# Italy's Fifth Progress Report under Directive 2009/28/EC

**December 2019**

## CONTENTS

## 1. Sectoral and overall shares and actual consumption of energy from renewable sources (Article 22(1) (a) of Directive 2009/28/EC).

***Table 1:*** **The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources[1]**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| RES-H&C[2] (%) | 18.09% | 18.91% | 19.25% | 18.89% | 20.08% | 19.23% |
| RES-E[3] (%) | 31.30% | 33.42% | 33.46% | 34.01% | 34.10% | 33.93% |
| RES-T[4] (%) | 5.41% | 5.02% | 6.50% | 7.41% | 6.48% | 7.66% |
| **Overall RES share[5] (%)** | **16.74%** | **17.08%** | **17.53%** | **17.41%** | **18.27%** | **17.78%** |
| Of which from cooperation mechanism[6] (%) | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| Surplus for cooperation mechanism (%)[7] | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |

***Table 1a:*** **Calculation table for the renewable energy contribution of each sector to final energy consumption (toe)[8]**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| (A) Gross final consumption of RES for heating and cooling | 10,603 | 9,934 | 10,687 | 10,538 | 11,211 | 10,673 |
| (B) Gross final consumption of electricity from RES | 8,665 | 9,001 | 9,142 | 9,183 | 9,401 | 9,345 |
| (C) Gross final consumption of energy from RES in transport | 1,468 | 1,310 | 1,456 | 1,360 | 1,388 | 1,587 |
| **(D) Gross total RES consumption[9]** | **20,737** | **20,245** | **21,286** | **21,081** | **22,000** | **21,605** |
| (E) Transfer of RES to other Member States | 0 | 0 | 0 | 0 | 0 | 0 |
| (F) Transfer of RES from other Member States and 3rd countries | 0 | 0 | 0 | 0 | 0 | 0 |
| **(G) RES consumption adjusted for target (D)-(E)+(F)** | **20,737** | **20,245** | **21,286** | **21,081** | **22,000** | **21,605** |

*Note:* In the table, the consumption of electricity in transport is attributed to component C.

[1]Facilitates comparison with Table 3 and Table 4a of the NREAPs.
[2]Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Articles 5(1)b) and 5(4) of Directive 2009/28/EC) divided by gross final consumption of energy for heating and cooling. The same methodology as in Table 3 of NREAPs applies.
[3]Share of renewable energy sources (RES) in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Articles 5(1)a) and 5(3) of Directive 2009/28/EC), divided by total gross final consumption of electricity. The same methodology as in Table 3 of NREAPs applies.
[4] Share of renewable energy in transport (Article 3(4) of Directive 2009/28/EC: final energy from renewable sources consumed in transport divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels and 4) electricity.
[5]Share of renewable energy in gross final energy consumption. The same methodology as in Table 3 of NREAPs applies.
[6]In percentage point of overall RES share.
[7]In percentage point of overall RES share.
[8]Facilitates comparison with Table 4a of the NREAPs.
[9] According to Article 5(1) of Directive 2009/28/EC, gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

***Table 1.b*: Total actual contribution (installed capacity, gross electricity generation) from each renewable energy technology in Italy to meet the binding 2020 targets and indicative interim trajectory for the shares of energy from renewable resources in electricity[10]**

*Note:* For easier reading of the data, Table 1.b has been divided into two parts. The first, on this page, concerns installed capacity (MW); the second, on the next page, concerns gross electricity generation (GWh).

**INSTALLED CAPACITY (net output in MW)**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| **Hydropower[11]:** | **22,009** | **22,098** | **22,220** | **22,298** | **22,426** | **22,499** |
| *non-pumped* | 14,454 | 14,506 | 14,628 | 14,991 | 15,109 | 15,182 |
| *pumped* | 3,957 | 3,982 | 3,982 | 3,982 | 3,940 | 3,940 |
| *mixed* | 3,598 | 3,610 | 3,610 | 3,325 | 3,377 | 3,377 |
| **Geothermal** | **729** | **768** | **768** | **767** | **767** | **767** |
| **Solar:** | **18,185** | **18,594** | **18,901** | **19,283** | **19,682** | **20,108** |
| *photovoltaic* | 18,185 | 18,594 | 18,901 | 19,283 | 19,682 | 20,108 |
| *concentrated solar power* | - | - | - | - | - | - |
| **Tide, wave, ocean** | **-** | **-** | **-** | **-** | **-** | **-** |
| **Wind:** | **8,542** | **8,683** | **9,137** | **9,384** | **9,737** | **10,230** |
| *onshore* | 8,542 | 8,683 | 9,137 | 9,384 | 9,737 | 10,230 |
| *offshore* | - | - | - | - | - | - |
| **Biomass:** | **3,762** | **3,772** | **3,804** | **3,871** | **3,881** | **3,926** |
| *solid biomass* | 606 | 620 | 616 | 685 | 684 | 733 |
| *biogas* | 1,317 | 1,336 | 1,336 | 1,352 | 1,372 | 1,375 |
| *bioliquids* | 1,003 | 990 | 1,000 | 993 | 987 | 971 |
| *municipal waste* | 836 | 826 | 852 | 841 | 839 | 846 |
| **TOTAL** | **53,227** | **53,915** | **54,830** | **55,603** | **56,493** | **57,529** |
| of which in CHP | 1,807 | 1,870 | 2,018 | 1,962 | 1,986 | 2,042 |

*Table 1.b continues on the next page*

[10] Facilitates comparison with Table 10a of the NREAPs.

[11] Starting from 2017, Eurostat has changed the classification of hydropower plants and their output. Accordingly, this table shows the latest classification, which is not comparable with the data of the previous progress reports.

*Table 1.b continued from the previous page*

**GROSS ELECTRICITY GENERATION (GWh)**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| **Normalised hydropower[12]:** | **44,984** | **45,765** | **45,933** | **46,191** | **46,047** | **46,800** |
| *non-pumped (normalised)* | 42,790 | 43,508 | 43,674 | 44,142 | 43,980 | 44,679 |
| *pumped (not normalised)* | 1,898 | 1,711 | 1,432 | 1,825 | 1,826 | 1,716 |
| *mixed (normalised)* | 2,195 | 2,257 | 2,259 | 2,049 | 2,067 | 2,121 |
| **Geothermal:** | **5,659** | **5,916** | **6,185** | **6,289** | **6,201** | **6,105** |
| **Solar:** | **21,589** | **22,306** | **22,942** | **22,104** | **24,378** | **22,654** |
| *photovoltaic* | 21,589 | 22,306 | 22,942 | 22,104 | 24,378 | 22,654 |
| *concentrated solar power* | - | - | - | - | - | - |
| **Tide, wave, ocean** | - | - | - | - | - | - |
| **Wind (normalised):** | **14,120** | **14,887** | **15,298** | **16,519** | **17,198** | **17,923** |
| *onshore (not normalised)* | 14,897 | 15,178 | 14,844 | 17,689 | 17,742 | 17,716 |
| *offshore (not normalised)* | - | - | - | - | - | - |
| **Biomass[13]:** | **16,960** | **18,681** | **19,366** | **19,425** | **19,320** | **19,129** |
| *solid biomass* | 3,679 | 3,823 | 3,947 | 4,125 | 4,232 | 4,191 |
| *biogas* | 7,448 | 8,198 | 8,212 | 8,259 | 8,316 | 8,350 |
| *sustainable bioliquids* | 3,628 | 4,290 | 4,865 | 4,627 | 4,389 | 4,217 |
| *municipal waste (renewable)* | 2,206 | 2,370 | 2,343 | 2,415 | 2,384 | 2,371 |
| **TOTAL** | **103,312** | **107,556** | **109,725** | **110,528** | **113,143** | **112,611** |
| of which in CHP | 7,471 | 8,823 | 9,640 | 9,694 | 9,978 | 10,129 |

**Note 1**: As from the second Progress Report, the net output capacity of the installations is given, instead of gross capacity (as stated in the first report and in the NAP); moreover, from the second report onwards, the entire output of pumped hydropower stations is considered, while in the first report only the virtual non-pumped share was considered.

**Note 2**: By subtracting from the total electricity produced from renewable energy sources in each year the share used in transport, the value of the gross final consumption of electricity from renewable sources is obtained, shown in line B of Table 1a.

[12] Starting from 2017, Eurostat has changed the classification of hydropower plants and their output. Accordingly, this table shows the latest classification, which is not comparable with the data of the previous progress reports.

[13] This includes only the bioliquids complying with the applicable sustainability criteria under Article 5(1), last subparagraph of Directive 2009/28/EC.

*Table 1c:* **Total actual contribution (final energy consumption[14]) from each renewable energy technology in Italy to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in heating and cooling (ktoe)[15]**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| **Geothermal** (excluding low temperature geothermal heat in heat pump applications) | **135** | **130** | **133** | **144** | **150** | **149** |
| **Solar** | **168** | **180** | **190** | **200** | **209** | **219** |
| **Biomass[16]:** | **7,781** | **7,045** | **7,780** | **7,586** | **8,202** | **7,709** |
| *solid biomass* | 7,431 | 6,646 | 7,380 | 7,175 | 7,764 | 7,264 |
| *biogas* | 246 | 283 | 250 | 252 | 272 | 270 |
| *sustainable bioliquids* | 21 | 31 | 42 | 42 | 43 | 49 |
| *municipal waste (renewable)* | 83 | 85 | 108 | 117 | 124 | 127 |
| **Renewable energy from heat pumps:** | **2,519** | **2,580** | **2,584** | **2,609** | **2,650** | **2,596** |
| *of which aerothermal* | 2,447 | 2,501 | 2,500 | 2,523 | 2,563 | 2,507 |
| *of which geothermal* | 65 | 71 | 76 | 77 | 78 | 80 |
| *of which hydrothermal* | 7 | 8 | 8 | 9 | 9 | 9 |
| **TOTAL** | **10,603** | **9,934** | **10,687** | **10,538** | **11,211** | **10,673** |
| *Of which DH[17]* | 208 | 191 | 230 | 241 | 239 | 249 |
| *Of which biomass in households[18]* | 6,633 | 5,676 | 6,393 | 6,173 | 6,757 | 6,252 |

[14]Direct use and district heating (DH) as defined in Article 5(4) of Directive 2009/28/EC.
[15]Facilitates comparison with Table 11 of the NREAPs.
[16]This includes only the bioliquids complying with the applicable sustainability criteria under Article 5(1), last subparagraph of Directive 2009/28/EC.
[17]District heating and / or cooling from total renewable heating and cooling consumption (RES- DH).
[18]From the total renewable heating and cooling consumption.

*Table 1d:* **Total actual contribution from each renewable energy technology in Italy to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector (ktoe)[19,20]**

| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| - Bioethanol | 1.5 | 0.9 | 2.4 | 0.4 | 0.0 | 0.8 |
| - Biodiesel (FAME) | 1,164.6 | 997.1 | 1,011.3 | 931.2 | 952.8 | 1,142.6 |
| - Hydrotreated vegetable oil (HVO)* | 11.5 | 58.0 | 119.5 | 75.3 | 74.5 | 74.5 |
| - Biomethane | - | - | - | - | - | - |
| - Fischer-Tropsch diesel | - | - | 11.0 | - | - | - |
| - Bio-ETBE | 70.9 | 7.5 | 19.7 | 31.9 | 33.0 | 31.7 |
| - Bio-MTBE | - | - | - | - | - | - |
| - Bio-DME | - | - | - | - | - | - |
| - Bio-TAEE | - | - | - | - | - | - |
| - Biobutanol | - | - | - | - | - | - |
| - Biomethanol | - | - | - | - | - | - |
| - Pure vegetable oil | 1.6 | - | - | - | - | - |
| **Total sustainable biofuels** | **1,250.2** | **1,063.5** | **1,164.0** | **1,038.9** | **1,060.3** | **1,249.6** |
| Of which | | | | | | |
| Sustainable biofuels produced from feedstock listed in Annex IX Part A | 7.8 | 13.7 | 12.6 | 8.9 | 6.8 | 64.9 |
| Other sustainable biofuels eligible for the target set out in Article 3(4)e | - | - | - | - | - | - |
| Sustainable biofuels produced from feedstock listed in Annex IX Part B | 94.2 | 115.0 | 286.4 | 386.9 | 350.3 | 519.9 |
| Sustainable biofuels for which the contribution towards the renewable energy target is limited according to Article 3(4)d | 1,135.6 | 877.7 | 712.7 | 264.1 | 186.6 | 176.7 |
| **Other double counted biofuels not included in Annex IX | 12.6 | 57.1 | 152.2 | 378.4 | - | - |
| Sustainable biofuels not subject to the restrictions set out in Article 3(4) | - | - | - | 0.5 | 516.6 | 488.1 |
| Imported from third countries | 862.5 | 649.9 | 722.2 | 723.3 | 769.0 | 840.2 |
| - Hydrogen from renewables | - | - | - | - | - | - |
| - Renewable electricity | 218.2 | 246.7 | 292.2 | 320.7 | 327.5 | 337.5 |
| Of which | | | | | | |
| consumed in road transport | 1.3 | 1.6 | 1.9 | 2.0 | 2.4 | 2.9 |
| consumed in rail transport | 101.9 | 117.2 | 137.4 | 156.5 | 158.7 | 166.7 |
| consumed in other transport sectors | 114.9 | 127.9 | 152.9 | 162.3 | 166.4 | 167.9 |

(*) Includes the biopropane co-produced by the HVO production process.
(**) Under the national transposition measure for the ILUC Directive (Legislative Decree No 51 of 21 March 2017), biofuels produced from several by-products not included in Annex IX are eligible for double counting up until 30 June 2018. However, for the purpose of monitoring the target set out in Article 3(4) of Directive 2009/28/EC, those biofuels are accounted for as single-counted biofuels from the year 2017 onwards.

[19] For biofuels, only those compliant with the sustainability criteria set out in Article 5(1) last subparagraph of Directive 2009/28/EC are taken into account. In the annual questionnaires sent to Eurostat for statistical purposes, HVO and Fischer-Tropsch diesel are placed under 'biodiesel' (taking their energy content into account), since the questionnaires have no specific category for such diesel fuels.

[20] Facilitates comparison with Table 12 of the NREAPs.

## 2. Measures taken in the preceding two years and/or planned at national level to promote the growth of energy from renewable energy sources (RES) taking into account the indicative trajectory for achieving the national RES targets as outlined in the National Renewable Energy Action Plan (Article 22(1)(a) of Directive 2009/28/EC)

Directive 2009/28/EC was transposed by Legislative Decree No 28/2011, which introduced both immediately applicable provisions and provisions to be implemented by subsequent ministerial decrees, which have since been issued.
The main implemented or planned measures, consistent with the guidelines of the National Action Plan, are set out below.

### *Table 2:* Overview of all policies and measures

| Name and reference of the measure | Type of measure* | Expected result** | Targeted group and or activity*** | Existing or planned**** | Start and end dates of the measure |
|---|---|---|---|---|---|
| **MEASURES IN THE HEATING, COOLING AND ENERGY EFFICIENCY SECTORS** | | | | | |
| Energy Efficiency Certificates (White Certificates or EECs)<br>Articles 29 and 30 of Legislative Decree 28/2011 and Ministerial Decree 28/12/2012, Legislative Decree 102/2014, Ministerial Decree 11/01/2017; Ministerial Decree 10/05/2018) | Regulatory - Financial | The Ministerial Decree of 11 January 2017 has set the following annual energy-saving targets for the EEC scheme:<br>• 7.14 Mtoe of primary energy in 2017;<br>• 8.32 Mtoe of primary energy in 2018;<br>• 9.71 Mtoe of primary energy in 2019;<br>• 11.19 Mtoe of primary energy in 2020. | Obligated parties:<br>• Electricity distributors having more than 50,000 final customers;<br>• Natural gas distributors having more than 50,000 final customers.<br><br>Voluntary scheme participants:<br>• Companies under the control of, or controlling, obligated parties.<br>• Non-obligated electricity and natural gas distributors.<br>• Public and private entities holding UNI CEI 11352 certification<br>• Public and | *Implemented measure, set out in the NAP.*<br><br>The facility, introduced in 2004, has been updated, inter alia, by Legislative Decree 28/2011, Ministerial Decree 28/12/2012, Legislative Decree 102/2014, Ministerial Decree 11/01/2017 and Ministerial Decree 10/05/2018.<br><br>Below are the main new elements introduced by the Ministerial Decree of 10/05/2018:<br>• projects involving the use of renewable energy sources for non-electrical uses shall be eligible only with regard to their capacity to increase energy efficiency and save non-renewable energy;<br>• The concept of baseline consumption, which is used to determine the additional savings of a project, has been redefined as being equal to the value of consumption before implementation of the energy efficiency project. According to the definition contained in the Ministerial Decree of 11 January 2017, instead, baseline consumption was the lower of consumption before implementation of the energy efficiency project and the reference consumption. The Ministerial Decree specifies that in the case of new installations, building or sites however named, for which no energy consumption values prior to the project are available, the baseline consumption is equal to the reference consumption.<br>• The pricing incentive granted to the obligated parties, to cover a share of the costs incurred to implement projects (or to purchase White Certificates), cannot exceed the value of €250 per certificate. This provision applies to the obligation sessions after 1 June 2018; at the end of November 2019, the Regional Administrative Court of Milan ruled that the €250 cap on the pricing incentive for EECs payable to distributors was unlawful.<br>• Upon the obligated parties' request, the Energy Services Operator (*Gestore dei Servizi Energetici* - GSE) may issue them with White Certificates not relating to the implementation of energy efficiency projects, at a unit value equal to €260 minus the | 2005 – n/a |

| | | | | | |
|---|---|---|---|---|---|
| | | | private entities that have appointed a UNI CEI 11339-certified energy management expert<br>• Public and private entities having an ISO 50001-certified energy management system | value of the final pricing incentive for the obligation year. In any case, this amount may not exceed €15. These certificates cannot be transferred by the obligated party who receives them; they are marked as being of a specific type, are not entitled to the pricing incentive and can be acquired only if the obligated party already holds certificates covering 30% of the obligation;<br>• obligated parties who acquire White Certificates from the GSE not deriving from the implementation of energy efficiency projects, may, under certain conditions, redeem all or part of the sum paid for the acquisition, against the delivery of Certificates generated by implementing energy efficiency projects or acquired on the market<br>• Thirty new types of actions eligible for the scheme have been introduced, and newly installed projects have been differentiated from replacement projects by granting the former a longer lifetime (in years). Eight new forms for Standardised Projects (SP) have been introduced, encouraging actions such as the installation of LED lights, energy efficiency measures for the propulsion system of cargo and/or passenger ships, and the purchase of hybrid vehicles and electric vehicles powered by renewable energy;<br>• if the obligated party achieves less than 100%, but more than 60% of its obligation/quota, it may offset the remaining share of obligation in the following two years without incurring penalties, and no longer in only one year as was previously the case.<br><br>. | |
| Tax deduction for building renovation | Financial | Achievement of the energy efficiency and renewable energy production targets | Taxpayers owning existing buildings | *Implemented measure, supplementing the NAP.*<br><br>The measure introduced by Article 16-bis of Presidential Decree No 917/86 and subsequently extended by several legislative measures allows the deduction from IRPEF (personal income tax) of a percentage of the costs incurred for renovating the dwellings and communal areas of residential buildings located in the Italian territory. On 1 January 2012, this scheme was made permanent by Decree Law No 201/2011 and was included among IRPEF-deductible costs. The deductible amount, which initially stood at 36%, was subsequently increased to 50%, albeit not in a structural manner. The 2019 Budget Law (Law No 145 of 30 December 2018) extended the higher rate of personal income tax (IRPEF) deduction of 50% to 31 December 2019, confirming the cap on eligible costs of €96,000 per dwelling. The 2020 Budget Law has extended the 50% deduction to 2020.<br><br>The various types of works eligible for tax deduction include ‘works for installing cabling in buildings, containing noise pollution, achieving energy savings, adopting static and earthquake-proofing measures for buildings and carrying out internal works’. Works to install home renewable energy generation systems, for instance photovoltaic installations, are classified on a par with energy-saving works. | 1998 – n/a |
| Tax deduction for energy efficiency upgrades | Financial | Achievement of the energy efficiency and renewable thermal energy production targets | Taxpayers owning existing buildings | *Implemented measure, set out in the NAP.*<br><br>This measure, introduced by the 2007 Budget Law and subsequently extended by several legislative measures, makes it possible to deduct from personal or corporate income tax (IRPEF and IRES) a share of the costs incurred to upgrade the energy efficiency of buildings. The 2019 Budget Law (Law No 145 of 30 December 2018) extended to | 2007 – n/a |

| | | | | | |
|---|---|---|---|---|---|
| | | | | 31 December 2019 the deadline for claiming a deduction from personal or corporate income tax (IRPEF or IRES) of 65% of the costs of energy efficiency improvement works on buildings.<br><br>The following actions are eligible:<br>• works achieving an energy performance index for winter heating not exceeding the values set out in Annex A to the Decree of the Ministry of Economic Development of 11 March 2008 (maximum tax deduction: €100,000);<br>• works on existing buildings, parts of existing buildings or property units, concerning opaque wall area, opaque horizontal structures and windows, including blinds or shutters, up to a maximum tax deduction of €60,000 (eligibility for the facility is subject to compliance with certain thermal transmittance requirements);<br>• installation of solar panels for the production of domestic or industrial hot water and to cover hot water demand in swimming pools, sports facilities, nursing homes, schools and universities (maximum tax deduction: €60,000);<br>• replacement of existing winter heating systems with systems using condensing boilers, and concurrent upgrading of the distribution system (maximum tax deduction: €30,000);<br>• replacement of existing winter heating systems with high-efficiency heat pumps and low-enthalpy geothermal systems (maximum tax deduction: €30,000);<br>• replacement of existing conventional water heaters with heat pump systems for sanitary hot water production (maximum tax deduction: €30,000);<br>• purchase and installation of the solar shading systems listed in Annex M to Legislative Decree No 311/2006 (maximum tax deduction: €60,000);<br>• purchase and installation of winter heating systems using biomass-fired boilers (maximum tax deduction: €30,000);<br>• purchase, installation and commissioning of multimedia devices for the remote control of home heating, air-conditioning and hot water systems, to increase users' awareness of energy consumption and the efficiency of the systems.<br><br>The 2020 Budget Law has extended the incentive (*ecobonus*) to 2020. | |
| Incentives for the production of heat from renewable energy sources and small-scale energy efficiency projects.<br>(Article 28 of Legislative Decree No 28/2011, Ministerial Decrees of 28/12/2012 and 16/02/2016 '*Conto Termico*' (Thermal energy account') | Financial | Achievement of the energy efficiency and renewable thermal energy production targets | Public administrations and private parties (households, condominiums/commonholds and businesses or farms) | *Existing and implemented measure, set out in the NAP.*<br><br>Under the Ministerial Decree of 16 February 2016, entitled 'Update of the incentive framework for small-scale energy efficiency and renewable heat projects', small-scale renewable heat production and energy efficiency projects are eligible for an incentive proportionate to the amount of renewable thermal energy produced or energy saving achieved.<br><br>Two types of actions are covered:<br>1) energy efficiency projects in existing buildings;<br>2) small-scale renewable heat and high-efficiency system projects.<br><br>The scheme is aimed at:<br>- public administrations (PA), for one or more type 1 and 2 projects;<br>- Private parties i.e. households, condominiums and businesses or farms, for one or | 2012 – n/a |

| | | | | | |
|---|---|---|---|---|---|
| | | | | more of type 2 projects.<br><br>The scheme has a maximum total annual budget, which is split into two different amounts for private and public beneficiaries:<br>- €200 million for actions planned or implemented by public administrations;<br>- €700 million for actions planned or implemented by private parties; | |
| Obligation to integrate renewable sources in new buildings and in major building renovations (Article 11 of Legislative Decree No 28/2011) | Regulatory | Renewables must cover 50% of energy consumption for sanitary hot water, and a variable percentage of consumption for heating and cooling | End-users owning new or renovated buildings | *Implemented measure, set out in the NAP.*<br><br>New-build and major renovation projects must include RES to cover heat, electricity and cooling demand in accordance with the minimum integration principles and start dates set out in Annex 3 to Legislative Decree No 28/2011.<br><br>In detail, all of the following conditions must be met: 50% of energy for sanitary hot water from RES, and the following percentages of total energy for hot water, heating and cooling:<br>- 20% for building permit applications submitted between 31 May 2012 and 31 December 2013;<br>- 35% for applications submitted between 1 January 2014 and 31 December 2017;<br>- 50% for applications submitted from 1 January 2018.<br>Under Annex 3 to Legislative Decree No 28/2011, the above shares are:<br>- - increased by 10% for public buildings;<br>- - reduced by 50% in historic centres (A zones).<br><br>RES systems installed to meet the prior obligations will benefit from the RES incentives for the share exceeding that required for compliance with said prior obligations. Projects not meeting the obligation will not be issued the building permit. Regions may establish higher minimum shares of renewable energy than those set out in the Decree. | June 2012 – n/a |
| **MEASURES IN THE ELECTRICITY SECTOR** | | | | | |
| New incentive schemes (Article 24 of Legislative Decree 28/2011, and Ministerial Decrees of 06/07/2012 and 23/6/2016) | Financial | Achievement of the RES electricity targets | Investors/ End users | *Implemented measure, supplementing the NAP.*<br><br>Legislative Decree No 28/2011 provided that installations (excluding solar) commissioned from 2013 onward would be supported by new incentives replacing the Green Certificates and the all-inclusive tariffs.<br>The Ministerial Decree of 23 June 2016, published on 29 June 2016, updated the incentive schemes under the Ministerial Decree of 6 July 2012 for RES electricity installations other than photovoltaic. The 2016 Decree added solar thermal installations to the schemes and repealed the Ministerial Decree of 11 April 2008.<br>The incentives under the Decree apply to installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded, commissioned from 1 January 2013. Quotas of supported capacity have been established, divided by type of source and installation and broken down according to manner of access to the incentives (auctions; registers for new construction, complete reconstruction, reactivation, upgrading and hybrid systems; registers for refurbishments; direct access). The new Decree provided for a single session, which was held before the end of 2016, for assigning the entire capacity of the various quotas of the registers, registers for refurbishments and auctions. Direct access to the | 2013 – 2017 |

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| | | | | incentives was also granted to small-size installations commissioned by the end of 2017.<br><br>The total average indicative cost of all the types of incentives granted to non-photovoltaic installations, named 'RES meter', calculated in a specified manner, cannot exceed €5.8 billion per year: once that limit is reached, all incentives, including direct-access ones, will cease.<br><br>The Decree has introduced two types of incentives:<br>A) an All-Inclusive feed-in Tariff (AIT) for installations with a power output of up to 500 kW, calculated by adding the base feed-in tariff to the amount of any premium tariffs;<br>B) an Incentive (I) for installations with a power output in excess of 500 kW, calculated by subtracting from the base feed-in tariff – inclusive of any premium tariffs to which the installation is entitled – the hourly zonal price of energy (in the zone where the electricity generated by the installation is fed into the grid). The energy produced by the installations eligible for the incentive (I) remains available to the producer.<br><br>Access to the incentives laid down in the Ministerial Decree of 23 June 2016 is alternative to the Net Metering system and to Simplified Purchase and Sale Arrangements. | |
| **MEASURES FOR THE TRANSPORT SECTOR** | | | | | |
| Use of biomethane and advanced biofuels in transport (Ministerial Decree of 2 March 2018) | Regulatory – Financial | Promotion of sustainable biofuels (EU target for 2020: 10% of transport consumption covered by renewable energy sources) | Producers of biomethane, advanced biomethane and other advanced biofuels. | The Decree incentivises the production of advanced and non-advanced biomethane and of other advanced biofuels, solely for use in transport. For the plants producing advanced biomethane and other advanced biofuels, the Ministerial Decree of 2 March 2018 introduced the possibility of having the release-for-consumption certificates (RCCs) collected by the GSE, which is the entity appointed to manage the support mechanism, at a fixed price established by the same Decree (€375/RCC), with collection costs paid by the entities obligated to release biofuels for consumption, as identified in the Decree of the Ministry for Economic Development of 10 October 2014 as amended and supplemented. The Decree also establishes the possibility, only for advanced biomethane producers requesting it, of physical collection of the biomethane by GSE. On the other hand, producers of non-advanced biomethane who release their product for consumption in transport can only be issued RCCs. Incentives for the construction of biomethane liquefaction plants have also been introduced, to facilitate the spread of this fuel also in liquid form. Partial or total conversions of existing biogas production plants, including with increases in production capacity, are also facilitated, extending the incentive period compared to the current rules. Lastly, in order to prove the renewable origin of biomethane, Guarantees of Origin (GOs) have been introduced for biomethane obtained from by-products and not benefiting from other types of incentives. To manage this scheme, the GSE has set up a 'National Register of Guarantees of Origin for Biomethane' | 2018 - 2022 |
| Obligation to release biofuels for consumption (Law No 81 of 11 March 2006; Article 33 of Legislative Decree | Regulatory – Financial | Promotion of sustainable biofuels (EU target for 2020: 10% of transport consumption | Parties that release fossil fuels for consumption | *Implemented measure, set out in the NAP.*<br><br>Those parties that release for consumption petrol and diesel from fossil sources for use as transport fuels must release for consumption in the national territory a minimum share of biofuels, set to increase over time. Alternatively, these parties may meet their obligation by purchasing all or part of the equivalent share of biofuels or the corresponding allowances from other parties. This system ('release obligation'), introduced by Law No 81 of | 2007 – n/a |

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| No 28/2011 as amended and supplemented, Ministerial Decree of 10 October 2014); Legislative Decree No 51 of 21 March 2017; Ministerial Decree of 13 December 2017. | | covered by renewable energy sources) | | 11 March 2006 and updated by Legislative Decree No 20/2011 and by the Ministerial Decrees of 10 October 2014, 31 December 2017 and 2 March 2018, is the incentive scheme for the use of biofuels in transport.<br>For the period from 2012 to 2014, the minimum share of biofuels to be released for consumption, calculated on the basis of the calorific power of the fossil fuels released for consumption the previous year, was 4.5%. The Ministerial Decree of 10 October 2014 updated the criteria, conditions and procedures for complying with this obligation. Specifically, the Decree has established for the years after 2015 the minimum quantity of biofuels which must be released for consumption each year. This amount is now based on the energy content of the fossil fuels released for consumption in the same calendar year, and is divided into different shares among the different types of biofuels. The Decree also introduced the 'advanced biofuels' category, which comprises biofuels obtained solely from the raw materials listed in Annex I (Part 2-bis, Section A) to Legislative Decree No 28/2011, as amended by Legislative Decree No 51/2017. Recently, the Ministerial Decree of 2 March 2018 updated the minimum shares of biofuels and advanced biofuels to be released for consumption for the years 2018, 2019, 2020, 2021 and 2022. The Ministerial Decree of 2 March 2018 also stipulates that the advanced obligation must be met as to 75% through the release for consumption of advanced biomethane, and as to the remaining 25% through other advanced biofuels. As a rule, one 'Certificate of release for consumption' is issued for every 10 Gcal of biofuel released. However, for some types of biofuels, the quantity to be released for consumption in order to obtain a certificate is lower. Specifically, for biofuels from waste, including landfill gas, or from by-products (Article 33(5) of Legislative Decree No 28 of 3 March 2011 as amended and supplemented) and for advanced biofuels, one certificate is granted for every 5 Gcal released (double counting). The complete list of the by-products eligible for double counting is provided (Article 33(5-ter)). Double counting also applies to all biofuels from algae, cellulosic or lignocellulosic materials. | |
| Legislative Decree No 51/2017, implementing Directive (EU) 2015/652 and Directive (EU) 2015/1513 | Regulatory | Ensure a reduction in life-cycle emissions from transport fuels and from electricity consumed by road vehicles.<br>Start the transition from traditional biofuels to biofuels offering greater GHG emission reductions | Operators in the bioliquid/ biofuel sectors and in the fossil fuel/electricity sector for road transport | *Implemented measure, supplementing the NAP*<br><br>The parties that release fuels for consumption must guarantee that, for the year 2020, the life-cycle emissions associated with the products released for consumption are at least 6% lower than a benchmark figure.<br><br>In order to reach the 2020 target share of renewables in gross final energy consumption, the maximum combined contribution of biofuels and bioliquids produced from cereal and other starch-rich crops, sugars and oil crops and from crops grown as main crops primarily for energy purposes on agricultural land shall be no more than 7% of the final consumption of energy in transport in 2020. | 2017 - 2020 |

