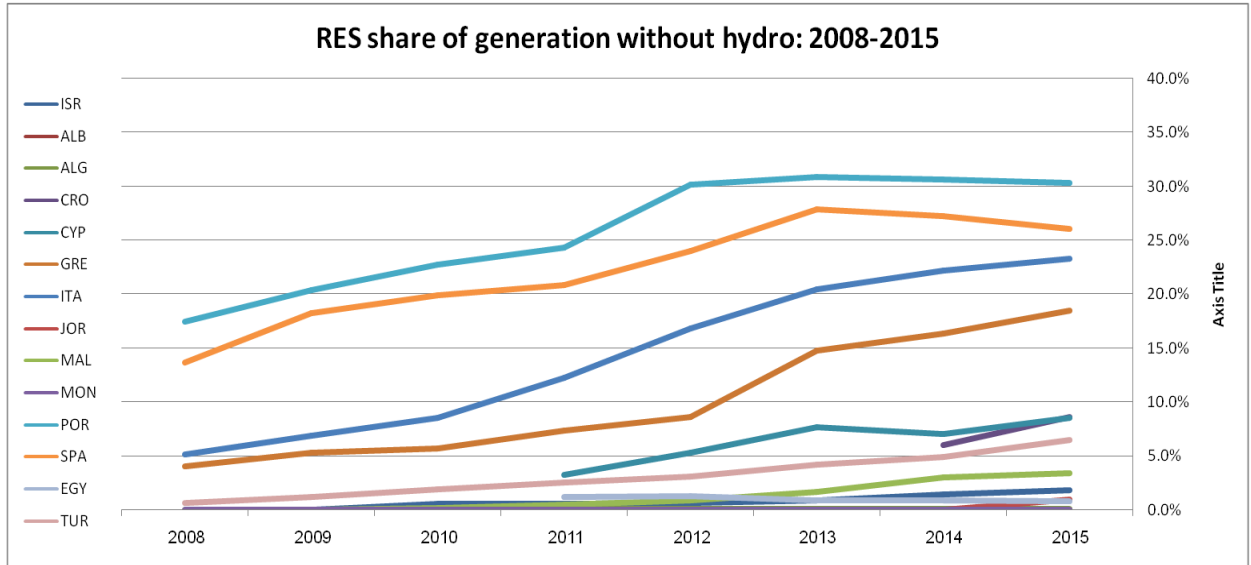
¹ To calculate the "total averages" with consistently, PAL was omitted from the average do to partial data



1.3 Evolution over the years

The following charts are describing the development of RES share of total generation from 2008 and on in different MS. As demonstrated in section (1.2), considering the all RES sources the results are volatile with significant annual differences, but when discounting Hydro-power from the data, the results shows a consistent growth of 1.0 % a year in non-weighted average terms:

