

**Italy's Fourth Progress Report under  
Directive 2009/28/EC**

**December 2017**

## CONTENTS

CONTENTS.....	2
1. Sectoral and overall shares and actual consumption of energy from renewable sources (Article 22(1)(a) of Directive 2009/28/EC) .....	4
2. Measures taken in the preceding two years and/or planned at national level to promote the growth of energy from renewable sources 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).....	10
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). .....	25
2.b Please describe the measures for ensuring the transmission and distribution of electricity produced from renewable energy sources and in improving the framework or rules for bearing and sharing of costs related to grid connections and grid reinforcements (Article 22(1)(f) of Directive 2009/28/EC).....	29
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).....	38
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).....	67
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).....	69
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).....	72
6. Please describe the developments in the preceding two years in the availability and use of biomass resources for energy purposes (Article 22(1)(g) of Directive 2009/28/EC). .....	73
7. Please provide information on any changes in commodity prices and land use within your Member State in the preceding two 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 your country (Article 22(1)(h) of Directive 2009/28/EC).....	75
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).....	80
9. Please provide information on the estimated impacts of the production of biofuels and bioliquids on biodiversity, water resources, water quality and soil quality within your country in the preceding two years. Please provide information on how these impacts	

were assessed, with references to relevant documentation on these impacts within your country (Article 22(1)(j) of Directive 2009/28/EC). .....	81
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). .....	82
11. Please report on (for the preceding two 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) and (m) of Directive 2009/28/EC).....	84
11.1. Please provide details of statistical transfers, joint projects and joint support scheme decision rules. ....	88
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).....	90
13. Please indicate the amounts of biofuels and bioliquids in energy units corresponding to each of the categories or raw materials listed in Part A of Annex VIII that are taken into consideration by the Member State in question in order to comply with the objectives set out in Article 3(1) and (2) and Article 3(4)(1).....	91
Annex I – Compliance with the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, 1998) .....	92
Annex II – Methodology used to estimate greenhouse gas emission savings in Italy .....	93

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

*Preamble:* The following tables include the data from 2009 onwards, because some data for this period have been amended slightly as a consequence of changes in calculation method or the availability of new data.

*Table 1: The sectoral (electricity, heating and cooling, and transport) and overall shares of energy from renewable sources<sup>1</sup>*

	2009	2010	2011	2012	2013	2014	2015	2016
RES-H&C <sup>2</sup> (%)	16.43%	15.64%	13.82%	16.98%	18.09%	18.89%	19.17%	18.73%
RES-E <sup>3</sup> (%)	18.81%	20.09%	23.55%	27.42%	31.30%	33.42%	33.46%	34.01%
RES-T <sup>4</sup> (%)	3.93%	4.84%	4.98%	6.04%	5.39%	4.99%	6.42%	7.24%
<b>Overall RES share<sup>5</sup> (%)</b>	<b>12.78%</b>	<b>13.02%</b>	<b>12.88%</b>	<b>15.44%</b>	<b>16.74%</b>	<b>17.08%</b>	<b>17.53%</b>	<b>17.41%</b>
of which from cooperation mechanism (%) <sup>6</sup>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
surplus for cooperation mechanism (%) <sup>7</sup>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

<sup>1</sup> Facilitates comparison with Table 3 and Table 4a of the NREAPs.

<sup>2</sup> Share of renewable energy in heating and cooling: gross final consumption of energy from renewable sources for heating and cooling (as defined in Article 5(1)(b) and (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.

<sup>3</sup> Share of renewable energy in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Article 5(1)(a) and (3) of Directive 2009/28/EC), divided by total gross final consumption of electricity. The same methodology as in Table 3 of NREAPs applies.

<sup>4</sup> Share of renewable energy in the transport sector: final energy from renewable sources consumed in transport (see Article 5(1)(c) and (5) of Directive 2009/28/EC) divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in land transport (as reflected in row 3 of Table 1). The same methodology as in Table 3 of NREAPs applies.

<sup>5</sup> Share of renewable energy in gross final energy consumption. The same methodology as in Table 3 of NREAPs applies.

<sup>6</sup> In percentage point of overall RES share.

<sup>7</sup> In percentage point of overall RES share.

*Table 1a: Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)<sup>8</sup>*

	2009	2010	2011	2012	2013	2014	2015	2016
(A) Gross final consumption of RES for heating and cooling	10 178	10 018	8 101	10 226	10 603	9 934	10 687	10 538
(B) Gross final consumption of electricity from RES	5 244	5 768	6 837	7 840	8 665	9 001	9 142	9 183
(C) Gross final consumption of energy from RES in transport	1 290	1 575	1 577	1 552	1 468	1 310	1 456	1 360
<b>(D) Gross total RES consumption<sup>9</sup> (%)</b>	<b>16 712</b>	<b>17 362</b>	<b>16 515</b>	<b>19 618</b>	<b>20 737</b>	<b>20 245</b>	<b>21 286</b>	<b>21 081</b>
(E) Transfer of RES to other Member States	0	0	0	0	0	0	0	0
(F) Transfer of RES from other Member States and third countries	0	0	0	0	0	0	0	0
<b>(G) RES consumption adjusted for target (D)-(E)+(F)</b>	<b>16 712</b>	<b>17 362</b>	<b>16 515</b>	<b>19 618</b>	<b>20 737</b>	<b>20 245</b>	<b>21 286</b>	<b>21 081</b>

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

<sup>8</sup> Facilitates comparison with Table 4a of the NREAPs.

<sup>9</sup> 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 the indicative interim trajectory for the shares of energy from renewable sources in the electricity sector<sup>10</sup>**

*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 (MW)

	2009	2010	2011	2012	2013	2014	2015	2016
<b>Hydropower:</b>	<b>21 371</b>	<b>21 520</b>	<b>21 737</b>	<b>21 880</b>	<b>22 009</b>	<b>22 098</b>	<b>22 220</b>	<b>22 298</b>
<i>non-pumped</i>	13 827	13 976	14 193	14 325	14 454	14 506	14 628	14 991
<i>&lt;1 MW</i>	451	509	548	569	621	654	697	742
<i>1 MW-10 MW</i>	2 137	2 155	2 271	2 335	2 413	2 432	2 511	2 557
<i>&gt;10 MW</i>	11 239	11 312	11 374	11 421	11 420	11 420	11 420	11 692
<i>pumped</i>	3 957	3 957	3 957	3 957	3 957	3 982	3 982	3 982
<i>mixed<sup>11</sup></i>	3 587	3 587	3 587	3 598	3 598	3 610	3 610	3 325
<b>Geothermal</b>	<b>695</b>	<b>728</b>	<b>728</b>	<b>728</b>	<b>729</b>	<b>768</b>	<b>768</b>	<b>767</b>
<b>Solar:</b>	<b>1 264</b>	<b>3 592</b>	<b>13 131</b>	<b>16 785</b>	<b>18 185</b>	<b>18 594</b>	<b>18 901</b>	<b>19 283</b>
<i>photovoltaic</i>	1 264	3 592	13 131	16 785	18 185	18 594	18 901	19 283
<i>concentrated solar power</i>	0	0	0	0	0	0	0	0
<b>Tide, wave, ocean</b>	<b>0</b>							
<b>Wind:</b>	<b>4 879</b>	<b>5 794</b>	<b>6 918</b>	<b>8 102</b>	<b>8 542</b>	<b>8 683</b>	<b>9 137</b>	<b>9 384</b>
<i>onshore</i>	4 879	5 794	6 918	8 102	8 542	8 683	9 137	9 384
<i>offshore</i>	0	0	0	0	0	0	0	0
<b>Biomass:</b>	<b>1 871</b>	<b>2 183</b>	<b>2 631</b>	<b>3 555</b>	<b>3 762</b>	<b>3 772</b>	<b>3 804</b>	<b>3 871</b>
<i>solid biomass</i>	438	406	421	538	606	620	616	685
<i>biogas</i>	359	480	732	1 274	1 317	1 336	1 336	1 352
<i>bioliquids</i>	371	581	736	989	1 003	990	1 000	993
<i>municipal waste</i>	703	716	742	754	836	826	852	841
<b>TOTAL</b>	<b>30 080</b>	<b>33 817</b>	<b>45 145</b>	<b>51 050</b>	<b>53 227</b>	<b>53 915</b>	<b>54 830</b>	<b>55 603</b>
of which in CHP	718	858	1 084	1 642	1 807	1 870	2 018	1 962

*Table 1.b continues on the next page*

<sup>10</sup> Facilitates comparison with Table 10a of the NREAPs.

<sup>11</sup> In accordance with new Eurostat methodology.

Table 1.b continued from the previous page

**GROSS ELECTRICITY GENERATION (GWh)**

	2009	2010	2011	2012	2013	2014	2015	2016
<b>Hydropower<sup>12</sup>:</b>	<b>42 278</b>	<b>43 390</b>	<b>44 012</b>	<b>44 140</b>	<b>44 984</b>	<b>45 765</b>	<b>45 933</b>	<b>46 191</b>
<i>non-pumped</i>	25 491	29 168	32 726	35 888	39 788	43 814	44 054	44 750
<i>&lt;1 MW</i>	1 200	1 504	1 765	1 971	2 327	2 661	2 813	2 955
<i>1 MW-10 MW</i>	4 908	5 530	6 352	7 019	7 877	8 672	8 904	8 960
<i>&gt;10 MW</i>	21 452	24 269	26 787	29 062	31 779	34 739	34 597	34 884
<i>pumped</i>	4 305	3 290	1 934	1 979	1 898	1 711	1 432	1 825
<i>mixed<sup>13</sup></i>	2 069	2 135	2 178	2 165	2 195	2 257	2 259	2 049
<b>Geothermal</b>	<b>5 342</b>	<b>5 376</b>	<b>5 654</b>	<b>5 592</b>	<b>5 659</b>	<b>5 916</b>	<b>6 185</b>	<b>6 289</b>
<b>Solar:</b>	<b>676</b>	<b>1 906</b>	<b>10 796</b>	<b>18 862</b>	<b>21 589</b>	<b>22 306</b>	<b>22 942</b>	<b>22 104</b>
<i>photovoltaic</i>	676	1 906	10 796	18 862	21 589	22 306	22 942	22 104
<i>concentrated solar power</i>	0	0	0	0	0	0	0	0
<b>Tide, wave, ocean</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Wind:</b>	<b>6 830</b>	<b>8 787</b>	<b>10 266</b>	<b>12 402</b>	<b>14 120</b>	<b>14 887</b>	<b>15 298</b>	<b>16 519</b>
<i>onshore</i>	6 830	8 787	10 266	12 402	14 120	14 887	15 298	16 519
<i>offshore</i>	0	0	0	0	0	0	0	0
<b>Biomass<sup>14</sup>:</b>	<b>7 557</b>	<b>9 440</b>	<b>10 832</b>	<b>12 342</b>	<b>16 960</b>	<b>18 681</b>	<b>19 366</b>	<b>19 425</b>
<i>solid biomass</i>	2 828	2 261	2 522	2 582	3 679	3 823	3 947	4 125
<i>biogas</i>	1 665	2 054	3 405	4 620	7 448	8 198	8 212	8 259
<i>bioliquids</i>	1 448	3 078	2 698	2 977	3 628	4 290	4 865	4 627
<i>renewable share of municipal waste</i>	1 616	2 047	2 208	2 163	2 206	2 370	2 343	2 415
<b>TOTAL</b>	<b>62 684</b>	<b>68 899</b>	<b>81 560</b>	<b>93 338</b>	<b>103 312</b>	<b>107 555</b>	<b>109 725</b>	<b>110 528</b>
<i>of which in CHP</i>	2 379	3 251	4 224	5 193	7 471	8 823	9 640	9 694

**Note 1:** As from the second version of the Progress Report, the net power of the installations is indicated, instead of gross power (as indicated in the first version and in the NAP); in addition, the entire power of hydroelectric pumping installations is considered from the second version onwards, whereas only the share virtually attributable to natural inputs was considered in the first version.