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| Legislative Decree No 257/2016, implementing Directive 94/2014/ EU on the deployment of alternative fuels infrastructure | Regulatory | Establish criteria and guidelines for deploying alternative fuel infrastructure, to reduce oil dependence and mitigate the environmental impact of transport. | Public bodies | *Implemented measure, supplementing the NAP*<br><br>This measure aims to reduce the use of traditional fuels and thus favour alternative energy carriers such as electricity, CNG and LNG, which include or can include an increasing share of energy from renewable sources.<br><br>By 31 December 2020, an appropriate number of electric vehicle charging points accessible to the public will be put in place. Their number shall be set by taking into account, among other things, the estimated number of electric vehicles registered by the end of 2020.<br><br>When replacing their car, bus and service vehicle fleets, public bodies must ensure that at least 25% of the new vehicles are CNG/LNG-powered, electric or hybrid.<br><br>By 31 December 2017, Municipalities must adapt their regulations so as to ensure that outlets for electric vehicle charging are installed at new or refurbished buildings meeting specific parameters (floor area of more than 500 $m^2$ for non-residential buildings and at least 10 dwellings for new residential buildings). At least 20% of the parking spaces must have charging points.<br><br>When authorising the construction of new petrol stations or the renovation of existing ones, the Regions must require them to install fast electric vehicle charge points (with power rating between 22 kW and 50 kW).<br><br>This regulatory framework is accompanied by public awareness-raising actions: clear communication, standardised labelling and precise specifications at charging points are all basic requirements to help users make a smooth transition and contribute actively to the spread of sustainable daily mobility practices. | 2017 - 2020 |
| **MEASURES FOR ELECTRICITY GRIDS** | | | | | |
| Authorisation of grid connection works (Articles 4 and 16 of Legislative Decree No 28/2011) | Regulatory | Coordinating the development of power-generating installations with that of the electricity grid | Network operators | *Implemented measure, supplementing the NAP.*<br><br>The construction and operation of certain grid development works are authorised by the competent Region via a single procedure.<br>This authorisation procedure applies to works for feeding in and off-taking the electricity generated by a number of installations and not covered by the connection quotations signed by the grid operator and the energy installation owners.<br>The single procedure also applies to distribution network works and infrastructure designed to improve the dispatching of the energy generated by already operating installations. | March 2011 – n/a |
| National transmission grid development plan (Article 17 of Legislative Decree No 28/2011) | Regulatory | Planning of the development of the national transmission grid | National transmission system operator (Terna SpA) | *Implemented measure, set out in the NAP.*<br><br>A specific section of Terna SpA's National Transmission Grid Development Plan lists the actions eligible for the above-mentioned single procedure, taking into account the current procedures for issue of plant construction and operating licences.<br>In the same section of the Plan, Terna also sets out the grid upgrading works necessary to | March 2011 – n/a |

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| | | | | ensure the full feed-in and off-take of the electricity generated by renewable energy installations. These works include storage systems to facilitate the dispatching of electricity from non-programmable RES.<br>As to the investments in storage systems set out in the Development Plan, the Ministry of Economic Development has approved an experimental programme for a total installed capacity of 35 MW, classified as eligible for incentives by the Italian Regulatory Authority for Energy, Networks and the Environment (ARERA, formerly AEEGSI). The programme consists of six pilot projects located at key points of the national transmission grid, where in the past the energy losses from renewable installations have been especially significant. | |
| Compensation for works on the national transmission grid (Article 17 of Legislative Decree No 28/2011) | Financial | Works to adapt the transmission grid to the development of RES generation systems | National transmission system operator (Terna SpA) | *Implemented measure, supplementing the NAP.*<br><br>The Electricity and Gas Authority ensures return on the investments made for developing and operating the installations included in the above-mentioned section of the Development Plan, taking into account their effectiveness for the purpose of off-taking the renewable energy and the speed of installation and commissioning of the systems, also by means of modulation according to the different electricity market zones and storage technologies. | March 2011 – n/a |
| Compensation for work on the distribution networks (Article 18 of Legislative Decree No 28/2011) | Financial | Works to adapt distribution networks to the development of RES generation systems | Distribution network operators | *Implemented measure, supplementing the NAP.*<br><br>Greater return on invested capital shall be granted to upgrading projects based on smart grid concepts.<br>These projects may concern installation of systems for the control, regulation and operation of loads and production units, including electrical car charging systems.<br>The level of remuneration takes into account the size of the project, calculated in terms of active users involved, degree of innovation, speed of work execution and commissioning, and effectiveness for the purpose of full offtake of the distributed energy produced.<br>The regulator has selected seven pilot projects for introducing innovative technologies in the distribution network, on the basis of the ratio of benefit indicator to the cost of the pilot project. | March 2011 – n/a |
| Distribution network development plans (Article 18 of Legislative Decree No 28/2011) | Regulatory | Planning of the development of distribution networks | Distribution network operators | *Implemented measure, supplementing the NAP.*<br><br>Each year, distribution network operators publish a Development Plan setting out the main works planned and the estimated completion times, also to favour the coordinated development of the network and of power generation plants.<br>The plans are prepared in coordination with Terna and must be consistent with the contents of the National Transmission Grid Development Plan. | March 2011 – n/a |
| Updating of the technical and economic conditions for accessing the networks (Article 19 of Legislative Decree No 28/2011) | Regulatory | Ensuring the integration of renewable sources in the electricity system to the extent necessary to achieve the 2020 targets | Producers and network operators | *Implemented measure, supplementing the NAP.*<br><br>Every two years, ARERA updates the Consolidated text of the technical and financial conditions for connection to networks subject to third-party connection obligation (CTAC, Consolidated text of active connections) and performs a quantitative analysis of the imbalance costs weighing on the electricity system as a consequence of the dispatching of each of the non-programmable renewable sources, assessing the impact of the provisions set out in the CTAC.<br>In the event of changes in market conditions, the regulator shall update its measures on the | March 2011 – n/a |

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| | | | | connection of power generating installations more often than required by Legislative Decree No 28/2011. | |
| Construction of storage systems by the network operator (Article 36 of Legislative Decree No 93/2011) | Regulatory | Ensure the integration of non-programmable renewable sources into the electricity system | Network operators | *Implemented measure, supplementing the NAP.*<br><br>Legislative Decree No 28/2011 allows the national transmission grid operator to include in its Grid Development Plan electricity storage systems designed to facilitate dispatching from non-programmable installations.<br>Legislative Decree No 93/2011 provides that these systems may also be installed by distribution system operators. | June 2011 – n/a |
| Simplification of requirements for connecting PV installations (MD of 19/05/2015) | Regulatory | Favour the connection of building-integrated PV systems | Producers and network operators | *Implemented measure, supplementing the NAP.*<br><br>The Decree introduces a single form for the installation, connection and operation of small photovoltaic installations integrated on the roofs of buildings, with an output of less than 20 kW. | May 2015 – n/a |
| Aggregation of energy installations and users (Legislative Decree No 102/2014) | Regulatory | Improve the efficiency of the electricity market by avoiding the interruption of RES electricity generation. | Producers/consumers/network operators | *Planned measure, supplementing the NAP.*<br><br>Legislative Decree No 102/2014 introduced the possibility of setting up clusters of energy installations and customers for access to aggregated supply and to provide flexibility services. Such clusters are to be entrusted to entities guaranteeing efficient aggregation. The network operators must establish the rules governing the participation of these new clusters.<br>ARERA has launched pilot projects to gain useful data for the full-scale reform of dispatching. The projects relate to the market participation of dispatching services, also in aggregate form, of demand and not-yet authorised production units, including those powered by non-programmable renewable sources. | July 2014 – n/a |
| **MEASURES FOR NATURAL GAS NETWORKS** | | | | | |
| Conditions for connecting biomethane systems to the natural gas network.<br>(Article 20 of Legislative Decree No 28/2011) | Regulatory | Injection of biomethane into the natural gas network | Biomethane producers and natural gas network operators | *Planned measure, supplementing the NAP.*<br><br>By Decision 46/2015/R/gas of 12 February 2015, ARERA approved the rules for the connection of biomethane systems to the natural gas networks, to which network operators must adapt their network codes, and the rules for determining the quantities of biomethane eligible for the incentive. Annex A to the Decision contains:<br>- in Section I the rules for biomethane, designed in line with the targets set out in Legislative Decree No 28/11, designed to guarantee the safe and efficient operation of gas networks, establish clear and transparent network connection procedures and ensure affordable connection, to promote the wider use of biomethane;<br>- in Section II, the rule on how to measure, calculate and certify the quantity of biomethane eligible for the incentives pursuant to the Decree of 5 December 2013.<br><br>By Decision 210/2015/R/gas, ARERA issued rules on market processes for feeding biomethane into the network.<br>By Decisions 299/2016/R/gas and 806/2016/R/gas, ARERA approved the updates to the SRG Network Code made to implement, respectively, the rules under Decisions | 2011 – n/a |

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| | | | | 46/20165/R/gas and 210/2015/R/gas.<br>By Decision No 27/2019/R/gas, under an ad hoc procedure launched by Decision No 239/2017/R/gas, the Authority updated the connection rules under Decision No 46/2015/R/gas, to align them with developments in the relevant technical standards, including the approval of technical standard CEN 16723-1 which ended the standstill on the quality specifications for biomethane to be fed into natural gas networks. The measure leaves the pre-existing provisions unchanged and adds to them Section III, which implements the Ministerial Decree of 2 March 2018 on incentives for biomethane.<br>By Decision 102/2019/R/gas, ARERA approved an update to the Network Code of SRG (the company Snam Rete Gas), which extended the validity period of the connection estimate and introduced rules on the transport of biomethane in cylinders by truck. | |
| Incentives for feeding biomethane into the natural gas network<br>(Article 21 of Legislative Decree No 28/2011, Ministerial Decrees of<br>5 December 2013 and 2 March 2018) | Financial | Injection of biomethane into the natural gas network | Biomethane producers | *Implemented measure, supplementing the NAP.*<br><br>The Ministerial Decree of 5 December 2013, which incentivises biomethane production, applies to:<br>- new systems installed in the national territory and commissioned within five years from 18 December 2013;<br>- existing installations in the national territory for the production and use of biogas (or landfill gas/sewage sludge treatment gas/syngas), which, after 18 December 2013 and no later than five years thereafter, were partially or entirely converted to biomethane production.<br>The Decree establishes three types of incentives for the biomethane injected into the natural gas network, according to its intended use:<br>- issue of certificates of release for consumption - RRCs (*Certificati di Immissione in Consumo* - CIC) for biomethane injected into the natural gas network specifically for use as transport fuel;<br>- a financial incentive for biomethane injected into the natural gas transport or distribution network irrespective of its use;<br>- a financial incentive via the tariffs for electricity generation from biogas set out in the Ministerial Decree of 6 July 2012, for biomethane injected into the natural gas network and used in high-efficiency CHP plants.<br>Typically, the incentive for biomethane production lasts 20 years.<br><br>The Ministerial Decree of 2 March 2018 incentivises the production of advanced and non-advanced biomethane and of other advanced biofuels, solely for use in transport. For the plants producing advanced biomethane and other advanced biofuels, the Ministerial Decree of 2 March 2018 introduced the possibility of having the release-for-consumption certificates (RCCs) collected by the GSE, which is the entity appointed to manage the support mechanism, at a fixed price established by the same Decree (€375/RCC), with collection costs paid by the entities obligated to release biofuels for consumption, as identified in the Decree of the Ministry for Economic Development of 10 October 2014 as amended and supplemented. The Decree also establishes the possibility, only for advanced biomethane producers requesting it, of physical collection of the biomethane by GSE. On the other hand, producers of non-advanced biomethane who release their product for consumption in transport can only be issued RCCs. | 2013 – n/a |

| MEASURES FOR DISTRICT HEATING AND COOLING NETWORKS | | | | | |
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| Energy Efficiency Certificates for District Heating Networks | Financial | Support for infrastructure development | Private investors Operators | *Existing measure, supplementing the NAP.*<br><br>DH networks are eligible for the White Certificate scheme (also known as Energy Efficiency Certificates - EEC).<br>The certificates available to DH networks linked to HE CHP installations are calculated in the manner set out in the Ministerial Decree of 5/9/2011 which establishes the support scheme for high-efficiency cogeneration.<br>The MD of 11/01/2017 includes the following actions:<br>- Installation of heat recovery components, if not technically possible in the *ex ante* (baseline) situation, also for district heating and/or cooling networks<br>- energy efficiency improvement projects for district heating and/or cooling networks;<br>- installation of district heating and/or cooling networks;<br>- installation of boilers for district heating and/or cooling networks | 2011 – n/a |
| Reduced excise duty | Fiscal | Promotion of district heating | Operators | *Existing measure*<br><br>District heating systems enjoy several fiscal benefits compared to heat production directly by civil end-users. The fuel consumed by CHP units and by integration boilers directly connected to the same district heating network is eligible for the same reduced excise duty rate set for industrial use (and the associated share of reduced rate for electrical uses), provided that certain conditions are met (high-efficiency cogeneration and electricity/heat ratio >10%). If these requirements are not met, such fuel consumption is charged at the excise duty rate for non-industrial uses. | 2007 – n/a |
| Tax credit | Fiscal | Promotion of district heating | Operators | *Existing measure*<br><br>Law No 448 of 23 December 1998 (the 1999 Budget Law) introduced a tax credit per kilowatt-hour (kWh) of heat from district heating networks powered by biomass or geothermal energy, in municipalities located in specified climatic zones. This tax credit is equal to €0.01033 per kWh of heat supplied. Decree Law No 268 of 30 September 2000 introduced a further reduction of €0.01549 per kWh, thus increasing the tax credit to €0.02582 per kWh of heat supplied. After being extended on several occasions, these reductions were made permanent by Law No 203/2008 (2009 Budget Law). As from 1 January 2014, the subsidy was cut by 15% by Decree of the Prime Minister of 21 March 2014. | 1998 – n/a |
| National Energy Efficiency Fund (Article 15 of Legislative Decree No 102/2014; Ministerial Decrees of 22 December 2017 and 5 April 2019) | Financial | Support to the financing of energy efficiency projects | Public administrations and private investors | *Existing measure, set out in the NAP*<br><br>Revolving Fund supporting projects helping to achieve the national energy efficiency targets. It promotes the contribution of national and EU financial institutions and private investors with a balanced risk-sharing approach. Eligible actions include:<br>- projects to improve the energy efficiency of public buildings;<br>- development of district heating and cooling networks;<br>- improvement of the energy efficiency of public services and infrastructure, including street lighting;<br>- improvement of the energy efficiency of entire residential buildings, including social | 2014 – n/a |

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| | | | | housing buildings;<br>- energy efficiency and energy saving in the industrial and services sectors.<br>The National Energy Efficiency Fund took over the resources of the District Heating Guarantee Fund (Article 22 of Legislative Decree 28/2011) mentioned in previous editions of this report. | |
| Promotion and development of district heating and district cooling, and of competition (Articles 9 and 10 of Legislative Decree No 102/2014 and Legislative Decree No 141/2016) | Regulatory | User protection, promotion and regulation of competition | Operators | *Existing measure, supplementing the NAP*<br><br>Legislative Decree No 102/2014, transposing Directive 2012/27/EU on energy efficiency, entrusted ARERA with the task of regulating, inter alia, the following aspects:<br>- measuring the thermal energy supplied to buildings via district heating networks;<br>- invoicing, and information on invoicing and on access to consumption data;<br>- service standards and metering systems;<br>- the criteria for setting and publishing user connection tariffs and manner whereby users can request disconnection.<br><br>Legislative Decree No 141/2016, among other things, entrusted ARERA with setting the indicative benchmark costs for the providers of the service of splitting ('sub-invoicing') heating and cooling charges among the various property units of condominiums and multifunctional buildings supplied by a centralised district heating source or by a district heating network or by a centralised system supplying several buildings. | 2014 – n/a |
| **CROSS-CUTTING MEASURES** | | | | | |
| Provisions on sustainable bioliquids/ biofuels (Legislative Decree No 55/2011, Legislative Decree No 28/2011, Ministerial Decree of 23 January 2012) | Regulatory | Promotion of sustainable biofuels and bioliquids | Operators in the bioliquid/biofuel sectors | *Implemented measure, supplementing the NAP.*<br><br>Legislative Decree No 55/2011, which transposed Directive 2009/30/EC, and Legislative Decree No 28/2011 require adoption of EU sustainability criteria.<br>The Ministerial Decree of 23 January 2012, as amended and supplemented, implemented the national biofuel and bioliquid certification scheme, which sets out the methods for assessing compliance with sustainability criteria.<br>The Decree of 23 January 2012:<br>- established the national biofuel and bioliquid certification scheme;<br>- laid down the conditions for joining the scheme;<br>- established the rules for reporting the data on the GHG emissions produced by the fuels per energy unit;<br>- laid down the conditions for verifying compliance with the mass balance system needed to ensure traceability of the certified product all along the supply chain.<br>The national certification scheme introduced by the Ministerial Decree of 23 January 2012 will be repealed one year after the entry into force of the Ministerial Decree of 14 November 2019 which introduced the new national scheme for the certification of sustainable biofuels and bioliquids. | 2012 – 2020. |
| Simplification of the authorisation process (Articles 5, 6 and 7 of Legislative Decree No 28/2011) | Regulatory | Simpler and faster authorisation procedures | Investors/ /end users/public authorities | *Existing and implemented measure, set out in the NAP.*<br><br>Legislative Decree No 28/2011 has streamlined the authorisation of renewable energy installations. It has simplified the framework by establishing three types of authorisations:<br>- Single Authorisation (SA);<br>- simplified authorisation procedure (SAP);<br>- Notification of Minor Works not requiring a building permit (NMW). | March 2011 – n/a |

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| | | | | For certain plant types and sizes, the Regions may simplify authorisation procedures even further (several regions have already issued legislation to this effect). | |
| Rationalisation measures (Article 12 of Legislative Decree No 28/2011) | Regulatory - Financial | Rationalisation of procedures | Investors/ End users | *Planned measure, provided for by the NAP.*<br><br>Legislative Decree No 28/2011 introduced simplification measures to streamline the costs and types of guarantees required for the authorisation, installation, connection and operation of renewable energy installations and for granting incentives to those installations. | 2013 – n/a |
| Installer qualification schemes (Article 15 of Legislative Decree No 28/2011 ) | Regulatory | Quality assurance in the installation of RES systems | Installers | *Implemented measure, supplementing the NAP.*<br><br>The professional qualification for the installation and extraordinary maintenance of biomass-fired boilers, fireplaces and stoves, PV and solar thermal systems on buildings, low-enthalpy geothermal systems and heat pumps can be obtained by means of specific courses organised by the Regions. | August 2013 – n/a |
| Breakdown of national targets among the Regions (Article 37 of Legislative Decree No 28/2011, Ministerial Decree of 11 May 2015) | Regulatory | Improved coordination of functions between State and Regions and provision of guidance to grid operators and producers | Regions and Autonomous Provinces, grid operators, energy producers | *Implemented measure, set out in the NAP*<br><br>The national targets on renewable sources to be achieved by 2020 have been allocated among the Regions, in agreement with them; this encourages the Regions to plan how to achieve their targets and to streamline and speed up their authorisation procedures in line with their commitments; it also helps network operators to plan network development.<br>The Ministerial Decree of 11 May 2015 approved the method applied under the national statistical system to collect the necessary data for measuring progress towards the Regional targets. | 2011 – 2015 - |
| Renewable energy on Italy's smaller islands (Ministerial Decree of 14 February 2017) | Regulatory | Gradual coverage of the demand of Italy's smaller, non-interconnected islands, by using energy from renewable sources | Electricity companies or third parties | *Implemented measure, supplementing the NAP.*<br><br>The Ministerial Decree of 14 February 2017 set out provisions for gradually covering the demand of Italy's smaller, non-interconnected islands, by using energy from renewable sources, establishing:<br>- the quantitative targets of the island's energy demand to be covered by energy from renewable sources<br>- target periods/dates for the gradual development of power generation from renewable sources<br>- the investment support schemes necessary to achieve those targets<br>Decision No 558/2018/R/EFR laid down the tariffs remunerating the electricity and thermal energy produced from renewable sources in non-interconnected islands and the application procedure, in implementation of Ministerial Decree No 14/02/2017. | May 2017 – n/a |

## 2.a Please describe the progress made in evaluating and improving administrative procedures to remove regulatory and non-regulatory barriers to the development of renewable energy (Article 22(1)(e) of Directive 2009/28/EC).

### New developments in the two-year period 2017/2018

In order to simplify the procedures for the construction of micro-cogeneration units, the Decree of the Ministry of Economic Development of 16 March 2017 approved the single forms for the construction, connection and operation of high-efficiency micro-cogeneration units, as defined by Legislative Decree No 20 of 2007, and micro-cogeneration units powered by renewable sources; the Decree also streamlined the exchange of information between the municipalities, grid operators and GSE. For more details, see the section 'Connections to the electricity networks'.

### The previous framework

Paragraph 4.2.1 of the National Action Plan described the state of play of authorisation procedures for plants for renewable energy installations. Italy has implemented several additional measures to remove the regulatory and non-regulatory barriers identified by the review and improve administrative procedures to support the development of renewable sources.

The proportionality and necessity of administrative procedures are evaluated by assessing the complexity of the authorisation process (timeframe, number and complexity of the authorisations required) by reference to the type of project to be implemented (energy source, size of installation, location).

Legislative Decree No 28/2011, which transposed Directive 2009/28/EC, revised in part the general framework for authorising renewable energy installations (Articles 4-9), to ensure that authorisation procedures would be proportionate and necessary, and streamlined and expedited at the appropriate administrative level, as required by Article 13 of the Directive. The current national framework comprises three types of authorisation procedures for installations using renewable energy sources:

- **Single Authorisation (SA)**. This procedure was introduced by Legislative Decree No 387/2003, which transposed Directive 2001/77/EC, to authorise renewable electricity installations and the associated works and infrastructure. The SA is required for installations having installed capacity above specific thresholds, and is issued at the end of a single procedure, carried out by an Interdepartmental Conference composed of all the competent administrations. This authorisation enables construction and operation of the installation, granting exemption from planning restrictions where necessary. Legislative Decree No 28/2011 reduced the maximum duration of the procedure from 180 to 90 days, not including the time necessary for the Environmental Impact Assessment (EIA), where required. The Single Authorisation (SA) is issued by the Regions or by the Provinces delegated by them.

- **Simplified Authorisation Procedure (SAP)** This was introduced by Legislative Decree No 28/2011 to replace the Notification of Start of Works (NSW). The simplified authorisation procedure (SAP) can be used to install RES energy systems below certain installed capacity thresholds (above which the SA applies) and for certain types of RES thermal energy plants. The SAP must be submitted to the Municipality at least 30 days before the start of works, together with a detailed report signed by a certified engineer and the appropriate technical drawings and documents, including proof of the project's compatibility with the current zoning instruments and building codes, and of its compliance with hygiene, health and safety rules. Under the SAP system, the application is authorised via tacit acceptance: 30 days after its submission, if no replies or notices have been issued by the Municipality, works can start.

- **Notification to the Municipality of minor works not requiring a building permit (NMW)** – this is the simplest authorisation procedure, applicable to certain small-scale renewable electricity or thermal projects, which are considered to be minor works and are therefore exempted from building permits. The notice of start of works must be sent to the Municipality together with a detailed report signed by a certified engineer. It is not necessary to wait 30 days before starting works.

Legislative Decree No 28/2011 also allows Regions to apply the SAP to electricity generating installations having an installed capacity of up to 1 MWe, and to apply the NMW procedure to installations having a capacity of up to 50 kWe and to photovoltaic installations of any power capacity installed on buildings. As at the end of December 2018, 14 Regions had made changes to the national authorisation thresholds.

To ensure the provision of exhaustive and transparent information, Legislative Decree No 28/2011 provided for the creation of a national web portal, with a wealth of information on renewable energy and energy efficiency, including guidance on the administrative procedures for constructing renewable energy installations. Each year, the Energy

Services Operator (GSE) publishes a report on the authorisation procedures in force, broken down by Region and Province.

The Ministerial Decree of 10 September 2010 (National Guidelines for the Authorisation of Renewable Energy Installations) required monitoring of the effectiveness and efficiency of authorisation procedures at Regional and Provincial level, so as to identify good practices and suggest improvements.

All the measures described above are summarised in Table 2.a.

## Table 2a: Overview of all the measures taken to improve administrative procedures

| Name and reference of the measure | Type of measure* | Expected result | Beneficiaries (group and/or activity) *** | Existing or planned policies or measures***** | Start and end dates of the measure |
|---|---|---|---|---|---|
| **MEASURES TO SIMPLIFY AND SPEED UP ADMINISTRATIVE PROCEDURES** | | | | | |
| Single Authorisation (SA) for large installations (Legislative Decree No 387/2003) | Regulatory | Simplifying and speeding up authorisation procedures | Renewable energy installations | *Existing and implemented measure.* | 2003 – n/a |
| Cut in half the time for issue of the Single Authorisation (Legislative Decree No 28/2011) | Regulatory | Acceleration of authorisation procedures | Renewable energy installations | *Existing and implemented measure, supplementing the NAP.* | 2011 – n/a |
| Simplified Authorisation Procedure and Single Authorisation for biomethane plants (Legislative Decree No 28/2011, amended by Law No 116/2014) | Regulatory | Use of the Simplified Authorisation Procedure for certain types of biomethane plants and of the Single Authorisation in the remaining cases | Renewable energy installations | *Existing and implemented measure, supplementing the NAP.* | 2014 – n/a |
| **MEASURES TO MAKE ADMINISTRATIVE PROCEDURES TRANSPARENT AND PROPORTIONATE** | | | | | |
| Web portal providing information on authorisation procedures (Legislative Decree No 28/2011) | Non-binding | Transparency of information | Engineers designing RES installations | *Existing and implemented measure, supplementing the NAP.* | 2012 – n/a |
| Monitoring of authorisation procedures (Ministerial Decree of 10 September 2010) | Non-binding | Identification of good practices and recommendations for improvement | State and Regions | *Existing and implemented measure, supplementing the NAP.* | 2012 – n/a |
| **MEASURES TO SIMPLIFY ADMINISTRATIVE PROCEDURES FOR SMALL, DECENTRALISED INSTALLATIONS** | | | | | |
| Introduction of the Simplified Authorisation Procedure - SAP (Legislative Decree No 28/2011) | Regulatory | Simplifying authorisation procedures for small plants | Renewable energy installations | *Existing and implemented measure, supplementing the NAP* | 2011 – n/a |
| Introduction of the Notification of Minor Works not requiring a building permit – NMW (Legislative Decree No 28/2011) | Regulatory | Simplifying authorisation procedures for small plants | Renewable energy installations | *Existing and implemented measure, supplementing the NAP.* | 2011 – n/a |
| Option for the Regions to change the national authorisation thresholds (Legislative Decree No 28/2011) | Regulatory | Scaling and adapting the national legislation to local contexts | Regions | *Existing and implemented measure, supplementing the NAP* | 2011 – n/a |
| Introduction of the single form to report the installation, connection and operation of small photovoltaic installations fitted on the roofs of buildings (Decree of the Ministry of Economic Development of 19 May 2015) | Regulatory | Simplification of the authorisation process for small photovoltaic installations | Photovoltaic installations | *Existing and implemented measure, supplementing the NAP.* | 2015 – n/a |

| | | | | | |
|---|---|---|---|---|---|
| Identification of projects requiring authorisation procedures, Certified Notice of Start of Works, tacit acceptance and notification, and identification of the administrative frameworks applicable to specific activities and procedures, pursuant to Article 5 of Law No 124 of 7 August 2015 | Regulatory | This act specifies which projects only require notification or Certified Notice of Start of Works or tacit acceptance, and which, conversely, require issue of a specific authorisation, and lays down the associated coordinating provisions | Renewable energy installations | *Existing and implemented measure, supplementing the NAP* | 2016 – n/a |
| Regulation identifying the projects exempted from landscape authorisation or subject to the Simplified Authorisation Procedure (Presidential Decree No 31 of 13 February 2017) | Regulatory | Projects and works not subject to landscape authorisation or subject to SAP for the renewal of landscape authorisations | Renewable energy installations and urban/building projects | *Existing and implemented measure, supplementing the NAP* | 2017 – n/a |
| Approval of the single forms for the construction, connection and operation of high-efficiency micro-cogeneration units and micro-cogeneration units powered by renewable sources (Decree of 16 March 2017) | Regulatory | Simplification of procedures for the construction of high-efficiency micro-cogeneration plants and micro-cogeneration plants powered by renewable energy sources | High-efficiency micro-CHP plants using renewable energy resources | *Existing and implemented measure, supplementing the NAP* | 2017 – n/a |

## 2.b Please describe the measures taken to ensure the transmission and distribution of electricity produced from renewable energy sources, and to improve the framework or rules for bearing and sharing of costs referred to related to grid connections and grid reinforcements (Article 22(1)(f) of Directive 2009/28/EC).

### Dispatching and network services

The national electricity system is constantly evolving as a result of the expansion of non-programmable renewable sources and distributed generation. A process to **reform the market for dispatching services** was launched back in 2015 to strengthen integration between European markets and ensure technology neutrality among potential dispatching service providers (producers, consumers and aggregators), to help promote the engagement and market participation of energy from renewable sources and fair cost sharing.

The national regulator has also taken into account the guidelines contained in Regulation (EU) 2015/1222, establishing a guideline on capacity allocation and congestion management (CACM Regulation) and Regulation (EU) 2017/2195 (Balancing Regulation). An overhaul of the framework for the dispatching service is currently under way. The new rules will be set out in the new Integrated Text on Electricity dispatching (TIDE), and aim to:

- identify the main action lines for the evolution of the dispatching service in the new market context, also with a view to achieving the Union's targets for 2030;
- complete the integration of the Italian markets with those of other European countries, with particular reference to the coupling of the intraday markets characterised by continuous trading, the change of the gate closure interval to one hour before the start of the relevant market time unit, and the harmonisation of the services necessary to ensure the security of the system (ancillary services).

Italy already has a reference framework for the opening of the market opening to new entities; Article 11 of Legislative Decree No 102/2014 regulates the participation of distributed generation, renewable sources, high-efficiency cogeneration and demand in the energy market and in the services market, laying down the requirements and procedures for the participation of individual consumption and production units. The participation of demand in the balancing and reserve markets and in other grid services is particularly encouraged, by defining the technical methods whereby transmission and distribution system operators must organise the participation of service providers and consumers, including consumption and/or production unit aggregators.

Pending completion of the new dispatching reform, by Decision No 300/2017/R/eel, the Authority introduced initial opening, through pilot projects, of the dispatching services market (hereinafter, DSM) to previously non-entitled production units (PU) and consumption units (CU) and to storage systems, in order to provide new dispatching resources. Said resources may also be provided by production and/or consumption unit aggregators, through the creation of Authorised Virtual Units (AVU), acting as Terna's counterparties for the provision of services.

The pilot projects, which operate on a voluntary basis, were launched in the course of 2017 and are providing both useful data for the full-scale reform of dispatching and new dispatching resources. To ensure the greatest neutrality in the provision of dispatching services and optimise resources, several previous requirements for dispatching service authorisation have been removed, specifically constraints on technology and size, and both production and consumption units are now entitled to voluntary participation in some dispatching services.

For the first time, the national framework identifies two separate entities:

- the Balance Service Provider (BSP), Terna's counterparty for the supply of dispatching resources (hence, responsible for non-compliance with orders on the DSM);
- the Balance Responsible Party (BRP), user of the dispatching of the same units included in the AVUs.

The pilot projects launched in 2017 and 2018 concern:

- **Authorised Virtual Consumption Units (AVCUs)** in the dispatching services market, consisting of several off-take points which may belong to several dispatching service users; the applicant (balancing service provider) may either own or have obtained a mandate without the power of representation for all of the off-take points associated with the AVCUs; these units are entitled to provide upward tertiary reserve power and balancing resources;
- **Authorised Virtual Production Units (AVPUs)**, only for minor production units, which may also be included in different dispatching contracts. AVUPs have been empowered to provide resources for the resolution of scheduled congestion, tertiary power reserve and balancing (upward or downward);

- a third pilot project which combined the first two projects and which is still ongoing[21], has included in the authorised virtual unit the minor production units (both programmable and non-programmable), the major non-qualified production units not subject to authorisation which share the connection point with consumption units, as well as consumption units (**MAVUs - Mixed Authorised Virtual Units**). Storage systems and electric vehicles can also be included in MAVUs when providing services to the grid (vehicle-to-grid). MAVUs are empowered to provide resources (upward or downward) for the resolution of scheduled congestion, tertiary reserve (both spinning and replacement) and balancing;
- **Major production units, not currently authorised and not already included in the AVUs (MPUs)**[22]. The counterparty for the provision of dispatching resources is the Balance Service Provider (BSP), which is the same as the dispatching user. In order to be admitted to the pilot project, MPUs must have a modulating capacity (upward or downward) of at least 5 MW and may be authorised to provide resources for the resolution of scheduled congestion, for the spinning and replacement tertiary reserve and for balancing. Their purpose is to provide the above services, with the exception of the tertiary replacement reserve;
- the provision of the primary frequency regulation service by means of **storage systems attached to major production units (MPUs)**[23]. The maximum amount of primary reserve that can be supplied in the Continent under the pilot project was set at 30 MW, in the first phase of the trial.