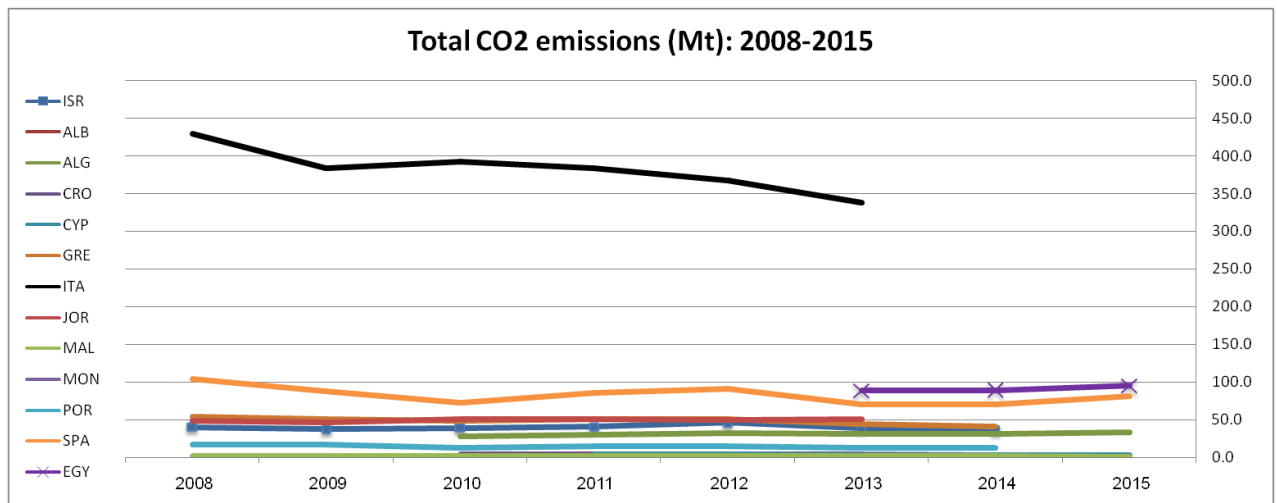




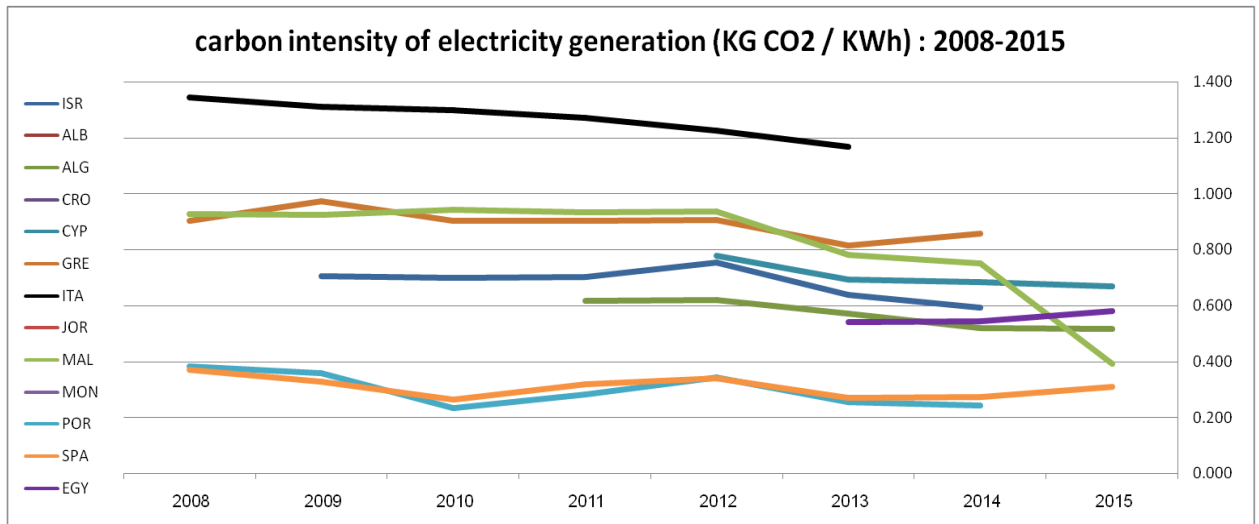
Another noticeable distinction in the graph is the difference between EU and non-EU states. While EU states increased their share of non-hydro RES annually in 1.8% in the reported period, non-EU states increased their share in only 0.2% a year.

1.4 Overall CO2 emissions and intensity

This chapter analyzes overall carbon emissions from electricity generation in the responding MS. Around 57% of total emissions in the report are attributed to one state - Italy. Between 2011-2013, the only years in which full data is reported by most MS in the questionnaire (excluding Egypt), total emissions declined from 665 Mt to 593 Mt (a total emission reduction of 10.7%).



While CO2 emissions in absolute terms can create an incomplete impression (as in some of the MS demand is growing and in others it is declining) the analysis of CO2 intensity (in KG CO2 / KWh) demonstrates the process of de-carbonization of electricity markets in MS.



According to the data available the average level of annual CO₂ intensity decline was 2.9%. The pace of de-carbonization is higher than the level of increase in RES share, reflecting an additional transition from generation by coal and diesel - to natural gas..

2 Legislative and regulatory framework

This part is related to the legislative and regulatory framework for RES² and CHP³ electricity generation. As demonstrated in the table below, of 15 MS who answered to the questioner, 14 reported to have specific RES legislation, 11 reported to have all-RES targets and 6 more to have specific E-RES targets. Nearly all target-years are for 2020.

The non-weighted average of all-RES targets was 23%, whereas the non-weighted average of E-RES targets was 27%.

E-targets RES year	E-targets RES	Targets RES year	Targets RES	Legislation RES	MS
2020	10%			X	ISR
		2020	38%	X	ALB
		2030	27%	X	ALG
	no		no	X	CRO
2020	16%	2020	13%	X	CYP
2020	40%	2020	20%	X	GRE
		2020	17%	X	ITA
		2020	20%	X	JOR
		2020	10%	X	MAL
		2020	33%	X	MON
2020	59.60%	2020	31%	X	POR
		2020	20%	X	SPA
n/a	n/a	n/a	n/a	n/a	EGY
2020	10.00%	2020	25%	X	PAL
2023	X		X	X	TUR
2022	20%	2035	30-40%	X	EGY

² RES: Renewable Energy Sources, according the **Directive 2009/28/EC**.

³ CHP: Combined Heat and Power, according **Directive 2012/27/EU**.

In contrary to the high degree of legislation and regulation on RES, only 7 of the MS reported to have specific legislation on CHP, and no MS reported to have a specific target.

<u>Targets CHP</u>	<u>Legislation CHP</u>	<u>MS</u>
no	no	ISR
no	no	ALB
no	no	ALG
no	X	CRO
no	X	CYP
no	no	GRE
no	X	ITA
no	no	JOR
no	X	MAL
no	X	MON
no	X	POR
no	X	SPA
n/a	n/a	EGY
no	no	PAL
no	no	TUR
no	X	EGY

3 Amendments by Member States

This part is attributed to amendments written by MS on recent regulatory developments in the RES and EE sectors. In the following Benchmarking report we include amendments by Cyprus, Greece, Spain, Italy and Israel.

3.1 CYPRUS 2016

In 2016, the Cyprus Energy Regulatory Authority (CERA), within the framework of European and national legislation, took a series of decisions aimed at shaping and developing the Cyprus energy market in conditions of healthy competition, consumer protection and encouraging the use of Renewable Energy Sources (RES).

Specifically, CERA, in the context of stimulating research and development in the fields of electricity and gas markets, has issued a Decision on the process of reviewing and evaluating applications for innovative and/or pioneering and/or standard RES stations for the production of electricity. The licensing of such technologies, whose total installed capacity does not exceed 200 kW, will be subject to an exception from license under certain conditions.

In 2016 the Council of Ministers, issued Regulations on the Promotion and Encouragement of the use of RES. These Regulations concern the determination of the amount of the consumption fee, the date of its enforcement and further include provision for reimbursement of the amount paid by the RES producers in 2015.

By its Decision, CERA decided to establish a procedure for exemption from obtaining an exception from licence for electricity generating installations using RES with total capacity from 1 kW to 20 kW

Currently, a plan for the promotion of photovoltaic systems and biomass / biogas systems is being prepared to promote photovoltaic (PV) systems and biomass / biogas systems by consumers to become electricity prosumers. The Plan includes three categories.

Category A refers solely to consumer's investments for the installation of small PV systems connected to the grid to meet their own needs by applying net-metering system. The maximum power of each PV system is 5.2 kW per unit.