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

**Note 3:** In the first version of the Progress Report and in the NAP, the biodegradable share of municipal waste was included in solid biomass.

<sup>12</sup> Normalised in accordance with Directive 2009/28/EC and Eurostat methodology.

<sup>13</sup> In accordance with new Eurostat methodology.

<sup>14</sup> Takes into account only bioliquids complying with applicable sustainability criteria, see Article 5(1), last subparagraph, of Directive 2009/28/EC.

**Table 1c: Total actual contribution (final energy consumption<sup>15</sup>) 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 sources in the heating and cooling sector (ktoe)<sup>16</sup>**

	2009	2010	2011	2012	2013	2014	2015	2016
<b>Geothermal</b> (excluding low-temperature geothermal heat in heat pump applications)	<b>213</b>	<b>139</b>	<b>139</b>	<b>134</b>	<b>135</b>	<b>130</b>	<b>133</b>	<b>144</b>
<b>Solar</b>	<b>85</b>	<b>134</b>	<b>140</b>	<b>155</b>	<b>168</b>	<b>180</b>	<b>190</b>	<b>200</b>
<b>Biomass<sup>17</sup>:</b>	<b>7 952</b>	<b>7 652</b>	<b>5 551</b>	<b>7 522</b>	<b>7 781</b>	<b>7 045</b>	<b>7 780</b>	<b>7 586</b>
<i>solid biomass</i>	7 848	7 540	5 114	7 247	7 431	6 646	7 380	7 175
<i>biogas</i>	19	26	330	183	246	283	250	252
<i>bioliquids</i>	28	25	22	21	21	31	42	42
<i>renewable share of municipal waste</i>	56	62	86	71	83	85	108	117
<b>Renewable energy from heat pumps:</b>	<b>1 928</b>	<b>2 092</b>	<b>2 270</b>	<b>2 415</b>	<b>2 519</b>	<b>2 580</b>	<b>2 584</b>	<b>2 609</b>
<i>of which aérothermal</i>	1 885	2 043	2 214	2 351	2 447	2 501	2 500	2 523
<i>of which geothermal</i>	39	44	50	57	65	71	76	77
<i>of which hydrothermal</i>	4	5	6	6	7	8	8	9
<b>TOTAL</b>	<b>10 178</b>	<b>10 018</b>	<b>8 101</b>	<b>10 226</b>	<b>10 603</b>	<b>9 934</b>	<b>10 687</b>	<b>10 538</b>
<i>of which district heating<sup>18</sup></i>	137	144	161	171	208	191	202	219
<i>of which biomass in households<sup>19</sup></i>	7 380	7 163	4 602	6 637	6 633	5 676	6 393	6 173

<sup>15</sup> Direct use and district heat as defined in Article 5(4) of Directive 2009/28/EC.

<sup>16</sup> Facilitates comparison with Table 11 of the NREAPs.

<sup>17</sup> Takes into account only bioliquids complying with applicable sustainability criteria, see Article 5(1), last subparagraph, of Directive 2009/28/EC.

<sup>18</sup> District heating and/or district cooling from total renewable heating and cooling consumption.

<sup>19</sup> 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 sources in the transport sector (ktoe)<sup>20,21</sup>**

	2009	2010	2011	2012	2013	2014	2015	2016
- Bioethanol	-	0.0	0.3	2.0	1.5	0.9	2.4	0.4
- Biodiesel (FAME)	1 051.6	1 297.4	1 286.4	1 251.8	1 164.6	997.1	1 011.3	931.2
- Hydrotreated vegetable oil (HVO)*	-	-	-	10.5	11.5	58.0	119.5	75.3
- Biomethane								
- Fischer-Tropsch diesel	-	-	-	-	-	-	11.0	-
- Bio-ETBE	92.5	122.1	113.8	101.3	70.9	7.5	19.7	31.9
- Bio-MTBE								
- Bio-DME								
- Bio-TAEE								
- Biobutanol								
- Biomethanol								
- Pure vegetable oil	-	-	-	-	1.6	-	-	-
<b>Total sustainable biofuels</b>	<b>1 144.1</b>	<b>1 419.6</b>	<b>1 400.5</b>	<b>1 365.7</b>	<b>1 250.2</b>	<b>1 063.5</b>	<b>1 164.0</b>	<b>1 038.9</b>
of which								
Sustainable biofuels produced from the materials listed in Annex IX, Part A	-	-	11.3	62.4	7.8	13.7	12.6	8.9
Other sustainable biofuels admissible for the purposes of meeting the target set out in Article 3(4)(e)								
Sustainable biofuels produced from the materials listed in Annex IX, Part B	38.0	38.0	18.2	97.7	94.2	115.0	286.4	386.9
Sustainable biofuels having a limited impact in meeting the renewable energy target, pursuant to Article 3(4)	n/a	n/a	1 337.7	1 026.1	1 135.6	877.7	712.7	264.1
**Other double counting biofuels no included in Annex IX	-	-	33.3	179.5	12.6	57.1	152.2	378.4
Imported from third countries	346.1	591.3	763.9	1 293.4	862.5	649.9	722.2	723.3
Hydrogen from renewable sources	-	-	-	-	-	-	-	-
Electricity from renewable sources	145.8	155.8	176.3	185.9	218.2	246.7	292.2	320.7
of which								
consumed in road transport	-	0.9	0.9	1.0	1.3	1.6	1.9	2.0
consumed in rail transport	61.7	66.9	76.8	82.8	101.9	117.2	137.4	156.5
consumed in other transport sectors	84.1	88.0	98.6	102.0	114.9	127.9	152.9	162.3
Other – Animal fats classified as category 3	-	-	-	-	-	-	-	0.5

(\*) Includes biopropane resulting from the HVO production process.

(\*\*) The national transposition measure for the ILUC Directive (Legislative Decree No 51 of 21 March 2017) stipulates that biofuels produced from several by-products not included in Annex IX may be eligible for Double Counting up until 30 June 2018.

(\*\*\*) In the annual questionnaires sent to Eurostat for statistical purposes, HVO and Fischer-Tropsch diesel are placed under 'biodiesel' (taking its energy content into account), since there is no specific category for them in the questionnaires.

<sup>20</sup> 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.

<sup>21</sup> 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 sources 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 has been transposed by Legislative Decree No 28/2011, which included certain immediately applicable provisions as well as others to be implemented by subsequent Ministerial Decrees, which have since been issued.

The main implemented or planned measures consistent with the framework 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 policies or measures****	Start and end dates of the measure
<b>MEASURES IN THE HEATING, COOLING AND ENERGY EFFICIENCY SECTORS</b>					
Energy Efficiency Securities (EESs, also known as White Certificates) (Articles 29 and 30 of Legislative Decree No 28/2011, Ministerial Decree of 28 December 2012, Legislative Decree No 102/2014, Ministerial Decree of 11 January 2017)	Regulatory - Financial	The Ministerial Decree of 11 January 2017 provides that the EES mechanism shall pursue the following annual energy-saving targets: <ul style="list-style-type: none"> <li>• 7.14 Mtoe of primary energy in 2017</li> <li>• 8.32 Mtoe of primary energy in 2018</li> <li>• 9.71 Mtoe of primary energy in 2019</li> <li>• 11.19 Mtoe of primary energy by 2020</li> </ul>	Obligated parties: <ul style="list-style-type: none"> <li>• Electricity distributors having more than 50 000 final customers</li> <li>• Natural gas distributors having more than 50 000 final customers</li> </ul> Parties joining the scheme on a voluntary basis: <ul style="list-style-type: none"> <li>• Companies under the control of, or controlling, obligated parties</li> <li>• Natural gas or electricity distributors not under the obligation</li> <li>• Public and private</li> </ul>	<i>Implemented measure, set out in the NAP</i> This mechanism, introduced in 2004, was updated, <i>inter alia</i> , by Legislative Decree No 28/2011, the Ministerial Decree of 28 December 2012, Legislative Decree No 102/2014 and the Ministerial Decree of 11 January 2017.  The main new elements introduced by the Ministerial Decree of 11 January 2017 concern: <ul style="list-style-type: none"> <li>• the inclusion of annual national quantitative energy-saving targets for the four-year period running from 2017 to 2020;</li> <li>• the scrapping of the analytical method for assessing savings: the Decree provides for only a new ex-post method (designated PC) and a new standardised method (designated PS);</li> <li>• new definitions for the concepts of baseline consumption and additional energy saving. ‘Baseline consumption’ now means the consumption of primary energy by the technological system, which is used as a reference point for calculating the additional energy savings for which White Certificates are awarded. The baseline consumption is equivalent to whichever is lower out of the consumption prior to the implementation of the energy efficiency project and the benchmark consumption. In the case of new installations, buildings or sites however designated, for which there are no energy consumption values prior to the operation, the baseline consumption is equal to the benchmark consumption. ‘Additional energy saving’ now means the difference, in terms of primary energy (expressed in toe), between the baseline consumption and the energy</li> </ul>	2005 – n/a