So far, the following installations have been authorised:

- 128 Mixed Authorised Virtual Units - MAVUs (almost all under forward contracts) for a total qualified capacity of 830.7 MW for the 'upward' service and 200.9 MW for the 'downward' service managed by 24 BSPs. These MAVUs are mainly located in the North (94 MAVUs), while the remainder are located in the Centre-North (17), Centre-South (11), South (5) and in Sardinia (1).
  All MAVUs are authorised for upward services (for capacities ranging between the minimum threshold of 1 MW and a maximum of 62 MW); only 28 of them are also authorised for downward services (for capacities between 1 MW and 28 MW);
- storage systems for a total of 27.7 MW;
- 1 Major production unit (MPU) using hydropower (impoundment hydroelectric plant), for which no offer has so far been accepted by Terna.

During 2018, Terna reported to the Authority voltage issues in the Brindisi area, pointing out the need for voltage regulation resources in that area. By Decision No 675/2018/R/eel of 18 December 2018, the Authority approved the draft rules for the supply of **voltage regulation resources in the Brindisi area**, and the associated model contract. Under the rules, the resources must be selected on the basis of a competitive tendering procedure, giving priority to those made available by 1 March 2020 and, subordinately, by 1 July 2020 and 1 October 2020. The selected resources are contracted for 10 years.

As regards the **settlement of imbalances**, provisions have been introduced to prevent, to the extent possible, scheduling strategies designed to produce an economic advantage for the market operator, and charge the costs on the grid. While maintaining dispatching priority, for production units using renewable sources, the settlement of imbalances has been introduced, and has been updated from 2015[24].

In line with the Union's Regulation establishing a guideline on electricity balancing (Balancing Code), the regulator is currently working to modify the balancing prices so as to reflect the true value of electricity in real time, consistent with time, space and market dimensions. The following measures apply in the transitional period.

To calculate imbalance costs[25], the main changes in force since August 2016 are given below:

- for the period between August 2016 and August 2017, the imbalance fees are calculated as follows:
  - for production units not authorised to use dispatching services, and not using renewable sources, imbalance fees are calculated through the single-dual pricing mechanism, introduced by Decisions 444/2016/R/eel and 800/2016/R/eel;
  - for production units using non-programmable renewable sources, the fees can be calculated on a single pricing basis for the entire imbalanced energy; alternatively, the method under Decision 522/2014/R/eel may be applied;
- from September 2017 onwards, imbalance costs are calculated through the single pricing mechanism for all production units.

[21] The regulation of the pilot project was approved by Decision 422/2018/R/eel and entered into force on 1 November 2018.

[22] This pilot project was approved by Decision No 383/2018/R/eel and its implementation started on 1 September 2018.

[23] Project approved by Decision 402/2018/R/eel.

[24] The rules on imbalances, adopted by Decision 281/2012/R/eel, have been updated, first by Decision 522/2014/R/eel following a ruling of the *Consiglio di Stato* (Supreme Administrative Court) No 2936/2014, and later by Decisions 444/2016/R/eel, 800/2016/R/eel and 419/2017/R/eel.

[25] With reference to the commissioning of new installations, Terna's 'Grid Transmission, Dispatching, Development and Safety Code' requires a testing period of up to 180 days for new production units. In these cases, the electricity that is subject to imbalance is valued at the zonal price.

Pending a complete overhaul of the framework on the dispatching service, by Decision 419/2017/R/eel, ARERA introduced:

- as from 1 September 2017:
  - a new method for calculating the sign of the aggregate zonal imbalance, based on the measurements of cross-zonal and foreign trade;
  - the reintroduction of the single pricing mechanism for calculating the actual imbalances of the non-authorised units, consistent with the introduction of the new sign calculation method;

- as from 1 July 2017:
  - the macro-zonal no-arbitrage fee to be applied to the imbalances relating to non-authorised consumption units and production units, in order to eliminate any distortions due to calculation of the imbalance prices at macro-zonal level and of the market prices at zonal level.

In the case of non-programmable renewable sources, Decision 522/2014/R/eel thus remains applicable, enabling dispatching users to choose, every year, whether to apply:

- a) the settlement of imbalances applying to the other non-authorised production units; or
- b) the new rules introduced specifically for non-programmable renewable sources.

The latter framework identifies 'bands', which are different for each non-programmable source, within which the unitary imbalance fee applicable to non-authorised production units is not charged[26].

The dispatching priority of electricity from renewable sources must be achieved while ensuring the operational safety of the electricity system. Thus, under emergency conditions, renewable production may be limited for some time.

In this regard, since 2007 compensation has been paid for energy losses from wind power plants due to generation reductions imposed by Terna to ensure the security of the electricity system.

To improve the dispatching service, the national transmission system operator (Terna) draws up forecasts of feed-in from production units. Since 2010[27], for small production units using non-programmable renewable sources, Terna has also been using the forecasts prepared by GSE.

In order to ensure the secure operation of the electricity system through better forecasting and to facilitate the supply of resources, further measures have been introduced, including specific obligations for energy producers using non-programmable renewable sources and distributed generation.

Initially, certain network services were made available only to wind and photovoltaic installations connected to the national transmission grid (Annexes A17 and A68 to the Terna Grid Code), including capacity reduction when necessary and insensitivity to voltage dips.

Given the ever-increasing importance of renewable sources in the Italian energy generation mix, and in particular of installations using non-programmable renewable sources and distributed generation, since 2013 (also by legislative initiative)[28] electricity installations to be connected at low and medium voltage have been required to install devices extending their operating range in terms of frequency and voltage without being disconnected from the grid[29]. These obligations, set out in Annex A70 to the Grid Code, have also been extended to installations already in operation in 2012 to which a deadline for compliance was granted. In 2017 and 2018, ARERA continued to check that the existing installations had achieved compliance with the requirements.

In addition, since 2014, wind turbines and photovoltaic installations connected to the medium-voltage networks and having a power output of at least 100 kW have been required to provide a remote disconnection service to ensure the security of the electricity system, in accordance with Annex A72 to the Grid Code. This obligation has since been extended to existing installations for which the connection request had been submitted prior to 1 January 2013. Remote disconnection is only applied when the security of the national electricity system is threatened and no alternative actions are possible.

[26] The bands differentiated by source are equal to:
- 49% of the binding programme, amended and corrected on the basis of the dispatching points of major wind-powered production units;
- 31% of the binding programme, amended and corrected on the basis of the dispatching points of major Solar PV production units;
- 8% of the binding programme, amended and corrected on the basis of the dispatching points of major run-of-river hydroelectric units;
- 1.5% of the binding programme amended and corrected on the basis of the dispatching points of major production units powered by 'other' non-programmable renewable sources (mostly geothermal electric production units);
- 8% of the binding programme, amended and corrected on the basis of the dispatching points of minor production units (i.e. having a capacity of less than 10 MVA).

[27] Decision of the Authority ARG/elt 4/10.

[28] Two Interministerial Decrees were adopted, first on 5 May 2011, later on 5 July 2012, providing that photovoltaic systems, even those already in operation when the measures came into force, must be adapted to provide certain grid services.

[29] Decision of the Authority 84/2012/R/eel as amended and supplemented.

## Storage systems and support to 'smart grid' projects

In a context of increasingly unpredictable energy dispatching driven by the growth of non-programmable renewable sources, **storage systems** will play an increasingly important role. For instance, they may be used to deliver grid services, contain imbalances, and contain peaks in the off-take of electricity, maximising self-consumption. Storage systems may be installed by end-users, network operators (Terna and distribution companies) and by producers.

As regards pilot projects for electricity storage systems, Article 17 of Legislative Decree No 28/2011 allows the national transmission system operator to include in its Grid Development Plan electricity storage systems designed to facilitate dispatching by non-programmable installations. Under this Decree and in accordance with Article 36(4) of Legislative Decree No 93/2011, operators can construct and operate on-site electricity storage systems using batteries. These storage systems can also be installed and operated by distribution network operators. The objectives of the storage systems tested in the pilot projects are to reduce the amount of energy loss from non-programmable renewable sources due to local grid congestion, and to provide the primary regulation service.

Under the **2012-2015 National Electric System Security Defence Plan**, drawn up by Terna and approved by the Ministry of Economic Development, a programme has been designed for the installation of 40 MW of storage systems, in order to exploit the potential offered by the rapid response times of storage systems to increase the operational security margins of the high-voltage networks of Sicily and Sardinia.
To this end, the Authority has designed a specific incentive for investments in storage systems related to pilot projects with specified characteristics.

With regard to the investments in storage systems under the 2012-2015 Defence Plan, ARERA initially granted incentives to two pilot projects, for the installation of power-intensive storage systems (Storage Lab) in Sicily and Sardinia[30] with a maximum capacity of 8 MW each. Subsequently, in line with the limit values set in the Plan, the Authority admitted to the incentive scheme six more pilot projects having a total capacity of 35 MW, located at key points of the national transmission grid, where in the past the energy losses from renewable installations have been especially significant. In this case, so-called 'energy intensive' electrochemical storage technologies are used. This pilot scheme will make it possible to assess the performance of the different storage technologies, individual Storage Systems (SSs) and the overall Pilot Storage Station (PSS), and the benefits they deliver.[31]
The two-year trial (2016-2017) of energy-intensive storage systems implemented by Terna was completed with the publication at the end of 2018 of Terna's final report, pursuant to Decisions 288/2012/R/eel of 2 July 2012 and 66/2013/R/eel of 21 February 2013. The gains produced by the three storage systems of Ginestra, Flumeri and Scampitella (total capacity 34.8 MW, total cost of approximately €160 million), thanks to the reduction in loss of wind power over the period 2016-2017, can be summarised as follows:
• saving of wind energy loss, 34.37 GWh;
• gain from the saving of fuel costs and $CO_2$ emissions (assigned a value of 60 €/MWh for ease of calculation), about €1 million per year.
In the second year of the trial too, the results of the dynamic thermal rating (DTR) actions, required by the Authority's decisions on the network sections concerned by the pilot storage projects, proved to be interesting in terms of cost/benefit ratio.

Investment costs amounted to Euro 840,000 and the gains from the reduction in loss of wind power over the two-year period 2016-2017 can be summarised as follows:
• saving of wind energy loss, 114.05 GWh;
• gain from the saving of fuel costs and $CO_2$ emissions (assigned a value of 43 €/MWh for ease of calculation), about €3.5 million per year.

Storage systems can also be installed at generation installations operated by producers other than the national transmission system operator. The Interministerial Decree of 5 July 2012 provided that, in order to ensure development of photovoltaic energy while guaranteeing the security of the electricity system, by coordinating with measures pursuing the same aims concerning renewable sources other than photovoltaic and with the measures referred to in Articles 17 and 18 of Legislative Decree No 28/2011, ARERA shall establish the manner by which producers may use storage systems, including those integrated with inverters, to improve management of the electricity generated and store such electricity in the event of disconnection or power modulation signals.

There are no incentive schemes for the installation of storage systems by end users or producers. However, the technical standards for connecting production installations to distribution networks have been updated (Standard CEI 0-16 for medium-voltage connection and Standard CEI 0-21 for low-voltage connections) and rules have been adopted for integrating those installations into the national electricity system.

[30]By Decision 227/2014/R/eel, the Authority granted Terna's application to replace the Caltanissetta and Ottana sites with Ciminna and Casuzze in Sicily and Codrongianos in Sardinia, with no change in total installed capacity, and to label the two power-intensive projects 'Sicily' and 'Sardinia' respectively.
[31]For more details, please see the Terna website at https://www.terna.it/it-it/sistemaelettrico/progettipilotadiaccumulo.aspx

The updates to the technical connection standards (Standards CEI-016 and CEI 0-21) lay down the requirements to be met by new installations in order to be able to deliver network services. They include, inter alia, regulation of active power and insensitivity to voltage dips, as well as the manner and configuration of installing storage systems at an electricity generating installation. The installation drawings for measuring devices have also been established, in case it is necessary to measure the electricity generated by other power-generating modules and the electricity taken from the grid, stored, released and fed back into the grid by the storage systems.

Storage systems can also be fitted in installations which have access to the incentive and/or business schemes for energy off-take set out in the relevant regulatory framework, provided that they comply with the requirements under which the installations were admitted to those schemes.

The Ministerial Decree of 14 February 2017, which introduced provisions for the gradual coverage of the demand of Italy's smaller, non-interconnected islands, by using energy from renewable sources, promotes the implementation of two pilot projects, which may also include renewable offshore and solar thermal plants and, in compliance with the requirements of security and continuity of service, should enable, by 31 December 2020, the reduction of annual conventional electricity production. In particular, the projects will be selected also on the basis of their level of innovation. Consideration will be given to systems for the integration of renewable sources through the efficient use of storage systems and the development of electrical transport, integration of the electrical system with the islands' water supply system and with the adjustable demand present on the islands, and network upgrading with the smart distribution system concept.

As regards **smart grids**, to deliver an efficient energy system in line with the EU guidelines, the regulator selected seven pilot projects[32] to receive incentives for introducing innovative technologies in distribution networks, in order to integrate the behaviour and actions of all users connected to the same network, so as to favour distributed generation and the efficient use of resources. The trials ended in 2015 and the reported results[33] include the possibility of increasing the networks' hosting capacity through the work carried out, and of enabling the dispatching of distributed energy resources.

Based on the results of the smart grid pilot projects, the Authority has introduced an incentivising regulation scheme, selective and output-based and addressed at electricity distributors, for transforming distribution networks into Smart Distribution Systems. The innovative development of distribution networks could help to contain the level of investment required and hence the cost of the service, to the benefit of final customers. The net benefits from incorporating innovative facilities in distribution systems may thus be partly assigned to network operators through a specific incentive, to encourage them to deploy the solutions that maximise system benefits. The Authority has analysed the interaction with other regulating mechanisms for electricity distribution, and has identified two innovative Smart Distribution System facilities suitable for large-scale use, whose deployment could be bolstered by incentive schemes: monitoring of power flows and of the status of distributed resources in MV networks, and voltage adjustment in the same networks.

## Connection to the electricity networks

As concerns **network access conditions and allocation of connection costs**, network operators must give priority to connection requests and connection works for RES power plants or high-efficiency cogeneration (CHP) plants. To this end, network operators must ensure that these priority installations are connected to the grid within the timeframes set out in the Consolidated Text on Active Connections (CTAC[34]) which lists grid connection procedures, obligations, timing and costs. Decree-Law No 91/14, as implemented by the Ministerial Decrees of 19 May 2015 and 16 March 2017, introduced a single form for the construction, connection and operation respectively of small photovoltaic systems integrated in the roof of buildings, small high-efficiency micro-cogeneration units and micro-cogeneration units powered by renewable sources; the rules on connection were also simplified.

In particular, the Decree of 19 May 2015, introduced, with effect from 24 November 2015, for photovoltaic systems meeting certain characteristics,[35] a simplified installation, connection and commercial operation procedure. The aim of the Decree was to streamline the authorisation process for PV systems having a capacity of up to 20 kW as a two-step procedure, using:

[32]Initially, eight pilot projects had been selected, but one distributor dropped its project.
[33]For more details, see the Authority's website section at http://www.autorita.energia.it/it/operatori/smartgrid.htm
[34]Decision ARG/elt 99/08 as amended and supplemented.
[35]The Single Form, governed by the Decree of 19 May 2015 is used for the installation, connection and commercial operation of PV plants having all the following characteristics:
a) installed at the premises of end users already equipped with active low-voltage off-take points;
b) having a power output not exceeding that already available;
c) having rated power not exceeding 20 kW;
d) for which access to net metering is requested at the same time;
e) installed on the roofs of buildings in the manner set out in Article7-bis(5) of Legislative Decree No 28/11;
f) no additional energy installations at the same offtake point.

- reduction of the information and details to be supplied to the authorities and other relevant parties, thereby streamlining the exchange of information between Municipalities and Regions, network operators and GSE (Energy Services Operator);
- streamlining of the entire procedure.

Under the new system, users only deal with the network operator, to report the start and end of works via the Single Form. It is the network operator, and no longer the user, that then deals with the Municipalities and Regions to obtain authorisation for the installation, with Terna to register the system's data and with GSE to activate the net metering service.

For these PV systems, requiring only minor works, namely installation of the meter, connection costs are very low compared to the other types of plants, and amount to €100.

By the Decree of the Ministry of Economic Development of 16 March 2017, similar measures were introduced for the installation, connection and operation of high-efficiency micro-CHP units and of CHP units using renewable sources[36].

The application procedure is as follows: applicants must send to the network operator Part I of the single form at the start of works, and Part II at the end of works. Both notifications must contain a minimum required amount of information and documents; the network operator will in turn handle dealings with GSE, Terna (the TSO) and the Municipality. In Part I of the form, the applicant must also request access to the Net Metering scheme, and, optionally, may ask to join the White Certificates scheme, declaring that he is not subject to the ban on cumulation referred to in Article 6 of the Ministerial Decree of 5 September 2011.

The network operator must also provide the applicant, even via its website, with guidance based on the information provided by GSE, Terna and the Customs Office, listing the requirements to be met by the applicant during operation of the installation and the parties to be contacted for the various events that will take place during the life of the installation.

As regards the **connection costs** to low- and medium-voltage grids, under the CTAC, renewable energy installations are entitled to lower prices than those charged to installations using traditional fuels.

In particular, the price for connecting RES installations, hybrid installations (the latter only if their thermal capacity is less than 300 MW and at least half of their energy is produced from renewable sources), and high-efficiency CHP systems, is the lowest of the two values A and B (in Euro):

$$A = CP_A \times P + CM_A \times P \times D_A + 100$$

$$B = CP_B \times P + CM_B \times P \times D_B + 6000$$

where:

- $CP_A$ = 35 €/kW, $CM_A$ = €90/(kW·km), $CP_B$ = €4/kW, $CM_B$ = €7.5/(kW·km);
- P is the connection power, which is equal to the greatest of zero and the additional power required for dispatching (which is the difference, if positive, between the dispatching power requirement and the connection power available before the action);
- $D_A$ is the straight line distance between the connection point and the closest medium/low voltage transformer substation in use for at least 5 years;
- $D_B$ is the straight-line distance between the connection point and the closest high/medium voltage transformer substation in use for at least 5 years.

In the case of new connection via underground cable, the distance-based (CM) connection price doubles, whereas in the case of connection of installations that cannot be reached by a carriageable road or which are separated from the existing distribution systems by stretches of sea, lake or wetland, the distance-based (CM) and power capacity-based (CP) connection prices are multiplied by three. If the connection line is provided in part by underground cable and in part by above-ground line, the formulas for calculating the price are more complex.

[36]The approved single forms, different for high-efficiency micro-CHP units and of CHP units using renewable sources, apply to the systems having all of the following characteristics:
a) installed at the premises of final customers already equipped with active low- or medium-voltage off-take points;
b) having a power output not exceeding that already available for offtake;
c) using biomass, biogas, bioliquids, methane gas or LPG;
d) for which access to net metering is requested at the same time;
e) If located in heritage sites pursuant to Legislative Decree No 42 of 2004 (Cultural Heritage Code), they do not alter the state of the places and the exterior appearance of the buildings;
f) having a generation capacity of less than 50 kWe.

The connection price is paid by the connection applicant to the network operator, as to 30% when accepting the quotation, and as to the remaining 70% when completion of the works strictly necessary for the connection is notified. Alternatively, for amounts not exceeding €2,000, network operators can include in the terms and conditions of the connection service the requirement of upfront payment of the entire cost of the connection concurrently with quotation acceptance.

The price does not include the costs of the authorisation process which must be paid separately to the grid operators, if they handle the process, and the costs of acceptance testing which must be paid to the distributor if the installation owner decides to establish the grid connection system on his own.

For the connection of RES and high efficiency CHP plants, the connection applicant can install independently the connection system as to the parts not involving work on the existing electricity network i.e., as a rule, installation of the electricity line, if missing, and of the feed-in system. The network operator may allow the applicant to carry out works on the existing network, subject to the requirements of security and continuity of the electricity service.

After completing the connection works done independently, the applicant must send to the network operator the work completion notice, together with all the documents necessary for testing, commissioning and operating the relevant network sections. The costs of acceptance testing are paid by the applicant, even if the result is negative. Within 60 working days from completion of the acceptance testing and in any case not before taking over the installed works, the network operator shall reimburse the applicant for the amount paid at the time of quotation acceptance, plus the legal interest rate. The network operator shall also pay a price equal to the difference, if positive, between the cost of the works installed by the applicant and the connection price stated in the quotation. If the difference is negative, its amount shall be paid by the applicant to the network operator within the same 60-day period.

In the event of a set of generating plants[37], if the applicant decides to do the connection on his own, this must apply to all the connections of the set.

For high- and extra high-voltage connections of RES installations, at the time of submitting the application for the MTRs (Minimum Technical Requirements, i.e. the executive design for the connection works), the applicant shall pay the network operator a fee covering the work and technical analysis performed to draw up the MTRs.

The prices for renewable energy installations are half those charged for installations using traditional sources. This price is the sum of €1,250 and the figure obtained by multiplying 0.25 €/kW with connection power, up to a maximum of €25,000. The costs of works on the existing network are never charged to applicants that have renewable energy installations.
If the applicant did not fully pay the connection charges at the time the MTRs were accepted, before starting the connection works the applicant shall, on the network operator's request, submit a financial security in the form of a bank guarantee, covering the balance of the connection charge. This guarantee can be enforced by the network operator if the connection is not executed within the time limit set out in the connection contract for reasons attributable to the applicant, or if the applicant defaults on payment of the connection price. If the applicant decides not to go ahead with the project, for instance due to site clean-up requirements, the network operator may enforce a share of the guarantee covering the costs incurred up to that date, net of payments already made and plus any costs the network operator will incur to restore proper operation of the electricity network.

## Capacity market

**Legislative Decree No 379/2003** set up a new remuneration mechanism for the availability of electricity capacity able to achieve and maintain adequate production capacity, in order to ensure cover national demand and the necessary reserve margins.

By **Decision No 98/11**, as amended and supplemented, ARERA established the criteria and conditions for developing the framework for remunerating the availability of electricity capacity, and tasked Terna with drawing up the framework, also via formal public consultations.

By **Decree of 30 June 2014**, the Ministry of Economic Development approved the electricity capacity remuneration framework proposed by Terna, pursuant to Article 2 of Legislative Decree No 379 of 19 December 2003. By communication of 27 October 2016, the Ministry of Economic Development provided guidance to Terna for supplementing and amending the draft framework and conducting a public consultation.

The Decree was notified to the European Commission which, by Decision C(2018) 617 of 7 February 2018, found the rules governing the capacity market notified by the Ministry of Economic Development on 24 August 2017 to be compatible with the internal market.

[37]A batch of generating plants is a group of separate renewable energy plants and/or high-efficiency CHP plants, located on the same land or on adjacent land, that may be separated only by road, railway or watercourse. The plants belonging to a batch must have a required input power such as to allow, for each of them, the supply of the connection service in low or medium voltage only.

The draft Decree, previously notified to the European Commission, has been updated to take into account the Draft Integrated National Energy and Climate Plan (NECP), which provides for the launch of the capacity market in 2019, and to introduce specific environmental requirements on emissions as an additional criterion for eligibility to the capacity market. This is done to combine, from the launch of the capacity market, the objective of adequacy of supply with that of environmental protection, and to promote investment choices consistent with the decarbonisation process, applying in advance some of the provisions of the EU Regulation on the internal market for electricity that will come into force on 4 July 2019.

On **28 June 2019**, following Decision C(2019) 4509 of June 14, 2019 by the European Commission, which found the proposal to amend the capacity regulations to be compatible with the internal market, the Minister of Economic Development approved the **decree approving the new rules** on the system of remuneration of the availability of generation capacity.

The capacity market ensures the medium-long-term adequacy of the system, by providing appropriate flexible capacity, to the extent strictly necessary for ensuring the security of supply of the electricity system and meeting energy demands, without leading to any electricity price or tariff increases for final customers, also through the participation of distributed generation from renewable sources and of demand.

The market is structured through procurement auctions organised by Terna, with a maximum planning horizon of four years, for trading physical generation capacity reliability options.

Participation is voluntary, and is open to new and existing energy generating installations, whether or not using renewable sources, and to demand. It should be noted that the energy investment incentives provided by the GSE, including net metering and simplified Purchase and Sale Arrangements, other than White Certificates and the 'Conto Termico' (Thermal energy account), cannot be cumulated with participation in the capacity market. In particular, generators must relinquish those other incentives for the entire delivery period covered by the qualification process (1 year). Upon such relinquishment, incentive payments shall be stopped and may not be recovered by the beneficiary. The selected counterparties receive (pay) a premium (€/MW/year), known as fixed price, which is the clearing price of the auction (marginal price) in which the contract was awarded.

In return, for each hour of the delivery period and with reference to the place of delivery, the counterparties must:

- offer the contracted capacity on the Day-Ahead Market (Mercato del Giorno Prima, 'MGP') or on the Intra-Day Market (Mercato Infragiornaliero, 'MI'), directly or indirectly, through the dispatching user or the market operator, and offer on the Dispatching Services Market (DSM) the part of the contracted capacity not accepted on the electricity markets;
- pay Terna a variable fee equal to any positive difference (in €/MWh) between the spot price and the strike price.

The first two auctions were held in 2019 for delivery years 2022 and 2023. In detail, according to the data supplied by Terna in the first auction, approximately 36.5 GW of domestic capacity were selected, of which approximately 1 GW from non-programmable renewable sources (wind, photovoltaic and hydroelectric) and approximately 4.4 GW foreign capacity. The total annual cost of the auction is €1,299 million (of which €19.2 million foreign capacity), with a valuation premium of 4,400 €/MW/year for foreign capacity and, in all National Areas, of 75,000 €/MW/year for new capacity and 3,3000 €/MW/year for existing capacity.
For the second auction, with delivery 2023, approximately 39 GW of domestic capacity were selected – including approximately 1.3 GW from non-programmable renewable energy installations – and approximately 4.4 GW of foreign capacity.

## 3. Please describe the support schemes and other measures currently in place that are applied to promote energy from renewable sources and report on any developments in the measures used with respect to those set out in your National Renewable Energy Action Plan (Article 22(1)(b) of Directive 2009/28/EC)

### THERMAL SECTOR

The main national schemes promoting the thermal use of renewable energy sources are the White Certificates (or Energy Efficiency Certificates), the Thermal Account and Tax Deductions.

### White Certificates

White Certificates (also known as Energy Efficiency Certificates - EECs) are tradable securities which certify energy savings in final energy uses. The legal basis of the White Certificates scheme is set out in the Ministerial Decrees of 24 April 2001, 20 July 2004, 21 December 2007, 28 December 2012, 11 January 2017 and 10 May 2018.

In particular, the Ministerial Decree of 10/05/2018 introduced important amendments to the Ministerial Decree of 11/01/2017 'Determination of the national quantitative energy saving targets for electricity and gas distributors in the years 2017 to 2020 and approval of the new Guidelines for preparing, implementing and assessing energy efficiency projects', described in the previous edition of this report.

The White Certificate scheme is based on the obligation for gas and/or electricity distributors with more than 50,000 final customers to achieve pre-set annual energy savings targets. The energy-saving targets set by the new Ministerial Decree for the period 2017-2020 are as follows:

**Annual national quantitative energy-saving targets to be achieved through the White Certificates scheme**

| Year | Primary energy to be saved (Mtoe) |
|---|---|
| 2017 | 7.14 |
| 2018 | 8.32 |
| 2019 | 9.71 |
| 2020 | 11.19 |

**Required savings in final uses of electricity and natural gas:**

| Year | Electricity savings [millions of EECs] | Natural gas savings [millions of EECs] |
|---|---|---|
| 2017 | 2.93 | 2.95 |
| 2018 | 2.49 | 3.08 |
| 2019 | 2.77 | 3.43 |
| 2020 | 3.17 | 3.92 |

The following parties may submit energy efficiency projects:

a) Obligated parties;
b) electricity and gas distributors not subject to the obligation;
c) public and private parties that either hold UNI CEI 11352 certification, have appointed a UNI CEI 11339-certified energy management expert or have an ISO 50001-certified energy management system.

The parties entitled to submit energy efficiency projects implement actions that generate additional primary energy savings for end users and sell the White Certificates thus obtained on the market managed by GME (the electricity market operator) or by means of bilateral contracts to obligated parties and other parties participating in the scheme. White Certificates have a commercial value of 1 toe each.

The main new elements introduced by the Ministerial Decree of 10/05/2018 are the following:

- projects involving the use of renewable energy sources for non-electrical uses shall be eligible only with regard to their capacity to increase energy efficiency and save non-renewable energy;
- The concept of baseline consumption, which is used to determine the additional savings of a project are determined, has been redefined as being equal to the value of consumption before implementation of the energy efficiency project. According to the definition contained in the Ministerial Decree of 11/01/2017, instead, baseline consumption was the lower of consumption before implementation of the energy efficiency project and the reference consumption. The Ministerial Decree specifies that in the case of new installations, building or sites however named, for which no energy consumption values prior to the project are available, the baseline consumption is equal to the reference consumption.
- The pricing incentive granted to the obligated parties, to cover a share of the costs incurred to implement projects (or to purchase White Certificates), **cannot exceed the value of €250 per certificate**. This provision applies to the obligation sessions after 1 June 2018; at the end of November 2019, the Regional Administrative Court of Milan ruled that the €250 cap on the pricing incentive for EECs payable to distributors was unlawful.
- Upon the obligated parties' request, the Energy Services Operator (*Gestore dei Servizi Energetici* - GSE) may issue them with White Certificates not relating to the implementation of energy efficiency projects, at a unit value equal to €260 minus the value of the final pricing incentive for the obligation year. In any case, this amount may not exceed €15. These certificates cannot be transferred by the obligated party who receives them; they are marked as being of a specific type, are not entitled to the pricing incentive and can be acquired only if the obligated party already holds certificates covering 30% of the obligation;
- obligated parties who acquire White Certificates from the GSE not deriving from the implementation of energy efficiency projects, may, under certain conditions, redeem all or part of the sum paid for the acquisition, against the delivery of Certificates generated by implementing energy efficiency projects or acquired on the market
- Thirty new types of actions eligible for the scheme have been introduced, and newly installed projects have been differentiated from replacement projects by granting the former a longer lifetime (in years). Eight new forms for Standardised Projects (SP) have been introduced, encouraging actions such as the installation of LED lights, energy efficiency measures for the propulsion system of cargo and/or passenger ships, and the purchase of hybrid vehicles and electric vehicles powered by renewable energy;
- if the obligated party achieves less than 100%, but more than 60% of its obligation/quota, it may offset the remaining share of obligation in the following two years without incurring penalties, and no longer in only one year as was previously the case.

Annex 1 to the Ministerial Decree of 10 May 2018 contains the non-exhaustive list of actions eligible for the scheme, and specifies the useful life and the type of White Certificates that can be obtained according to the form of energy saved. The actions are divided by sector (industry, networks, services, transport, civil sector and cross-cutting behavioural measures), type (new installation and replacement) and form of energy saved. Annex 2 contains the list of standardised projects (SPs) eligible for the mechanism and their detailed descriptive sheets.

The Decree of 30 April 2019 of the Directorate-General for the Electricity Market, Renewables and Energy Efficiency, and Nuclear Energy of the Ministry of Economic Development, in agreement with the Directorate-General for Climate and Energy of the Ministry of the Environment and Protection of Land and Sea, approved the operational guidance prepared by GSE to promote the selection, definition and submission of projects under the White Certificate scheme, pursuant to Article 15(1) of the Ministerial Decree of 11 January 2017 as amended and supplemented. The Guidance provides, *inter alia*, useful instructions on how to apply for the incentives and a description of the best available technologies, including those identified at European level, the economic and energy savings potential delivered by those technologies, and advice on how to identify the reference consumption where actual figures on consumption levels before the action are not available. Annex 2 to the Decree updates the non-exhaustive list of actions eligible for the scheme

Various authorities participate in developing the guidelines and assessing the projects developed to meet the annual targets imposed on electricity and natural gas distributors. The role of the Ministry of Economic Development and the Ministry of the Environment and Protection of Land and Sea is to provide coordination and guidance. GSE is

responsible for measuring and certifying energy savings, with support from ENEA (the Italian National Agency for new technologies, energy and sustainable economic development) and the company RSE (*Ricerca sul sistema energetico*). GME (*Gestore dei mercati energetici* - Electricity Market Operator) manages the regulated platforms for the trading of energy efficiency certificates. The Regulatory Authority for Energy, Networks and the Environment (ARERA) establishes the pricing incentives and monitors the scheme. GSE is responsible for verifying and monitoring all the energy efficiency projects that have requested access to the White Certificate scheme. It does so by means of document checks or unannounced site inspections and visits.