Category B refers to PV plants and biomass / biogas systems implemented in commercial, industrial, public buildings, camps, schools, agricultural and animal farms, fishing enterprises, etc. for the purpose of generating electricity for their own use (self-production). The power of each system should range from 10 kW to 10 MW per electricity bill. The maximum power of each system cannot exceed 80% of the consumer's peak demand as recorded last year.

Category C concerns installations of autonomous PV Systems in a building / piece of land not connected to the EAC network. Every consumer has the right to apply. There is no limit to the maximum power of each system.

It is expected that the above plan will open for the public during June 2017.

Moreover, CERA, by Decision, decided that the base prices and the fuel adjustment coefficients for purchasing electricity generated from RES, which will include the fuel avoidance cost, the variable maintenance avoidance cost, the greenhouse gas rights avoidance cost of and the assistance to the Cyprus Organisation for Storage and Management of Oil Stocks (COSMOS) avoidance cost, should be submitted by Electricity Authority of Cyprus (EAC) to CERA for approval. In addition, the price for purchasing electricity generated from RES is under detailed study and will vary according to the results obtained.

Finally, by its Decision, CERA decided to determine the certified entities, the minimum time period and the procedure of the Wind Potential measurements in accordance with the current International Standards.

Statistics

Under the EU's NER300 program for demonstration projects for innovative renewable energy technologies funding that are mature enough for demonstration but not yet commercially implemented, two Cypriot electricity generation projects have been approved by the EU. The Council of Ministers has approved for each of these projects an individual support measure. In this context, CERA granted a licence for the construction and operation of a Solar Thermal power station with thermal energy storage consisting of small towers and mirrors, with total capacity of 50 MWe and a license for the construction of a Solar Thermal power station with Stirling machines with total capacity of 50.76 MWe with electricity storage.

In 2016, the installation of 1,090 Photovoltaic Systems, with a total installed capacity of 4.09 MW, has been completed using net metering method. As "Net Metering" for the purposes of the Scheme has been defined as the method for all consumers in the premises of which a small Photovoltaic System with capacity of up to 5 kW is installed.

Furthermore, during 2016, CERA received 14 applications for the installation of Photovoltaic Systems using the self-production method in commercial and industrial buildings with a total installed capacity of 0.46 MW. As "Self-production" for the purposes of the Scheme has been defined as the generation of electricity from units located in legally constructed premises located within the same block and/or adjacent to the premises of the commercial or industrial consumer. Energy is not injected into the grid but is used at all times for own consumption and not for economic exploitation through network use.

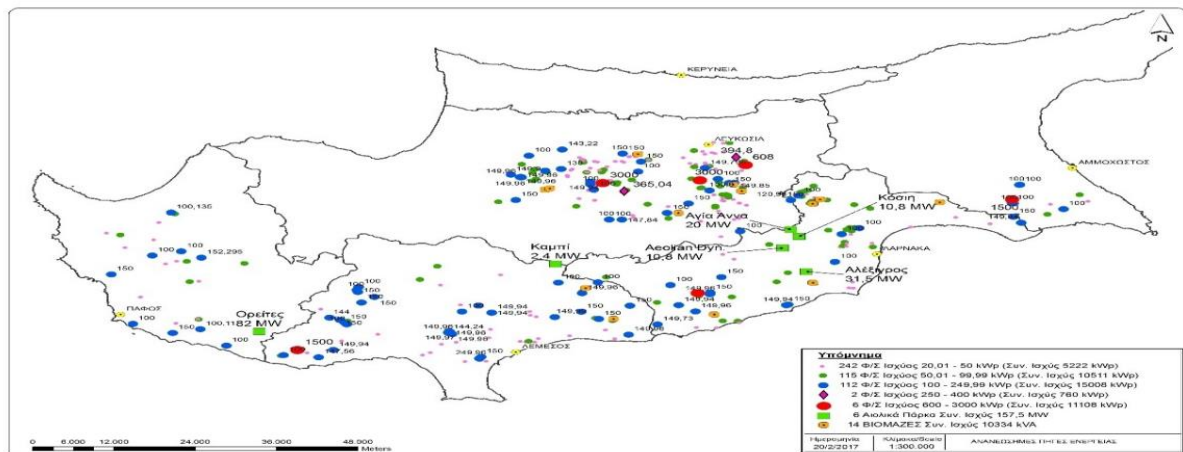


Diagram 1: Geographical distribution of licensed units generating electricity from RES with capacity greater than 20 KWp, up to 2016