			<p>parties holding UNI CEI 11352 certification</p> <ul style="list-style-type: none"> <li>Public and private parties having appointed a UNI CEI 11339-certified energy management expert</li> <li>Public and private parties having an ISO 50001-certified energy management system in place</li> </ul>	<p>consumption following the implementation of a project. This saving is calculated with reference to the same rendered service, thereby ensuring that the conditions influencing energy consumption are standardised;</p> <ul style="list-style-type: none"> <li>the revision of the minimum threshold for projects. Over the course of the first 12 months of the monitoring period, standardised projects must have generated an additional energy-saving quota of no less than 5 toe, while implemented projects must have generated an additional energy-saving quota of no less than 10 toe;</li> <li>the scrapping of the 'tau' durability coefficient, which forecasted cash flows with respect to the actual energy savings achieved. Under the new Ministerial Decree, the technical life of an intervention once again corresponds to its useful life, which is limited to a maximum of 10 years. Upon submitting its application, however, the proposing party may request that, for half of the duration of the useful life of the project, the number of White Certificates issued be multiplied by the factor K1=1.2; in those cases, for the remaining duration of the useful life, the number of White Certificates issued following the final reporting of the actual energy savings achieved and measured is multiplied by the factor K2=0.8;</li> <li>there are now once again four types of Certificates, namely Type I, Type II, Type III and Type IV. These replace the Type II-CAR, Type V, Type IN and Type E Certificates.</li> </ul> <p>The new guidelines for preparing, implementing and assessing energy efficiency projects and for defining the criteria and procedures for issuing White Certificates replace those that were in force up to the end of 2016 (AEEGSI Decision EN 9/11), and are contained in Annexes 1 and 2 to the Ministerial Decree of 11 January 2017. Annex 3, for its part, contains a list of the types of admissible projects and the associated useful-life values.</p>	
Tax deduction for building renovations	Financial	Achievement of targets of energy efficiency and energy generation from RES	Taxpayers owning existing buildings	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The measure governed by Article 16-bis of Presidential Decree No 917/86 and subsequently extended by further legislative measures allows the deduction from IRPEF (personal income tax) of a percentage of the costs incurred for renovating dwellings and the 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 included among costs deductible from IRPEF. The deductible amount, which initially stood at 36%, was subsequently increased to 50%, although not in a structural manner. The 2017 Budget Law (Law No 232 of 11 December 2016) extended the deadline for receiving the maximum IRPEF deduction (50%) to 31 December 2017, with the maximum amount of expenses possible to claim back standing at EUR 96 000 for each property unit. The draft 2018 Budget Law, which is currently under discussion, intends to extend the 50% deduction into 2018.</p> <p>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</p>	1998 – n/a

				install home renewable energy generation systems, for instance photovoltaic installations, are classified on a par with energy-saving works.	
Tax deduction for energy efficiency improvements	Financial	Achievement of targets of energy efficiency and thermal energy generation from RES	Taxpayers owning existing buildings	<p><i>Implemented measure, set out in the NAP</i></p> <p>Measure established by the 2007 Budget Law and subsequently extended by several legislative measures which allow deducting part of the costs incurred to improve the energy efficiency of buildings from IRPEF (personal income tax) or from IRES (corporate income tax). The 2017 Budget Law (Law No 232 of 11 December 2016) extended the deadline for claiming tax deductions of up to 65% (from IRPEF and from IRES), for works aimed at improving the energy efficiency of buildings, to 31 December 2017.</p> <p>The following works are eligible:</p> <ul style="list-style-type: none"> <li>• works making it possible to achieve an energy performance index for heating of no greater than the values set out in Annex A to the Decree of the Ministry of Economic Development of 11 March 2008 (maximum deduction: EUR 100 000);</li> <li>• works on existing buildings, parts of existing buildings or property units thereof, concerning vertical opaque structures, horizontal opaque structures or windows, including blinds or shutters, up to a maximum deduction of EUR 60 000 (eligibility for the relief is subject to compliance with specific thermal transmittance requirements);</li> <li>• installation of solar panels for the production of domestic or industrial hot water and for covering hot water demand in swimming pools, sports facilities, healthcare centres and residential facilities, schools and universities (maximum deduction: EUR 60 000);</li> <li>• replacement of existing winter heating systems with others using condensing boilers, and upgrading of the distribution system (maximum deduction: EUR 30 000);</li> <li>• replacement of existing winter heating systems with high-efficiency heat pumps and low-enthalpy geothermal systems (maximum deduction: EUR 30 000);</li> <li>• replacement of existing conventional water heaters with those comprising a heat pump specifically for producing sanitary hot water (maximum deduction: EUR 30 000);</li> <li>• purchase and installation of the solar shading systems listed in Annex M to Legislative Decree No 311/2006 (maximum deduction: EUR 60 000);</li> <li>• purchase and installation of winter heating systems using biomass-fired boilers (maximum deduction: EUR 30 000);</li> <li>• purchase, installation and bringing into operation of multimedia devices for remotely controlling heating systems, water heating systems or air-conditioning systems in dwellings, aimed at making users more aware of their energy consumptions and ensuring that the systems operate efficiently.</li> </ul> <p>The draft 2018 Budget Law, which is currently under discussion, retains this environmental bonus for 2018, but with some modifications concerning, <i>inter alia</i>, the amounts that can be deducted (which could fall to 50% for some works).</p>	2007 – n/a

<p>Contributions for the generation of thermal energy from renewable energy sources and for small-scale energy efficiency projects (Article 28 of Legislative Decree No 28/2011, Ministerial Decree of 28 December 2012 and Ministerial Decree of 16 February 2016, 'Thermal Account')</p>	<p>Financial</p>	<p>Achievement of targets of energy efficiency and thermal energy generation from RES</p>	<p>Public administrations and private parties (households, condominiums, businesses and farms)</p>	<p><i>Existing and implemented measure, set out in the NAP</i></p> <p>Under the Ministerial Decree of 16 February 2016, entitled 'Update of the rules governing the incentivisation of small-scale projects for increasing energy efficiency and for generating thermal energy from renewable sources', small-scale projects for generating thermal energy from renewable sources and increasing energy efficiency may receive an incentive proportionate to the amount of renewable thermal energy generated or to the level of energy saving achieved.</p> <p>Incentives are provided for two types of projects:  1) projects to improve energy efficiency in existing buildings;  2) small-scale projects for the generation of thermal energy from renewable sources and for high-efficiency systems.</p> <p>The following parties are eligible for the scheme:  - public administrative bodies, in respect of one or more of the projects under Categories 1 and 2;  - private parties, i.e. individuals, condominiums and businesses or farms, in respect of one or more of the projects under Category 2.</p> <p>The Decree establishes a maximum total annual budget which cannot be exceeded, with different amounts for private and public parties:  - EUR 200 million for projects planned or implemented by public administrative bodies;  - EUR 700 million for projects planned or implemented by private parties.</p>	<p>2012 – n/a</p>
<p>Obligation to integrate renewable sources in new buildings and in existing buildings undergoing major renovation work (Article 11 of Legislative Decree No 28/2011)</p>	<p>Regulatory</p>	<p>Coverage of 50% of energy consumption for the production of sanitary hot water, variable percentage of coverage of energy consumption for heating and cooling</p>	<p>End users owning new or renovated buildings</p>	<p><i>Implemented measure, set out in the NAP</i></p> <p>New building construction and major renovation projects must provide for the use of RES to cover heat, electricity and cooling requirements in accordance with the minimum integration principles and the start dates set out in Annex 3 to Legislative Decree No 28/2011.</p> <p>Specifically, the following conditions must be complied with simultaneously: 50% of energy consumption for sanitary hot water from RES, and the following percentages of the sums of consumption for sanitary hot water, heating and cooling:  - 20% for building permit applications submitted between 31 May 2012 and 31 December 2013;  - 35% for building permit applications submitted between 1 January 2014 and 31 December 2017;  - 50% for building permit applications submitted from 1 January 2018.</p> <p>Pursuant to the provisions laid down in Annex 3 to Legislative Decree No 28/2011, the thresholds indicated above are:  - increased by 10% for public buildings;</p>	<p>June 2012 – n/a</p>

				<p>- reduced by 50% in historic centres (zone A).</p> <p>RES systems installed to meet the previous obligations benefit from RES incentives as to the share exceeding that necessary to comply with the abovementioned obligations. Failure to comply with the obligations shall result in the building permit not being issued. Regions may establish stricter minimum quotas than those set out in the Decree.</p>	
<b>MEASURES IN THE ELECTRICITY SECTOR</b>					
<p>New incentive schemes (Article 24 of Legislative Decree No 28/2011, Ministerial Decree of 6 July 2012 and Ministerial Decree of 23 June 2016)</p>	Financial	Achievement of the RES electricity targets	Investors/end users	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Legislative Decree No 28/2011 provided that installations (excluding solar) commissioned from 2013 onwards would be supported by new incentives replacing the Green Certificates and the All-Inclusive Tariffs.</p> <p>The Ministerial Decree of 23 June 2016 was published on 29 June 2016, updating the schemes already introduced by the Ministerial Decree of 6 July 2012 for providing incentives for electricity generated by installations using renewable sources other than photovoltaic. That Decree included thermal solar installations among the installations eligible for those schemes, annulling the Ministerial Decree of 11 April 2008.</p> <p>The incentives under the Decree apply to installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded, and commissioned from 1 January 2013. Quotas of supported capacity are in place, 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 renovations; direct access). The new Decree provided for a single session, to be held before the end of 2016, for assigning the entire capacity of the various quotas of the registers, registers for renovations and auction proceedings. Direct access to the incentives is also possible for 'low-threshold' installations that are commissioned by the end of 2017.</p> <p>The total average indicative cost of all the types of incentives afforded to non-photovoltaic installations, referred to as the 'RES counter', must be calculated by following specific methods, and cannot exceed the annual limit of EUR 5.8 billion: once that limit is reached, all further incentives would be stopped, including those under direct access.</p> <p>The Decree provides for two types of incentives:</p> <p>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 sum of any premium tariffs;</p> <p>B) an Incentive (I) for installations with a power output in excess of 500 kW, calculated as the difference between the base feed-in tariff – to which are added any premium tariffs to which the installation is entitled – and 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.</p>	2013 – 2017