As stated in the earlier editions of this report, to enable obligated parties to recover all or part of their investment costs for the actions, a component of the electricity and natural gas distribution tariffs has been introduced. For the years 2017 and 2018 the final pricing incentives were set respectively at: €311.45 per EEC (final incentive) and €250.54 per EEC (reference incentive).

**Presentation of the main results for 2017 and 2018**

In 2018 GSE received 2,211 requests under the white certificate scheme and issued in total 3,832,984 EECs, corresponding to primary energy savings of 1.31 Mtoe. In 2018 the number of EECs Issued decreased by about 34% compared to 2017; 5,807,831 EECs were issued, equal to about 1.9 Mtoe of primary energy savings.

As in previous editions, for the purposes of this report results are shown in terms of value of the EECs issued only in respect of projects approved for participation in the White Certificate scheme and using renewable heating and cooling technologies. Result analysis is only performed on the projects provided with technical data sheets for standardised or analytical assessment of the energy savings obtained. It should be noted that the Ministerial Decree of 11 January 2017 repealed all the technical sheets on analytical and standardised valuation methods, which had been in force in 2015 and 2016 and will continue to receive certificates until the end of their useful life.

The data on the number of certificates issued and primary energy savings obtained have been taken from the annual reports on the white certificate scheme published by GSE. The price used to calculate the value of the EECs issued is the average market price for calendar years 2017 and 2018. In 2018, the average price was about 304 €/EEC; in 2017 it was 267 €/EEC.

**Estimated annual value of incentives provided for certain categories of RES actions under the EEC scheme in 2017 and 2018**

| | | | **EECs issued (No of EECs)** | | **Annual value of the incentive (k€)** | |
|---|---|---|---|---|---|---|
| Sheet No | Title of the technical data sheet | Calculation method | 2017 | 2018 | 2017 | 2018 |
| 8T | Use of solar collectors to produce domestic hot water | Standard | 4,757 | 2,478 | 1,270 | 752 |
| 15T | Installation of external air intake electric heat pumps in place of boilers in new or renovated residential buildings | Standard | 10 | - | 3 | - |
| 22T | Application in the civil sector of district heating systems for space conditioning and domestic hot water production | Analytic | 25,036 | 7,786 | 6,685 | 2,364 |
| 26T | Installation of centralised systems for the heating/cooling of non-industrial buildings | Analytic | 73,367 | 47,414 | 19,590 | 14,395 |

## Thermal Energy Account

The Ministerial Decree of 16 February 2016, which came into force on 31 May 2016, updated the 'Thermal Account' (TA) scheme, strengthening and simplifying the incentive mechanism introduced by the Decree of 28 December 2012, which supported energy efficiency projects and RES heat projects. The scheme has an annual budget of €900 million. The beneficiaries of this mechanism are public administrations, which can draw on a €200 million budget for energy efficiency and RES thermal energy projects, enterprises and households, for which €700 million are budgeted only for RES heat installations.

The incentive provides, in one or more instalments, a capital grant which, subject to specific parameters, criteria and expenditure limits, can cover between 40% and 65% of the investment costs, depending on the project.

The Ministerial Decree of 16 February 2016 enhanced the scheme's technological innovation impact, by basing the eligibility requirements on the latest technical standards, prioritising the best performing technology on the market and simplifying the procedures for accessing the incentives. In addition to simplifying procedures and expanding the range of possible beneficiaries (to include in-house companies and housing cooperatives), the Decree also added new energy

efficiency actions. Other significant changes include the increase in the size of eligible installations and a simpler direct access procedure for installations included in a specific catalogue.

Other changes concerned the incentives themselves: the threshold for paying them out as a single lump sum was raised from €600 to €5,000, and the payment timeframe was shortened from six to two months.

Under the new Thermal Account, buildings can be refurbished to improve their energy performance, reducing fuel consumption costs and thereby quickly recovering part of the costs incurred. In addition, the new TA enables public administrations to play an exemplary role as required by the Energy Efficiency Directive.

The scheme can be accessed in two ways: direct access (after completing the works) or reservation (when starting the works). The first procedure is open to both public and private entities, while the second is reserved for public administrations. A previous third access option, which involved joining a register, has been scrapped.

As in the previous version, the new Thermal Account provides incentives to two categories of projects:

- **Category 1 - Eligible projects by public administrations**
  - thermal insulation of opaque surfaces;
  - replacement of windows
  - replacement of heating systems with condensing boilers;
  - installation of screening and/or shading systems;
  - conversion of buildings into NZEBs;
  - replacement of indoor and outdoor lighting systems with efficient lighting systems;
  - installation of building automation technologies for the buildings' heating and electricity systems.

- **Category 2. Eligible projects by public administrations and private parties**
  - replacement of heating/cooling systems with heat pump systems up to 2,000 kW
  - replacement of air conditioning systems with biomass generators up to 2,000 kW
  - installation of solar thermal collectors up to 2,500 $m^2$
  - replacement of electric water heaters with heat pump boilers;
  - replacement of heating/cooling systems with new hybrid systems (condensing boilers + heat pump)

For category 2 actions, the incentive, which may not exceed 65% of eligible expenditure, is calculated on the basis of the presumed thermal energy output capacity and according to technology, system size and climate zone. Moreover, biomass stoves and boilers receive premium coefficients for low particulate emission values.

Support is provided for the conversion of existing buildings into 'nearly zero-energy buildings (NZEBs)'. These are building renovation works, including volume extensions by up to 25%, carried out to convert the buildings owned by the public administration into 'nearly zero-energy buildings', respecting the requirements of the Ministerial Decree of 26 June 2015. Reimbursable expenses also include earthquake proofing works, via reinforcement or reconstruction, which also boost thermal insulation. Buildings that are demolished may be rebuilt in a different location.

Incentives are also provided for building automation actions. They consist in installing technologies to automatically control and manage the heating and electricity systems of buildings so as to improve their energy performance, with regard to space heating and cooling, ventilation and air conditioning, water heating, lighting, control of solar shading systems, integrated control and centralisation of various applications, consumption tracking and analysis, achieving at least Class B of Standard EN15232.

The incentive is paid in 1, 2 or 5 annual instalments, depending on the size and type of the action; for actions by private parties, the limit for receiving a single lump sum payment is €5,000, while PA receive a single payment regardless of the amount of the incentive.

### Results achieved in 2017 and 2018

The following table shows the number of incentive applications received in 2017 and 2018, and the total amount requested each year.

**Thermal Account incentive applications in 2017 and 2018**

| YEAR | DIRECT ACCESS | | RESERVATION | | TOTAL | |
|---|---|---|---|---|---|---|
| | Number of applications | Amount of incentive requested (€m) | Number of applications | Amount of incentive requested (€m) | Number of applications | Amount of incentive requested (€m) |
| 2017 | 42,894 | 121.5 | 333 | 61.7 | 42,894 | 121.5 |
| 2018 | 92,461 | 247.8 | 489 | 87.9 | 92,461 | 247.8 |

The direct access procedure is by far the most common (99% of the applications and 74% of the incentives).

The following table provides a breakdown by type of action, showing the number of projects in each type, the total incentives per type of action, and the average incentive granted to each individual project.

**Direct access. Breakdown of approved applications by type of action in 2017 and 2018**

| | Year 2017 | | | Year 2018 | | |
|---|---|---|---|---|---|---|
| TYPE OF ACTION | No of projects implemented | Total incentives per type of action [M€] | Average incentive per project [€/project] | No of projects implemented | Total incentives per type of action [M€] | Average incentive per project [€/project] |
| 1.A - Opaque building envelope | 166 | 6.10 | 36,765 | 197 | 7.6 | 38,702 |
| 1.B - Transparent surfaces | 131 | 2.85 | 21,786 | 189 | 4.5 | 23,856 |
| 1.C - Condensing boilers | 1,079 | 2.92 | 2,703 | 1,457 | 4.0 | 2,734 |
| 1.D - Shading systems | 17 | 0.07 | 4,118 | 22 | 0.1 | 4,952 |
| 1.E - NZEBs | 1 | 1.06 | 1,058,000 | 9 | 2.5 | 273,606 |
| 1.F - Lighting systems | 70 | 0.70 | 9,957 | 134 | 1.4 | 10,751 |
| 1.G - Building Automation | 19 | 0.08 | 4,368 | 26 | 0.2 | 7,942 |
| 2.A - Heat pumps | 1,949 | 9.59 | 4,923 | 8,109 | 25.3 | 3,119 |
| 2.B - Biomass stoves and boilers | 23,425 | 51.05 | 2,179 | 45,302 | 98.4 | 2,172 |
| 2.C - Solar thermal | 12,213 | 24.75 | 2,026 | 21,350 | 44.8 | 2,099 |
| 2.D - Heat-pump water heaters | 388 | 0.22 | 575 | 427 | 0.3 | 636 |
| 2.E - Hybrid systems | 61 | 0.14 | 2,246 | 117 | 0.3 | 2,556 |
| Total | 39,519 | 99.53 | 2,519 | 77,339 | 189.4 | 2,449 |
| EA+EPC: Energy audits and energy performance certificate | 365 | 0.62 | 1,685 | 465 | 0.8 | 1,782 |
| TOTAL | | **100.2** | | | **190.2** | |

The expected benefits have been estimated on the basis of the approved incentive applications. The actions contracted in 2018 activated more than €400 million of investments, more than 1,500 GWh of thermal energy from renewable sources and 36 ktoe of final energy savings, corresponding to emission savings of about 164,000 tonnes of $CO_2$.

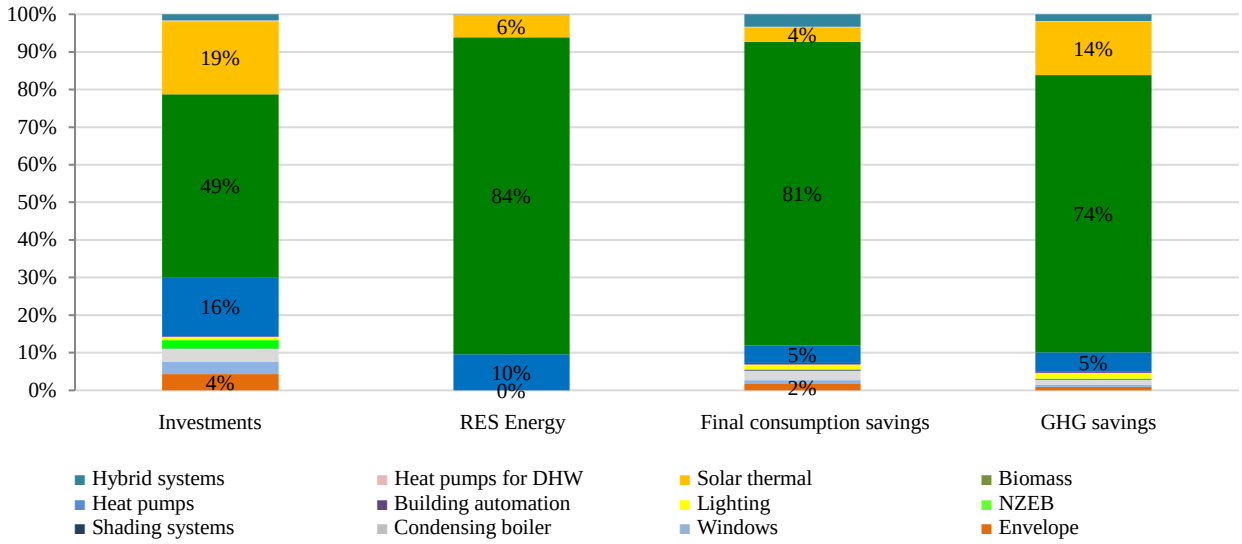
**Energy and environmental benefits of the new actions supported by the Thermal Account in 2018**

| | **Investment** | **RES Energy** | **Final consumption savings** | **GHG savings** |
|---|---|---|---|---|
| | **€m** | **ktoe** | **ktoe** | **ktCO2** |
| 1.A - Opaque building envelope | 18 | - | 0.6 | 1.5 |
| 1.B - Transparent surfaces | 14 | - | 0.4 | 0.9 |
| 1.C - Condensing boilers | 14 | - | 0.9 | 2.3 |
| 1.D – Shading systems | 0.4 | - | 0.0 | 0.2 |
| 1.E - NZEBs | 9 | - | 0.1 | 0.2 |
| 1.F - Lighting systems | 4 | - | 0.5 | 2.5 |
| 1.G - Building Automation | 1 | - | 0.2 | 0.4 |
| 2.A - Heat pumps | 65 | 12.8 | 1.7 | 8.5 |
| 2.B - Biomass stoves and boilers | 200 | 112.7 | 29.4 | 120.6 |
| 2.C - Solar thermal | 80 | 8.0 | 1.4 | 23.2 |
| 2.D - Heat-pump water heaters | 1 | 0.1 | 0.1 | 0.3 |
| 2.E - Hybrid systems | 7 | 0.1 | 1.2 | 2.9 |
| **Total** | **413** | **134** | **36** | **164** |

Among the different types of intervention promoted in the thermal account, the environmental energy contribution offered by biomass plants stands out, on account of the high number of applications for this type of action, of the high use factor of these technologies (hours of heating, mainly in mountain areas, etc.) and of the fact that they often replace obsolete systems with low conversion efficiency. Other significant types of systems supported by the scheme are solar

installations, with a high number of projects but lower use factors (compared to biomass plants) and heat pumps, which have grown strongly over the last year.

**Contribution of the various types of actions supported by the Thermal Account to the benefits produced**



## Tax advantages for energy-saving projects

Solar thermal installations, high-efficiency heat pumps, low-enthalpy geothermal systems, biomass-fired boilers and heat-pump water heaters can benefit from an incentive scheme for energy-saving projects in the building sector via tax deductions. This is a voluntary mechanism, enabling individuals or businesses to deduct respectively from their personal (IRPEF) or corporate (IRES) income tax a percentage of the cost of certain types of energy upgrading works on existing buildings. The deduction is spread over 10 years.

The tax advantages for energy saving projects are covered by the annual and multi-annual State budget. The scheme entered into force in 2007 (Law No 296/2006, Budget Law for 2007) and has since been amended and extended. The 2019 Budget Law (Law No 145 of 30 December 2018) extended to 31 December 2019 the deadline for claiming a deduction from personal or corporate income tax (IRPEF or IRES) of 65% of the costs of energy efficiency improvement works on buildings.

In the years covered by this report (2017 and 2018), the deduction was 65%.

The 2018 Budget Law (Law No 205 of 27 December 2017) introduced some changes to the framework described in the previous edition of this report. These include:

- the reduction to 50% of the deduction of the costs for the purchase and installation of windows inclusive of frames and of solar shading, and for the replacement of space heating systems with condensing boilers with least class A efficiency rating;
- the reduction to 50% of the deduction of the costs for the purchase and installation of space heating systems using biomass-fired boilers (maximum deduction €30,000);
- the non-eligibility of the purchase costs of condensing boilers with efficiency rating below class A;
- the introduction of a new deduction (65%, up to a maximum deduction value of €100,000) for the purchase and installation of micro-cogenerators to replace existing plants;
- a 65% deduction of the costs of replacing space heating systems with hybrid systems, consisting of a heat pump integrated with a condensing boiler, or of the costs of purchasing and installing condensing air heaters;
- from 2018, the 50% deduction also applies to condensing boilers with an average seasonal efficiency at least equal to that required for class A products under by Regulation (EU) No 811/2013. If, in addition to being at least Class A, the boilers are also equipped with advanced temperature control systems (Classes V, VI or VIII of Commission Communication 2014/C 207/02), the higher deduction rate of 65% is granted.

The deduction has been extended to 31 December 2021 for works on the common parts of condominium buildings and for works carried out in all the property units of a single condominium. These type of projects receive higher deductions when they achieve specific energy performance levels. Specifically, deductions of 70% or 75% can be granted, to be calculated by multiplying the total expenditure (which cannot exceed €40,000) by the number of property units in the building.

Even higher deductions are granted to projects that include earthquake proofing works on buildings in seismic zones 1, 2 or 3. In these cases, the deduction is increased to 80% deduction if risk is reduced by one class, to 85%, if risk is reduced by at least 2 classes. The ceiling of expenditure eligible for deduction is €136,000 per property unit in the building.

Another important new feature, in force since 2018, is the possibility of assigning the receivable, consisting of the deduction, also for energy efficiency projects on individual property units and not only for those on the common parts of condominium buildings. Hence, regardless of the property on which the actions are carried out, from 2018 all taxpayers who in the year preceding the year in which the expenditure was incurred were in the ‘no tax area’ (had no taxable income) may, in lieu of the tax deduction, assign their receivable to suppliers or other private entities, including credit institutions and financial intermediaries. Taxpayers that have taxable income may instead transfer their receivable to suppliers or other private entities, except for credit institutions and financial intermediaries.

Tax deduction limits have been established according to type of project. The caps are given in the following table:

**Maximum deductions**

| TYPE OF ACTION | MAXIMUM DEDUCTION |
|---|---|
| Energy efficiency improvements in existing buildings | €100,000 |
| on existing building envelope (e.g. walls, roofs and floors) | €60,000 |

| | |
|---|---|
| installation of solar panels for the production of DHW | €60,000 |
| replacement of space heating systems | €30,000 |
| purchase and installation of solar shading systems | €60,000 |
| purchase and installation of winter heating systems using biomass-fired boilers | €30,000 |
| multimedia devices for the remote control of heating, hot water production and air conditioning systems in housing units | no maximum amount |
| for the years 2018 and 2019, purchase and installation of micro-cogenerators | €100,000 |
| Works on the communal areas of condominiums eligible for 70% or 75% deduction | there is no upper limit for the deduction but there is a cap on total expenditure, which is €40,000 multiplied by the number of property units in the building |
| actions on common parts of condominium buildings eligible for 80 or 85% deduction | there is no upper limit for the deduction but there is a cap on total expenditure, which is €136,000 multiplied by the number of property units in the building |

The tax deduction can be requested by all resident and non-resident taxpayers, including businesses, holding the property concerned under any title. In particular, the following parties are eligible for the scheme:

- individuals, including persons pursuing trades or professions
- taxpayers with income from business activities (individuals, partnerships, limited liability companies)
- groups of professionals
- public and private entities not pursuing business activities.

From 2018, deductions for all types of energy efficiency projects can also be claimed by:

- social housing institutes, however named, and equivalent entities, established and already operating as of 31 December 2013 in the form of companies meeting the EU law requirements on 'in house providing'. The deductions are for energy efficiency works carried out on buildings owned by or managed on behalf of the municipalities and used for social housing purposes;
- undivided-ownership housing cooperatives for works carried out on properties owned by them and assigned for use to their members.

In 2017, instead, Social Housing Institutes were only eligible for the higher 70 and 75% deductions.

**Main results**

The following table summarises the total investments – divided by technology/type of action – made in 2017 and in 2018, which benefited from the tax relief for energy-saving projects.

**Investments (€million) by technology, years 2017 and 2018**

| Technology/action | 2018 (€million) | 2017 (€million) |
|---|---|---|
| Floors and ceilings | 484 | 412 |
| Walls | 529 | 385 |
| Doors and windows | 1,236 | 1,736 |
| Solar thermal | 36 | 50 |
| Solar shading systems | 128 | 184 |
| Condensing boilers | 561 | 633 |
| Biomass-fired boilers | 2 | 11 |
| Heat pumps | 224 | 235 |
| Building automation | 17 | 20 |
| Other | 111 | 58 |
| TOTAL | 3,328 | 3,724 |

* Geothermal systems, heat pump water heaters for DHW, hot air generators, micro-cogenerators and hybrid systems

Source: ENEA 2019 ANNUAL REPORT - 65% Tax deductions

## Tax advantages for building renovations

Energy saving projects, in particular the installation of RES energy generating systems, are also eligible for tax advantages for building renovation projects. For example, the installation of PV power systems (Revenue Agency Decision No 22/E of 2 April 2013) and of power storage system are both eligible. Note that to be eligible, the power storage system must have been installed together with the PV system, since in this case it is functionally connected to the PV system. If the storage system was installed after the PV system, it will not be eligible if the PV system itself is not eligible as it benefits from a tariff incentive.

The relief consists of the deduction from personal income tax (IRPEF) of 50% of the costs incurred, up to a maximum amount of €96,000 per property unit.

Tax advantages for building renovations are covered by the State annual and multi-annual budget. This scheme entered into force in 1986 (Article 16-bis of President Decree No 917/86) and has been amended and extended since then. Recently, the 2019 Budget Law (Law No 145 of 30 December 2018) extended to 31 December 2019 applicability of the highest IRPEF tax deduction (50%), confirming the maximum spending limit of €96,000 per property unit. Barring a new extension, from 1 January 2020 the deduction rate will revert to the standard value of 36%, with an expenditure cap of €48,000. From 2018, works carried out must be reported to ENEA, as is already the case for energy efficiency projects on buildings. The reporting is necessary to monitor and evaluate the energy savings achieved by the building renovation projects.

The 2019 Budget Law also extended the 50% tax deduction on the purchase of furniture and large appliances of minimum class A+ (A for ovens), to furnish property units under renovation. With regard to the costs for earthquake roofing works, higher deductions have been introduced, of up to 85%, in force until 31 December 2021.

In the years covered by this report (2017 and 2018), the deduction was 50%.

The tax deduction on renovation costs is available to all taxpayers paying personal income tax (IRPEF), whether or not residing in Italy. This facility is available not only to property owners but also to holders of rights in rem/personal rights to use the properties being renovated, and who pay the renovation costs:

- owners or bare owners
- holders of a right in rem to enjoyment (usufruct, use, residence or leasehold), tenants or users;
- members of divided or undivided ownership housing cooperatives;
- sole traders, for property not classed as capital goods or commercial goods;
- the entities listed in Article 5 of the Consolidated Text on Income Tax, which generate income in associated form (simple partnerships, general partnerships, limited partnerships and equivalent entities, family undertakings), under the same conditions as for sole traders.

The Decree-Law of 30 June 2019 (‘Growth Decree’), established that beneficiaries of the facility may assign their tax credit to the suppliers of the goods and services necessary to carry out the projects. In turn, the supplier may assign the

tax credit to its suppliers of goods and services. However, no further assignment is possible. In any case, the tax credit cannot be assigned to credit institutions or financial intermediaries.

## ELECTRICITY SECTOR

### Overview of the incentive schemes for electricity from renewable sources

During the period 2017-2018, the following incentive schemes for new renewable electricity installations were in place in Italy:

- **Ministerial Decree of 6 July 2012**, supporting non-PV RES electricity plants. From January 2013, this scheme superseded the Green Certificates (GC) and the All-Inclusive Tariffs (AIT).
- **Ministerial Decree of 23 June 2016**, which updated the schemes under the Ministerial Decree of 6 July 2012 for RES electricity installations other than photovoltaic. The 2016 Decree added solar thermal installations to the schemes and repealed the Ministerial Decree of 11 April 2008.

Support to renewable electricity generation is also provided by the following simplified electricity off-take services:

- **Simplified Purchase and Sale Arrangements (SPSAs)**, for programmable installations having a capacity of up to 10 MVA and for non-programmable installations of any capacity. Under this scheme, the energy is collected and paid for by GSE, which then places it on the market;
- **Net Metering (NM)**, for installations with a capacity of up to 200 kW. This upper limit was raised to 500 kW by Decree Law No 91/2014. Under the net metering scheme, the costs paid by users to purchase electricity from the grid are offset by the value of the electricity they produce and inject into the grid.

For completeness, we shall also mention earlier schemes, no longer accessible in the reporting period, which have continued to support a significant number of installations in operation.

The first Italian incentive scheme, introduced back in 1992, was **CIP 6/92**. It remunerated with the energy generated from renewable sources and equivalent sources through a feed-in tariff, whose value was updated over time. This is an all-inclusive tariff, since the payments made implicitly include both an incentive component and a component for the value of the electricity fed into the grid.

The **Green Certificates**, in force until 2015, were issued in proportion to the energy generated by renewable energy installations and by certain CHP plants, and were traded at market prices between their holders and producers and importers of electricity from traditional sources (which were obliged to inject into the national electricity grid each year a set share of RES electricity; the share was abolished in 2016); unsold certificates were purchased by GSE at regulated prices.

Since 2016, any installations still entitled to Green Certificates have received, for the remaining period of entitlement, an incentive on their incentivised net production, which supplements their revenue from energy pricing.

The **All-Inclusive Tariffs**, introduced by Law No 244/2007, were governed by the Ministerial Decree of 18 December 2008. They were reserved for installations having a capacity of up to 1 MW (200 kW for wind turbines), which were in operation by 31 December 2012. The scheme consists of a set of fixed electricity feed-in tariffs, whose value includes both the incentive component and the pricing component for the electricity supplied to the grid.

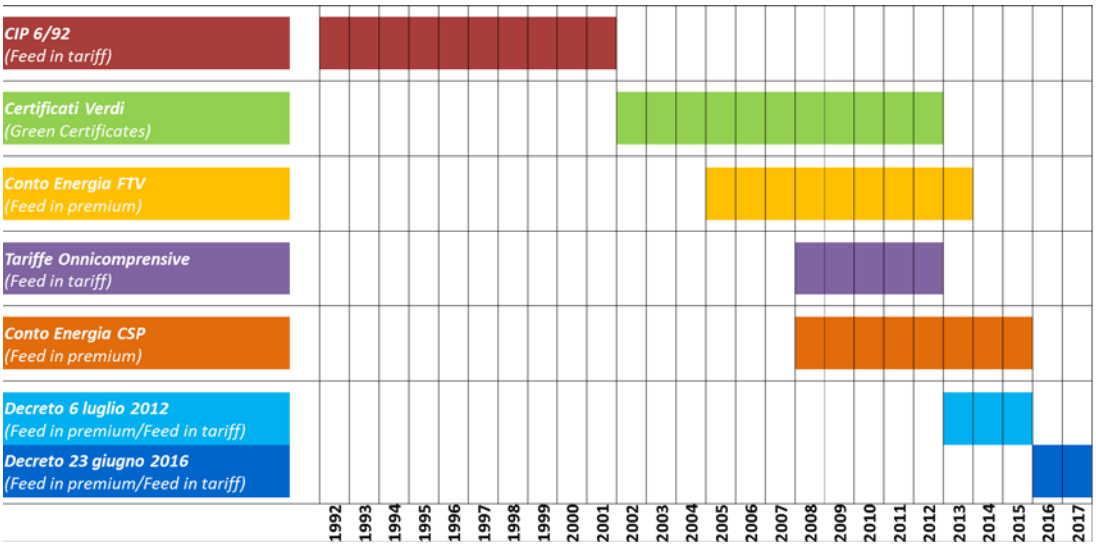
In the photovoltaic sector, access to the PV electricity feed-in scheme known as ‘Energy Account’ was discontinued in 2013, (except for special cases), as the budget available (€6.7 billion/year) had been fully used up. New projects in 2017 and 2018 were mainly supported by net metering and/or via a tax deduction mechanism (the latter only available for small installations supplying energy to buildings).

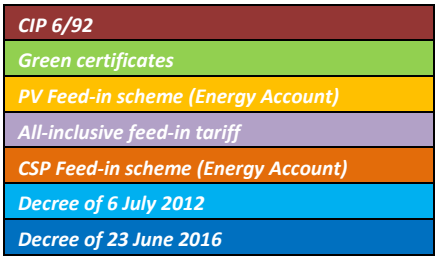
The **Ministerial Decree of 6 July 2012** introduced a new incentive scheme for non-PV RES installations commissioned from 1 January 2013, to replace the Green Certificate and All-Inclusive Tariff (AIT) schemes. These installations are subsidised on the basis of the electricity they supply to the grid: those supplying up to 1 MW receive all-inclusive tariffs, while those supplying more than 1 MW receive an incentive equal to the difference between a reference tariff and the hourly zonal price of electricity. To access the incentives, installations must either have been entered in registers or have participated in descending price auctions (depending on their power output), while for small-sized installations access is direct.

The **Ministerial Decree of 23 June 2016** updated the incentive schemes for non-PV RES installations introduced by the Ministerial Decree of 6 July 2012, extending their scope to solar thermal installations (and repealing the Ministerial Decree of 11 April 2008, which had established the previous incentive scheme for solar thermal plants). These installations are subsidised on the basis of the electricity they supply to the grid: those supplying up to 500 kW receive all-inclusive tariffs, while the installations above this threshold receive an incentive equal to the difference between a reference tariff and the hourly zonal price of electricity. To access the incentives, installations must either have been entered in registers or have participated in descending price auctions (depending on their power output), while for small-sized installations access is direct.

The following diagram shows the time sequence of the different renewable electricity support schemes in Italy. The periods shown in the chart represent the time windows for accessing the schemes and not the duration of the incentives. Please note that the diagram is purely indicative; for instance, it does not include transitional periods or the actual start date of the incentives for those installations that joined a scheme near its deadline.

**Incentive systems in force in the period 1992-2018**




**Incentive schemes for electricity from renewable sources**

| INCENTIVE SCHEME | ACCESS PERIOD[1] | DURATION OF INCENTIVE [1] | SOURCES/TECHNOLOGIES | INSTALLED CAPACITY [2] | TYPE OF INCENTIVE [3] | VALUE OF INCENTIVE | TYPE OF ENERGY COVERED | VALUE OF THE ENERGY FED INTO THE GRID[4] |
|---|---|---|---|---|---|---|---|---|
| **MD 23/06/2016 RES-E** | from 2016 | 15-30 years | Non-PV RES-E and CSP | <=500kW | FIT | Constant tariff | Fed-in | Included in the tariff |
| | | | | >500kW | SFIP | Tariff calculated as the difference between a reference value and market price | Fed-in | Market |
| **MD 6/7/2012 RES-E** | 2013-2016 | 15-30 years | Non-PV RES-E | <=1MW | FIT | Constant tariff | Fed-in | Included in the tariff |
| | | | | >1MW | SFIP | Tariff calculated as the difference between a reference value and market price | Fed-in | Market |
| **Fifth PV Feed-in scheme** | 2012-2013 | 20 years | PV | <=1MW | FIT + PT | Constant tariff | Produced | Included in the tariff |
| | | | | >1MW | SFIP + PT | Tariff calculated as the difference between a reference value and market price | Produced | Market |
| **Feed-in scheme for solar thermal power installations** | 2008-2016 | 25 years | CSP | Any | FIP | Constant tariff | Produced | Market or SPSAs or NM |
| **All-Inclusive Tariff (AIT)** | 2008-2012 | 15 years | Non-PV RES-E | <=1MW[5] | FIT | Constant tariff | Fed-in | Included in the tariff |
| **I-IV PV Feed-in scheme** | 2006-2012 | 20 years | PV | Any | FIP[6] | Constant tariff | Produced | Market or SPSAs or NM |
| **Green Certificates / Feed-in tariff replacing GCs** | 2002-2012 | 8-15 years | RES-E[7] | Any | Green certificates / SFIP | GC market or purchase of GC at a value indexed to the price of energy / tariff obtained by | Produced | Market or SPSAs or NM |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | difference with energy price | | |
| **CIP6/92** | 1992-2001 | 8-15 years | RES-E and equivalent | Any | FIT | Tariff partly indexed to fuel prices | Fed-in | Included in the tariff |

*Notes to the table*
(1) indicative period of eligibility for the scheme and duration of the incentive, save for any specific or transitional provisions
(2) not less than 1 kW
(3) FIT: Feed in Tariff, i.e. an all-inclusive tariff for the energy supplied to the grid
FIP: Feed-In Premium, a constant-premium tariff in addition to the market value of energy
SFIP: Sliding Feed-In Premium, a premium tariff calculated as the difference between a reference value and the market price of energy
PT: Premium Tariff applied to self-consumed energy
(4) access to Simplified Purchase and Sale Arrangements (SPSAs) and Net Metering (NM) is regulated according to the type and capacity of the installation
(5) 200 kW for wind turbines
(6) the 4th Feed-in scheme (Energy Account) provided a FIT + PT for installations that were commissioned from 2013
(7) includes specific CHP plants connected to district heating networks

## MD 23 June 2016

The Ministerial Decree of 23 June 2016 updated the incentive schemes under the Ministerial Decree of 6 July 2012 for RES electricity installations other than photovoltaic. The 2016 Decree added solar thermal installations to the schemes and repealed the Ministerial Decree of 11 April 2008. The incentives under the Decree apply to installations that are: newly built, entirely rebuilt, reactivated, upgraded or renovated, commissioned from l January 2013. Access to the incentives laid down in the Ministerial Decree of 23 June 2016 is alternative to the Net Metering system and to Simplified Purchase and Sale Arrangements.