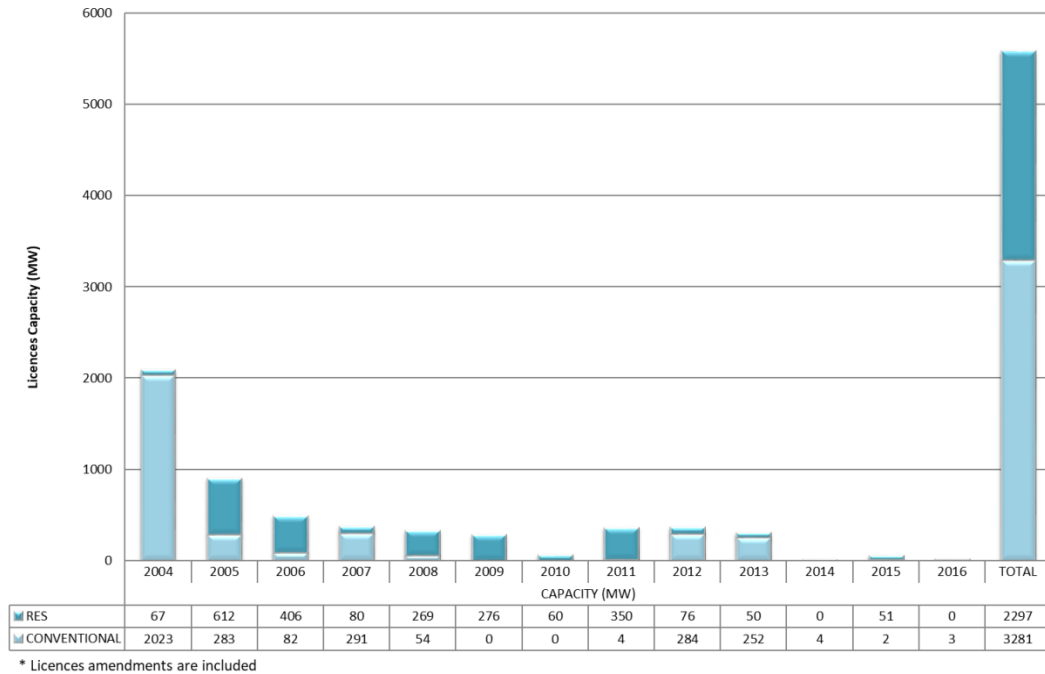


Diagram 2: Applications for electricity generation licences submitted from 2004 to 2016

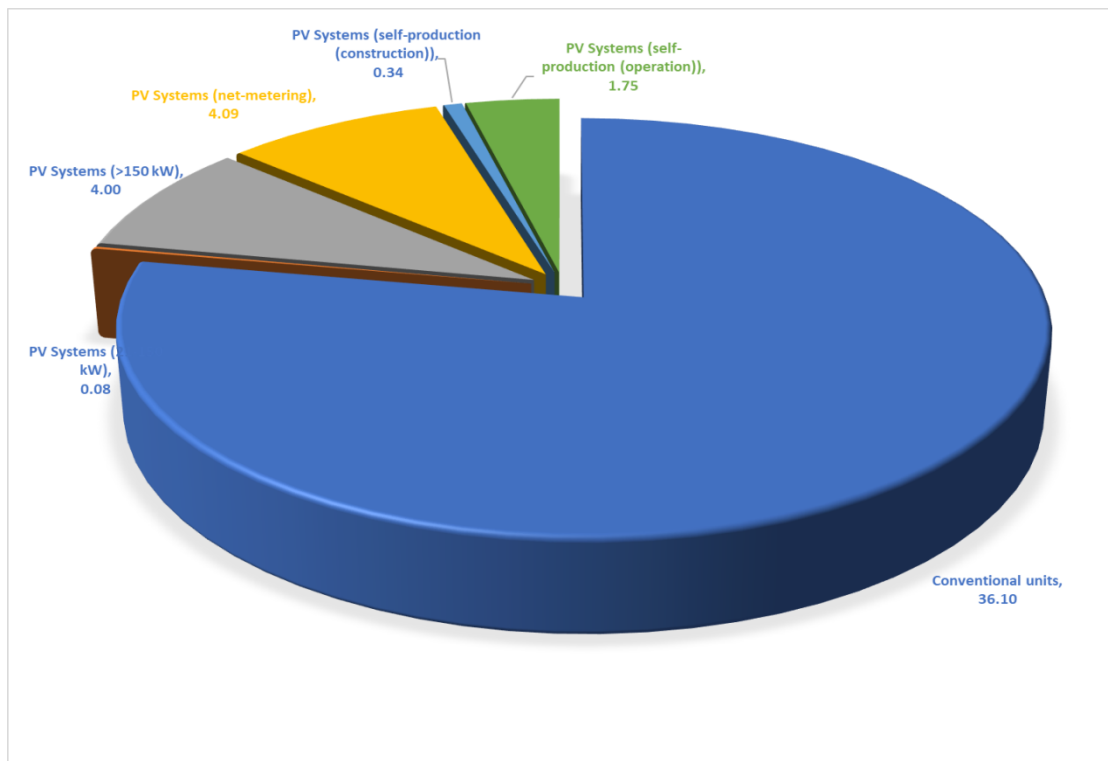


Diagram 3: Capacity (MW) of exceptions from licence submitted in 2016

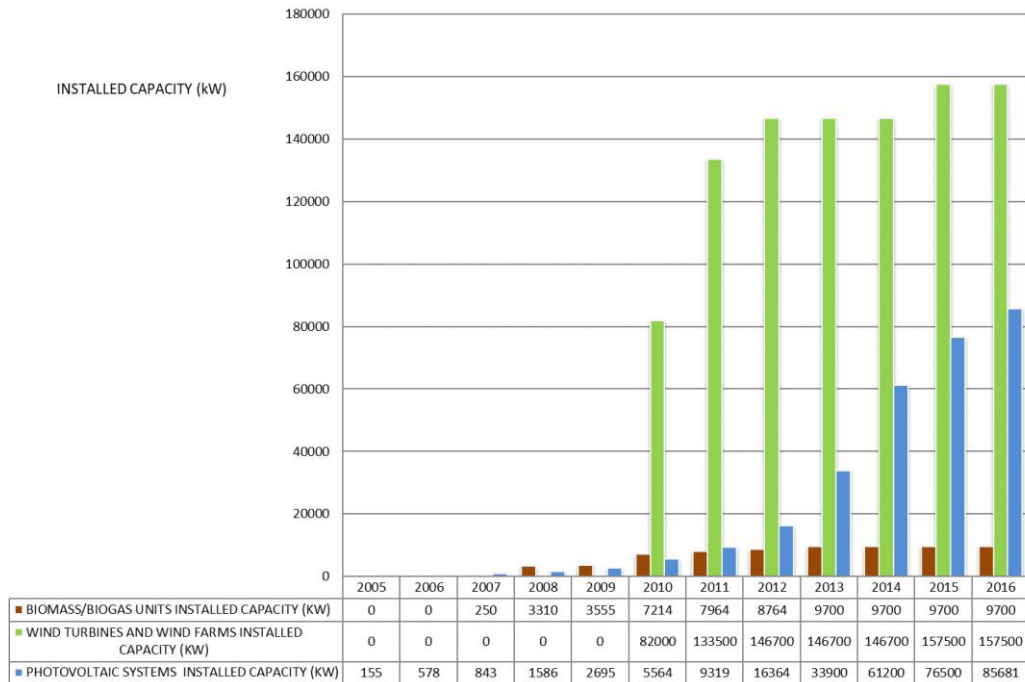


Diagram 4: Annual installed RES capacity (kW)