				Access to the incentives laid down in the Ministerial Decree of 23 June 2016 is alternative to the Net Metering and Simplified Purchase and Sale Arrangements systems.	
<b>MEASURES FOR THE TRANSPORT SECTOR</b>					
Obligation to release biofuels for consumption (Law No 81 of 11 March 2006; Article 33 of Legislative Decree No 28/2011, as amended and supplemented; Ministerial Decree of 10 October 2014; Legislative Decree No 51/2017; Ministerial Decree of 13 December 2017)	Regulatory - Financial	Spread of sustainable biofuels (EU target by 2020: 10% of transport consumption covered from renewable sources)	Parties releasing fossil fuels for consumption	<p><i>Implemented measure, set out in the NAP</i></p> <p>Those parties that release for consumption petrol and diesel from fossil sources for use in transport must release for consumption in the national territory a minimum quota 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. This system ('release obligation'), introduced by Law No 81 of 11 March 2006 and updated by Legislative Decree No 20/2011, by the Ministerial Decree of 10 October 2014 and by the Ministerial Decree of 13 December 2017, provides an incentive for the use of biofuels in transport.</p> <p>During the period from 2012 to 2014, the minimum quota 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, amounted to 4.5%.</p> <p>The Ministerial Decree of 10 October 2014 updated the criteria, conditions and procedures for complying with this obligation. Specifically, the Decree 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 it is divided into different shares among the different types of biofuels. The same Decree also introduced the category of advanced biofuels, which are those 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. More recently, the Ministerial Decree of 13 December 2017 updated the minimum percentages of biofuels and advanced biofuels that had to be released for consumption for the years 2018, 2019 and 2020.</p> <p>As a rule, one 'Release-for-Consumption Certificate' is issued per 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 produced 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, a certificate is granted for every 5 Gcal released for consumption (double counting). The by-products eligible for double counting are shown in a detailed list (Article 33(5-ter)). Double counting also applies to all biofuels produced from algae and from cellulosic or ligno-cellulosic materials.</p>	2007 – n/a
Legislative Decree No 51/2017, implementing Directive (EU) 2015/652 and Directive (EU)	Regulatory	Guarantee a reduction in the life-cycle greenhouse gas	Operators in the bioliquid/biofuel sectors and in the road vehicle	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Those parties that release fuels for consumption shall be obliged to guarantee that, for the</p>	2017 – 2020

2015/1513		emissions for fuels used in transport, and a reduction in the amount of electricity consumed by road vehicles. Launch the transition from traditional biofuels to biofuels that allow for greater reductions in greenhouse gas emissions	fossil fuel/electricity sector	<p>year 2020, the life-cycle greenhouse gas emissions for the products released for consumption are at least 6% lower than a benchmark figure. The calculation method for measuring the emissions of those products and the default values to be used for the fossil fuel sectors has been established.</p> <p>In order to reach the 2020 target concerning the share of renewables in gross final consumption, the maximum combined share of biofuels and bioliquids produced from cereals 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.</p> <p>A national target to be achieved in 2020 has also been set, equal to at least 0.5%, in terms of energy content, of the release of advanced biofuels for consumption, expressed as a percentage of the share of energy from renewable sources in all forms of transport in 2020.</p> <p>Provision has also been made for incentive schemes to no longer be available to all biofuels produced from waste and residues, but instead only to those produced from materials included in a specific list.</p>	
Legislative Decree No 257/2016, implementing Directive 94/2014/EU on the deployment of alternative fuels infrastructure	Regulatory	Put criteria and guidelines in place for deploying alternative fuels infrastructure in order to minimise dependence on oil and mitigate the environmental impact of transport	Public bodies	<p><i>Implemented measure, supplementing the NAP</i></p> <p>This measure aims to reduce the use of traditional fuels and thus favour alternative energy carriers such as electricity, CNG and LNG, these carriers including or possibly including growing constituents originating from renewable energy sources.</p> <p>By 31 December 2020, a sufficient number of electric-vehicle charging points accessible to the public will have been put in place. This number has been fixed by taking account, among other things, of the estimated number of electric vehicles that will have been registered by the end of 2020.</p> <p>When replacing car, bus and service vehicle fleets, at least 25% of the vehicles purchased by public bodies must be CNG/LNG-powered, electric or hybrid.</p> <p>By 31 December 2017, Municipalities shall be required to adapt their regulations in order to ensure that electric-vehicle charging points are in place on the sites of new or refurbished buildings meeting specific parameters (a surface area of greater than 500 m<sup>2</sup> for non-residential buildings and at least 10 dwelling units for new residential buildings). At least 20% of the total number of parking spaces must have charging points.</p> <p>The Regions, when authorising the construction of new fuel distribution facilities or the refurbishment of existing ones, must make it mandatory for 'high-capacity, at least rapid' charging infrastructure to be put in place (i.e. between 22 kW and 50 kW).</p> <p>This regulatory framework is supplemented by efforts to raise citizens' awareness: clear</p>	2017 – 2020

				communications, standardised labelling and precise specifications at charging points are all fundamental conditions for allowing end users to benefit as much as possible from the transition and play a direct part in taking another step towards sustainable practices for getting about on a daily basis.	
<b>MEASURES FOR ELECTRICITY GRIDS</b>					
Authorisation of works to connect to the electricity grids (Articles 4 and 16 of Legislative Decree No 28/2011)	Regulatory	Coordination between development of power plants and that of the electricity grid	Grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The construction and operation of certain grid development works are authorised by the competent Region via a single procedure. This authorisation procedure applies to works for feeding in and off-taking the electricity generated by several plants and not covered by the connection quotations signed by the grid operator and the power plant owners. The single procedure also applies to distribution grid works and infrastructure designed to improve the dispatching of the energy generated by plants that are already in operation.</p>	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 grid operator (Terna SpA)	<p><i>Implemented measure, set out in the NAP</i></p> <p>Terna SpA has set out, in a specific section of the National Transmission Grid Development Plan, the actions eligible for the abovementioned single procedure, taking into account the current procedures for issuing plant construction and operating permits. In the same section of the Plan, Terna also sets out the grid upgrading works necessary to 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. As to 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 Electricity, Gas and Water Authority (AEEGSI). The programme consists of six pilot projects located at critical points of the national transmission grid, where the level of power generation from renewable sources has been especially low.</p>	March 2011 – n/a
Remuneration for work 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 installations	National transmission grid operator (Terna SpA)	<p><i>Implemented measure, supplementing the NAP</i></p> <p>AEEGSI ensures return on investments for developing and operating the systems included in the abovementioned section of the Development Plan, taking into account effectiveness for the purpose of off-taking energy from renewable sources and the speed of execution and commissioning of the systems, with modulation according to each electricity market zone and different storage technologies.</p>	March 2011 – n/a
Remuneration for work on the distribution grids (Article 18 of Legislative Decree No 28/2011)	Financial	Works to adapt distribution grids to the development of	Distribution grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Greater return on invested capital is provided with respect to upgrading projects designed</p>	March 2011 – n/a

		RES installations		<p>according to smart grid concepts.</p> <p>These projects relate to systems for the control, regulation and operation of loads and production units, including electric-car charging systems.</p> <p>The amount of remuneration is determined with reference to project size, calculated as number of active users involved, degree of innovation, speed of work execution and commissioning, and effectiveness for the purpose of full off-take of the distributed production.</p> <p>The regulator has selected seven pilot projects for introducing innovative technologies in the distribution grid, on the basis of the ratio of benefit indicators to the cost of the pilot project.</p>	
Distribution grid development plans (Article 18 of Legislative Decree No 28/2011)	Regulatory	Planning of the development of distribution grids	Distribution grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Each year, distribution grid operators publish a Development Plan setting out the main works planned and estimated completion times, also to favour the coordinated development of the grid and of power generating installations.</p> <p>The plans are prepared in coordination with Terna and are consistent with the contents of the National Transmission Grid Development Plan.</p>	March 2011 – n/a
Updating of the technical and economic conditions for accessing the grids (Article 19 of Legislative Decree No 28/2011)	Regulatory	Ensure the integration of renewable sources into the electricity grid to the degree necessary to achieve the targets set for 2020	Producers and grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Every two years, AEEGSI updates the consolidated text of the technical and economic conditions for connections to grids subject to third-party connection obligation (Consolidated Text on Active Connections – CTAC) and performs a quantitative analysis of the imbalance costs weighing on the electricity grid as a consequence of the dispatching of each non-programmable renewable source, assessing the impact of the provisions set out in the CTAC.</p> <p>In the event of changes in market conditions, the regulator shall update the measures on the connection of power generating installations at shorter intervals than required by Legislative Decree No 28/2011.</p>	March 2011 – n/a
Construction of storage systems by the grid operator (Article 36 of Legislative Decree No 93/2011)	Regulatory	Ensure the integration of non-programmable renewable sources into the electricity grid	Grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>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.</p> <p>Legislative Decree No 93/2011 provides that these systems can also be installed by distribution system operators.</p>	June 2011 – n/a
Simplification for connection of photovoltaic installations (Ministerial Decree of 19 May 2015)	Regulatory	Favour the connection of building-integrated photovoltaic installations	Producers/grid operators	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The Decree provides for the adoption of a single form for the installation, connection and operation of small photovoltaic installations on the roofs of buildings, with an output of</p>	May 2015 – n/a

				less than 20 kW.	
Aggregation of power generating 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/ grid operators	<p><i>Planned measure, supplementing the NAP</i></p> <p>Legislative Decree No 102/2014 introduced the possibility of setting up clusters of power generating installations and users for access to aggregate supply and to provide flexibility services, to be managed by operators guaranteeing efficient aggregation. The grid operators must establish the rules for organising the participation of these new clusters. AEEGSI has launched pilot projects that will make it possible to acquire useful elements for bringing dispatching up to speed, relating to the participation in the dispatching services market, including in aggregate form, of demand and the production units that have not yet been authorised, including production units using non-programmable renewable sources.</p>	July 2014 – n/a
<b>MEASURES FOR NATURAL GAS GRIDS</b>					
Conditions for connecting biomethane installations to the natural gas grid (Article 20 of Legislative Decree No 28/2011)	Regulatory	Feeding of biomethane into the natural gas grid	Biomethane producers and natural gas grid operators	<p><i>Planned measure, supplementing the NAP</i></p> <p>By Decision 46/2015/R/gas of 12 February 2015, AEEGSI approved the rules for connecting biomethane installations to the natural gas grids, to which grid operators must adapt their grid codes, and the rules for determining the quantities of biomethane eligible for the incentive. Annex A to the Decision contains:</p> <ul style="list-style-type: none"> <li>- in Section I, the rules for biomethane, developed in line with the targets set out in Legislative Decree No 28/11 aimed at guaranteeing the safe and technically efficient operation of gas grids, establishing transparent and certain grid connection procedures and enabling affordable connection, to promote widespread use of biomethane;</li> <li>- in Section II, the provisions on the manners for measuring, calculating and certifying the quantity of biomethane eligible for the incentives pursuant to the Decree of 5 December 2013.</li> </ul> <p>By Decision 204/2016/R/gas of 28 April 2016, AEEGSI approved an amendment to the Transportation Grid Code of the company Snam Rete Gas S.p.A., aimed at transposing the Directives for connecting biomethane installations to the natural gas grids, in accordance with Decision 46/2015/R/gas.</p> <p>By Decision 299/2016/R/gas of 9 June 2016, AEEGSI approved a proposed update to the transportation grid code of the company Infrastrutture Trasporto Gas S.p.A. relating to biomethane, aimed at transposing the Directives for connecting biomethane installations to the natural gas grids, in accordance with Decision 46/2015/R/gas.</p> <p>By Decision 239/2017/R/gas of 13 April 2017, AEEGSI launched a procedure aimed at updating the Directives for connecting biomethane installations to the natural gas grids, in accordance with Decision 46/2015/R/gas.</p>	2011 – n/a