### Type of incentives

The incentives are granted for the net amount of electricity produced and fed into the grid, which is the lower of net electricity production (gross production less the electricity absorbed by ancillary services and losses) and the electricity actually fed into the grid. Therefore, any self-consumed electricity cannot benefit from the incentives.

The Decree establishes two separate incentive schemes, according to installed capacity, type of renewable source and type of installation:

A. An **All-Inclusive feed-in Tariff** (AIT) for installations with an installed capacity of up to 500 kW, calculated by adding the base feed-in tariff to any premium tariffs to which the installation is entitled;
B. An **incentive** (I) for installations with installed capacity in excess of 500 kW, calculated as the difference between the base feed-in tariff – plus any premium tariffs – and the hourly zonal price of energy (in the market zone where the electricity produced by the installation is fed into the grid). The energy produced by the installations eligible for the incentive (I) remains available to the producer, who is required to price it independently.

The values of the reference base tariffs for the different classes of power rating and sources are, in general, less than or equal to those introduced in 2012. However, the installations can - following the updated procedure - access the tariffs and premiums under the Ministerial Decree of 6 July 2012, for installations, other than solar thermal, commissioned within a year of the entry into force of the Ministerial Decree of 23 June 2016.

### Feed-in Tariffs

The value of the base feed-in tariffs (BTs) is set according to energy source, type of installation and class of power output, and applies, net of any reductions or premiums, over the standard useful life of the specific type of installation, as set out in Annex 1 to the Decree.

**Annex 1 to the Ministerial Decree of 23 June 2016**

| Non-Renewable | Typology | Power rating | USEFUL LIFE OF THE INSTALLATIONS | TARIFF |
|---|---|---|---|---|
| | | kW | years | €/MWh |
| Wind | Onshore | 1<P≤20 | 20 | 250 |
| | | 20<P≤60 | 20 | 190 |
| | | 60<P≤200 | 20 | 160 |
| | | 200<P≤1000 | 20 | 140 |
| | | 1000<P≤5000 | 20 | 130 |
| | | P>5000 | 20 | 110 |
| | Offshore (1) | 1<P≤5000 | | |
| | | P>5000 | 25 | 165 |
| Hydropower | Run-of-river hydroelectric | 1<P≤250 | 20 | 210 |
| | | 250<P≤500 | 20 | 195 |
| | | 500<P≤1000 | 20 | 150 |
| | | 1000<*P*≤5000 | 25 | 125 |
| | | P>5000 | 30 | 90 |
| | Water reservoir and hydro storage | 1<P≤5000 | 25 | 101 |
| | | P>5000 | 30 | 90 |
| Ocean (including tide and wave) | | 1<P≤5000 | 15 | 300 |
| | | P>5000 | - | - |
| Geothermal | | 1<P≤1000 | 20 | 134 |
| | | 1000<P≤5000 | 25 | 98 |
| | | P>5000 | 25 | 84 |
| Landfill gas | | 1<P≤1000 | 20 | 99 |
| | | 1000<P≤5000 | 20 | 94 |
| | | P>5000 | - | - |
| Sewage treatment plant gas | | 1<P≤1000 | 20 | 111 |
| | | 1000<P≤5000 | 20 | 88 |
| | | P>5000 | - | - |
| Biogas | a) products of biological origin listed in Table 1-B | 1<P≤300 | 20 | 170 |
| | | 300<P≤600 | 20 | 140 |
| | | 600<P≤1000 | 20 | 120 |
| | | 1000<P≤5000 | 20 | 97 |
| | | P>5000 | 20 | 85 |
| | b) by-products of biological origin listed in Table 1-A; d) unsorted waste other than that referred to in point c) | 1<P≤300 | 20 | 233 |
| | | 300<P≤600 | 20 | 180 |
| | | 600<P≤1000 | 20 | 160 |
| | | 1000<P≤5000 | 20 | 112 |
| | | P>5000 | - | - |
| Biomass | a) products of biological origin listed in Table 1-B | 1<P≤300 | 20 | 210 |
| | | 300<P≤1000 | 20 | 150 |
| | | 1000<P≤5000 | 20 | 115 |
| | | P>5000 | - | - |
| | b) by-products of biological origin listed in Table 1 A. d) unsorted waste other than that referred to in point c) | 1<P≤300 | 20 | 246 |
| | | 300<P≤1000 | 20 | 185 |
| | | 1000<P≤5000 | 20 | 140 |
| | | P>5000 | - | - |
| | c) waste the biodegradable portion of which is determined on the basis of fixed rates, in the manner set out in Annex 2 to the Decree of 6 July 2012 | 1<P≤5000 | - | - |
| | | P>5000 | 20 | 119 |
| Sustainable bioliquids | | 1<P≤5000 | 20 | 60 |
| | | P>5000 | - | - |
| Solar thermal | | 1<P≤250 | 25 | 324 |
| | | 250<P≤5000 | 25 | 296 |
| | | P>5000 | 25 | 291 |

**Manner of accessing the incentives**

The incentive scheme sets out quotas of supported capacity, divided by type of source and installation and broken down according to the manners of accessing the incentives that had already been introduced by the Ministerial Decree of 6 July 2012, namely:

- **direct access**, for small size installations that are newly built, entirely rebuilt, reactivated, refurbished or upgraded (for upgrading, only the additional capacity is considered);
- entry in **registers**, in a high-enough position to benefit from the annual quotas of supported capacity assigned to the different sources, in the case of medium-sized installations that are newly built, entirely rebuilt, reactivated or upgraded (for upgrading, only the additional capacity is considered);
- participation in **descending-price auctions**, ranking in a high-enough position to benefit from the annual quotas of supported capacity assigned to the different sources, in the case of installations that are newly built, entirely rebuilt, reactivated or upgraded (for upgrading, only the additional capacity is considered);
- entry in **registers**, in a high-enough position to benefit from the annual quotas of supported capacity assigned to the different sources, in the case of **refurbishment** of installations having a capacity greater than the maximum capacity eligible for direct access.

The new provisions introduced by the Ministerial Decree of 23 June 2016 include direct access for hydroelectric plants subject to compliance with specific environmental requirements and, for all sources, a single capacity limit of 5 MW, above which the incentives may be accessed only by participating in auctions (the previous Ministerial Decree of 6 July 2012 had established different values by type of plant: 20 MW for geothermal electric plants, 10 MW for hydroelectric plants, and 5 MW for other type of RES installations).

The new Decree introduced a single session for allocating the entire capacity from the various quotas of the registers, registers for refurbishments and auctions. The three calls for applications were published on 20 August 2016; the application periods opened on 30 August 2016 and ended on 28 October 2016 for registers and 27 November 2016 for auctions.

In all, 1,261 applications were received, for a total of 2,899.6 MW. Of these, 448 applications, corresponding to 1,200.3 MW, ranked successfully in the register and auction lists published respectively on 25 November 2016 and on 22 December 2016. The data on the applications and results are given in the following tables.

**Ministerial Decree of 23 June 2016 - Applications for auction participation**

| TYPE OF INSTALLATION | QUOTA | APPLICATIONS SUBMITTED | | | APPLICATIONS GRANTED | | |
|---|---|---|---|---|---|---|---|
| | Capacity (MW) | Number | Total capacity (MW) | Quota % | Number | Total capacity (MW) | Quota % |
| Onshore wind | 800.0 | 96 | 1,972.3 | 246.53% | 38 | 800.0 | 100.00% |
| Offshore wind | 30.0 | 1 | 30.0 | 100.00% | 1 | 30.0 | 100.00% |
| Biomass in accordance with Article 8(4)(c) and (d) | 50.0 | 1 | 20.0 | 40.00% | 1 | 20.0 | 40.00% |
| Geothermal electricity | 20.0 | 1 | 19.8 | 99.00% | 1 | 19.8 | 99.00% |
| Solar thermal | 100.0 | 1 | 41.0 | 41.00% | 0 | 0.0 | 0.00% |
| **TOTAL** | **1,000.0** | **100** | **2,083.1** | | **41** | **869.8** | |

**Ministerial Decree of 23 June 2016 - Applications for Entry in the Registers**

| TYPE OF INSTALLATION | QUOTA | APPLICATIONS SUBMITTED | | | APPLICATIONS GRANTED | | |
|---|---|---|---|---|---|---|---|
| | Capacity (MW) | Number | Total capacity (MW) | Quota % | Number | Total capacity (MW) | Quota % |
| | | | | | | | |
| Onshore wind | 56.9 | 256 | 185.5 | 325.75% | 66 | 56.9 | 100.00% |
| Hydropower | 79.0 | 565 | 248.6 | 314.91% | 125 | 79.0 | 100.00% |
| Geothermal electricity | 30.0 | 10 | 49.3 | 164.33% | 7 | 30.0 | 100.00% |
| Biomass and Biogas referred to in Article 8(4)(a), (b) and (d), sewage treatment plant gas, landfill gas and sustainable bioliquids | 89.5 | 233 | 114.4 | 127.81% | 176 | 89.5 | 100.00% |
| Ocean (including tide and wave) | 6.0 | 0 | 0.0 | 0.00% | 0 | 0.0 | 0.00% |
| Solar thermal | 20.0 | 14 | 33.2 | 166.04% | 8 | 20.0 | 100.00% |
| **TOTAL** | **281.4** | **1,078** | **631.0** | | **382** | **275.4** | |

**Ministerial Decree of 23 June 2016 - Applications for Entry in Registers for refurbishments**

| TYPE OF INSTALLATION | QUOTA | APPLICATIONS SUBMITTED | | | APPLICATIONS GRANTED | | |
|---|---|---|---|---|---|---|---|
| | Capacity (MW) | Number | Total capacity (MW) | Quota % | Number | Total capacity (MW) | Quota % |
| Onshore wind | 40.0 | 5 | 9.1 | 22.75% | 5 | 9.1 | 22.75% |
| Hydropower | 30.0 | 77 | 160.5 | 534.93% | 19 | 30.0 | 100.00% |
| Geothermal electricity | 20.0 | 1 | 16.0 | 80.00% | 1 | 16.0 | 80.00% |
| **TOTAL** | **90.0** | **83** | **185.6** | | **25** | **55.1** | |

**Results of the incentive scheme**

Below is a summary of the results of the incentive scheme under the Ministerial Decree of 23 June 2016 as at 31 December 2018, approximately one and a half years after the Decree came into force.

For each type of installation, the available capacity is the capacity stated in the Decree for the respective quotas. For the registers only, the capacity stated in the Decree has been decreased by the capacity of the direct-access installations that had been commissioned as at the date of the call.

The eligible capacity is the capacity of the installations that ranked successfully in the register and auction lists. Of these installations, as at 31 December 2018, a small portion had been excluded through withdrawal, annulment or refusal; consequently, the capacity eligible for the incentive at 31 December 2018 is lower than that originally allowed.

The table also gives a breakdown of the share of capacity of the eligible installations, commissioned as at 31 December 2018, which had applied for the incentives.

As to direct access, the table shows the capacity of the installations commissioned as at 31 December 2018 and the capacity that had been excluded as at the same date, following assessment by GSE.

Overall, there were 2,933 plants in operation at 31 December 2018, with a total capacity of 551.5 MW. Most of the installations were wind turbines (2,283), followed by run-of-river hydroelectric plants (348). Wind turbines also came top in terms of installed capacity (418.4 MW), followed by run-of-river hydroelectric plants (72.2 MW). In 2017 a significant number of installations entered the scheme through direct access, as the deadline for application had been set at 31 December 2017, while new entries in 2018 were only by installations successfully placed in the register, refurbishment register and auction rankings for 2016. Overall, the capacity that benefited from direct access amounted to 177 MW, mostly from wind farms (122 MW).

In addition to the installations in operation, a significant number of installations (215, with a capacity of 778 MW) which had placed successfully in the auctions or the registers, had not yet been commissioned by 31 December 2018 but were still eligible for the incentive.

**Ministerial Decree of 23 June 2016 - Summary of incentive results as at 31 December 2018 [MW]**

| INCENTIVE ACCESS PROCEDURE AND TYPE OF INSTALLATION | AVAILABLE CAPACITY | ELIGIBLE CAPACITY | ELIGIBLE CAPACITY AS AT 31/12/2018 | DATA ON ELIGIBLE APPLICANTS AS AT 31/12/2018 | | EXCLUDED CAPACITY AS AT 31/12/2018 |
|---|---|---|---|---|---|---|
| | | | | In operation | Not in operation | |
| **Auctions** | **1,000.0** | **869.8** | **869.0** | **264.2** | **604.8** | **0.8** |
| Onshore wind | 800.0 | 800.0 | 799.2 | 264.2 | 535.0 | 0.8 |
| Offshore wind | 30.0 | 30.0 | 30.0 | - | 30.0 | - |
| Geothermal electricity | 20.0 | 19.8 | 19.8 | - | 19.8 | - |
| Waste (Biomass C and D) | 50.0 | 20.0 | 20.0 | - | 20.0 | - |
| Solar thermal | 100.0 | - | - | - | - | - |
| **Registers** | **281.4** | **275.4** | **231.1** | **91.7** | **139.4** | **44.3** |
| Hydropower | 79.0 | 79.0 | 75.9 | 33.6 | 42.3 | 3.1 |
| Onshore wind | 56.9 | 56.9 | 35.9 | 26.6 | 9.3 | 21.1 |
| Geothermal electricity | 30.0 | 30.0 | 20.7 | - | 20.7 | 9.3 |
| Ocean | 6.0 | - | - | - | - | - |
| Bioenergy (excluding Biomass C waste) | 89.5 | 89.5 | 78.6 | 31.6 | 47.1 | 10.9 |
| Solar thermal | 20.0 | 20.0 | 20.0 | - | 20.0 | - |
| **Refurbishment registers** | **90.0** | **55.1** | **51.9** | **18.5** | **33.5** | **3.2** |
| Hydropower | 30.0 | 30.0 | 30.0 | 12.5 | 17.5 | - |
| Onshore wind | 40.0 | 9.1 | 5.9 | 5.9 | 0.0 | 3.2 |
| Geothermal electricity | 20.0 | 16.0 | 16.0 | - | 16.0 | - |
| **Total Auctions/Registers/ Refurbishment Registers** | **1,371.4** | **1,200.3** | **1,152.0** | **374.4** | **777.6** | **48.3**- |
| **Direct access** | | | | **177.1** | | **16.9** |
| Hydropower | | | | 27.9 | | 1.6 |
| Wind turbine | | | | 121.7 | | 11.4 |
| Geothermal electricity | | | | - | | |
| Ocean | | | | | | 0.1 |
| Bioenergy (excluding waste) | | | | 27.5 | | 3.8 |
| **Grand total** | **1,371.4** | **1,200.3** | **1,152.0** | **551.5** | **777.6** | **65.2** |
| | | | | | | |

## Indicative annual cost of the incentives to electricity generation from renewable sources

### Non-photovoltaic sources

The ‘RES electricity meter’ is the tool that is used to display, on GSE’s website, the ‘indicative annual cost of incentives’ granted to RES electricity installations other than photovoltaic.

The meter was introduced by the Ministerial Decree of 6 July 2012 and was updated in 2016 pursuant to Article 27 of the Ministerial Decree of 23 June 2016, which amended the scope of the installations to be included and the calculation methods.

The indicative annual cost of the incentives provides an indicative estimate of the potential annual cost of the incentives provided to non-PV RES installations, under the various incentive schemes adopted over time.

Besides calculating the figure for the reference month of publication, as required by Article 27 of the Ministerial Decree of 23 June 2016, the indicative annual cost is calculated for all the future months in which installations eligible for tariff

incentives are scheduled to be commissioned, also taking into account the expected trends in the market price of electricity.

On the basis of this indicative cost scenario, GSE calculates the annual average of monthly values for the next three years. This average, defined as the 'average indicative annual cost of incentives', is published by GSE on its website and is updated every month.

Under Article 3 of the Ministerial Decree of 23 June 2016 this average indicative annual cost of the incentives must be checked against the limit of **€5.8 billion** established by the Ministerial Decree of 6 July 2012: if the limit is reached, direct access to incentives is suspended.

As at 31 December 2018, the RES Electricity meter stood at **€4,902 million**, divided among the various incentive schemes as follows: €2,608 million for the former Green Certificates incentive; €1,801 million for the all-inclusive tariff; €15 million for CIP 6/92; €370 million for the installations commissioned in accordance with the Ministerial Decree of 6 July 2012; €109 million for the installations commissioned in accordance with the Ministerial Decree of 23 June 2016.

The indicative average cost, calculated as the average of the monthly values of the following three years, stands at €4,843 million, and shows a mainly downward trend over the medium term, mainly due to exits from the incentive scheme.

**Indicative annual cost of renewable energy sources for electricity (RES-E) other than PV, as at 31 December 2016 [€m]**

| | Incentive former Green Certificates | AIT | CIP 6/92 | MD 6/7/2012 | MD 23/6/2016 | Solar Thermal | Total |
|---|---|---|---|---|---|---|---|
| Wave | 0 | 0 | | 0 | 0 | 0 | 0 |
| CSP | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Geothermal | 88 | 0 | | 10 | 0 | 0 | 97 |
| Bioliquids | 447 | 170 | | 0 | 0 | 0 | 617 |
| Biomass | 457 | 72 | 15 | 44 | 17 | 0 | 604 |
| Hydropower | 444 | 236 | | 92 | 33 | 0 | 804 |
| Wind | 1117 | 5 | 0 | 158 | 38 | 0 | 1318 |
| Biogas | 55 | 1318 | 0 | 67 | 20 | 0 | 1461 |
| **TOTAL** | 2608 | 1801 | 15 | 370 | 109 | 0 | 4902 |

**Photovoltaic**

Photovoltaic solar installations benefited from five feed-in schemes known collectively as the 'Energy Account', implemented in sequence from 2006 to 2012. The last version, the fifth PV Feed-in Scheme (Energy Account), was introduced by the Ministerial Decree of 5 July 2012, and was closed to new applicants on 6 July 2013, 30 days after the indicative total annual cost of **€6.7 billion** had been reached.

As at 31 December 2018, 549,186 installations had been commissioned under the Energy Account, for a total capacity of 17,564 MW, of which:

- 5,462 installations under the first Energy Account, for a capacity of 151 MW;
- 203,218 installations under the second Energy Account, for a capacity of 6,754 MW;
- 38,761 installations under the third Energy Account, for a capacity of 1,555 MW;
- 204,103 installations under the fourth Energy Account, for a capacity of 7,702 MW;
- 97,642 installations under the fifth Energy Account, for a capacity of 1,402 MW.

Over time, several events have resulted in changes in the total budget for the feed-in incentive to PV installations under the Energy Account.

One such event was the entry into force of Decree Law No 91 of 24 June 2014, which remodulated the incentives for photovoltaic installations having a supported capacity above 200 kW (known as 'incentive-spreading' rule). Overall, the total acceptances of the remodulation option reduced indicative annual cost in 2018 by about €390 million, compared to the scenario without adoption of the Decree Law.

In 2018, the incentivised energy totalled approximately 20.2 TWh; consequently, the total cost of the incentives was approximately €5.9 billion. The incentives paid derive mainly from the 2nd Energy Account (€2.9 billion for 7,933 GWh of energy supplied) and the 4th Energy Account (€2.2 billion for 8,747 GWh).

## TRANSPORT SECTOR

### Biofuels

**Obligation to release biofuels for consumption**

In Italy, those parties that release for consumption petrol and diesel from fossil sources for use as transport fuels must release for consumption in the national territory a minimum share of biofuels that increases over time. Alternatively, these parties may meet their obligation by purchasing all or part of the equivalent share or the related rights from other parties (as a rule, each 10 Gcal of biofuel released for consumption is rewarded by one 'certificate of release for consumption'). This system ('biofuel blending obligation'), introduced by Law No 81 of 11 March 2006, promotes the use of biofuels in transport.

The Ministerial Decree of 10 October 2014 as amended and supplemented establishes the minimum quantity of biofuel that must be released for consumption in a given year, and divides this quantity into different shares among the various types of biofuels. The Decree also introduced the concept of 'advanced biofuels', which was amended and updated by Legislative Decree No 51 of 21 March 2017, transposing Directive (EU) 2015/1513.

Under the Decree, each year a minimum amount of biofuels must be released for consumption, as a percentage of the total quantity of petrol and diesel released for consumption in the same calendar year (no longer a percentage of the quantity released the year before, as was the case previously), calculated on the basis of the energy content of those fuels.

**The Ministerial Decree of 2 March 2018 on 'Promotion of the use of biomethane and other advanced biofuels in the transport sector' introduced some amendments to the Ministerial Decree of 10 October 2014. In particular, the minimum shares of biofuels and advanced biofuels to be released for consumption have been updated.** The following table shows the minimum quantities of biofuels to be released for consumption from 2015 onwards.

**Minimum percentage share of biofuels to be released for consumption in a given year**

| Year | Q% biofuels | Q% advanced biofuels |
|---|---|---|
| 2015 | 5.0% | |
| 2016 | 5.5% | |
| 2017 | 6.5% | |
| **2018** | **7.0%** | **0.6%** |
| **2019** | **8.0%** | **0.8%** |
| **2020** | **9.0%** | **0.9%** |
| 2021 | 9.0% | 1.5% |
| From 2022 | 9.0% | 1.85% |

As shown by the table, starting from 2018 an increasing share of the release for consumption obligation must be covered by advanced biofuels. Advanced biofuels are defined as biofuels, including biomethane, produced exclusively from the raw materials listed in Part A of Annex 3 to the Ministerial Decree of 10 October 2014 as amended and supplemented:

- Algae if cultivated on land in ponds or photobioreactors;
- Biomass fraction of mixed municipal waste, but not separated household waste subject to recycling targets;
- Separated household bio-waste, garden and park bio-waste, food and kitchen waste from households, restaurants, caterers and retail premises as well as comparable waste from food processing plants;
- Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agri-food and fish and aquaculture industry;
- Straw;
- Animal manure and sewage sludge;
- Tall oil pitch;
- Crude glycerine;
- Bagasse;
- Grape marcs and wine lees;
- Nut shells;
- Husks;
- Cobs cleaned of kernels of corn;

- Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, branches, pre-commercial thinnings, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil;
- Other non-food cellulosic material: it includes food and feed crop residues (such as straw, stover, husks and shells), grassy energy crops with a low starch content (such as ryegrass, switchgrass, miscanthus, giant cane and cover crops before and after main crops), industrial residues (including from food and feed crops after vegetable oils, sugars, starches and protein have been extracted), and material from biowaste;
- Other ligno-cellulosic material, material composed of lignin, cellulose and hemicellulose such as biomass sourced from forests (e.g. from undergrowth clearing and forestry maintenance), woody energy crops and forest-based industries' residues and wastes, except saw logs and veneer logs;
- Renewable liquid and gaseous transport fuels of non-biological origin;
- Carbon capture and use for transport purposes, if the energy source is renewable;
  Bacteria, if the energy source is renewable.

In Part B of the same Annex, the following materials are explicitly indicated as producing non-advanced double counting biofuels:

- Used cooking oil;
- animal fats classified under categories 1 and 2 in accordance with Regulation (EC) No 1069/2009.

**The Ministerial Decree of 2 March 2018 also provides that 75% of the advanced fuel obligation must be met through the release for consumption of advanced biomethane and the remaining 25% through other advanced biofuels.**

**Release for Consumption Certificates**

To monitor fulfilment of the obligation, the Decree No 110/2008 of the Minister of Agricultural, Food and Forestry Policies established 'Release-for-Consumption Certificates' (RCCs). The procedures for issuing these Certificates have been updated by Legislative Decree No 28 of 3 March 2011, as amended and supplemented, and by the Ministerial Decree of 10 October 2014, as amended and supplemented.

In order to be issued the RCCs, the biofuels must meet the EU sustainability criteria. To ensure compliance with these criteria, all participants in the biofuel production chain must join the National Certification System (established and governed by the Decree of the Minister of the Environment, Land and Sea of 23 January 2012, which will be repealed one year after the entry into force of the Ministerial Decree of 14 November 2019 introducing the new National Certification System for the sustainability of biofuels and bioliquids) or a voluntary system approved by the European Commission, or must comply with specific bilateral or multilateral agreements concluded between the EU and third countries.

Generally, one certificate attests to the release of 10 Gigacalories (Gcal) of biofuel. However, for some types of biofuels the quantity to be released in order to obtain a certificate is lower. In particular, the release for consumption of advanced and non-advanced double counting biofuels gives the right to receive a Certificate for every 5 Gcal released (double counting).

The by-products eligible for double counting are those falling under the above-mentioned Annex I, part 2-bis, part A and part B of Legislative Decree No 28/2011 as amended by Legislative Decree No 51/2017. In order to facilitate the transition to the new incentive scheme, double counting premiums are allowed until 30 June 2018 also for biofuels obtained from the following by-products:

- glycerol waters;
- fatty acids from oil refining;
- saponified fatty acids from the neutralisation of acidic oil residues;
- residues from the distillation reaction of crude fatty acids and glycerol waters;
- waste lubricant vegetable oils derived from fatty acids;

The decree of the Minister of Economic Development of 20 January 2015 established a penalty of €750 for every missing Certificate in respect of the release for consumption obligation (from obligation year 2016) and provided that payment of the penalty does not extinguish the obligation. The defaulting parties must both pay the penalty and, the following year, have the required number of certificates, including those missing the previous year.

Biofuel schemes are implemented and managed by the Ministry for Economic Development, together with the Biofuels Technical Advisory Committee, which is chaired by the Ministry and comprises the Ministry of the Environment and Protection of Land and Sea, the Ministry of Agricultural, Food and Forestry Policies, the Ministry of the Economy and Finance and GSE. In particular GSE, in addition to sitting in the Committee and acting as Technical Secretariat for it, implements the release for consumption mechanism on behalf of the Minister of Economic Development, including: receipt of annual self-declarations on the release of fuels and biofuels; accreditation of biofuel producers eligible for the premium, issue of the certificates and their trading on the dedicated web platform developed to validate bilateral agreements, checks on fulfilment of the obligation, including through on-the-spot checks at the operators' premises, collection of data on $CO_2$ emissions also from LPG and methane suppliers.

The charges and costs of the release for consumption system are borne by the obligated parties and are calculated and paid to GSE in the manner established by the Decree of the Ministry of Economic Development of 24 December 2014.

**Certificates of release for consumption issued in 2017 and 2018**

With respect to the quantity of sustainable biofuels released for consumption in 2017, in 2018 the Energy Services Manager (GSE), which is the manager of the incentive mechanism, issued over 1.9 million RCCs to obligated parties, up from the 1.8 million certificates issued in 2017 for biofuels released for consumption in 2016.

## Biomethane, advanced biomethane and other advanced biofuels

The Decree of the Ministry of Economic Development of 5 December 2013 laid down provisions to promote effectively the production and consumption of biomethane, as required by Legislative Decree No 28/2011, which transposes the EU directives on the promotion of biomethane. With Directive 2009/73/EC, concerning common rules for the internal market in natural gas, the EU required Member States to take concrete measures to promote use of biogas and gas from biomass and access to the natural gas system, subject to compliance with technical rules and safety requirements. Similarly, Directive 2009/28/EC on the promotion of the use of energy from renewable sources, stated that biogas installations, from the purification of which biomethane is obtained, have, in view of the high greenhouse gas emission saving potential, significant environmental advantages in terms of heat and power production and production of biofuel.
The Decree of 5 December 2013 entrusted GSE with incentivising the production of biomethane:

a. injected into the natural gas transmission and distribution networks, by paying a feed-in tariff on the biomethane injected into the network;
b. used in transport, after being injected into the natural gas network, through the issue of the Release-for-consumption certificates (RCCs) for biofuels;
c. used in high-efficiency CHP plants through the electricity generation tariffs introduced by the Ministerial Decree of 6 July 2012, referred to biogas.

The incentive, directed at new plants commissioned after the date of entry into force of the Decree and at existing biogas production/use plants that are (totally or partially) converted to biomethane production, is only applicable to plants commissioned by 18 December 2018.
By Decree of 5 December 2013, GSE granted the incentives, with effect from June 2017, to only one installation, having a production capacity of 3,750 Sm3/hour, for the injection of biomethane into the natural gas transmission and distribution networks (option a).
In order to boost access to incentives, in March 2018 the Ministry of Economic Development, in agreement with the Ministry of the Environment and the Ministry of Agricultural, Food and Forestry Policies issued a new Interministerial Decree for the use of biomethane and advanced biofuels in transport. The Decree provides incentives for the production of advanced and non-advanced biomethane and other advanced biofuels exclusively for the transport sector, in order to contribute to the achievement of the target of 10% renewable sources in transport by 2020. It also enabled the transition to the new framework of installations that were already qualified or in the process of qualification pursuant to the Ministerial Decree of 5 December 2013. For the plants producing advanced biomethane and other advanced biofuels, the Ministerial Decree of 2 March 2018 introduced the possibility of having the release-for-consumption certificates (RCCs) collected by the GSE, which is the entity appointed to manage the support mechanism, at a fixed price established by the same Decree (€375/RCC), with collection costs paid by the entities obligated to release biofuels for consumption, as identified in the Decree of the Ministry for Economic Development of 10 October 2014 as amended and supplemented. The Decree also establishes the possibility, only for advanced biomethane producers requesting it, of physical collection of the biomethane by GSE. On the other hand, producers of non-advanced biomethane who release their product for consumption in transport can only be issued RCCs. Apart from confirming the premiums already established by the Ministerial Decree of 5 December 2013 for the construction of new natural gas distribution facilities for transport, the 2018 Decree introduced new incentives for the construction of biomethane liquefaction plants, to promote the use of this fuel also in liquid form. Partial or total conversions of existing biogas production plants, including with increases in production capacity, are also facilitated, extending the incentive period compared to the current rules. Lastly, in order to prove the renewable origin of biomethane, Guarantees of Origin (GOs) have been introduced for biomethane obtained from by-products and not benefiting from other types of incentives. To manage this scheme, the GSE has set up a 'National Register of Guarantees of Origin for Biomethane'

**Main results at 31 December 2018**

In recent years GSE has examined the applications of biomethane production plants for the incentives under the Decree of 5 December 2013 and those under the Decree of 2 March 2018. Specifically, between 2015 and 2018, GSE examined 14 applications for access of biomethane production plants to the incentives under the MD of 5 December 2013, and

approved 11, which were declared eligible. Only one plant was already in operation. The table below shows the approvals awarded for the incentive mechanisms under the Ministerial Decree of 5 December 2013.

Installations approved under the Ministerial Decree of 5 December 2013

| | APPROVALS IN THE PROJECT DESIGN STAGE | | APPROVALS OF ALREADY OPERATING PLANTS | |
|---|---|---|---|---|
| | **No of installations** | **Production capacity [Sm3/h]** | **No of installations** | **Production capacity [Sm3/h]** |
| Feeding into the network (Article 3) | 2 | 1,500 | 1 | 3,750 |
| Use in transport (Article 4) | 8 | 10,084 | 0 | 0 |
| Use in High-efficiency CHP plants (Article 5) | 0 | 0 | 0 | 0 |
| **Total** | **10** | **11,584** | **1** | **3,750** |

The incentives under the Ministerial Decree of 5 December 2013 were available to plants commissioned by 17 December 2018. To date, none of the 10 plants approved in the project design phase has been commissioned yet. Following the entry into force of the Ministerial Decree of 2 March 2018, GSE was entrusted with examining and approving biomethane and other advanced biofuels production plants for access to the new incentive mechanisms. The incentives under the MD of 2 March 2018 are available to new or reconverted biomethane production plants commissioned between 21 March 2018 and 31 December 2022. This condition does not apply to biomethane production plants already approved and in operation under the Ministerial Decree of 5 December 2013, which therefore were commissioned before the entry into force of the Ministerial Decree of 2 March 2018 (20 March 2018). Consequently, the only plant commissioned before 20 March 2018, and approved for the incentive scheme under the MD of 5 December 2013, was also approved for the incentives under the Ministerial Decree of 2 March 2018, which expressly allowed access to the new incentive mechanisms by plants commissioned before its entry into force, provided they were already approved, or in the approval process under the Ministerial Decree of 5 December 2013. The tables below show the approvals awarded for the incentive mechanisms under the Ministerial Decree of 2 March 2018.