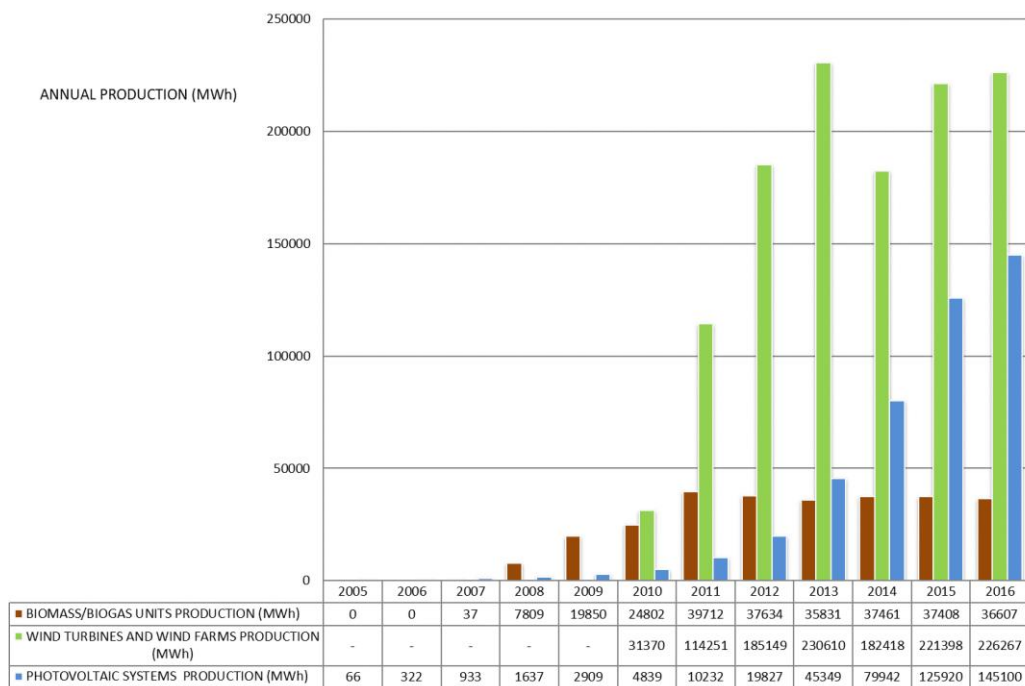


Diagram 5: Annual RES production (MWh)

3.2 GREECE 2016

By virtue of Law 4414/09.08.2016 the new legal framework regarding the RES operation & remuneration in Greece was laid down based on the EC Guidelines over the State Aid in the sectors of energy and environment (2014 – 2020). In this context, the existing FIT scheme is being replaced by a market oriented sliding Feed in Premium (sFiP) scheme with the exception of small RES plants (WF with P_{inst} up to 3MW and rest RES with up to 0,5MW) which hold the existing FiT structure.

The level of premium will be defined through tenders organized by the Regulator with predefined ceiling prices for the operational aid per technology and category of RES (Reference Price), administratively determined on the basis of the Levelized Cost of Electricity (LCOE) for a typical plant of each RES technology.

Furthermore, RES producers are obliged to submit production forecasts and in this respect they can be represented in the market mechanisms by aggregators. A temporary mechanism to improve forecasting via a management bonus/penalty was set in place until balancing responsibilities will be undertaken by RES producers (with plants above a certain size) when a balancing market is established.

Additionally, within 2016 a pilot tender for 40MW of mature PV plants was carried out by RAE, where the Initial Reference Price was set at 104 €/MWh for PVs below 1MW (category A, max 20% in total) and at 94€/MWh for PVs with capacity above 1 MW (Category B). Prerequisite for the participation in the tender was the existence of active Binding Interconnection Terms or Interconnection Contract and the maximum capacity per project was limited at 10MW. The pilot tender was very successful as significant reductions of prices have been achieved:

- Category A (PV ≤ 1 MW): Prices from 94,97€/MWh to 104€/MWh, in average: 98,78€/MWh
- Category B (PV > 1 MW): Prices from 79,97€/MWh to 88€/MWh, in average: 83,3€/MWh.

3.3 SPAIN 2016

Renewable energy produced in 2016 in Spain more electricity (37,78%) than other sources of conventional energy such as coal, gas or nuclear, representing that year more than 45% of the total installed capacity.

In the whole of the renewable, most important technology is wind, with 23.049 MW capacity installed at the end of 2016, followed by 17.025 MW hydraulics and solar, with 6.971 MW.

From the point of view of the generation, wind power represented 47.7% of all renewable production, followed by the hydraulic with 35.8% and solar, with 13.3% (8.2% photovoltaic and thermal 5,1%).

With respect to the new capacity, and in order to meet the targets set for 2020, have been held between 2016 and 2017 three auctions of RES:

- January 2016: Auction of 500 MW of wind power and 200 MW of biomass.- Covered demand winning facilities that will be in service in the year 2019 and that will receive, in the first six-year regulatory period, only the price of the spot market.