				<p>By Consultation Document 484/2017/R/gas of 28 June 2017, AEEGSI carried out a consultation aimed at updating the Directives for connecting biomethane installations to the gas grids, in accordance with Decision 46/2015/R/gas, following changes made to the technical regulations governing the sector at both national and Community level, as part of Mandate M/475 issued by the European Committee for Standardisation (CEN), including the approval of technical standard CEN 16723-1, which led to the end of the standstill concerning the quality specification for biomethane to be injected into the natural gas grids.</p>	
<p>Incentives for biomethane injected into the natural gas grid (Article 21 of Legislative Decree No 28/2011, Ministerial Decree of 5 December 2013)</p>	Financial	Injection of biomethane into the natural gas grid	Biomethane producers	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The Ministerial Decree of 5 December 2013, which provides incentives for producing biomethane, applies to:</p> <ul style="list-style-type: none"> <li>- new installations constructed in the national territory and commissioned after 18 December 2013 and no later than five years after that date;</li> <li>- existing installations located 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.</li> </ul> <p>The Decree establishes three types of incentives for the biomethane injected into the natural gas grid, according to its intended use:</p> <ul style="list-style-type: none"> <li>- issue of Release-for-Consumption Certificates (RCCs) for biomethane injected into the natural gas grid specifically for use in transport;</li> <li>- a financial incentive for biomethane injected into the natural gas transportation and distribution grid irrespective of its use;</li> <li>- a financial incentive via tariffs for electricity generation provided for by the Ministerial Decree of 6 July 2012 relating to biogas, for biomethane injected into the natural gas grid and used in high-efficiency CHP plants.</li> </ul> <p>Typically, the incentive to biomethane production lasts 20 years.</p> <p>By Decision 208/2015/R/gas of 7 May 2015, AEEGSI approved the tariff coverage procedures for incentivising the production of biomethane to be injected into the natural gas transportation and distribution grids, including any differences between costs and earnings recorded by the Energy Services Operator (GSE) for off-taking/selling the biomethane, through the use of the 'Fund for Measures and Initiatives for Saving Energy and Developing Renewable Sources in the Natural Gas Sector', funded from revenue raised by imposing two obligatory tariffs on the gas distribution and transportation service.</p> <p>By Decision 210/2015/R/gas of 7 May 2015, AEEGSI established the Directives on the market processes relating to the injection of biomethane into the operating natural gas transportation and distribution grids, governing the procedures for allocating the injections and off-takes into the natural gas transportation and distribution grid and the simplified purchase and sale arrangements for the biomethane itself on behalf of GSE within the</p>	2013 – n/a

				<p>meaning of the Ministerial Decree of 5 December 2013, to promote widespread use of biomethane. The provision sets out, among other things, the conditions for GSE granting facilitated access to the Virtual Trading Point, on behalf of the entity in charge of balancing.</p> <p>By Decision 806/2016/R/gas of 28 December 2016, AEEGSI approved an amendment to the Transportation Grid Code of the company Snam Rete Gas S.p.A., aimed at transposing the AEEGSI Directives on the market processes relating to the injection of biomethane into the natural gas transportation and distribution grids, in accordance with Decision 210/2015/R/gas.</p> <p>In order to further facilitate access to the incentives, the Ministry of Economic Development, in partnership with the Ministry of the Environment and Protection of Land and Sea and with the Ministry of Agricultural, Food and Forestry Policies, placed for public consultation, from 13 December 2016 to 13 January 2017, a draft for a new Interministerial Decree on the use of biomethane and biofuels, including advanced biofuels.</p>	
<b>MEASURES FOR DISTRICT HEATING AND DISTRICT COOLING NETWORKS</b>					
Energy Efficiency Securities for district heating networks	Financial	Support to infrastructure development	Private investors, operators	<p><i>Existing measure, supplementing the NAP</i></p> <p>District heating networks can access the Energy Efficiency Securities (EESs, also known as White Certificates) incentive scheme.</p> <p>The securities issued to district heating networks supplied by high-efficiency CHP plants are calculated according to the procedure set out in the Ministerial Decree of 5 September 2011, which defines the support scheme for high-efficiency cogeneration.</p> <p>Until the Ministerial Decree of 11 January 2017 came into force, for district heating networks which were supplied by non-cogeneration plants or plants that did not fall among those identified in the Ministerial Decree of 5 September 2011, the provisions set out in technical data sheet 22T, entitled 'Application in the civil sector of district heating systems for space conditioning and for producing sanitary hot water', applied.</p> <p>Following the entry into force of the Ministerial Decree of 11 January 2017 on Energy Efficiency Securities, data sheet 22T was abolished; among the projects eligible for securities set out in Table 1 of Annex 2 to the Ministerial Decree, the following are also covered:</p> <ul style="list-style-type: none"> <li>- installation of components for recovering heat, when not technically possible previously, also for serving district heating and/or district cooling networks;</li> <li>- work to make existing district heating and/or district cooling networks more efficient;</li> <li>- installation of district heating and/or district cooling networks;</li> <li>- installation of boilers for serving district heating and/or district cooling networks.</li> </ul>	2011 – n/a

Reduced excise duty	Fiscal	Promotion of district heating	Operators	<p><i>Existing measure</i></p> <p>District heating operators enjoy several fiscal benefits with respect to generating heat intended for civilian end users. The amounts of fuel consumed by CHP units and by integration boilers that are directly connected to the same district heating network are eligible for the reduced rate of excise duty granted for industrial uses (and the associated share of the reduced rate for electrical uses), provided that certain conditions are met (high-efficiency cogeneration, and electricity/heat ratio of &gt;10%). If those requirements are not met, those amounts consumed shall be subject to the rate of excise duty applicable to civil uses.</p>	2007 – n/a
Tax credit	Fiscal	Promotion of district heating	Operators	<p><i>Existing measure</i></p> <p>Law No 448 of 23 December 1998 (the 1999 Budget Law) introduced a tax credit for every kilowatt hour (kWh) of heat supplied by district heating networks powered by biomass or geothermal energy, in municipalities located in specific climatic zones. This tax credit is equal to EUR 0.01033 for every kWh of heat supplied. Decree Law No 268 of 30 September 2000, converted into Law No 354 of 23 November 2000, introduced a further reduction of EUR 0.01549 per kWh, thus increasing the tax credit to EUR 0.02582 per kWh of heat supplied. After being deferred on several occasions, these reductions were finally made official by Law No 203/2008 (the 2009 Budget Law). This tax break was cut by 15% as of 1 January 2014, owing to the measures laid down in the Decree of the Italian Prime Minister of 21 March 2014.</p>	1998 – n/a
Guarantee fund for district heating (Article 22 of Legislative Decree No 28/2011)	Financial	Support to infrastructure development	Investors	<p><i>Existing measure, supplementing the NAP</i></p> <p>A guarantee fund has been set up for supporting the construction of district heating networks, financed with a share of the proceeds from the sale of methane gas (initially, a levy of EUR 0.05/m<sup>3</sup>, charged to end users). The resources intended for this fund have been assigned to the National Energy Efficiency Fund established by Article 15 of Legislative Decree No 102/2014.</p>	2012 – n/a
National Energy Efficiency Fund (Article 15 of Legislative Decree No 102/2014)	Financial	Support to the financing of energy efficiency projects	Public administrations and private investors	<p><i>Existing measure, set out in the NAP</i></p> <p>The Fund, which is revolving in nature, favours the financing of projects helping to achieve the national energy efficiency targets: it promotes the involvement of national and EU financial institutions and of private investors on the basis of appropriate risk sharing. Eligible projects concern:</p> <ul style="list-style-type: none"> <li>- projects to improve the energy efficiency of buildings owned by public administrative bodies;</li> <li>- construction of district heating and district cooling networks;</li> <li>- improvement of the energy efficiency of public services and infrastructure, including street lighting;</li> </ul>	2014 – n/a

				<ul style="list-style-type: none"> <li>- improvement of the energy efficiency of entire residential buildings, including social housing buildings;</li> <li>- improvement of energy efficiency and reduction in energy consumption in the industry and services sectors.</li> </ul>	
Promotion and development of district heating and district cooling, and of competition (Articles 9 and 10 of Legislative Decree No 141/2016)	Regulatory	User protection, promotion and regulation of competition	Operators	<p><i>Existing measure, supplementing the NAP</i></p> <p>Legislative Decree No 102/2014, transposing Directive 2012/27/EU on energy efficiency, entrusted AEEGSI with the task of governing, among other things:</p> <ul style="list-style-type: none"> <li>- measuring the thermal energy supplied to buildings via district heating networks;</li> <li>- invoicing, and information on invoicing and on access to consumption data;</li> <li>- service standards and metering systems;</li> <li>- the criteria for setting and publishing user connection tariffs and the manner for requesting disconnection.</li> </ul> <p>Legislative Decree No 141/2016, among other things, made AEEGSI responsible for setting the indicative benchmark costs charged to distribution service providers ('sub-invoicing') for heating and cooling 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 a plurality of buildings.</p>	2014 – n/a
<b>CROSS-CUTTING MEASURES</b>					
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	<p><i>Implemented measure, supplementing the NAP</i></p> <p>Legislative Decree No 55/2011, which transposed Directive 2009/30/EC, and Legislative Decree No 28/2011 require adoption of EU sustainability criteria.</p> <p>The Ministerial Decree of 23 January 2012, as amended and supplemented, implemented the national biofuel and bioliquid certification scheme, which ensures verification of compliance with sustainability criteria.</p> <p>The Decree of 23 January 2012:</p> <ul style="list-style-type: none"> <li>- establishes the national biofuel and bioliquid certification scheme;</li> <li>- lays down the conditions for joining the scheme;</li> <li>- establishes the rules for reporting data on greenhouse gas emissions produced by the fuels per energy unit;</li> <li>- lays down the conditions for verifying compliance with the mass balance system needed to ensure traceability of the certified product all along the supply chain.</li> </ul>	2012 – n/a
Streamlining of authorisation procedures (Articles 5, 6 and 7 of Legislative Decree No 28/2011)	Regulatory	Simpler and faster authorisation procedures	Investors/end users/public administrative bodies	<p><i>Existing and implemented measure, set out in the NAP</i></p> <p>Legislative Decree No 28/2011 cuts down red tape for the authorisation of renewable energy installations, simplifying the framework by establishing three types of authorisations:</p> <ul style="list-style-type: none"> <li>- Single Authorisation (SA);</li> </ul>	March 2011 – n/a