Installations approved under the Ministerial Decree of 2 March 2018

| | APPROVALS IN THE PROJECT DESIGN STAGE | | APPROVALS OF ALREADY OPERATING PLANTS | |
|---|---|---|---|---|
| | **No of installations** | **Production capacity [Sm3/h]** | **No of installations** | **Production capacity [Sm3/h]** |
| Biomethane (Article 5) | 0 | 0 | 0 | 0 |
| Advanced biomethane (Article 6) | 6 | 4,336 | 1 | 3,750 |
| Other advanced biofuels (Article 7) | 0 | 0 | 4 | 41,630 |

As shown in the tables, seven biomethane production plants requested approval under the Ministerial Decree of 2 March 2018, all in respect of the incentive mechanism set out in Article 6 of the Decree 'Incentives for advanced biomethane injected into the natural gas network and intended for transport'. Their total production capacity amounts to 8,086 Sm3 /h of advanced biomethane. Only one of these plants did not opt for the physical collection of the biomethane produced and injected into the natural gas transmission or distribution network; the remaining 6 asked GSE to collect the biomethane injected into the network. Four plants, producing advanced biofuels other than biomethane, applied to GSE for approval for the mechanism under Article 7 of the Ministerial Decree of 2 March 2018. They are biodiesel production plants, already in operation, reported to the GSE that they had contracted the sale of 41,630 tonnes of advanced biofuel with the obligated parties participating in the mechanism.

Advanced biomethane production plants approved under the Ministerial Decree of 2 March 2018 (Article 6)

| | APPROVALS IN THE PROJECT DESIGN STAGE | | APPROVALS OF ALREADY OPERATING PLANTS | |
|---|---|---|---|---|
| | **No of installations** | **Production capacity [Sm3/h]** | **No of installations** | **Production capacity [Sm3/h]** |
| With physical | 5 | 3,336 | 1 | 3,750 |

| | | | | |
|---|---|---|---|---|
| collection by GSE | | | | |
| Without physical collection by GSE | 1 | 1,000 | 0 | 0 |
| **Total** | **6** | **4,336** | **1** | **3,750** |

Plants for the production of other advanced biofuels qualified in accordance with the Ministerial Decree of 2 March 2018 (Article 7)

| | **APPROVALS IN THE PROJECT DESIGN STAGE** | | **APPROVALS OF ALREADY OPERATING PLANTS** | |
|---|---|---|---|---|
| | **No of installations** | **Production capacity [t/year]** | **No of installations** | **Production capacity [t/year]** |
| Biodiesel | 0 | 0 | 4 | 41,630 |
| Other biofuels | 0 | 0 | 0 | 0 |
| **Total** | **0** | **0** | **4** | **41,630** |

In the year 2018 only one biomethane production plant was supported by the scheme under the MD of 5 December 2013; following the issue of the MD of 2 March 2018, this plant requested and obtained transfer to the new incentive scheme. To access the incentives under the MD of 2 March 2018 for advanced biomethane (Article 6) and for other advanced biofuels (Article 7), after obtaining approval and signing the contract with the GSE, the plant must be included in a specific ranking published on the GSE website, in order to fall under the maximum annual limit of the incentive, expressed in RCCs, which for 2018 was 294,860 RCCs.

## 3.1 Please provide information on how supported electricity is allocated to final customers for the purposes of Article 3(6) of Directive 2003/54/EC (Article 22(1)(b) of Directive 2009/28/EC).

Following the entry into force of the Ministerial Decree of 31 July 2009 (Fuel Mix Decree), electricity retailers must provide the following information to their final customers:

- composition of the mix of primary energy sources used to generate the electricity supplied by the retailer;
- the environmental impact of electricity generation, useful for energy saving.

This disclosure obligation towards final customers was introduced in EU law by Directive 2003/54/EC and later confirmed by Directive 2009/72/EC.

In particular, electricity suppliers must provide, for the previous two years, the information necessary to trace the energy mix used, reporting it in the energy bills (at least once a quarter), on their websites, and in the promotional materials given to customers during pre-contract negotiations, using the model set out in the Fuel Mix Decree.

**Template for energy mix reporting**

| Primary sources used | Composition of the energy mix used for production of the electricity sold by the electricity retailer in the previous two years | | Composition of the average national mix used to generate the electricity fed into the electricity grid in the previous two years | |
|---|---|---|---|---|
| | Year (n-1) [%] | Year (n-2) [%] | Year (n-1) [%] | Year (n-2) [%] |
| **Renewable sources** | | | | |
| **Coal** | | | | |
| **Natural gas** | | | | |
| **Petroleum products** | | | | |
| **Nuclear** | | | | |
| **Other sources** | | | | |

The following table shows the percentages of the national energy mix assigned to each energy source in the period 2017-2018; the suppliers' offers may deviate from these percentages.

**Composition of the average national energy mix (years 2017 and 2018)**

| Primary sources used | Year 2017 (*) | Year 2018 (**) |
|---|---|---|
| | [%] | [%] |
| **Renewable sources** | 36.42% | 40.83% |
| **Coal** | 13.69% | 12.47% |
| **Natural gas** | 42.63% | 39.06% |
| **Petroleum products** | 0.76% | 0.54% |
| **Nuclear** | 3.62% | 4.11% |
| **Other sources** | 2.88% | 2.99% |

*(*) actual year-end data (**) preliminary data*

The following data sources were used to calculate the national energy mix:

- for electricity injected into the grid from national production, the data transmitted by producers to GSE and the data on installations not subject to reporting obligations (those covered by CIP 6/92, net metering and PV systems with nominal active power up to 1 MW covered by the V Feed-in scheme - Energy Account);
- for net imported electricity, Eurostat data, to which the GSE has attributed the EU energy mix.

For the achievement of the national targets, set at Union level by Directive 2009/28/EC on the promotion of the use of energy from renewable sources, reference is made to the gross national consumption and not to the electricity fed into the electricity system.

By Decision ARG/elt 104/2011, ARERA the (Authority for Energy, Networks and the Environment) has established the requirements to be met by contracts for the supply of renewable energy to protect consumers and ensure that the same RES electricity is not included in several sales contracts. Each sales contract for renewable energy must be backed by a quantity of GOs equal to the amount of electricity sold as renewable under that contract.

GSE is responsible for cross-checking the GOs cancelled by the supply companies against the data on the electricity supplied by them as 'green supplies'. If the cross-checks show a mismatch, the supplier must pay GSE a fee calculated by multiplying the number of GOs which it did not secure by the average selling price of GOs recorded by GME. Any other non-compliances must be reported to the Authority, which will then take appropriate action.

## 4. Please provide information on how, where applicable, the support schemes have been structured to take into account RES applications that give additional benefits, but may also have higher costs, including biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material (Article 22(1)(c) of Directive 2009/28/EC).

There are a number of legislative provisions to encourage the most environmentally-friendly and efficient renewable energy technologies.

### THERMAL SECTOR

To be eligible for the Thermal Account incentives (Ministerial Decree of 28 December 2012, see paragraph 3.B), biomass boilers had to meet specific requirements of efficiency, atmospheric emissions and fuel quality.

The new Thermal Account (DM of 16 February 2016), in force from 31 May 2016, strengthened and simplified the support mechanism under the Decree of 28 December 2012, established requirements of efficiency, atmospheric emissions and fuel quality, but also introduced premium coefficients (+20% or +50%) for plants with biomass generators with reduced particulate emissions.

### ELECTRICITY

The **Ministerial Decree of 23 June 2016** defined and updated the incentive schemes for RES electricity originally introduced by the Ministerial Decree of 6 July 2012. To calculate the All-inclusive Tariff or the Incentive, the following premiums may be added to the basic feed-in tariffs (Tb) set out in Table 1 of Annex 1 to the Decree:

For hybrid solar thermal installations, the lower the non-solar fraction (i.e. the proportion of net energy generated from non-solar sources), the higher the feed-in tariff:
- premium with non-solar fraction of up to 0.15 (Article 21(3) of the Decree)
- premium with non-solar fraction of between 0.15 and 0.50 (Article 21(3) of the Decree)

For geothermal electric plants:
- premium for total re-injection and zero emissions (Article 20(1) of the Decree)
- premium for plants built in new areas (Article 27(1) of the Decree)
- premium for reducing non-condensable gases (Article 20(1) of the Decree)

For offshore wind turbines:
- premium for connection works (Table 1.1 of Annex 1 to the Decree)

The previous **Ministerial Decree of 6 July 2012**, on incentive schemes for RES electricity, had introduced a number of tariff premiums to reward specifically the most environmentally friendly and efficient RES systems. With regard to bioenergy, the Decree provided greater incentives for by-products and waste, to reserve as far as possible the use of virgin biomass for the production of thermal energy and for non-energy uses.

- Premiums for installations using sustainable solid biomass, biogas or bioliquids

  Premium for the use of waste biomass

  Installations with an installed capacity between 1 MW and 5 MW, or above 1 MW in the case of refurbishments, using the waste biomass of the types listed in Annex 1, Table 1-B of the Decree, receive a premium of €20/MWh.

  Premium for GHG emission savings

  Installations with an installed capacity between 1 MW and 5 MW, or above 1 MW in the case of refurbishments, using ‘Type a’ biomass (products) or ‘Type b’ (by-product) biomass receive a premium of €10/MWh if their performance improves on the GHG emission reduction targets.

  Premium for reduction in pollutant emissions

  Installations with any installed capacity, including refurbished installations, using ‘Type a’ and/or ‘Type b’ biomass receive a premium of €30/MWh if they meet the atmospheric emission requirements set out in the table of Annex 5 to the Decree.

  Premium for high-efficiency cogeneration

Installations using ‘Type a’ biomass or ‘Type a’ biogas or sustainable bioliquids receive a premium of €40/MWh if they operate in high-efficiency cogeneration mode.

The premium is reduced to €10/MWh if the high-efficiency cogeneration installations use ‘Type b’ and/or ‘Type c’ (municipal waste) biomass or ‘Type b’ and/or ‘Type c’ biogas.

Premium for high-efficiency cogeneration combined with district heating

Installations using ‘type b’ biomass receive a premium of €40/MWh if they operate in high-efficiency cogeneration mode and use the cogenerated heat for district heating.

Premium for cogeneration biogas installations that recover 60% of the nitrogen

Biogas installations with installed capacity of up to 600 kW receive a premium of €30/MWh if they operate in high-efficiency cogeneration mode and recover nitrogen from the processed substances, for use in fertilisers, subject to certain conditions specified in the Decree.

Premium for cogeneration biogas installations that recover 30% of the nitrogen

Biogas installations with installed capacity of up to 600 kW receive a premium of €20/MWh if they operate in high-efficiency cogeneration mode and recover nitrogen from the processed substances, for use in fertilisers, subject to certain conditions specified in the Decree.

Premium for biogas installations that recover 40% of the nitrogen

Biogas installations with installed capacity of up to 600 kW receive a premium of €15/MWh if they recover nitrogen from the processed substances, for use in fertilisers, subject to certain conditions specified in the Decree.

- Premiums for geothermal electricity installations

Premium for total re-injection and zero emission

Geothermal electric plants other than those receiving the alternative feed-in tariff for advanced technologies (see following paragraphs), with total re-injection of the geothermal fluid into its source formations and zero emission, receive a premium of €30/MWh.

Premium for reducing non-condensable gases

High-enthalpy geothermal electric plants, able to reduce by at least 95% the level of hydrogen sulphide and mercury contained in the fluid entering the production plant, receive a premium of €15/MWh.

Alternative feed-in tariff for advanced geothermal electric technologies that are not yet fully commercial

The Ministerial Decree of 6 July 2012 introduced for not-yet fully commercial advanced geothermal electricity technologies a specific alternative feed-in tariff which cannot be cumulated either with those set out in Annex 1 to the same Decree or with the premium for total re-injection and zero emissions.

## TRANSPORT SECTOR

In implementation of Directive 2009/28/EC, Article 33(5) of Legislative Decree No 28/2011 provides that, for the purposes of meeting the obligation, the release for consumption of biofuels (including biomethane) for which the party releasing them for consumption demonstrates (by providing appropriate evidence of fulfilment of sustainability criteria) that they were produced from the waste, by-products or non-food materials listed in Annex I (Part 2-bis, Sections A and B) to Legislative Decree No 28/2011, as amended by Legislative Decree No 51/2017, shall be double counted compared to other biofuels. Accordingly, these double-counted fuels receive one Release-for-Consumption Certificate for every 5 Gcal of biofuel (instead of every 10 Gcal).

The Ministerial Decree of 10 October 2014 (see paragraph 3.C) introduced the concept of advanced biofuels. This was later applied and updated by Legislative Decree No 51 of 21 March 2017, which implemented Directive 2015/1513/EU and by the Ministerial Decree of 2 March 2018. Advanced biofuels are those obtained from the raw materials listed in Annex I, part 2-bis, part A of Legislative Decree No 28/2011, as amended by Legislative Decree No 51/2017. From 2018, specified shares of advanced biofuels will help to cover the obligation to release biofuels for consumption. The Ministerial Decree of 2 March 2018 stipulates that 75% of the advanced obligation must be met through the release for consumption of advanced biomethane, and the remaining 25% through other advanced biofuels

Lastly, the Ministerial Decree of 2 March 2018, described in detail in Section 3, provides incentives for the production of advanced and non-advanced biomethane and other advanced biofuels intended exclusively for the transport sector. The Decree also introduced new incentives for the construction of biomethane liquefaction plants, to promote the use of this fuel also in liquid form.

## RENEWABLE ENERGY SOURCES IN BUILDINGS

Promoting the use of renewable sources in buildings is a major goal. To achieve this objective while saving costs, the ideal time for integrating renewable energy technologies in buildings is during construction or renovation.

Decree-Law No 244/2016, which entered into force on 30 December 2016, extended the validity period of the minimum requirement of a 35% share of RES to cover the heating, cooling and DHW energy demand of newly constructed or extensively renovated buildings.

The deadline for raising the minimum RES share from 35% to 50%, originally set at 31 December 2016 by Legislative Decree No 28/2011, was moved to 31 December 2017. In light of this amendment, the updated obligations and deadlines are analysed below.

Article 11 and Annex 3 of Legislative Decree No 28/2011 introduced, with effect from 31 May 2012, the obligation to integrate RES in new buildings or 'buildings undergoing major renovation works' (namely existing buildings having a useful floor area of more than 1,000 $m^2$, undergoing full refurbishment of the building envelope; or existing buildings, demolished and rebuilt, also by way of extraordinary maintenance).

Legislative Decree No 28/2011 provides that thermal energy installations in these buildings must be designed and constructed so as to ensure that RES cover 50% of the total energy consumption for domestic hot water and the following percentages of the aggregate energy consumption for domestic hot water, heating and cooling:

- 20% for building permit applications submitted between 31 May 2012 and 1 December 2013;
- 35% for applications submitted between 1 January 2014 and 31 December 2017;
- 50% for applications submitted from 1 January 2018.

These obligations cannot be met by renewable energy installations producing only electricity which in turn powers hot water, heating and cooling units or systems.

The electric power output of the renewable energy installations which must necessarily be installed on or inside the building or its appurtenances is defined as follows:

- 1 kW every 80 $m^2$ for building permit applications submitted from 31 May 2012 to 31 December 2013;
- 1 kW every 65 $m^2$ for building permit applications submitted from 1 January 2014 to 31 December 2016;
- 1 kW every 50 $m^2$ for building permit applications submitted after 1 January 2017.

For public buildings, the required share of renewables to be integrated is 10% higher. Furthermore, building projects which exceed by at least 30% the mandatory minimum values of RES energy for the coverage of heat, electricity and cooling consumption may add an extra 5% to their permitted building volume.

The Decree applies nationwide; however, the Regions and municipalities may establish stricter renewable energy integration requirements in their air quality and environmental protection plans.

In some cases, it may prove impossible to install a RES system in the building: for example, in buildings subject to heritage or landscape protection constraints. In this case, a technical expert will perform a check and certify that none of the RES technology options are feasible, specifying the reasons for non-compliance with the RES obligation in his report.

The obligation to install a renewable energy installation does not apply to buildings served by a district heating network which already covers the buildings' energy requirements as concerns both space heating and cooling and the production of domestic hot water.

Failure to comply with the obligation leads to denial of the building permit.

## 5. Please provide information on the functioning of the system of guarantees of origin for electricity and heating and cooling from RES, and the measures taken to ensure reliability and protection against fraud of the system (Article 22(1)(d) of Directive 2009/28/EC).

Article 34 of Legislative Decree No 28/2011 implementing Directive 2009/28/EC provided that the procedures for the issue, recognition and use of the guarantee of origin (GO) of RES electricity would be updated by an ad hoc Ministerial Decree in accordance with Article 15 of Directive 2009/28/EC.

In line with the provisions of Directive 2009/28/EC and the Ministerial Decree of 31 July 2009 (the Fuel Mix Decree), GOs may be used by suppliers to demonstrate, to final customers, the share of RES declared in their energy mix. The main activities carried out by GSE to manage the GO system are the following:

- granting of 'PGO' (Plant with Guarantees of Origin) status to plants using renewable sources, excluding any plants benefiting from Simplified Purchase and Sale Arrangements, Net Metering and all-inclusive incentives (CIP 6/92, AIT) involving power off-take by GSE (the GOs for the energy generated by these excluded plants are issued and transferred at no charge to GSE to then be assigned though competition procedures);
- the issue of GOs on the electricity fed into the grid.

GSE issues one GO certificate for every MWh of electricity fed into the grid; the certificates are valid until the end of the 12th month after the relevant electricity was generated, but not beyond 31 March of the year following the year of generation.

GO certificates are issued and cancelled electronically via a dedicated web portal managed by GSE, and can also be traded abroad via the hub of the Association of Issuing Bodies (AIB), in accordance with the European Energy Certificate System, with the 24 AIB member countries (as at 2018). As a member of the AIB, GSE must comply with the Association's rules on the international trading of guarantees, in accordance with Directive 2009/28/EC. On this point, in January 2016, AIB conducted an audit on the management of GOs by GSE, to verify its compliance with the rules for participation in the international trade platform and with the applicable Union legislation. The audit was successful, confirming GSE's membership in the association and the possibility for operators to trade GOs with the countries currently connected to the hub. GOs are also traded nationally on the organised market (M-GO) and on the bilateral platform (BP-GO), both managed by GME.

Suppliers are only allowed to cancel their GOs in order to determine their own supply mixes and, from 2012, in accordance with the provisions laid down by ARERA in Decision ARG/elt 104/11, to prove the renewable origin of the electricity sold to final customers under renewable energy sales contracts.

The data on PGO-qualified production plants and the number of GOs issued by GSE over the period 2017-2018 are provided below:

- At 31 December 2017, 1,475 plants were qualified as PGOs, for a total capacity of 26 GW. During that year, 1227 of those plants were issued almost 41 million GOs, of which 17 million for production in 2016 and 23.6 million in 2017;
- At 31 December 2018, 2,700 plants were qualified as PGOs (including 1,475 in 2017), for a total capacity of 32 GW. This growth led to a significant increase in the number of GOs issued, almost 64 million, including 17.7 million for 2017 and 46.2 million for 2018.

The table below shows the total number of GOs issued, cancelled, imported and exported from 2015 to 2018.

**Changes in GOs (years 2015 and 2018)**

| Year | Issued | Cancelled | Imported | Exported |
|---|---|---|---|---|
| 2015 | 35,709,634 | 34,714,944 | 11,213,958 | 11,363,977 |
| 2016 | 40,206,573 | 38,796,750 | 11,602,934 | 25,525,831 |
| 2017 | 40,953,439 | 40,626,544 | 19,753,834 | 47,854,870 |
| 2018 | 63,990,852 | 45,885,415 | 24,955,966 | 52,250,376 |

Under Decision ARG/elt 104/2011, the GOs available to GSE are allocated through competitive procedures, organised in a public, transparent and non-discriminatory manner. Each year, GSE holds five auctions, in each, different GOs by type of plant and production period are traded, as specified below:

- GOs for January: GOs for the month of January of year ‘n’, valid for 12 months after the production period;
- GOs for February: GOs for the month of February of year ‘n’, valid for 12 months after the production period;
- GOs for other months: GOs for months other than those referred to in points (a) and (b) of year ‘n’, valid until 31 March of year ‘n+1’.

With regard to the outcome of the auctions held in 2018 – concerning GOs for production in 2017 and 2018 – 27,305,777 GOs were offered and 25,394,289 were sold, at a value of over €35 million. Note the strong increase in the value of the GOs compared to the previous year, when 28,003,380 GOs were sold against a total price of just €11.6 million).

## 6. Please describe the developments in the preceding 2 years in the availability and use of biomass resources for energy purposes (Article 22(1)(g) of Directive 2009/28/EC).

The figures in Table 4 are estimates made on the basis of the data on biomass energy consumption, since raw material assessment methods based on direct measurement of quantities are not felt to be reliable enough.

### *Table 4* Biomass supply for energy use

| | Amount of domestic raw materials [1] | | Primary energy from domestic raw materials (ktoe) | | Quantity of raw materials imported from the EU [1] | | Primary energy from raw materials imported from the EU (ktoe) | | Quantity of raw materials imported from non-EU countries[1] | | Primary energy from raw materials imported from non-EU countries (ktoe) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 | 2017 | 2018 |
| ***Biomass supply for heat and power:*** | | | | | | | | | | | | |
| Direct supply of woody biomass from forests and other wooded land for energy generation (felling etc.) | 18,339,848 | 16,456,534 | 6,094 | 5,468 | 704,026 | 774,336 | 234 | 257 | 385,995 | 367,214 | 128 | 122 |
| Indirect supply of woody biomass (residues and by-products of the wood industry etc.) [2] | 2,205,070 | 1,859,279 | 693 | 543 | 1,756,397 | 2,106,220 | 700 | 834 | 371,108 | 565,161 | 152 | 230 |
| Energy crops (grasses, etc.) and short rotation trees | 5,415,344 | 5,385,951 | 1,341 | 1,336 | 84,481 | 86,901 | 75 | 77 | 655,513 | 587,236 | 579 | 519 |
| Agricultural by-products/processed residues and fishery by-products | 5,027,229 | 5,124,564 | 1,113 | 1,126 | | | | | | | | |
| Biomass from waste (municipal, industrial etc.) | 5,867,836 | 5,929,654 | 1,558 | 1,598 | | 1,037 | | 1 | 2,145 | | 2 | |
| ***Other*** | | | | | | | | | | | | |
| ***Biomass supply for transport:*** | | | | | | | | | | | | |
| Common arable crops for biofuels | 0 | 0 | 0 | 0 | 20,618 | 14,941 | 18 | 13 | 79,786 | 72,366 | 275 | 64 |
| Energy crops (grasses, etc.) and short rotation trees for biofuels (please specify) | | | | | | | | | | | | |
| Other (liquid waste and by-products, etc.) | 91,114 | 94,384 | 81 | 83 | 45,656 | 53,497 | 40 | 47 | 93,026 | 228,441 | 82 | 202 |

[1] Data expressed in tonnes/year as is or tonnes/year volatile substance for materials intended for anaerobic digestion.

[2] This heading also includes pellets, including imported pellets, even though this is not strictly speaking a raw material.

## Table 4.a: Current domestic agricultural land use for production of crops that may be used as energy crops (ha)

| Land Use | Total land area (ha) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| oat | 126,254 | 120,012 | 104,862 | 103,525 | 108,956 | 105,118 | 108,459 | 107,454 |
| sugar beet | 45,545 | 53,514 | 40,712 | 51,986 | 38,124 | 32,297 | 37,972 | 34,408 |
| rapeseed | 18,759 | 10,301 | 18,550 | 16,444 | 12,101 | 13,542 | 15,580 | 14,396 |
| sunflower | 118,099 | 111,678 | 127,628 | 111,350 | 114,449 | 110,716 | 114,446 | 103,870 |
| durum wheat | 1,198,974 | 1,260,143 | 1,270,490 | 1,287,564 | 1,328,874 | 1,383,675 | 1,304,856 | 1,278,401 |
| common wheat | 533,606 | 593,494 | 631,667 | 586,615 | 553,642 | 528,743 | 501,716 | 543,324 |
| corn (maize) | 994,773 | 978,543 | 908,114 | 869,378 | 655,993 | 660,727 | 645,742 | 591,206 |
| barley | 270,386 | 246,127 | 237,268 | 232,713 | 242,895 | 244,232 | 250,526 | 262,482 |
| rice | 246,537 | 235,052 | 216,019 | 219,532 | 227,331 | 234,133 | 234,133 | 229,545 |
| rye | 4,850 | 4,988 | 4,825 | 3,869 | 4,113 | 4,172 | 3,592 | 3,538 |
| soy bean | 165,955 | 152,993 | 184,146 | 232,867 | 308,979 | 288,060 | 322,417 | 326,587 |
| sorghum | 42,335 | 38,637 | 51,066 | 51,914 | 45,413 | 43,840 | 40,901 | 39,596 |
| other crops | 21,621 | 21,389 | 35,558 | 37,307 | 24,206 | 28,725 | 33,205 | 34,347 |

Source: Istat

## 7. Please provide information on any changes in commodity prices and land use within Italy in the preceding 2 years associated with increased use of biomass and other forms of energy from renewable sources. Please provide where available references to relevant documentation on these impacts in Italy (Article 22(1)(h) of Directive 2009/28/EC)

Changes in agricultural commodity prices in Italy in the period 2017-2018, which may also be associated with increased use of biomass and other forms of energy from renewable sources

### Changes in the prices of agricultural products in Italy

| Crops and direct by-products | Examples of indicative prices (€/t) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
| **WOOD ENERGY (wood-to-energy supply chain)** | | | | | | | | |
| fuel wood | 137 | 137 | 137 | 137 | 142 | 142 | 142 | 142 |
| wood pellets | 185 | 189 | 205 | 252 | 227 | 219 | 228 | 238 |
| wood chips | 43 | 41 | 42 | 47 | 40 | 38 | 39 | 40 |
| **CEREAL CROPS (usable for biogas production)** | | | | | | | | |
| durum wheat | 286 | 283 | 269 | 301 | 290 | 196 | 204 | 206 |
| common wheat | 232 | 265 | 234 | 207 | 200 | 179 | 198 | 203 |
| corn (maize) | 208 | 257 | 214 | 182 | 167 | 178 | 180 | 182 |
| corn (maize) as energy crop | n/a | n/a | 186 | n/a | n/a | n/a | 128 | 127 |
| cut corn (maize) | n/a | n/a | n/a | n/a | n/a | n/a | 33 | 31 |
| barley | 237 | 230 | 217 | 190 | 181 | 160 | 165 | 193 |
| sorghum | 214 | 241 | 230 | 182 | 171 | 192 | 170 | 180 |
| **OIL SEED CROPS (usable for bioliquid production)** | | | | | | | | |
| rapeseed meal | n/a | 313 | 307 | 276 | 273 | 244 | 245 | 263 |
| sunflower seeds | 343 | 398 | 338 | 272 | 299 | 314 | 285 | 291 |
| soy beans | 381 | 454 | 473 | 404 | 363 | 389 | 404 | 374 |
| **COMMON FEED** | | | | | | | | |
| lucerne | 104 | 114 | 140 | 113 | 85 | 83 | 95 | 116 |
| straw | 82 | 61 | 52 | 59 | 48 | 38 | 41 | 60 |
| common wheat pellets | 155 | 174 | 170 | 137 | 128 | 122 | 121 | 135 |
| common wheat meal | 207 | 214 | 201 | 169 | 167 | 150 | 146 | 164 |
| common wheat bran | 150 | 170 | 165 | 133 | 124 | 156 | 118 | 134 |
| common wheat groats | 161 | 176 | 170 | 139 | 130 | 120 | 126 | 142 |
| durum wheat bran and groats | 146 | 165 | 163 | 131 | 122 | 114 | 116 | 132 |
| durum wheat pellets | 156 | 174 | 171 | 138 | 129 | 123 | 122 | 136 |
| durum wheat middling | 290 | 275 | 264 | 233 | 225 | 206 | 191 | 197 |
| durum wheat meal | 179 | 190 | 185 | 150 | 141 | 133 | 134 | 148 |

Source: Source: AGER Commodity Exchange and Chambers of Commerce

### Changes in land use in Italy, associated with increased use of biomass and other forms of energy from renewable sources

The following table provides detailed data on agricultural land use in Italy up to 2018.

## Use of agricultural land in Italy

| Total area of Italy: 30,134,000 ha | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Utilised agricultural area: 12,720,000 ha | | | | | | | | |
| Forested area: 11,778,000 ha | | | | | | | | |
| | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| **ARABLE LAND** | **6,436,000** | **5,955,000** | **6,488,000** | **6,405,000** | **6,418,000** | **6,466,000** | **6,710,000** | **6,618,000** |
| cereals and rice | 3,439,000 | 3,350,000 | 3,460,000 | 3,393,000 | 3,191,000 | 3,233,000 | 3,123,000 | 3,090,000 |
| rotated fodder crops | 2,009,000 | 1,826,000 | 2,121,000 | 2,153,000 | 2,223,000 | 2,239,000 | 2,369,000 | 2,384,000 |
| dried legumes | 68,000 | 72,000 | 68,000 | 67,000 | 73,000 | 87,000 | 148,000 | 153,000 |
| oilseed and industrial crops | 424,000 | 275,000 | 387,000 | 413,000 | 490,000 | 461,000 | 508,000 | 480,000 |
| vegetables | 434,000 | 374,000 | 401,000 | 326,000 | 392,000 | 398,000 | 474,000 | 425,000 |
| greenhouse vegetables | 37,000 | 33,000 | 37,000 | 38,000 | 38,000 | 39,000 | 39,000 | 39,000 |
| tuberous plants | 62,000 | 58,000 | 51,000 | 53,000 | 49,000 | 48,000 | 49,000 | 47,000 |
| **PERMANENT CROPS** | **2,424,000** | **2,299,000** | **2,360,000** | **2,325,000** | **2,219,000** | **2,217,000** | **2,246,000** | **2,249,000** |
| fruit orchards | 587,000 | 513,000 | 529,000 | 508,000 | 403,000 | 404,000 | 408,000 | 407,000 |
| olive groves | 1,137,000 | 1,100,000 | 1,129,000 | 1,127,000 | 1,143,000 | 1,145,000 | 1,144,000 | 1,142,000 |
| vineyards | 700,000 | 686,000 | 702,000 | 690,000 | 673,000 | 668,000 | 694,000 | 700,000 |
| **PASTURES AND GRASSLAND** | **4,503,000** | **2,359,000** | **4,388,000** | **3,925,000** | **3,862,000** | **3,852,000** | **3,735,000** | **3,771,000** |

Source: Istat

Bioenergies play a significant role in the agricultural sector; they range from solid biomass (excluding the biodegradable fraction of waste) to biogas and bioliquids. Although agriculture plays a marginal role in the national energy balance, several efficient supply chains have developed in this sector, mainly in the field of energy production from agricultural by-products and waste. An example is the biogas sector which, after achieving outstanding results, is now expanding beyond electricity generation to include biomethane production, following upgrading. This confirms the potential strategic role of agriculture in linking the rural system with energy production, to ensure integration and diversification of agricultural income, through a multifunctional approach, helping to develop the circular economy.

#### Multifunctional, secondary and support activities in the agricultural sector

For many agricultural holdings, renewable energy generation is an additional source of revenue, of varying size, supplementing their agricultural income. In its annual report entitled ‘Development of the Agricultural Economy’, the National Institute for Statistics (Istat) assessed the overall state of the primary sector. The report classified energy production as a secondary activity with respect to crop and livestock farming activities.
The total value of secondary and support activities has increased in recent years from €6.3 billion in 2000 to around €11.5 billion in 2018. The production of renewable energy (photovoltaic, biogas, biomass) accounted for 32% of all secondary activities, followed by agritourism (30%).
The value of secondary agricultural activities exceeded €4.6 billion in 2018, of which over €1.3 billion came from agritourism (including recreational and social activities and educational farms) and €1.5 billion from renewable energy, divided as follows: 63.4% from photovoltaic, 29.4% from biomass from agricultural and forestry activities and 7.2% from biogas from animal droppings.
As to geographical distribution, solar energy production is more widespread in farms in North-East Italy (40%), while biogas production is more common in the North West (58%). Energy generation from solid biomass is largely

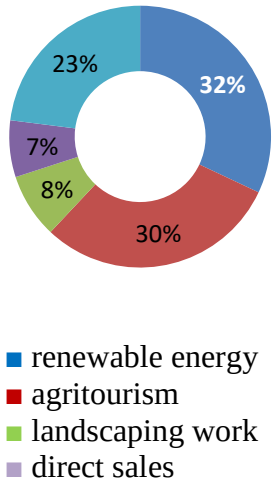
concentrated in the North East (83%). Lastly, Southern Italy and the islands, together with the North East, have a significant percentage of farms with other forms of energy production (both with about 35%).