- May 2017: Technologies of 3.000 MW, neutral auction.-
Result: 2.980 MW wind, 19 MW other renewables and 1 MW photovoltaic, which will go into service in 2020, and which will receive, in the first six-year regulatory period, only the price of the spot market.
- July 2017: Auction neutral technologies of 5.037 MW.-
Result: 3.909 MW photovoltaic and 1.128 MW wind farm, which will go into service in 2020, and which will receive, in the first six-year regulatory period, only the price of the spot market.

3.4 ITALY 2016⁴

Over the last 25 years Italy has developed various support mechanisms for the implementation of energy production from renewable sources: administered rates, green certificates, auctions at downward. In 2016, thanks to the plurality of tools in the field, have been stimulated about 66 TWh of energy electricity from renewable sources (beyond 60% of the energy produced by RES). The diffusion of technologies and the reduction in generation costs have been accompanied by a lower level of support mechanisms. The expectation for the future is that renewables can continue to develop without the use of supporting tools.

As a result of the new installations from renewable sources and the general decline in total gross production and final consumption of electricity, the share of renewable sources on gross production and final consumption of electricity is significant. In details:

- Renewables affected about 109 TWh in 2015, equal to 38.5% of the national total production, compared with around 18% in 2004. This production was significantly reduced in 2015 compared to 2014 (-12 TWh); and further reduction was recorded in 2016.
- the incidence of non-programmable sources and, in particular, of solar and wind is significant, more than 23% of the total installed capacity in 2015 compared with just over 1% in 2004; more than 13% of the total product in 2015 compared to just less than 1% in 2004.

At the same time, renewable sources are mostly used through small and medium plants size associated with distribution networks (distributed generation). In 2015 the plants of power up to 10 MW, not only powered by renewable sources, represented over 21% of installed power: about 16 percentage points more than in 2004. Their weight in terms of production has gone from 4.7% in 2004 to 18.1% in 2015.

Regarding the connections to the power grids through medium and low voltage, in 2016 it has been recorded, compared to the previous year, a slightly increase both from the numerical point of view (+ 1,713 connection requests) and in terms of input of power injections required (+ 297 MW); in relation to the connections of the production in high and very high voltage electrical networks, in 2016 compared to the previous year, it has been recorded an increase of the number connections required +8 and in terms of injections requested + 479MW.

Concerning the prices, it is confirmed what observed in the previous years, presence of high prices during the evening (17-21h) when the RES production decreases.

⁴ AEEGSI Report 464/2017/EFR 22 June 2017

AEEGSI activity is concentrated on the regulation of the RES plants (not programmable sources and distributed generation) in order to let them contribute to the power network operation.

In 2016, the cost for the incentivization of RES has been of 13,6 billion euro, covered by a dedicated component of the bill (A3) due to the abolishment of the green certificates scheme.

Among the main regulatory innovations emerging within the national legislation of the 2016 there is the Decree of the Ministry of Economic Development of June 23, 2016 on incentivization of electricity produced from renewable sources other than photovoltaic, which came into force on 30 June and updated the mechanisms introduced by D.M. July 6, 2012.

3.5 ISRAEL 2016

Israel's renewable energy scheme was shaped by three government decisions - determining (2009), later ratifying (2011,2014), a target of 10% of RES generation by 2020. In the Paris convention – Israel took a further target of 17% RES generation by 2030. In 2016 Israel's RES share of generation was 2.6% - almost entirely by solar PV (876 MW installed).

As Israel lacks natural sources to produce hydropower, and Onshore Wind potential is limited (a 730 MW quota for wind for ~100\$/MWh FiT is likely to be installed later than 2020 due to statutory and environmental difficulties faced by the projects) a total amount of ~3.6 GW installed capacity of solar (3.3 GW PV and 0.3 GW CSP) is needed for 2020 in order to obtain the above mentioned targets.

As ~0.9.GW of PV is already installed and 0.5 GW of PV is under construction - an amount of for further 1.9 GW of PV is to be allocated for projects and systems in all sizes in the next 2-3 years – which would nearly triple the existing installed capacity.

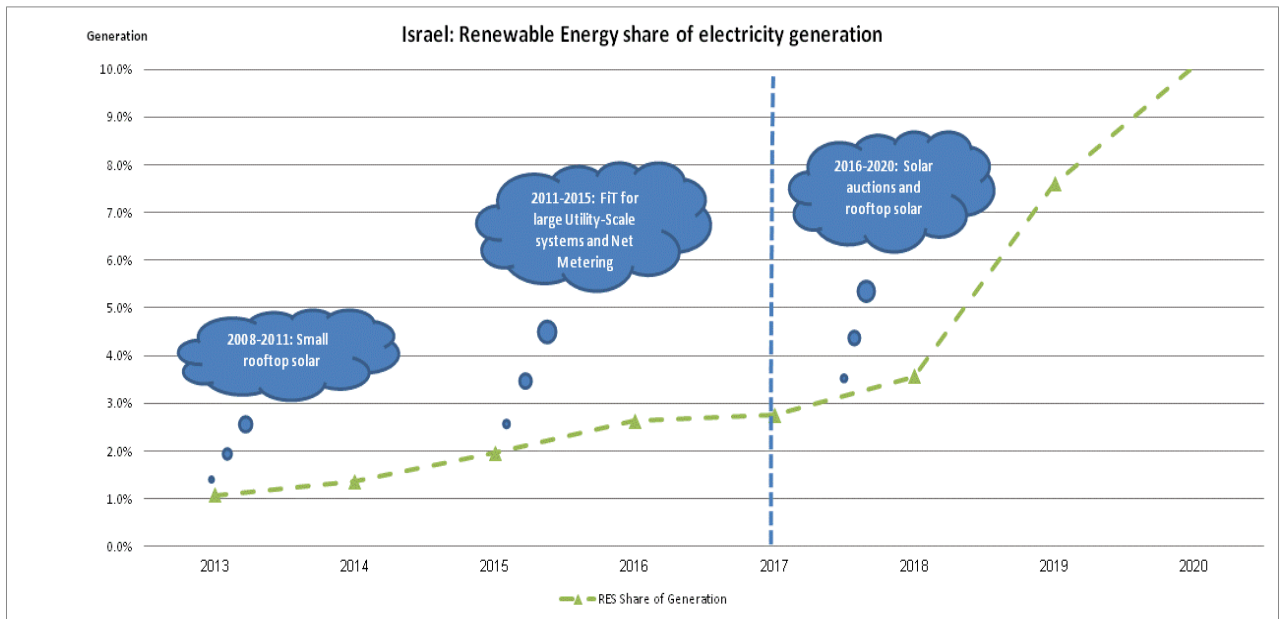
In order to reach these challenging targets, the Israeli regulator decided (December 2015) on a series of auctions (1,000 MW in total) in 2017-2018, and published an additional proposal for a further small rooftop solar incentive scheme. The first of six auctions was completed in Mars 2016, and 235 MW were allocated for 36 projects, for the winning bid of ~55\$/MWh for 23 years.