				<ul style="list-style-type: none"> <li>- Simplified Authorisation Procedure (SAP);</li> <li>- Notification of Minor Works not requiring a building permit (NMW).</li> </ul> <p>For certain installation types and sizes, the Regions may simplify authorisation procedures even further (several Regions have already issued legislation to this effect).</p>	
Rationalisation measures (Article 12 of Legislative Decree No 28/2011)	Regulatory - Financial	Rationalisation of procedures	Investors/end users	<p><i>Planned measure, set out in the NAP</i></p> <p>Legislative Decree No 28/2011 provides for the adoption of simplification measures to reorganise economic and financial burdens and the different forms of guarantees required for the authorisation, installation, connection and operation of renewable energy installations and for the granting of incentives thereto.</p>	2013 – n/a
Installer qualification schemes (Article 15 of Legislative Decree No 28/2011)	Regulatory	Quality assurance in the installation of renewable energy installations	Installers	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The professional qualification for the installation and extraordinary maintenance of biomass-fired boilers, fireplaces and stoves, photovoltaic and thermal solar installations on buildings, low-enthalpy geothermal systems and heat pumps can be obtained by means of specific courses organised by the Regions.</p>	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	<p><i>Implemented measure, set out in the NAP</i></p> <p>The national targets on renewable sources to be achieved by 2020 are broken down among the Regions, in coordination with the Regions themselves. This serves as a stimulus for the Regions to plan their roadmaps to achieve the targets and improve and streamline authorisation procedures consistently with their commitments. The breakdown also helps grid operators make their grid development plans.</p> <p>The Ministerial Decree of 11 May 2015 approved the method which, within the national statistical system, is applied to gather the data needed to measure progress towards attainment of the Regional targets.</p>	2011 – 2015
Renewable energy in Italy's smaller islands (Ministerial Decree of 14 February 2017)	Regulatory	Gradual fulfilment of the needs of Italy's smaller, non-interconnected islands, by using energy from renewable sources	Electricity companies or third parties	<p><i>Implemented measure, supplementing the NAP</i></p> <p>The Ministerial Decree of 14 February 2017 set out provisions for gradually fulfilling the needs of Italy's smaller, non-interconnected islands, by using energy from renewable sources, establishing:</p> <ul style="list-style-type: none"> <li>- the quantitative targets of the island's energy needs to be covered by power generation from renewable sources;</li> <li>- the deadlines for the gradual process for developing power generation from renewable sources;</li> <li>- the procedures for raising the investments needed to achieve those targets.</li> </ul>	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 since 2015**

As regards the photovoltaic sector, the Ministry of Economic Development published a Decree in May 2015 (Ministerial Decree of 19 May 2015) that approved a single form for the installation, connection and operation of small photovoltaic installations on the roofs of buildings, with an output of less than 20 kW, thereby further simplifying the procedure for bringing such installations into operation. The Ministerial Decree of 16 March 2017<sup>1</sup> was issued with similar objectives in mind, adopting measures concerning the installation, connection and operation of high-efficiency micro-CHP plants and CHP plants using renewable sources.

In February 2016, a Decree (Ministerial Decree of 16 February 2016) was approved in order to strengthen and simplify the incentive scheme applicable to thermal renewables and energy efficiency, known as the 'Thermal Account': the procedure for accessing the scheme was simplified, the scheme was extended to a greater range of projects, and the thresholds in place for incentives to be granted as a single payment were increased. The adopted measures have proven to be effective, as demonstrated by the marked increase in applications for incentives submitted following the amendments made to the scheme.

Amongst the measures aimed at reducing the tax burden placed on undertakings, the 2016 Stability Law (Law No 208/2015) introduced reductions for agricultural energy. This Law stipulates that all operations for generating agricultural energy, including the generation and sale of electricity and heat from renewable agricultural/forestry sources (up to 2 400 MWh/year) and electricity from photovoltaic installations (up to 260 MWh/year), and of chemical products and fuels of agricultural/forestry origin predominantly sourced from the land, are to be considered as agricultural operations and therefore yield agricultural income. For any energy generated above the limits indicated above, the income of the natural persons, simple partnerships and other parties is set, for the purposes of calculating income tax, by applying the amount of the payments of the operations subject to VAT registration, in relation to the component ascribable to the value of the energy sold, excluding the incentive share, with a profitability coefficient of 25%, notwithstanding the option of calculating income using standard methods.

In addition, Legislative Decree No 222 of 25 November 2016 identifies the activities covered by the reporting or Certified Notice of Start of Works (CNSW) or tacit acceptance procedures, and also those for which express title is required. Among the activities covered by this provision are those relating to the construction, installation, operation and alteration of installations generating electricity and heat energy from renewable sources and biomethane. Lastly, Presidential Decree No 31 of 13 February 2017 identifies the projects and works that are not subject to landscape permits and the applications for renewing landscape permits that are subject to the Simplified Authorisation Procedure (SAP). The projects that are exempt from landscape permits include thermal and photovoltaic solar panels which are fitted on buildings in such a way as not to be seen from public outside spaces and not to fall between the assets protected by the Cultural Heritage and Landscape Code (Legislative Decree No 42 of 22 January 2004); any projects not meeting both those requirements are subject to the SAP. The projects exempt from landscape permits also include the installation of micro-wind turbines not exceeding 1.50 m in height and 1.00 m in diameter, when those projects have no impact on the assets protected by the Cultural Heritage and Landscape Code. Any projects not meeting that requirement are subject to the SAP.

### **The previous framework**

Paragraph 4.2.1 of the National Action Plan described the state of play of authorisation procedures for renewable energy installations. To remove the regulatory and non-regulatory barriers identified by the review and improve the administrative procedures for supporting the development of renewable sources, Italy has put certain additional measures in place.

The proportionality and necessity of administrative procedures are evaluated by comparing the complexity of the authorisation process (timing, number and complexity of the authorisations to be obtained) against the type of project to be implemented (energy source, size of the 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, necessary, streamlined and expedited at the appropriate administrative level, as required by Article 13 of the Directive. The current national framework sets out 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 installations generating electricity from renewable energy sources and the associated works and infrastructure. The SA is required for installations exceeding specific power 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, where necessary also derogating from the applicable zoning rules. Legislative Decree No 28/2011 reduced the maximum duration of the procedure from 180 to 90 days, plus the time allotted to the Environmental Impact Assessment (EIA), where required. The Single Authorisation is issued by the Regions or by the Provinces that they delegate.
- **Simplified Authorisation Procedure (SAP)** – this was introduced by Legislative Decree No 28/2011 to replace the Notification of Start of Works (NSW). This simplified procedure can be used for the construction of installations generating electricity from renewable energy sources below certain installed capacity thresholds (above which the SA applies) and for certain types of installations generating thermal energy from renewable energy sources. The SAP must be submitted to the Municipality at least 30 days before commencement of works, together with a detailed report signed by a certified engineer and with project drawings and documents, also attesting to the project's compatibility with the applicable zoning plans and building codes, and 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 commence.
- **Notification of Minor Works not requiring a building permit (NMW)** – this is the simplest authorisation procedure, applicable to certain small-scale installations for generating electricity or thermal energy from renewable sources, which are considered to be minor works and as such are exempted from building permits. The works commencement notification must be sent to the Municipality together with a detailed report signed by a certified engineer. There is no requirement 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.

In order to ensure the provision of information and improve the transparency thereof, Legislative Decree No 28/2011 provided for the creation of a national web portal, providing extensive and detailed information on renewable energy and energy efficiency: it includes information 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) provides for the monitoring of the effectiveness and efficiency of the authorisation procedures at Regional and Provincial level, in order to identify good practices and suggest improvements.

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

**Table 2a: Overview of all the measures taken to streamline administrative procedures**

Name and reference of the measure	Type of measure*	Expected result	Targeted group and/or activity***	Existing or planned policies or measures****	Start and end dates of the measure
<b>MEASURES TO STREAMLINE AND ACCELERATE ADMINISTRATIVE PROCEDURES</b>					
Single Authorisation for large installations (Legislative Decree No 387/2003)	Regulatory	Simpler and faster authorisation procedures	Renewable energy installations	<i>Existing and implemented measure</i>	2003 – n/a
Halving of the time for issuing the Single Authorisation (Legislative Decree No 28/2011)	Regulatory	Faster authorisation procedures	Renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2011 – n/a
Simplified Authorisation Procedure and Single Authorisation for biomethane plants (Legislative Decree No 28/11, amended by Law No 116/14)	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	<i>Existing and implemented measure, supplementing the NAP</i>	2014 – n/a
<b>MEASURES TO MAKE ADMINISTRATIVE PROCEDURES TRANSPARENT AND PROPORTIONATE</b>					
Web portal providing information on authorisation procedures	Non-binding	Transparency of information	Engineers designing renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2012 – n/a
Monitoring of authorisation procedures (Ministerial Decree of 10 September 2010)	Non-binding	Identification of good practices and recommendations for improvements	State and Regions	<i>Existing and implemented measure, supplementing the NAP</i>	2012 – n/a
<b>MEASURES TO STREAMLINE ADMINISTRATIVE PROCEDURES FOR SMALL, DECENTRALISED INSTALLATIONS</b>					
Introduction of the Simplified Authorisation Procedure (Legislative Decree No 28/2011)	Regulatory	Simpler authorisation procedures for small installations	Renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2011 – n/a
Introduction of the Notification of Minor Works not requiring a building permit (Legislative Decree No 28/2011)	Regulatory	Simpler authorisation procedures for small installations	Renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2011 – n/a
Option for the Regions to change the national authorisation thresholds (Legislative Decree No 28/2011)	Regulatory	Sizing and adapting the national legislation to local contexts	Regions	<i>Existing and implemented measure, supplementing the NAP</i>	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	Regulatory	Simpler authorisation procedures for installing small photovoltaic installations	Photovoltaic installations	<i>Existing and implemented measure, supplementing the NAP</i>	2015 – n/a

19 May 2015 published by the Ministry of Economic Development)					
Identification of authorisation procedures, Certified Notice of Start of Works, tacit acceptance, reporting and identification of the administrative systems applicable to specific activities and procedures, pursuant to Article 5 of Law No 124 of 7 August 2015 (Legislative Decree No 222 of 25 November 2016)	Regulatory	Simpler authorisation procedures for small installations	Renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2016 – n/a
Regulation defining the projects exempt from the landscape permit or subject to the Simplified Authorisation Procedure (Presidential Decree No 31 of 13 February 2017)	Regulatory	Simpler authorisation procedures for small installations	Renewable energy installations	<i>Existing and implemented measure, supplementing the NAP</i>	2017 – n/a
Approval of single forms for installing, connecting and operating high-efficiency micro-CHP plants and CHP plants using renewable sources (Ministerial Decree of 16 March 2017)	Regulatory	Simpler authorisation procedures for small CHP plants	High-efficiency micro-CHP plants using renewable energy resources	<i>Existing and implemented measure, supplementing the NAP</i>	2017 – n/a

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

The integration of renewable energy generating installations in the energy markets is a goal pursued by the legislator and regulators, through a series of actions for reforming the manner of procuring resources for the dispatching service in the presence of renewable electricity generation.