**Secondary activities of agriculture: production at current values as at 2017 (€m)**

| | 2010 | 2015 | 2016 | 2017 | % Distribution in 2017 | % change (on current) 2017/2016 | % Change (in linked values reference year 2010) 2017/2016 |
|---|---|---|---|---|---|---|---|
| SECONDARY ACTIVITIES | | | | | | | |
| aquaculture | 7 | 7.5 | 7.7 | 7.8 | 0.2 | 1.5 | 0.3 |
| fruit processing | 141 | 183.6 | 190.1 | 187.1 | 4.1 | -1.6 | -3.5 |
| milk processing | 287.3 | 300.9 | 269.3 | 284.3 | 6.2 | 5.6 | 2.8 |
| agritourism, including recreational and social activities | 1108 | 1188.4 | 1271.9 | 1356.8 | 29.7 | 6.7 | 5.1 |
| meat processing | 294 | 296.5 | 302.2 | 328.4 | 7.2 | 8.7 | -0.3 |
| **renewable energy (PV, biogas, biomass)** | **231.9** | **1511.7** | **1451.8** | **1504.4** | **32.9** | **3.6** | **5.2** |
| woodworking/handicraft | 53 | 59.4 | 60.6 | 60.8 | 1.3 | 0.3 | -0.2 |
| production of animal feeds | 177 | 169.4 | 166 | 170 | 3.7 | 2.4 | 1.2 |
| landscaping (parks and gardens) | 309.8 | 343.9 | 343.6 | 350.2 | 7.7 | 1.9 | 0.9 |
| direct sales/marketing | 252 | 293.3 | 294.4 | 320.4 | 7 | 8.8 | 1.9 |
| **Total** | **2,861** | **4,354.6** | **4,357.6** | **4,570.2** | **100** | **4.9** | **3.5** |
| % weight on the value of agricultural production | 5.9 | 7.9 | 8.2 | 8.4 | | | |

Source: CREA, Yearbook of Italian Agriculture 2017

**Secondary agricultural activities in 2018, percentage composition**




Source: Istat, Trend of the agricultural economy 2018

The role of the agricultural sector in RES generation is increasing: specifically, PV production has been steadily growing in recent years and in the first four months of 2018 totalled 116 MW with a year-on-year increase of 6.4%.

Overall, RES generation accounts for over 30% of the value of production of secondary activities in agriculture, with €1.5 billion in 2017.

The interest in RES shown by farming enterprises is up with the times, as it helps to diversify farmers' activities with a view to environmental sustainability and it enables them to supplement their core agricultural income.

## The incidence of agro-energy in the bioeconomy

To define the value of production, the 'quantity by price' method is used. This consists in multiplying the quantities of products by their annual average unit price. The production of electricity from renewable sources is estimated on the basis of data on energy produced, expressed in kWh, by the main economic sectors (agriculture, industry, services) collected by GSE. The quantities of energy produced by the agricultural sector are then assigned a value through the average selling price, including any aid.

**Turnover of the bioeconomy as of 2017 in the EU and Italy (€m)**

| | EU | | Italy | |
|---|---|---|---|---|
| | **2016** | **2017** | **2016** | **2017** |
| agriculture, forestry and fisheries | 474,804 | 495,288 | 56,272 | 57,965 |
| agri-food industry | 950,000 | 992,750 | 113,661 | 116,616 |
| manufacture of beverages | 158,976 | 167,719 | 19,721 | 20,589 |
| manufacture of tobacco products | 35,606 | 36,746 | 454 | 454 |
| textile and clothing industry | 105,163 | 107,026 | 48,295 | 49,392 |
| wood industry | 173,724 | 181,819 | 22,160 | 23,140 |
| paper industry | 187,612 | 149,714 | 22,330 | 22,865 |
| biobased chemical industry | 35,711 | 38,282 | 2,409 | 2,578 |
| biobased pharmaceutical industry | 126,434 | 129,215 | 14,630 | 15,317 |
| bioplastics | 14,754 | 15,521 | 1,726 | 1,800 |
| **bioenergy (biodiesel, bioethanol and electricity from biomass)** | **23,025** | **23,025** | **3,896** | **3,957** |
| **Total** | **2,285,809** | **2,337,105** | **305,554** | **314,674** |

Source: CREA, Yearbook of Italian agriculture 2017

## Development of the land-leasing market

In recent years, land leasing has strengthened its role as the most effective way of increasing farm sizes, especially in Northern Italy, where the leasing market has grown sharply, with demand outstripping supply, especially for land for high-value crops.

Lately, however, the land-leasing market has suffered a setback, which is largely attributable to the drop in investments in the bioenergy sector, leading to a fall in the lease price of land for energy crops. The first signals of this trend reversal started some years ago, in 2012, following the reduction of the incentives for solar PV installations, in particular those on agricultural land. This decline has been recorded in all the regions with the largest share of energy crops, also due to the natural slowdown in the deployment of biomass-fired biogas or biofuel producing installations, which is linked to the process of balancing supply and demand at local level. Another possible factor could be the use of imported raw materials. Moreover, the role of agricultural contractors, which had previously accounted for much of the demand for land for energy crop production, is on the wane, presumably due to the growing number of cultivation contracts between energy installations and farmers for the supply of biomass.

**Changes in average land values in 2017 (€thousand/ha)**

| Geographical area | Altitude zone | | | | | Total | % change on 2016 |
|---|---|---|---|---|---|---|---|
| | Inland mountain | Coastal mountain | Inland hill | Coastal hill | Plain | | |
| North-West | 5.8 | 17.4 | 25.1 | 98.8 | 33.1 | 26.1 | 0.1 |
| North-East | 38.0 | | 45.0 | 30.8 | 44.4 | 43.0 | 0.3 |
| Centre | 9.2 | 24.3 | 14.8 | 16.6 | 22.4 | 14.8 | 0.0 |
| South | 6.5 | 9.8 | 12.2 | 17.0 | 17.9 | 12.9 | 0.3 |
| Islands | 5.8 | 7.2 | 7.6 | 8.9 | 14.3 | 8.6 | 0.7 |
| **Total** | **13.5** | **8.9** | **15.8** | **14.8** | **31.5** | **20.3** | **0.2** |
| % change on 2016 | 0.1 | 0.2 | 0.9 | 0.0 | 0.1 | 0.2 | |

Source: CREA, *L'andamento del mercato fondiario in Italia nel 2017* (Trends in the land market in Italy in 2017)

After five years of steady decline, the price of land has improved, albeit just slightly, compared to the previous year, according to the 2017 annual land market survey, carried out by the regional offices of CREA - Policy and Bioeconomy Centre. In 2017 the average price of land in Italy was just over €20,000 per ha, a lower value than in Northern Europe, but markedly higher than in other Mediterranean countries. The national average value hides the strong difference between purchase prices in Northern Italy, permanently above €40,000/ha in the North-East, and those recorded in the South, between €8,000 and €13,000/ha on average.

In the territories with a higher concentration of bioenergy plants, such as the biogas plants in the Po Plain areas of Lombardy and Emilia Romagna marked pressures on sales and lease prices have been recorded in this decade.

Leased areas, about 5.7 million hectares in total, account for almost half of the total UAA (46%). The size of these areas has steadily increased over the past two decades, recording a net increase of over 860,000 ha (+18%) on 2010. In general, in 2017, the main elements that continue to influence the lease market are the lack of liquidity and the fluctuations in farm income; together, these two factors discourage the purchase of land and promote leasing.

### Woody biomass

The National Report on the state of forests and forestry in Italy - RaF Italia 2017-2018 confirms that, in recent years, the use of wood products for energy purposes has been growing rapidly, driven by several factors: competitive pricing compared to petroleum products, improved efficiency of combustion and domestic heating devices, and the incentives for RES electricity, which encourage the deployment of biomass electricity generators of various sizes.

However, the wood fuel sector is marked by several specific uncertainties, including the strong misalignment between forest harvesting and consumption in the thermal sector.

In the thermal sector, in 2017 more than 19.7 million tonnes of solid biomass were used in Italy in the residential sector, having a total energy content of 282,916 TJ; consumption increased by more than 24,000 TJ on 2016 (+9.5%), mainly due to higher demand for heat compared to 2016. The data are based on the figures from the Survey on household energy consumption conducted by Istat in 2013/14, appropriately adjusted to factor in climate change, the use of solid biomass for heating in holiday homes and changes in the stock of installations due to purchases and to replacement of obsolete systems.

Since official wood imports are just above one million tonnes and exports are negligible, the cause of the discrepancy between actual and theoretical consumption remains to be clarified. Presumably, a tiny share of this huge total could come from non-forest sources (e.g. prunings of hedges, orchards and trees, recycling of used wood, processing residues from the wood industry, etc.), but the majority is thought to come from unrecorded imports (e.g. due to the absence of internal EU customs) and from forestry uses that escape current statistical surveys, often due to their operational limitations. In this regard, it should be noted that the survey system in use until a few years ago (and since discontinued), which aimed at an ideal census of 'forest harvesting', was affected by various methodological weaknesses, such as the lack of uniformity between the authorization procedures of the Regions and Autonomous Provinces, which have become increasingly diversified in recent decades. In light of this situation, all industry stakeholders agree on the need to reorganise the entire system of forestry statistics without delay.

## 8. Please describe the development and share of biofuels made from wastes, residues, non-food cellulosic material and ligno-cellulosic material (Article 22(1)(i) of Directive 2009/28/EC).

***Table 5: Development of biofuels***

*Please indicate the total quantities of biofuels produced from the raw materials listed in Annex IX to Directive 2009/28/EC (ktoe)*

| ***Raw materials listed in Part A of Annex IX to Directive 2009/28/EC*** | **2015** | **2016** | **2017** | **2018** |
|---|---|---|---|---|
| *a) Algae if cultivated on land in ponds or photobioreactors* | - | - | - | - |
| *b) Biomass fraction of mixed municipal waste, but not separated household waste subject to recycling targets under point (a) of Article 11(2) of Directive 2008/98/EC.* | - | - | - | - |
| *c) Bio-waste as defined in Article 3(4) of Directive 2008/98/EC from private households subject to separate collection as defined in Article 3(11) of that Directive* | - | - | - | - |
| *d) Biomass fraction of industrial waste not fit for use in the food or feed chain, including material from retail and wholesale and the agro-food and fish and aquaculture industry, and excluding feedstocks listed in part B of this Annex* | 10.8 | 7.6 | 6.8 | 33.4 |
| *e) Straw* | - | - | - | - |
| *f) Animal manure and sewage sludge* | - | - | - | - |
| *g) Palm oil mill effluent and empty palm fruit bunches* | - | - | - | 30.33 |
| *h) Tall oil pitch* | - | - | - | 1.18 |
| *i) Crude glycerine* | - | - | - | - |
| *j) Bagasse* | - | - | - | - |
| *k) Grape marcs and wine lees* | 1.75 | 1.29 | - | - |
| *l) Nut shells* | - | - | - | - |
| *m) Husks* | - | - | - | - |
| *n) Cobs cleaned of kernels of corn* | - | - | - | - |
| *o) Biomass fraction of wastes and residues from forestry and forest-based industries, i.e. bark, branches, pre-commercial thinnings, leaves, needles, tree tops, saw dust, cutter shavings, black liquor, brown liquor, fibre sludge, lignin and tall oil.* | - | - | - | - |
| *p) Other non-food cellulosic material as defined in point (s) of the second paragraph of Article 2.* | - | - | - | - |
| *q) Other ligno-cellulosic material as defined in point (r) of the second paragraph of Article 2 except saw logs and veneer logs.* | - | - | - | - |
| ***Raw materials listed in Part B of Annex IX to Directive 2009/28/EC*** | **2015** | **2016** | **2017** | **2018** |
| *a) Used cooking oil* | 67.2 | 72.3 | 78.6 | 138.3 |
| *b) Animal fats classified as categories 1 and 2 in accordance with Regulation (EC) No 1069/2009 of the European Parliament and of the Council* | 219.3 | 314.7 | 271.6 | 381.6 |
| ***Raw materials not listed in Annex IX but double counted (*)*** | 152.2 | 378.4 | - | - |

(**) Under the national transposition measure for the ILUC Directive (Legislative Decree No 51 of 21 March 2017), biofuels produced from several by-products not included in Annex IX are eligible for double counting up until 30 June 2018. However, for the purpose of monitoring the target set out in Article 3(4) of Directive 2009/28/EC, those biofuels are accounted for as single-counted biofuels from the year 2017 onwards.

## 9. Please provide information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality in Italy in the preceding 2 years. Please provide information on how these impacts were assessed, with references to relevant documentation on these impacts in Italy (Article 22(1)(j) of Directive 2009/28/EC).

Over the years, the European Union has developed a set of sustainability criteria to ensure that the use of biofuels and bioliquids does not affect biodiversity and delivers real emission savings. Compared to other Member States, in Italy the role of energy crops for biofuel production is limited, as a result both of general agricultural agronomic conditions and of regulatory constraints that limit the use of agricultural land for energy crops.

Therefore, the overall impact on the Utilised Agricultural Area - and consequently on closely related areas such as biodiversity, water resources and soil quality - is negligible, especially in terms of energy crops intended for the bioliquid and biofuel supply chains. As is the case for many other industries, in this sector too Italy is primarily a processor of imported raw materials (e.g. palm oil from Indonesia and other raw materials grown in several European countries).

The main energy crops used for the production of biofuels and bioliquids are sugar, cereal and oilseed crops (primarily rapeseed, sunflower and soy bean). However, the national statistics do not identify accurately enough the share of these crops that is used for energy production. Since only a few thousand hectares of energy crops are grown to produce bioliquids and biofuels, these dedicated crops do not have a significant impact on the local ecosystem and biodiversity.

The growing focus on the sustainability of bioliquids and biofuels relates to the strong commitment to ensuring ecological balance and protect biodiversity, which in Italy concerns both rural areas of outstanding natural beauty, and the vast agricultural and forestry heritage.

Any large-scale deployment of energy crops would supersede the traditional rotations between cereal and fodder crops and would generate a number of impacts: depletion of water resources, lack of cyclic rotations, conversion of pastures and permanent grasslands, massive use of pesticides, deep soil pollution and harm to bird life.

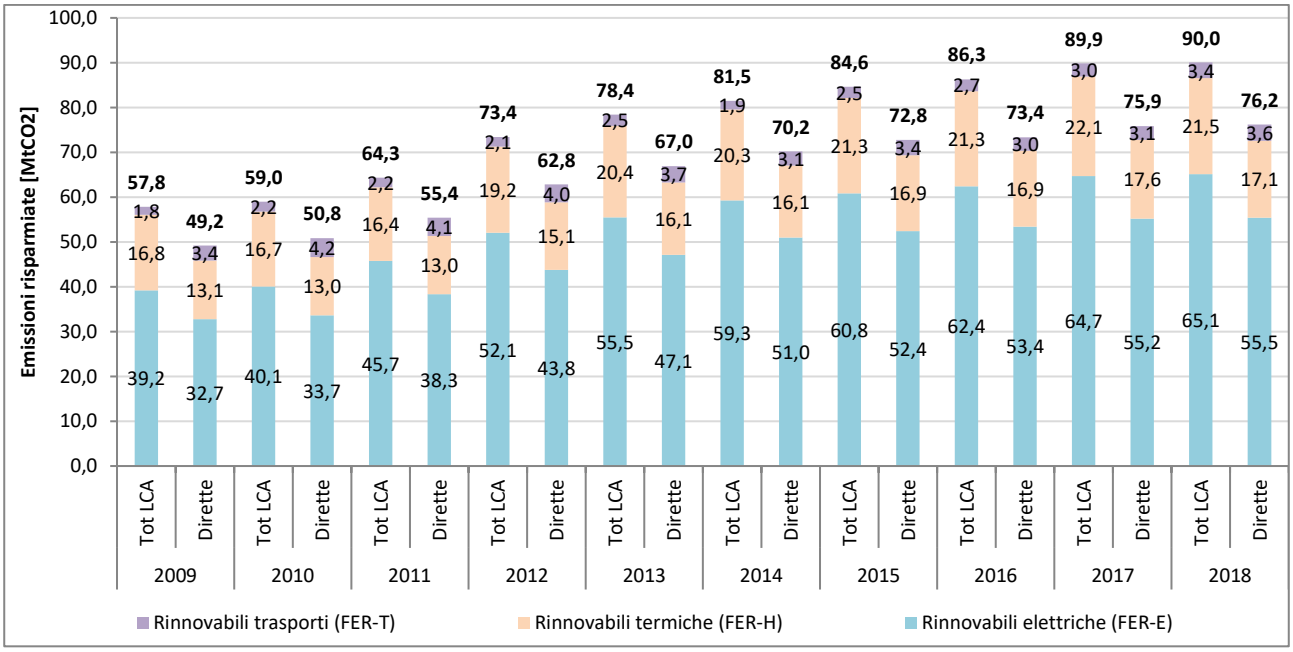
## 10. Please estimate the net greenhouse gas emission savings due to the use of energy from renewable sources (Article 22 (1)(k) of Directive 2009/28/EC)).

The following table sets out the estimated net greenhouse gas emission savings due to the use of energy from renewable sources in Italy from 2009 to 2018. The values reported have been updated over the entire time series, thanks to more precise calculation methods, the availability of updated consumption statistics and the adjustment of certain specific emission factors.

The spread of renewable energy sources in the electricity, thermal and transport sectors has generated a steady reduction in GHG emissions over the years: from 58 million tonnes of $CO_2$eq saved in 2009 to 90 million in 2018. By sector, the main contribution to emission savings comes from the electricity generation sector, where the penetration of RES has been highest. The emission savings figures for the electricity sector include the share of RES electricity used in transport, which therefore has not been counted under the renewables used in transport.

***Table 6:*** **Estimated GHG emission savings from the use of renewable energy: emissions over the whole life-cycle and direct emissions from the energy generation phase only (Mt CO2eq)**

| | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct |
| **RES Electricity** | 39.2 | 32.7 | 40.1 | 33.7 | 45.7 | 38.3 | 52.1 | 43.8 | 55.5 | 47.1 | 59.3 | 51.0 | 60.8 | 52.4 | 62.4 | 53.4 | 64.7 | 55.2 | 65.1 | 55.5 |
| **RES Heating & Cooling** | 16.8 | 13.1 | 16.7 | 13.0 | 16.4 | 13.0 | 19.2 | 15.1 | 20.4 | 16.1 | 20.3 | 16.1 | 21.3 | 16.9 | 21.3 | 16.9 | 22.1 | 17.6 | 21.5 | 17.1 |
| **RES Transport** | 1.8 | 3.4 | 2.2 | 4.2 | 2.2 | 4.1 | 2.1 | 4.0 | 2.5 | 3.7 | 1.9 | 3.1 | 2.5 | 3.4 | 2.7 | 3.0 | 3.0 | 3.1 | 3.4 | 3.6 |
| **Total RES** | 57.8 | 49.2 | 59.0 | 50.8 | 64.3 | 55.4 | 73.4 | 62.8 | 78.4 | 67.0 | 81.5 | 70.2 | 84.6 | 72.8 | 86.3 | 73.4 | 89.9 | 75.9 | 90.0 | 76.2 |




| Saved emissions [$MtCO_2$] | Tot LCA | | Direct |
|---|---|---|---|
| | Renewables for transport (RES-T) | Renewables for heating and cooling (RES-H) | Renewables for electricity production (RES-E) |

These estimates are based on the monitoring data, provided by GSE, on the GHG emission savings achieved through the use of RES, in accordance with Article 40 of Legislative Decree No 28/2011.

In a nutshell, GHG emission reductions are calculated by subtracting from the emissions that would have been produced by the substituted fossil fuels (SFF) the emissions produced by the renewable sources (RES) used. **The emissions**

**considered cover the whole life-cycle of the energy sources, in accordance with the Life-Cycle Assessment (LCA) approach.**

The GHG emissions considered are those of the main greenhouse gases: $CO_2$, $CH_4$ and $N_2O$ assessed in terms of $CO_2$eq through the conversion factors adopted in the latest national greenhouse gas emission inventories, which are 1 for $CO_2$, 298 for $N_2O$ and 25 for $CH_4$.

Under the LCA approach, the GHGs measured include upstream emissions – i.e. those linked to production of the energy source – the emissions caused by construction of the plant that will use the energy source (if significant) and the emissions produced during use (e.g. combustion) of the RES to generate electricity, heat or energy for transport ('direct' emissions).

The calculation comprises the following steps:

- identify, for each final use sector (electricity, heat or transport), the main renewable *energy sources and sub-sources* used in Italy;
- reconstruct the mix of *replaced fossil sources* for each renewable source and use sector;
- perform a life-cycle analysis for each *renewable sub-source* and for each *replaced fossil fuel* within each use sector, in order to identify the specific emission factors linked to each life-cycle phase and source;
- identify the amount of energy from renewable sources consumed each year in each use sector;
- calculate the *emission balance* using the formula shown in the annexes.

A document annexed to this report provides more details on the results obtained and the method applied.

## 11. Please report on (for the preceding 2 years) and estimate (for the following years up to 2020) the excess/deficit production of energy from renewable sources compared to the indicative trajectory which could be transferred to/imported from other Member States and/or third countries, as well as estimated potential for joint projects until 2020 (Article 22(1)(l),(m) of Directive 2009/28/EC).

As required of Member States by Regulation (EU) 2018/2000 of 12 December 2018, Italy has drawn up the Integrated National Energy and Climate Plan (NECP), which lays down the targets to be achieved by 2030, together with their indicative trajectories and the necessary policies and measures.

Under the scenarios developed for the period to 2030, it is estimated that by 2020 the share of final consumption covered by renewables could be up to 19%, without prejudice to Italy's binding commitment to achieve the 17% share assigned to it by the EU.

Directive 2009/28/EC establishes an indicative trajectory, defined as the average share of electricity from renewable sources in the periods 2011-2012, 2013-2014, 2015-2016 and 2017-2018 and, lastly, in 2020. Based on the targets set by the EU, a reference minimum trajectory to 2020 for the quantity of energy from renewable sources has been derived by interpolation.

The data on actual final consumption of RES energy for the years to 2018 and the estimates for 2019 and 2020 have been used to obtain, by subtraction, the data on excess/deficit RES energy production (actual data up to 2018, estimates for the subsequent years).

It is estimated that Italy will continue to exceed its mandatory RES energy target, albeit to a decreasing extent, until 2020. In Table 7 the surplus with respect to the target in 2020 is calculated considering the share of RES energy in gross final consumption estimated in the NECP (19%). Given the presence of various uncertainties about the evolution of energy demand and the mix of sources, it is of course possible to adopt more cautious estimation approaches which - while confirming also achievement of the binding 2020 target - would lead to a reduction of the surplus energy from RES.

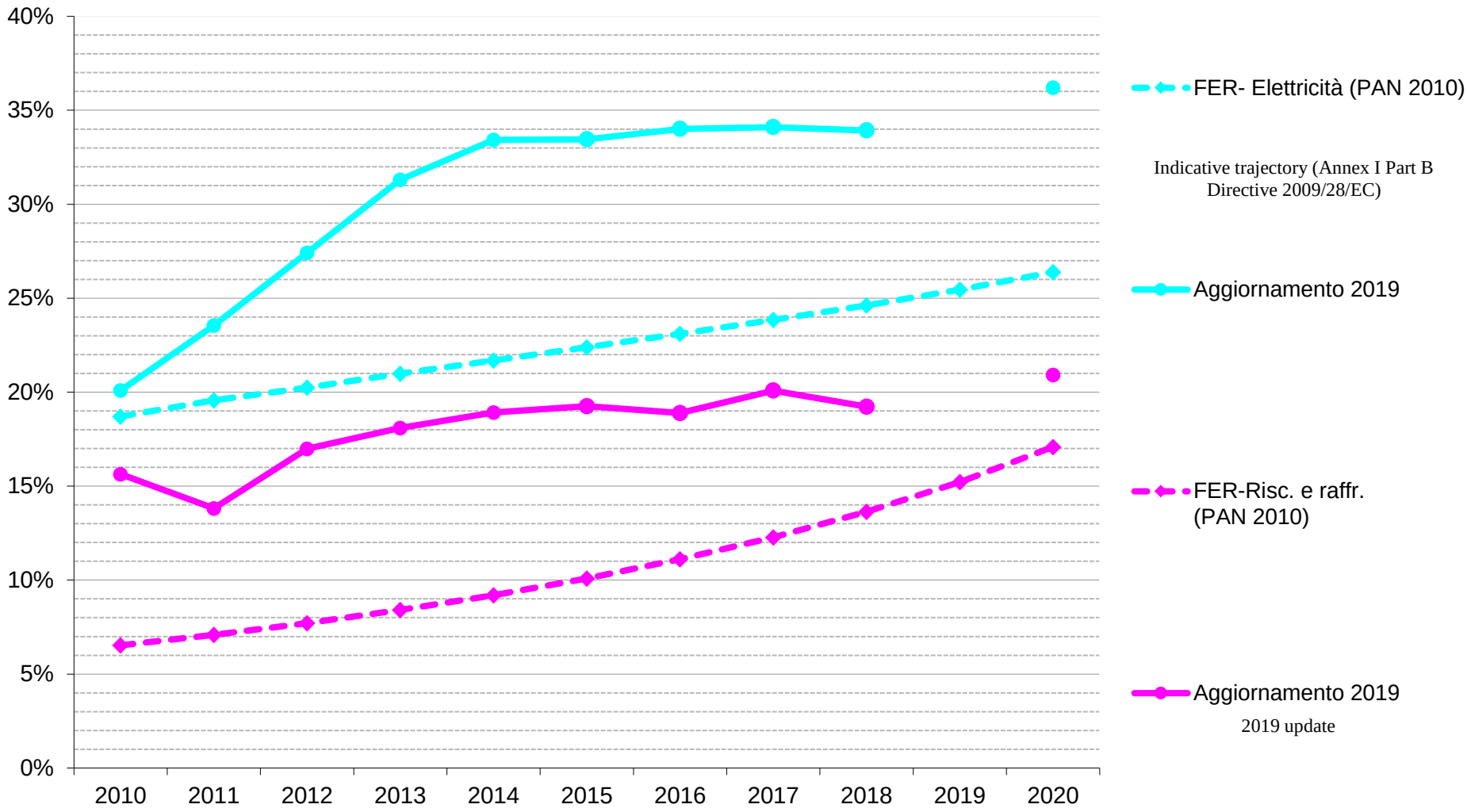
### *Table 7:* Actual and estimated excess and/or deficit (-) production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States and/or third countries in Italy (ktoe)[38,39]

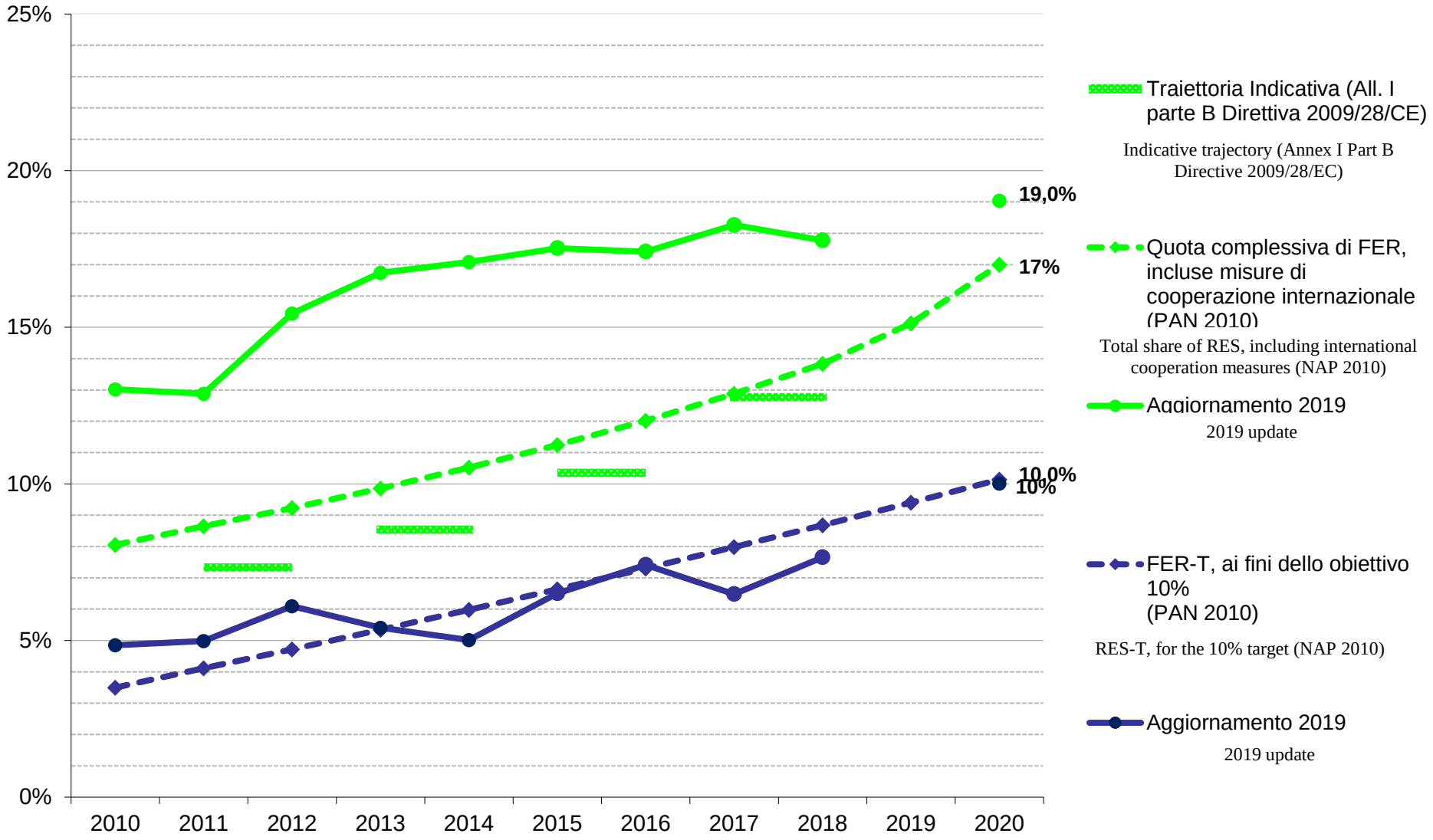
| | Achieved | | | | | | | | | | Forecasts | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Actual/estimated surplus or shortfall | 8,324 | 8,613 | 7,405 | 10,011 | 10,936 | 9,344 | 9,456 | 7,803 | 7,555 | 5,148 | 3,805 | 2,462 |

Based on the data of the past two years and the NECP forecasts, the following three charts provide updated scenarios ('2019 update') on the RES share of final energy consumption, with respect to the scenarios contained in the NAP.

[38]Please use actual figures to report on the excess production in the two years preceding submission of the report, and estimates for the following years up to 2020. In each report the Member State may correct the data of the previous reports.
[39]When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. –x ktoe).