Additional steps were taken by the regulator in the recent years to remove obstacles from the development of solar projects:

- An agreement with the Israeli Land Authority (owning most of the land available for Utility Scale project development) - for a fixed land-levy for solar projects.
- An exemption from Income Tax and VAT for small rooftop solar.
- An exemption from Betterment Levy and Municipal Rate for small rooftop solar.
- A simplification of grid connection standards for small rooftop solar.

A proposal to exempt all solar rooftops smaller than 630 KW from the need to have a construction permit is in process of approval.

To summarize – here is the existing, and projected development of RES generation in Israel, by 2020, according to government plans:



3.6 EGYPT 2016

Egypt Renewable Energy target:

- 20% of electricity from RES by 2022
- 30-40% by 2035
- 65% by 2050

In order to incentivize the private sector to develop RE projects and to reach its ambitious targets, the Egyptian Government has developed the following implementation schemes:

- Competitive bidding, divided into:
 - State-owned power plants, developed by New and Renewable Energy Authority (NREA) through EPC model since 1999;
 - Private power plants through a Build Own and Operate (BOO) scheme.

Feed-in-tariff (FiT) system, by setting a fixed price for RE energy producers (2phases), Two Prime Ministerial Decrees Nos. 1947/2014 and 2532/2016 established the offtake tariffs applicable to the first and second rounds or 'regulatory periods' of the Egyptian solar and wind FIT programme respectively. The FIT programme's target is to provide price certainty and long-term sale of electricity contracts that help finance renewable energy investments. Large-capacity solar projects (between 20MW and 50MW) paid a tariff of US\$14.34/kWh, currently reduced to US\$8.40/kWh, while wind projects of the same capacity paid a tariff between US\$4.60/kWh and US\$11.48/kWh, currently reduced to a tariff between US\$4/kWh and US\$7.96/kWh depending on the maximum operating hours of the wind plant. The 1st stage helped in Increasing the creditability of the RE market in Egypt, and Mitigating the financing risk and the administrative challenge, while The tariffs for small-scale household and commercial projects in the second stage have been increased, reflecting the impact of the depreciation of the Egyptian pound over the past two years.

- Merchant Mechanism IPP since 2012.
- Net Metering (by EgyptERA's periodic book no. 1 yr 2013 and its updates; Book1 March 2017 and book3 august 2017. The rules included possibility of net metering on a monthly bases and payment is based on consumption of bought net power. The electricity metering systems were supplied by the relevant electricity distribution company; however the subscriber bears its cost.

For each scheme, specific targets have been set in order to plan their respective contribution to RE market development in the Country. Furthermore, the new Investment Law No. 72/2017 grants a special investment incentive to projects generating renewable energy or depending on it, consisting of a deduction of 30 per cent of the net taxable profits for the first seven years of the life of the projects, subject to certain conditions to be set out in the Executive Regulations.

Status of Energy Conservation Promotion & Energy Efficiency:

The Egyptian government has launched several initiatives to encouraging technological solutions and applications for rationalizing energy consumption and optimizing exploitation of available energy resources and reducing the waste. The Egyptian energy policy 2035 embeds energy efficiency inside the general energy framework and in the entire economic policy, so as to be able to capture its multiple benefits.

In such way energy efficiency contributes to reach a stable energy security. The economic development gradually becomes decoupled from the energy increase. Transforming the economy allows Egypt to keep a leading role in the MENA region, exporting there energy efficiency technologies. Such success will allow Egypt being the bridge between Europe and the entire area, leading them in the transition towards a low carbon economy.

Methodology to reach 18% Savings:



CHP Legislations in Electricity Law no. 87/yr 2015. The law has two articles concerning this issue:

- Article Forty Five

Network Operator or Electricity Distribution Licensees shall purchase or pay for the surplus electric power deriving from the combined cycle electricity generation units and the other waste heat recovery from generation units with capacity of less than 50 MW, provided that such transactions shall be conducted under conditions and at prices set by EgyptERA.

- Article Forty Six

Network Operator and Electricity Distribution Licensee shall have from the combined cycle electricity generation units and the other waste heat recovery from generation units connected with their networks, provided that they shall bear the costs required for their networks expansion while the producer shall bear the networks connection costs.