In general, energy generating installations using non-programmable renewable sources, the main consumption units, and also distributors, are encouraged to become increasingly active in the market and to offer some dispatching services insofar as allowed by their technologies.

The electricity market is now heading in a new direction, in order to ensure the transition to 100% decarbonisation, the coordination of the payment mechanisms for productive capacity and the complete integration of renewable energies, and to meet demands in the electricity grid.

### Dispatching and grid services

In 2015, a procedure was launched to **reshape the market for dispatching services**, in order to promote greater integration between European markets and guarantee technology neutrality between potential dispatching service providers (producers, consumers and aggregators), in line with the measures that had already been taken to ensure that power generation from renewable sources had a stronger profile in the market and that costs were fairly shared.

The evolution of the Italian electricity grid started as part of a Europe-wide initiative that is still being defined, taking account of the directions identified in Regulation (EU) 2015/1222 establishing a guideline on capacity allocation and congestion management (CACM Regulation) and of those that could be incorporated in the Guidelines of Good Practice for Electricity Balancing Markets Integration (known as the Balancing Code).

There is already a benchmark regulatory framework in Italy for making markets more open 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 also services, laying down the requirements and procedures concerning 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 grid operators and distribution grid operators organise the participation of service providers and consumers, including the aggregators of consumption units and/or production units.

By Decision 300/2017/R/eel, AEEGSI launched a series of pilot projects in order to arrive at an organic dispatching regulation falling in line with the European Balancing Code.

The pilot projects, which were launched over the course of 2017, will make it possible to acquire useful elements for bringing dispatching up to speed; they concern the participation in the dispatching services market (DSM), including in aggregate form, of demand and the production units that have not yet been authorised, including production units using non-programmable renewable sources.

Provision has not been made for any other type of financial payment for carrying out pilot projects different from those provided for by the regulation.

In order to ensure the greatest possible neutrality for the provision of dispatching services and an increased optimisation of resources, several requirements needed for dispatching services to be authorised have been removed, thereby doing away with the technological and size-related constraints and allowing both production units and consumption units to voluntarily participate in some dispatching services.

More specifically, the mechanism for having demand participate in the provision of dispatching resources within the framework of the DSM, approved by Decision 372/2017/R/eel, consists of two stages:

1. creation and qualification of Authorised Virtual Consumption Units (AVCUs) in the dispatching services market, made up of several off-take points with the availability also of several users of the dispatching, in respect of which the applicant (known as the balancing service provider) is either the owner or has obtained a mandate without the power of representation for all of the off-take points associated with the AVCU;
2. submission of DSM bids relating to the AVCUs, and the possible selection thereof by Terna.

Participation in the pilot project is voluntary, and the balancing service provider may request access to the following services:

- tertiary power reserve, classed as a replacement reserve;
- resources for balancing.

The selected resources will be paid for by using the same procedures put in place for authorised production units, as indicated in the Dispatching Rules, and penalties may be imposed in the event of non-compliant services.

The pilot project also provided for the possibility of the short-term provision of resources made available by the AVCUs in the North and Centre-North market zones, limited to the period between June and September 2017, also for the purpose of securing the electricity grid during the summer in zones where major levels of criticality could arise. Under the procedures for the short-term provision of dispatching resources to parties owning AVCUs, a total of 81 MW has been allocated.

The pilot project for production units, approved by Decision 583/2017/R/eel, is, like that for the AVCUs, split into two stages:

1. creation and qualification of Authorised Virtual Production Units (AVPUs) in the dispatching services market, made up of several feed-in points with the availability also of several users of the dispatching, in respect of which the applicant (known as the balancing service provider) is either the owner or has obtained a mandate without the power of representation for all of the points associated with the AVPU;
2. submission of DSM bids relating to the AVPUs, and the possible selection thereof by Terna.

Participation in the pilot project is voluntary, and the balancing service provider may request access to the following services:

- resolutions of any congestions in the scheduling stage;
- tertiary power reserve;
- resources for balancing.

In this case too, the selected resources will be paid for by using the same procedures put in place for authorised production units, as indicated in the Dispatching Rules, and penalties may be imposed in the event of non-compliant services.

As regards the **regulation of imbalances**, mechanisms have been introduced in order to counteract, wherever possible, scheduling strategies aimed at drawing an economic advantage for the market operator, with the burden being placed on the grid. While maintaining dispatching priority, for production units using renewable sources, a regulation of imbalances has been introduced, and subsequently updated from 2015 onwards<sup>22</sup>.

Also in line with the provisions set out in the European Regulation establishing a guideline on electricity balancing (also known as the Balancing Code), the regulator is seeking to amend the balancing prices in such a way as to reflect the true value of electricity in real time, consistent with time, space and market dimensions. For the interim period, the regulator has put the following measures in place.

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<sup>22</sup> The Regulation on imbalances, introduced by Decision 281/2012/R/eel, was initially updated by Decision 522/2014/R/eel following Ruling of the *Consiglio di Stato* (Supreme Administrative Court) No 2936/2014, and then by Decisions 444/2016/R/eel, 800/2016/R/eel and 419/2017/R/eel.

As regards the calculation of the imbalance costs<sup>23</sup>, the new principles introduced as of August 2016 are given below:

- for the period between August 2016 and August 2017, the imbalance costs:
  - for production units not authorised to use dispatching services, unlike those using renewable sources, 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, may be calculated on a single pricing basis for the entire energy imbalance, or else the alternative regime laid down by Decision 522/2014/R/eel may be followed;
- for the period running from September 2017 onwards, the imbalance costs are calculated through the single pricing mechanism, for all production units.

Following a complete overhaul of the dispatching service regulation, by Decision 419/2017/R/eel, AEEGSI introduced:

- from 1 September 2017 onwards:
  - a new method for calculating the sign of the aggregate zone 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 method for calculating the sign;
- from 1 July 2017 onwards:
  - the macro-zonal no-arbitrage cost to be applied to the imbalances relating to non-authorised consumption units and production units, in order to eliminate any distortions resulting from calculating the imbalance prices at macro-zonal level and the market prices determined at zonal level.

In the case of non-programmable renewable sources, Decision 522/2014/R/eel thus remains in force, on the basis of which users of dispatching services can choose, every year, whether to apply:

- a) the regulation of imbalances put in place for the other non-authorised production units; or
- b) the new regulation specially introduced for non-programmable renewable sources.

The latter regulation defines so-called ‘bands’ which are differentiated for each non-programmable source, within which the unitary imbalance cost provided for non-authorised production units is not applied<sup>24</sup>.

The dispatching priority of electricity generation from renewable sources must be implemented while ensuring the operational security of the electricity grid. Thus, under emergency conditions, renewable production may be limited for a time.

In this regard, since 2007 compensation has been paid for non-generation by wind power plants due to generation reductions imposed by Terna to ensure the operational security of the electricity grid.

To improve the dispatching service, the national transmission grid operator (Terna) draws up forecasts of feed-in from production units. Since 2010<sup>25</sup>, for small production units using non-programmable renewable sources, it has also been using the forecasts prepared by GSE.

In order to ensure the operational security of the electricity grid through better foresight and making the provision of resources possible, further measures have been introduced which place obligations specifically on energy producers using non-programmable renewable sources and distributed generation.

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<sup>23</sup> With reference to the commissioning of new installations, Terna’s ‘Grid Security, Development, Dispatching and Transmission Code’ provides for a trial period of no more than 180 days for new production units. In those cases, the electricity making up the imbalance is valued at the zonal price.

<sup>24</sup> The differentiated bands for each source are equal to:

- 49% of the binding programme, as amended and corrected, for dispatching from large wind farms;
- 31% of the binding programme, as amended and corrected, for dispatching from large photovoltaic installations;
- 8% of the binding programme, as amended and corrected, for dispatching from large flowing-water installations;
- 1.5% of the binding programme, as amended and corrected, for dispatching from large production units using ‘other’ non-programmable renewable sources (most of which are geothermal electricity generating plants);
- 8% of the binding programme, as amended and corrected, for dispatching from small production units (i.e. those having a capacity of less than 10 MVA).

<sup>25</sup> Decision ARG/elt 4/10.

Initially, the provision of certain grid services was made available only to wind turbines and photovoltaic installations connected to the national transmission grid (Annexes A17 and A68 to the Terna Grid Code), these services including initiatives to reduce capacity as and 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, installations which generate electricity to be connected at low and medium voltage have, since 2013 (and again at the behest of the legislator<sup>26</sup>), been required to have devices installed to broaden the scope of operation in terms of frequency and voltage without disconnection from the electricity grid<sup>27</sup>. Those obligations, set out in Annex A70 to the Grid Code, have since been extended to installations that had become operational in 2012; over the course of 2016 and 2017, checks were performed to ensure that the electricity generating installations fulfilled those obligations.

In addition, since 2014, wind turbines and photovoltaic installations connected to the medium-voltage grid and having a power output of at least 100 kW have been required to provide a remote disconnection service in order to ensure the security of the electricity grid, as provided for in Annex A72 to the Grid Code. This obligation has also since been extended to existing installations for which the connection request had been submitted prior to 1 January 2013. Remote disconnection takes place only when there is a risk to the security of the national electricity grid and no other actions are possible.