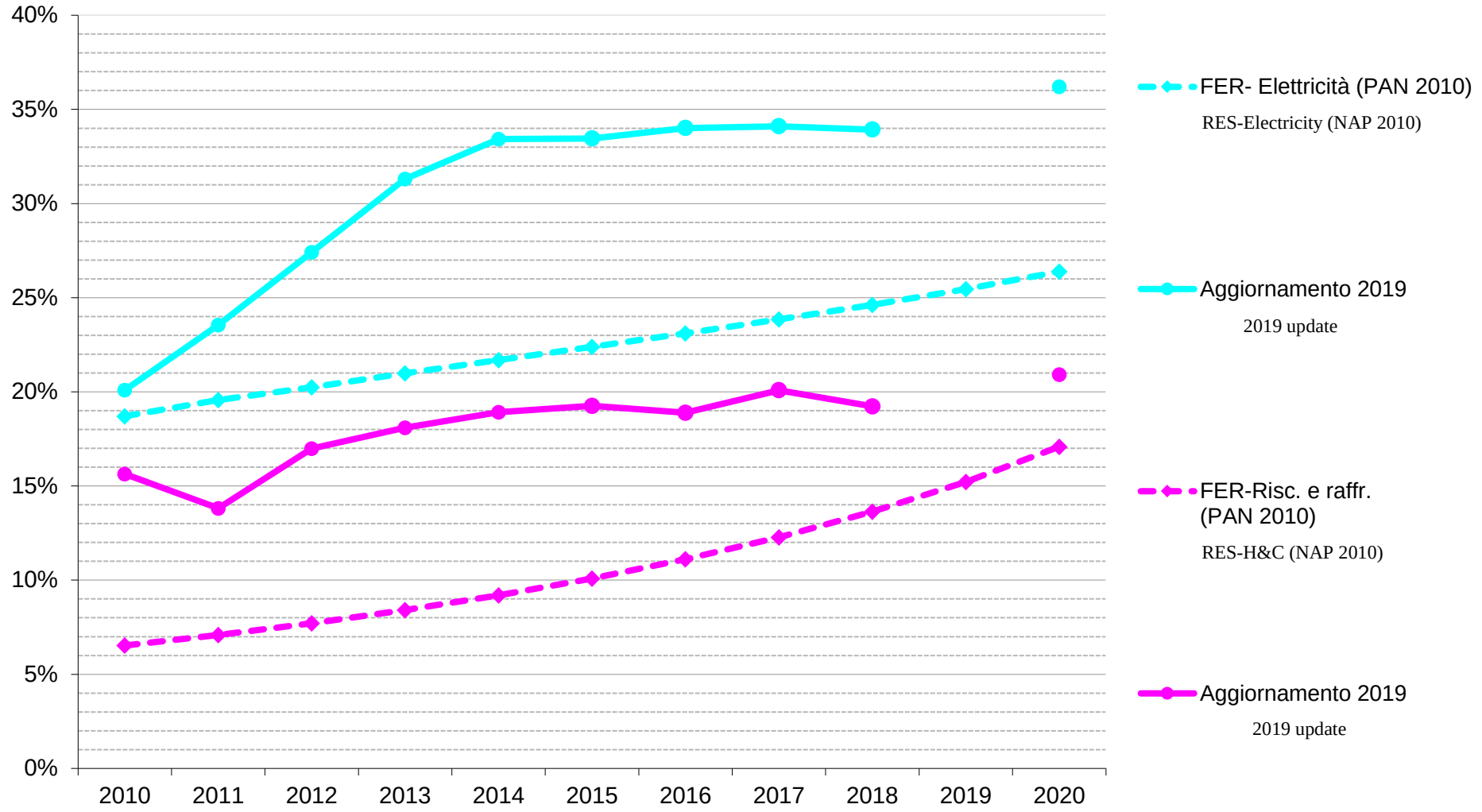
**RES share of gross final consumption: total and transport sector for the purpose of the 10% target**


40%
35%
30%
25%
20%
15%
10%
5%
0%
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
FER- Elettricità (PAN 2010)
Indicative trajectory (Annex I Part B Directive 2009/28/EC)
Aggiornamento 2019
FER-Risc. e raffr. (PAN 2010)
Aggiornamento 2019
2019 update

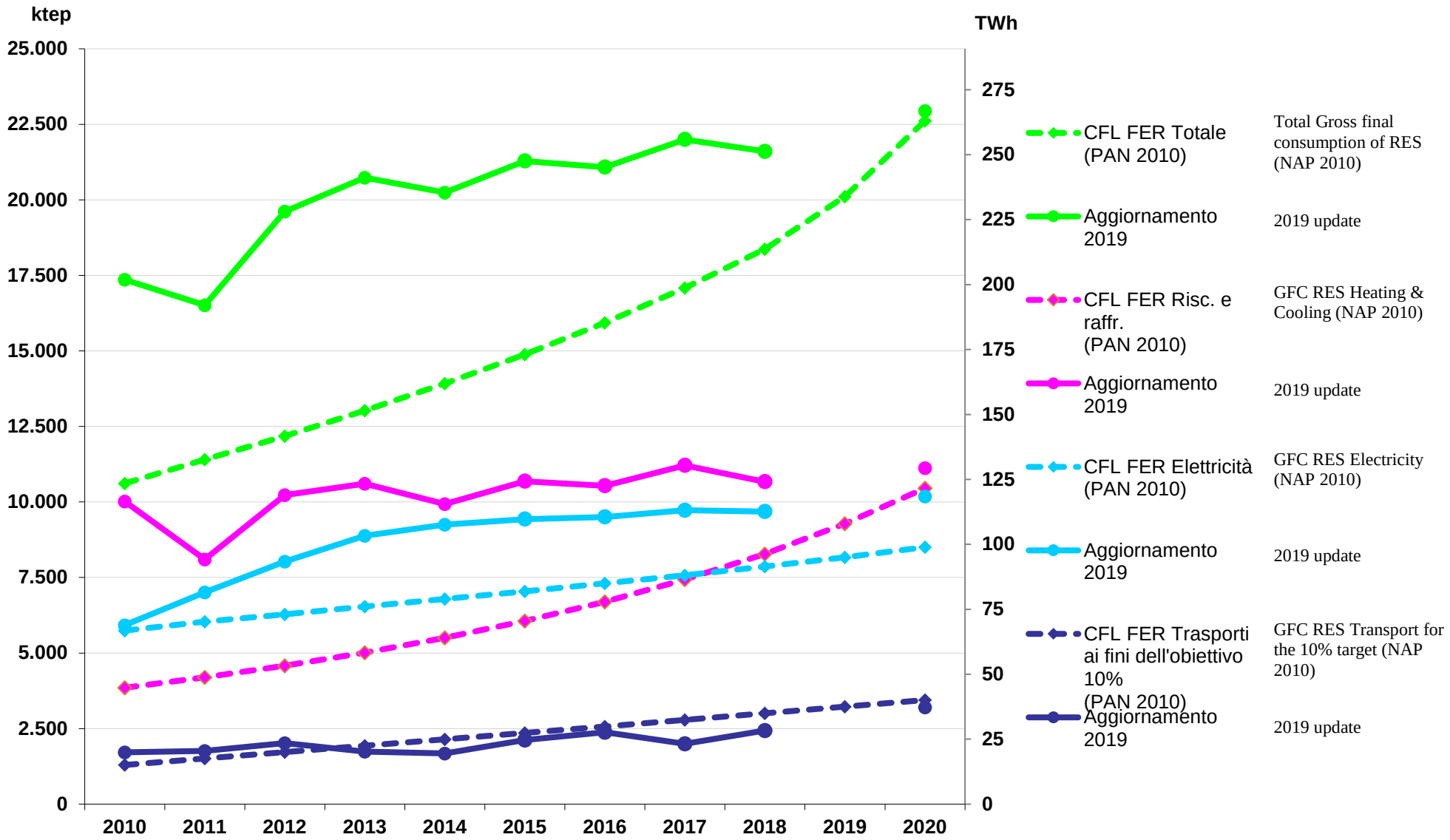



**RES share of gross final consumption:**

**heating and cooling sector and electricity sector**




**Gross final energy consumption**


ktep
TWh
25.000
22.500
20.000
17.500
15.000
12.500
10.000
7.500
5.000
2.500
0
275
250
225
200
175
150
125
100
75
50
25
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
CFL FER Totale (PAN 2010)
Total Gross final consumption of RES (NAP 2010)
Aggiornamento 2019
2019 update
CFL FER Risc. e raffr. (PAN 2010)
GFC RES Heating & Cooling (NAP 2010)
Aggiornamento 2019
2019 update
CFL FER Elettricità (PAN 2010)
GFC RES Electricity (NAP 2010)
Aggiornamento 2019
2019 update
CFL FER Trasporti ai fini dell'obiettivo 10% (PAN 2010)
GFC RES Transport for the 10% target (NAP 2010)
Aggiornamento 2019
2019 update

## 11.1. Please provide details of statistical transfers, joint projects and joint support scheme decision rules.

Implementation of the cooperation mechanisms between Member States provided for in Directive 2009/28/EC in order to achieve the renewable source targets is an optional choice of each Member State.

In Italy, the law transposing the Directive (Legislative Decree No 28 of 3 March 2011) provides for the possibility of launching, under specific conditions, statistical transfers, joint projects between Member States and joint projects with third countries, but does not make explicit mention of joint support schemes. The specific provisions set out in the Decree are described below.

***Statistical Transfers and Joint Projects with other Member States*** **Article 3**5 of Legislative Decree No 28/2011 provides that Italy may promote and manage, on the basis of specific international agreements with other Member States, joint projects and statistical transfers of energy production from renewable sources in Italy's favour. These agreements are promoted if the following conditions occur:

- the interim targets are not reached up to 2016;
- the energy subject to the statistical transfer, and the share of energy from the joint project, must be supported by an incentive having a lower value than the average weighted value of the incentives for RES electricity installations located in Italy, net of the generation of and incentives for, electricity from solar sources. The reference year for setting the amount of the incentive is the year prior to conclusion of the agreement;
- the energy subject to the statistical transfer, and the share of energy from the joint project, must contribute to the attainment of Italy's RES targets;
- appropriate measures must be put in place for monitoring the energy transferred for the purpose of meeting the national RES targets.

Furthermore, the costs of implementing these projects will be covered by the electricity and natural gas tariffs, in the manner established by the Italian Electricity and Gas Authority after conclusion of the agreements. Cooperation on joint projects with other Member States may include private operators.

***Joint projects with third countries***. Article 36 of Legislative Decree 28/2011 provides incentives, for the purpose of achieving the national renewable energy targets, for the import of RES electricity produced in non-EU countries to be fed into the Italian electricity system. The imports must be made by energy operators on the basis of international agreements entered into with the State from which the energy is imported.

The support given to the energy fed into the Italian electricity grid consists of an incentive having the same duration as, but lower value than, the incentive granted in Italy to the same energy sources and types of installations as those that produced the energy imported from the third country. The amount of the incentive must be defined, under individual agreements between Italy and the third countries from which the energy is imported, based on the following criteria: greater production capacity and efficiency of the plants located in third countries and average value of the incentives granted to the electricity produced by RES plants located in Italy.

The electricity generation and import methods must ensure that such energy contributes to the attainment of the national renewable energy targets. To this end, appropriate measures must be put in place to monitor the energy imported for the purpose of meeting the national target.

At the end of 2018, there were no active cooperation mechanisms with Member States or third countries.

As a final point, the Decree of the Ministry for Economic Development of 23 June 2016, which governs the incentives for RES electricity other than photovoltaic, provides that installations located in a EU Member State or in a third country bordering Italy may participate in the auctions for access to the Italian incentive schemes, subject to existence of an agreement between Italy and the Member State/third country in question, drawn up in accordance with the above-mentioned articles of Directive 2009/28/EC on statistical transfers and joint projects.

## 12. Please provide information on how the share for biodegradable waste in waste used for producing energy has been estimated, and what steps have been taken to improve and verify such estimates (Article 22(1)(n) of Directive 2009/28/EC).

For statistical purposes, 50% of municipal waste is considered to be renewable, in compliance with Eurostat rules.

The estimates on special waste are based on data supplied by ISPRA (Institute for Environmental Protection and Research, under the supervision of the Ministry of the Environment and Protection of Land and Sea) in its annual reports on the management of special waste. In particular, the information provided on each installation in the various editions of the reports (type and quantity of waste, economic activity of the operator), has made it possible to identify the installations using only organic waste. Where a breakdown of data by type of waste is available, e.g. secondary solid fuels (SSF), together with sufficient information to identify their organic share, the waste has been broken down into renewable and non-renewable portion. For all other uses, the waste was assumed to be non-renewable.

Under national law, the incentives for electricity from biodegradable waste are calculated two ways:

- fixed rates for certain categories of waste;
- analytical determination methods for the remaining waste.

The share of electricity generated from renewable sources and eligible for the incentive is set at a fixed rate of 51% of net generation from sorted municipal waste and, under certain conditions, from other specific types of non-municipal waste. This fixed rate (very similar to the share considered for statistical purposes) was set by the legislator following a testing campaign conducted on the municipal waste used by a representative sample of waste-to-energy plants.

For waste other than municipal waste, the amount of the incentive is calculated by means of tests performed accordance with European technical standards (C14, selective dissolution, product analysis).

As experience in performing these tests is built, certain types of waste will likely be found to have typical biodegradability rates, which may also be used for statistical purposes.

**13. Please indicate the amounts of biofuels and bioliquids in energy units corresponding to each category of feedstock group listed in part A of Annex VIII taken into account by that Member State for the purpose of complying with the targets set out in Article 3(1) and (2), and in the first subparagraph of Article 3(4).**

| Feedstock group | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| Cereals and other starch-rich crops | 68.3 | 7.9 | 17.2 | 24.4 | 30.0 | 32.4 |
| Sugars | 3.4 | - | 3.2 | 6.6 | 3.0 | 0.1 |
| Oil crops | 1,627.9 | 1,576.8 | 1,434.9 | 1,063.9 | 848.3 | 791.9 |

# Annex I - Compliance with the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, 1998)

The Ministry of Economic Development, which is the government body responsible for energy policies, launched a public consultation to share the national energy policy objectives and identify the best measures to attain them, ahead of drafting the National Renewable Energy Action Plan in 2010 (and subsequently when adopting the National Energy Strategy in 2012 and the new 2017 National Energy Strategy). The same approach was also followed when drafting the National Energy and Climate Plan on the basis of Regulation (EU) 2018/1999 of the European Parliament and of the Council on the Governance of the Energy Union and Climate Action. The consultation took place during 2019 and involved institutional actors, citizens, public and private sector operators, trade associations and experts.

The consultation carried out in 2010 saw the participation of more than 50 authorities, environmental groups, trade associations and sector organisations (including consumer groups), which were directly involved by the Ministry in preparation of the NAP developed together with the other competent Ministries. The NAP was accompanied by a summary which highlighted its key points. The consultation was also open to individual citizens.

A similar procedure was followed when preparing the National Energy Strategy in 2012 (105 participants in the consultation, including authorities, associations, research bodies and citizens), and when preparing the 2017 National Energy Strategy (835 observations received).

As concerns the steps in developing the implementing plans (one example is the National Transmission Grid Development Plan), in line with the EU rules, national legislation requires performance of a prior strategic environmental assessment, with an inclusive consultation and decision-making process.

Similarly, the installation of individual systems and infrastructure is subject to environmental impact assessment, again with broad stakeholder involvement. On this point, to streamline the acquisition and assessment of public contributions, Legislative Decree No 28/2011 provided that the Regions and the Autonomous Provinces should establish that where several RES projects were submitted for the same or adjoining geographical areas, they could undergo cumulative environmental impact assessment.

# Annex II – Estimates of greenhouse gas emission savings in Italy

## Emission savings in the electricity sector

The development of RES is contributing to the progressive decarbonisation of the electricity generation sector. In 2018, the estimated direct emission savings achieved thanks to production from renewable sources amounted to 65.1 million tonnes of $CO_{2eq}$, 70% greater than the savings recorded in 2009. The renewable sources that contributed the most to these savings were hydropower and solar.

**Table II.1: Net emission savings from RES electricity generation in the period 2009-2018 (MtCO2eq/year)**

| | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct |
| BIOGAS | 1.0 | 0.9 | 1.1 | 1.0 | 1.7 | 1.6 | 2.2 | 2.1 | 3.2 | 3.3 | 3.6 | 3.8 | 3.7 | 3.8 | 3.8 | 3.9 | 3.9 | 4.0 | 3.9 | 4.1 |
| BIOLIQUIDS | 0.6 | 0.8 | 1.1 | 1.5 | 0.9 | 1.3 | 1.0 | 1.4 | 1.2 | 1.7 | 1.4 | 2.0 | 1.6 | 2.3 | 1.8 | 2.2 | 1.8 | 2.1 | 1.8 | 2.1 |
| SOLID BIOMASS | 2.5 | 2.2 | 2.3 | 2.0 | 2.4 | 2.1 | 2.4 | 2.1 | 2.9 | 2.6 | 3.1 | 2.8 | 3.2 | 2.9 | 3.4 | 3.0 | 3.5 | 3.1 | 3.5 | 3.1 |
| WIND | 4.7 | 4.0 | 5.7 | 4.8 | 6.3 | 5.2 | 7.4 | 6.2 | 8.3 | 6.9 | 9.0 | 7.5 | 9.4 | 7.9 | 10.2 | 8.6 | 10.7 | 9.0 | 11.1 | 9.3 |
| GEOTHERMAL | 3.5 | 2.9 | 3.2 | 2.6 | 3.2 | 2.6 | 3.2 | 2.6 | 3.2 | 2.6 | 3.4 | 2.8 | 3.6 | 3.0 | 3.8 | 3.1 | 3.7 | 3.1 | 3.7 | 3.0 |
| HYDROPOWER | 26.5 | 21.7 | 25.5 | 20.8 | 25.1 | 20.4 | 25.2 | 20.4 | 24.9 | 20.2 | 25.9 | 21.2 | 26.0 | 21.2 | 26.4 | 21.5 | 26.7 | 21.7 | 27.5 | 22.5 |
| SOLAR | 0.4 | 0.4 | 1.1 | 1.0 | 6.2 | 5.1 | 10.7 | 8.9 | 11.9 | 9.9 | 12.8 | 10.8 | 13.3 | 11.3 | 13.0 | 11.0 | 14.5 | 12.2 | 13.5 | 11.4 |
| **TOTAL RES-E** | **39.2** | **32.7** | **40.1** | **33.7** | **45.7** | **38.3** | **52.1** | **43.8** | **55.5** | **47.1** | **59.3** | **51.0** | **60.8** | **52.4** | **62.4** | **53.4** | **64.7** | **55.2** | **65.1** | **55.5** |
| SPECIFIC EMISSIONS AVOIDED [g/kWh] | 626 | 522 | 582 | 489 | 561 | 470 | 558 | 469 | 537 | 456 | 551 | 474 | 554 | 478 | 564 | 483 | 572 | 488 | 578 | 492 |

The method used to estimate the emission savings from RES generation is an emission balance based on the following formula:

$$Emission\ savings = Emissions\ avoided\ (SFF - substituted\ fossil\ fuels) - Emissions\ produced\ (RES)$$

The emissions from fossil sources avoided and those produced by RES are calculated by means of the following formulas:

$$Avoided\ emissions\ from\ fossil\ sources = \sum_{SFF}(EF_{SFF} \times SF_{SFF}) \times Gross\ electricity\ generation$$

$$Emissions\ produced = EF_{RES} \times Annual\ RES\ production$$

$$Emissions\ produced_{LCA} = Emissions_{operation} + Emissions_{construction} + Emissions_{upstream}$$

where SFF are the replaced fossil fuels , $SF_{SFF}$ is the substitution factor of each fossil fuel technology [%], $EF_{SFF}$ is the emission factor of each marginal fossil fuel technology, calculated as the emissions needed to produce one gross electricity unit [g/kWh], and $EF_{RES}$ are the emission factors of the possible RES source-technology per unit of energy produced (g/kWh). This balance was calculated for each phase of the lifecycle of the energy source, including the following phases: upstream, plant construction and plant operation.

Annual RES generation is calculated on the basis of the statistical reports produced by GSE - Energy Services Operator[40], and of the data published by Terna - the National Transmission Grid Operator[41]. The electricity output considered is normalised gross generation from wind and hydropower, and actual gross generation from the other sources. To calculate the electricity generated from bioliquids, only the share from sustainable bioliquids is considered.

The greenhouse gas emission factors in the different phases of the lifecycle of renewable and fossil sources were acquired from the GSE's database of LCA emission factors, collated from a broad range of databases, legislation and technical literature, including RSE's databases of emission factors, ISPRA's databases of emission factors, Ecoinvent databases, NREL databases, IPCC 2006, EMAS Declarations, NEEDS Project, UNI-TS-11435, Directive 2009/28/EC

[40] http://www.gse.it/it/Statistiche/RapportiStatistici/Pagine/default.aspx
[41] http://www.terna.it/default/home_en/electric_system/statistical_data.aspx

and Communication COM 2010 (11). The greenhouse gas emission factors produced in the upstream phase were calculated by GSE from company databases containing the certified emission values for the different batches of bioliquids released for consumption in the country.

The $CO_2$ released in the bioenergy operation phase was considered to be zero, while the other GHGs ($CH_4$ , $N_2O$) were assigned values on the basis of emission factors taken from GSE's LCA database. The emission factors of the upstream phase of bioenergies were taken from the standard values shown in Annex V to Directive 2009/28/EC for the different types of bioliquids (including biofuels) and from the standard values listed in UNI-TS-11435 for the different types of biogas and for solid biomass[42]. The data on electricity generation from bioenergies were disaggregated and associated with the supply chains of the feedstocks on which the specific upstream emission factors depended. The supply chains of the biogas and bioliquids used to generate electricity were taken from the statistics on the plants in operation supplied by Terna, with additional information from GSE. Where detailed data on the origin of the bioenergies were not available, some conservative assumptions were made to assign the specific upstream emission factor. For example, solid woody biomass for electricity was assumed to come from wood chips from short rotation forestry, sourced at a distance of 71-200 km).

Determination of the mix of replaced fossil fuel technologies is based on the determination of a specific substitution factor for each RES-E, which takes into account the mix of marginal technologies on the wholesale electricity market, at the production times and in the production zones of the specific RES analysed. This factor was calculated for each RES by GSE on the basis of the hourly and zonal electricity production data from the main RES (source: Terna[43]) and on the basis of the hourly zonal marginal technology index (statistical data supplied by GME - the Energy Market Operator[44]). By calculating the weighted average of the zonal hourly marginal technology index on the basis of the hourly and zonal production of each RES source[45], it is possible to estimate the mix of sources that are likely to have been replaced by the production of each source considered. The marginality of renewable technologies was assumed not to be significant for the purposes of the analysis[46]; therefore, the replaced mix was normalised considering only the national fossil sources and imports. The GHG emission factors from national fossil sources were calculated by GSE on the basis of statistical data supplied by Terna (mix of fuels used by each technology, average performance) and of the fuel emission factors used by ISPRA in the 2015 NIR; for imports, the EU-28 average value provided by the JRC was used[47]. In order to contain some fluctuations due to temporary market contingencies that are not significant in terms of emissions, the index is averaged on a rolling three-year basis.

***Table II.2: Fossil fuels replaced thanks to renewable electricity generation in 2017-2018***

| | 2017 | | | | | | 2018 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coal | CCGT | Oil | ICE | GT | Imports | Coal | CCGT | Oil | ICE | GT | Imports |
| BIOGAS | 22.9% | 54.7% | 0.6% | 16.8% | 0.4% | 4.6% | 23.9% | 54.0% | 0.3% | 17.9% | 0.3% | 3.6% |
| BIOLIQUIDS | 22.9% | 54.7% | 0.6% | 16.8% | 0.4% | 4.6% | 23.9% | 54.0% | 0.3% | 17.9% | 0.3% | 3.6% |
| SOLID BIOMASS | 22.9% | 54.7% | 0.6% | 16.8% | 0.4% | 4.6% | 23.9% | 54.0% | 0.3% | 17.9% | 0.3% | 3.6% |
| WIND | 27.9% | 56.8% | 1.6% | 9.0% | 0.9% | 3.9% | 27.0% | 58.5% | 1.4% | 9.6% | 0.7% | 2.9% |
| GEOTHERMAL | 23.8% | 54.1% | 0.2% | 17.0% | 0.3% | 4.6% | 23.2% | 53.8% | 0.1% | 19.0% | 0.3% | 3.6% |
| HYDROPOWER | 19.3% | 52.8% | 0.2% | 22.6% | 0.3% | 4.9% | 20.6% | 50.4% | 0.1% | 24.6% | 0.3% | 4.0% |
| SOLAR | 25.1% | 56.1% | 0.4% | 15.1% | 0.4% | 2.9% | 24.7% | 55.3% | 0.3% | 16.9% | 0.3% | 2.6% |

[42]For solid biomass from waste, the emission factor was considered to be zero, since it was assigned to the waste supply chain.
[43] http://www.terna.it/default/home_en/electric_system/transparency_report_en/generation.aspx
[44] http://www.mercatoelettrico.org/it/download/DatiStorici.aspx
[45]The hourly production from bioenergy plants (aggregated in Terna's data to fossil thermal production) was assumed with baseload type profile and homogeneous zonal distribution.
[46]Hydropower plants are considered to be marginal in order to optimise production on the basis of appropriate market strategies; the other RES are almost never marginal; therefore it is to be excluded that RES electricity might give rise to mutual replacement between different RES; on the contrary, it will only replace fossil-fuel technologies and imports.
[47] R. Edwards et al. GHG Intensity of the electricity consumption in the EU (by Member State) and outside EUJRC 2017

**Table II.3: Emission factor of the fossil mix replaced in 2015-2018 (gCO2/kWh)**

| | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|
| | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct |
| BIOGAS | 587 | 480 | 596 | 486 | 603 | 492 | 611 | 498 |
| BIOLIQUIDS | 587 | 480 | 596 | 486 | 603 | 492 | 611 | 498 |
| SOLID BIOMASS | 587 | 480 | 596 | 486 | 603 | 492 | 611 | 498 |
| WIND | 623 | 515 | 630 | 521 | 632 | 521 | 631 | 519 |
| GEOTHERMAL | 593 | 486 | 608 | 498 | 606 | 494 | 606 | 494 |
| HYDROPOWER | 571 | 462 | 576 | 465 | 584 | 472 | 593 | 480 |
| SOLAR | 599 | 492 | 609 | 499 | 615 | 502 | 616 | 503 |
| **TOTAL RES-E** | 588 | 480 | 596 | 486 | 602 | 490 | 608 | 495 |

## Emission reduction in the heating and cooling sector

RES penetration in the heating and cooling sector is helping to avoid increasing amounts of emissions in processing and end-use sectors (industrial, services, residential, other end uses). The main contributor to these emission savings is the spread of heat pumps in the service sector and of biomass in the residential sector.

**Table II.4: Net emission savings associated with the use of renewable sources for heating and cooling between 2009 and 2018 (millions of tonnes of CO2eq/year)**

| | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct |
| SOLAR THERMAL | 0.3 | 0.2 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 |
| SOLID BIOMASS | 8.8 | 6.7 | 8.2 | 6.3 | 6.4 | 5.0 | 9.1 | 7.1 | 9.7 | 7.7 | 9.2 | 7.3 | 10.1 | 8.1 | 9.9 | 7.9 | 10.5 | 8.4 | 10.0 | 8.1 |
| CHARCOAL | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 |
| BIOGAS | 0.1 | 0.0 | 0.1 | 0.1 | 0.9 | 0.8 | 0.5 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 |
| ORGANIC FRACTION OF MUNICIPAL SOLID WASTE | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.3 |
| BIOLIQUIDS | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 |
| BIODIESEL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| GEOTHERMAL | 0.8 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6 | 0.4 | 0.5 | 0.4 |
| HEAT PUMPS | 6.7 | 5.1 | 7.3 | 5.6 | 7.9 | 6.0 | 8.4 | 6.4 | 8.7 | 6.7 | 9.0 | 6.9 | 9.0 | 6.9 | 9.0 | 6.9 | 9.2 | 7.0 | 9.0 | 6.9 |
| **TOTAL RES-H** | **16.8** | **13.1** | **16.7** | **13.0** | **16.4** | **13.0** | **19.2** | **15.1** | **20.4** | **16.1** | **20.3** | **16.1** | **21.3** | **16.9** | **21.3** | **16.9** | **22.1** | **17.6** | **21.5** | **17.1** |
| SPECIFIC EMISSIONS AVOIDED [g/MJ] | 65.2 | 50.7 | 64.0 | 49.7 | 68.8 | 54.3 | 66.7 | 52.3 | 66.8 | 52.8 | 68.2 | 54.2 | 67.7 | 53.8 | 67.9 | 54.0 | 67.2 | 53.4 | 67.5 | 53.8 |

The calculation method and data sources for estimating GHG emissions in the heating and cooling sector are similar to those applied in the electricity sector, with the following differences.

The emission balance associated with the use of RES in heating and cooling is calculated separately for each consumption subsector[48]. This assessment is made by sector because RES penetration differs in the end-use sectors according to the different use of the RES (supply chains, technologies), the fossil fuel mix and the fossil technologies presumably replaced by the RES.

[48] The subsectors and sources used in the emission balance are modelled on those used in the Eurostat energy balances. The balance also includes heat pumps, as required by Directive 2009/28/EC.

The replaced fossil fuel mix was calculated on the basis of the mix used annually in each sector (Eurostat balance) taking into account certain indicative energy conversion performance values of RES and fossil sources[49]. In the processing sector, instead, the renewable source was assumed to replace the lowest-emission fossil technology (current BAT), which is a natural gas boiler.

Bioenergies were associated with feedstock supply chains in each consumption sector, using the following statistics and assumptions:

1. Processing sector – CHP and heat-only plants: similarly to the assumption made for the electricity sector, solid biomass has been assumed conservatively to be 'wood chips from short rotation forestry - SRF', while sustainable bioliquids have been considered to be pure palm oil and rapeseed oil, other bioliquids (from plant or animal waste) and biodiesel, in shares taken from Terna's and GSE's statistics on the plants in operation. Biogas has also been broken down into different types (agricultural, from sludge etc.) based on the Terna data on CHP plants in operation. The calculations and assumptions have been made so as to ensure, for CHP plants, consistency between the heating and the electricity sectors. The RES plants serving district heating networks have been assumed to use the same bioenergy supply chains as CHP plants.
2. End uses – Industrial, services, other end uses: biogas consumption is associated with specific supply chains (agricultural, sludge, landfills, etc.) taken from GSE statistics. Bioliquid and biodiesel consumption is almost negligible, while solid biomass consumption has been assumed to consist as to 50% of unprocessed generic residue and as to the remaining 50% of woodchips from forestry residue.
3. End uses – Residential: solid biomass consumption consists of firewood sourced nationally or in Europe and pellets, in shares taken from GSE's annual statistics (85% wood and 15% pellets in 2018).

The $CO_2$ released in the bioenergy operation phase has been considered to be zero, while the other GHGs ($CH_4$ , $N_2O$) have been assigned values on the basis of emission factors taken from GSE's LCA database. The difference between emissions in the construction phase of bioenergy-fuelled and fossil fuel-fuelled boilers has been considered to be negligible, whereas it was assigned a value for solar collectors, heat pumps and geothermal plants.

**Reduction of emissions in the transport sector**

The use of biofuels in transport is estimated to generate the following GHG emission savings.

**Table II.5: Net emission savings from the use of RES in transport over the period 2009-2018 (MtCO2eq/year)**

| | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | | 2014 | | 2015 | | 2016 | | 2017 | | 2018 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct | Tot LCA | Direct |
| BIOETHANOL | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| BIO-ETBE | 0.1 | 0.3 | 0.1 | 0.4 | 0.1 | 0.3 | 0.1 | 0.3 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| BIODIESEL | 1.7 | 3.1 | 2.1 | 3.8 | 2.0 | 3.8 | 2.0 | 3.7 | 2.4 | 3.5 | 1.9 | 3.1 | 2.4 | 3.4 | 2.6 | 2.9 | 2.9 | 3.0 | 3.4 | 3.5 |
| **Total RES-T** | **1.8** | **3.4** | **2.2** | **4.2** | **2.2** | **4.1** | **2.1** | **4.0** | **2.5** | **3.7** | **1.9** | **3.1** | **2.5** | **3.4** | **2.7** | **3.0** | **3.0** | **3.1** | **3.4** | **3.6** |
| SPECIFIC EMISSIONS AVOIDED [g/MJ] | 37.5 | 71.0 | 36.8 | 70.4 | 36.9 | 70.4 | 36.8 | 70.2 | 47.9 | 70.3 | 43.2 | 70.7 | 51.1 | 70.5 | 61.0 | 69.3 | 67.1 | 69.3 | 65.9 | 69.2 |

The calculation method and data sources for estimating GHG emissions in the transport sector are similar to those applied to the electricity and thermal sectors, with the following differences.

The use of bioethanol/BIOETBE and biodiesel in transport is mostly blended with petrol and diesel respectively. Thus, each biodiesel and bioethanol energy unit is assumed to replace respectively one unit of diesel or petrol and their emissions.

The GHG emissions from petrol and diesel are calculated on the basis of the average emissions of the national diesel and petrol vehicle fleet, published by ISPRA[50] and calculated on the basis of the estimate software Copert v.5.2.2 (EMISIA SA, 2019).

[49] The thermal conversion efficiency of CHP and district heating installations has been taken from the operating data of the installations supplied by Terna and AIRU. To estimate the conversion efficiency of individual heating and cooling installations, given the lack of detailed statistics on the systems in operation, some assumptions were made, using values from the literature and from market surveys.
[50] Available on http://www.sinanet.isprambiente.it/it/sia-ispra/serie-storiche-emissioni/dati-trasporto-strada/view

As to emissions from the use of biofuels, $CO_2$ emissions are assumed to be zero, while $CH_4$ and $N_2O$ emissions are the same as those from the replaced fossil fuel.

Emissions from vehicle production have not been considered in that the biofuels are used to dilute fossil fuels (zero balance).

Greenhouse gas emissions from the upstream phase of biofuels have been calculated by GSE on ‘Certificates of Release for Consumption’ of biofuels, issued by GSE to the obligated parties that release biofuels into the national distribution system.