3.7 PORTUGAL 2016

Renewables account for a substantial part of the Portuguese system installed capacity. In 2016, renewable capacity accounted for 67% of the Portuguese installed capacity. This capacity consists mainly of hydro (6,9 GW or 53%) and wind power plants (5 GW or 39%) while also including biomass, CHP and photovoltaic plants. It is expected that renewables will continue to increase both in size and share of the Portuguese system.

Renewables are also responsible for covering a large portion of the Portuguese demand. In 2016, renewables fulfilled 63% (31 TWh) of the Portuguese electricity demand. Hydro plants were responsible for 50% (15 TWh) of the renewable production and wind plants were responsible for 39% (12 TWh) of the renewable production. The remaining renewable production came from thermal plants (9% or 3 TWh) and photovoltaic plants (2% or 0,8 TWh).

Renewable production in 2016 (31 TWh) was significantly higher than in 2015 (23 TWh), mainly as a result of an improved hydro capability factor, 1,33 vs 0,74. Portugal provides support mechanisms for renewables operating in special regime, including technologies such as small hydro, wind or photovoltaic plants. These support mechanisms result in additional costs in relation to wholesale market prices. These costs are covered and are a responsibility of all electricity consumers, but are mainly supported by residential households. In 2016, these costs were amounted to €1.026 million. The average price for special regime electricity production in 2016 was 98 €/MWh. Taking into account the different supported technologies, the average prices paid in 2016 were significantly different. Considering main technologies such as small hydro, wind, photovoltaic, biomass or renewable CHP, the average prices in 2016 were, respectively, 95€/MWh, 93 €/MWh, 296 €/MWh, 118 €/MWh and 95 €/MWh.

3.8 JORDAN 2016

Legislation

1. Issuance of new regulations for the sale of electrical power generated from renewable energy source systems (NET measurement) with the elimination of the limit the highest total renewable energy source systems attached to the medium-and low-pressure networks for distribution companies, taking into account The technical status of the installation of the electrical grid, which followed the necessary review of the instructions issued in 2012.
2. Issuance of a mechanism for calculating the rate of purchasing electric power from renewable energy sources (benchmark).
3. Issuance of licensing instructions for persons engaged in the design, supply, installation, operation, maintenance, inspection and operation of renewable energy source systems as of the date of 1/9/2016.
4. Preparation of a draft amendment to the regulations governing the sale and transit of electrical energy generated by renewable energy sources systems.
5. Issuing a standard license for the design, supply, installation, operation, maintenance and inspection of renewable energy source systems.
6. Issuance of the Standard model for the Connection Agreement for wind energy projects for the first phase of direct performances, dated 3/11/2016.
7. Issuance of a license form to carry out the activities of supplying, installing, operating, maintaining and inspecting renewable energy sources systems on 14/12/2016.

8. Preparation of the draft proposed instructions for the stimulus to the systems of renewable energy sources with Jordanian origin in the direct bidding system and the system of net electric power measurement.
9. An interpretative decision is made to article 3 of the regulations governing the sale of electrical energy generated from renewable energy sources systems so that that the Subscriber intends to install and connect to the power grid by the subscriber itself as needed according to the technical parameters of the electrical grid, and compensate for the surplus realized by the electricity company concerned by not more than 10% of the total energy consumed by him during the year.
10. A decision not to be reluctant to include in the development zone the provision of leasing services to solar producers on the condition that licences are obtained necessary to set up electricity production projects from solar energy in accordance with the legislation in force, and to obtain the approval of the relevant electricity companies to link to The network.
11. An organizational decision to apply the provisions of the Guide to the net measurement of electricity distribution companies to the national electricity Company and as appropriate.
12. Issuing an organizational decision to calculate the excess energy generated by the renewable energy Project of the Oasis project for the electricity distribution company.

Licenses and permits

1. 54 permits for amendments to renewable energy source systems.
2. The issuance of 28 organizational decisions to work in the renewable energy sector.
3. A decision that a student must obtain a license for the supply, installation and operation of renewable energy systems must have engineers accredited to the Engineers ' union, and that the design plans contained in article 8/A/1 of the instructions are certified by an engineering office, in addition to obtaining certification from The engineers ' union for projects with a capacity of more than 20 kw. The licensed person in the area of the installation of renewable energy source systems is a disaggregated contractor and according to the disclosures issued by the Ministry of Public Works and housing.
4. A policy of exempting companies and eligible persons in the case of direct offers under the Renewable Energy Act and the rationalization of energy from access to licence in accordance with the provisions of the licensing instructions for persons engaged in the design, supply, installation, operation, maintenance and inspection of renewable energy sources systems issued by The Commission as having the technical qualification and financial performance and have the competence to carry out their work.
5. Approval of the connection Agreement for the Wind/Noise energy project and the yearning Approval of the connection Agreement for the Wind/Storm energy project and the signing of the relevant items of the authority from the direct agreement of the Energy purchase Agreement relating to the wind energy project in the FVC region.
6. Approval of the direct convention of the Energy Purchase Agreement and the Convention on transport network connectivity for solar energy projects phase II for direct presentations and approval of the substance of articles (2.1) and (13) of the Convention relating to the Commission.

Control of electricity generating companies from renewable energy

1. Control and inspection procedures for 12 electric power generation companies and follow-up on the progress of work of companies to complete their stations under construction.
2. The authority continues to follow up licensed companies to generate electricity from renewable energy systems under the conditions set out in the licence.

3. Control of electricity distribution companies
4. Despite the presence of staff of the Authority in the electricity distribution companies to verify the performance of the companies in dealing with renewable energy applications, the monthly basis for field disclosures on electricity distribution companies to ensure that the procedures for accepting applications for the interconnection of renewable energy systems are in accordance with the legislation Headquarters.



This publication was produced with the financial support of the European Union. Its contents are the sole responsibility of MEDREG and do not necessarily reflect the views of the European Union.