In the course of 2016, by Decision 786/2016/R/eel, the technical standards for connecting power generating installations to distribution grids were updated (Standard CEI 0-16 for medium-voltage connections and Standard CEI-21 for low-voltage connections), setting out the requirements that the installations had to fulfil in order to be able to provide grid services.

The new editions of Standards CEI 0-21 and CEI 0-16 have, amongst other things, aligned them with the provisions set out in European Standard CEI EN 50438, which stipulate, *inter alia*, that the scope of application of the provisions applicable to active users must also be extended to energy generating installations with a nominal power output of less than 1 kW.

## Storage systems and support to smart grid projects

In the context of more unpredictable energy dispatching as a consequence of the growth of non-programmable renewable sources, **storage systems** are set to gain an increasingly important role: they may be used, for instance, to deliver grid services, contain imbalances, and contain the peaks in the off-take of electricity, maximising self-consumption. Storage systems may be installed by end users, grid operators (Terna and distributor companies) and producers.

As regards pilot projects for electricity storage systems, Article 17 of 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 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 electricity storage systems using batteries. These storage systems can also be constructed and operated by distribution grid operators. The objectives of the storage systems tested in the pilot projects are to reduce the amount of non-production of energy from non-programmable renewable sources due to local grid congestion, and to provide the primary regulation service.

In compliance with the provisions of Article 18 of Legislative Decree No 28/2011, the 2012-2015 Development Plan, drawn up by Terna and approved by the Ministry of Economic Development, includes electricity storage systems designed to facilitate energy dispatching by non-programmable installations, for a total power output of 40 MW.

To this end, AEEGSI has devised a specific incentive for investments in storage systems when they concern pilot projects for which the characteristics have been specified.

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<sup>26</sup> The legislator intervened in 2011, through the Interministerial Decree of 5 May 2011, and subsequently through the Interministerial Decree of 5 July 2012, stipulating that photovoltaic installations, including those that were already in operation when the provisions set out therein came into force, had to be modernised in order to provide certain grid services.

<sup>27</sup> Decision 84/2012/R/eel, as subsequently amended and supplemented.

With regard to the investments in storage systems under the 2012-2015 Defence Plan, AEEGSI initially granted incentives to two pilot projects, for the installation of power-intensive storage systems (Storage Lab) in Sicily and Sardinia<sup>28</sup> with a maximum capacity of 8 MW each. Subsequently, still within the limits of the Plan, AEEGSI admitted to the incentive scheme another six pilot projects for a total capacity of 35 MW, located along strategic axes of the national transmission grid, where power generation from renewable sources is particularly weak. This pilot scheme will make it possible to assess the performance of the different storage technologies, of individual Storage Systems (SSs) and of the overall Pilot Storage Station (PSS), and the benefits they deliver.<sup>29</sup>

Storage systems can also be fitted in energy generating installations. The Interministerial Decree of 5 July 2012 in fact provided that, in order to ensure development of photovoltaic energy with methods compatible with the security of the electricity grid, ensuring coordination with measures pursuing the same aims focusing on renewable sources other than photovoltaic and with the measures referred to in Articles 17 and 18 of Legislative Decree No 28/2011, AEEGSI shall establish the manner by which the responsible parties (producers) may use storage systems, including those integrated with inverters, to improve management of the electricity generated and to store the electricity generated by installations in the event of disconnection or power modulation signals.

No schemes have been introduced to incentivise the installation of storage systems by end users or producers; instead, the technical standards for connecting energy generating installations to distribution grids have been updated (Standard CEI 0-16 for medium-voltage connections and Standard CEI 0-21 for low-voltage connections) and rules have been adopted for integrating those installations into the national electricity grid.

When updating the technical connection standards (Standards CEI 0-16 and CEI 0-21), the requirements which new installations must meet in order to be able to provide grid services have been defined, including regulation of active power and insensitivity to voltage sags, 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 electricity generating clusters and the electricity taken from the grid, stored, released and fed back into the grid by the storage systems.

The technical requirements for storage systems set out in Variant 1 to the third edition of Standard CEI 0-16 in consolidated form and in Variant 1 to the second edition of Standard CEI 0-21 in consolidated form must be met by all storage systems having had a connection application submitted as from 21 November 2014. The procedures for testing the technical requirements for storage systems set out in Variant 1 to the third edition of Standard CEI 0-16 in consolidated form and the subsequent certifications provided for must be followed for storage systems having had a connection application submitted as from 1 September 2015. Until new testing procedures and new certifications become compulsory, the applicant is required to attach to the operating regulations a declaration in lieu of a sworn affidavit, pursuant to Presidential Decree No. 445/00, from the constructor of the storage system, stating that said system fulfils the requirements set out in Variant 1 to the third edition of Standard CEI 0-16 in consolidated form.

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 legislative framework, provided that the requirements making the installation eligible for those schemes are met.

Lastly, the Ministerial Decree of 14 February 2017 for spreading the use of renewable sources on Italy's smaller islands promotes the implementation of pilot projects, which shall be selected also on the basis of the degree of innovation, with particular reference to systems for integrating renewable sources through the efficient use of storage systems and the development of electricity transportation.

As regards **smart grids**, to ensure an efficient energy system in line with the EU guidelines, the regulator selected seven pilot projects<sup>30</sup> to receive incentives for introducing innovative technologies in the distribution grid, in order to integrate the behaviour and actions of all users connected to the same grid, so as to favour distributed generation and the efficient use of resources. The trials ended in 2015 and the results given in the

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<sup>28</sup> By Decision 227/2014/R/eel, AEEGSI granted Terna's application to replace the sites of Caltanissetta and Ottana with the sites of Ciminna and Casuzze in Sicily and Codrongianos in Sardinia, total installed capacity being equal, and to label the power-intensive project respectively as 'Sicily' and 'Sardinia'.

<sup>29</sup> For more information, please refer to the following link: <https://www.terna.it/en-gb/sistemaelettrico/progettipilotadiaccumulo.aspx>.

<sup>30</sup> Eight pilot projects were initially selected, but one distributor backed out from taking part.

final reports<sup>31</sup> highlighted the possibility of increasing the hosting capacity of the grids as a result of the work carried out, as well as enabling the distributed resources to be dispatched.

Based on the results of the smart grid pilot projects, AEEGSI has introduced an incentivisation regulation scheme, which is selective in nature and output-based and is aimed at electricity distributors, in order to transform distribution grids into Smart Distribution Systems. The innovative development of distribution grids could help to curb necessary investments and therefore keep the cost of the service down, which would obviously benefit final customers. The net benefits associated with the introduction of innovative functionalities in distribution grids may therefore be afforded in part to the grid operator through a specific incentive, in order to encourage the grid operator to move towards solutions that will best benefit the system. AEEGSI has analysed the degree of interaction with other regulations that focus on distribution operations, and has identified in particular two innovative functionalities of Smart Distribution Systems that can be replicated on a large scale, on which possible incentivisation measures should be concentrated in order to accelerate the implementation thereof: the trackability of power flows and of the status of the resources distributed over medium-voltage grids, and the regulation of the voltage of medium-voltage grids.

## Connection to the electricity grids

As regards **grid access conditions** and **allocation of connection costs**, grid operators must give priority to connection requests and works of renewable energy installations or high-efficiency CHP plants. To this end, grid operators must ensure that these priority facilities are connected to the grids within the timeframes set out in the Consolidated Text on Active Connections (CTAC<sup>32</sup>), which lists grid connection procedures obligations, timing and costs.

Furthermore, the Decree of 19 May 2015 introduced, from 24 November 2015, for photovoltaic installations meeting certain characteristics<sup>33</sup>, a simplified installation, connection and commercial operation procedure. The aim of the Decree was to streamline the authorisation process for photovoltaic installations with output of up to 20 kW as a two-step procedure, through:

- reducing the information and details to be supplied to the authorities and parties concerned, streamlining the exchange of information between Municipalities and Regions, grid operators and GSE;
- streamlining the entire procedure.

Users are in touch solely with the grid operator for reporting the start and completion of works via the ‘Single Form’, and it is the grid operator, and no longer the user, that interacts with Municipalities and Regions to obtain authorisation for the installation, with Terna registering the installation’s details and GSE activating the Net Metering service.

In the case of the abovementioned photovoltaic installations, for which simple works are planned, consisting solely in installing the meter bank, connection costs too are very limited compared to the other types of installations, amounting to EUR 100.

By the Decree of the Ministry of Economic Development of 16 March 2017, similar measures were also introduced concerning the installation, connection and operation of high-efficiency micro-CHP plants and CHP plants using renewable sources<sup>34</sup>.

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<sup>31</sup> For more information, please refer to the following link: <http://www.autorita.energia.it/it/operatori/smartgrid.htm>.

<sup>32</sup> Decision ARG/elt 99/08, as amended and supplemented.

<sup>33</sup> The Single Form, governed by the Decree of 19 May 2015, is used for the installation, connection and commercial operation of photovoltaic installations having all of 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 a nominal power output not exceeding 20 kW;
- d) for which access to net metering is requested at the same time;
- e) fitted on the roofs of buildings in the manner set out in Article 7-bis(5) of Legislative Decree No 28/2011;
- f) no additional energy generating installations at the same off-take point.

<sup>34</sup> The approved single forms, specifically for high-efficiency micro-CHP plants and for CHP plants using renewable sources, apply to plants having all of the following characteristics:

- a) installed at the premises of end users already equipped with active low-voltage or medium-voltage off-take points;
- b) having a power output not exceeding that already available as off-take;

More specifically, the applicant first of all sends the grid operator Part I of the single form upon commencement of the works, and then sends it Part II once the works have been completed. Both notifications must contain a minimum amount of information and number of documents, and it will be down to the grid operator to liaise with GSE, Terna and the Municipality. In Part I of the form, the applicant also declares its wish to access the Net Metering scheme and, optionally, to sign up to the White Certificates mechanism and not fall foul of the combination ban set out in Article 6 of the Ministerial Decree of 5 September 2011.

The grid operator furthermore provides the applicant, also via its website, with an instructional guide which, on the basis of the information provided by GSE, Terna and the Customs Office, lists the requirements that the applicant must meet while operating the installation and indicates the parties (and the corresponding references) that must be approached 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 renewable energy 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 plants is the lower of the two values A and B (in euros):

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

$$B = CP_B \times P + CM_B \times P \times D_B + 6\,000$$

where:

- $CP_A = \text{EUR } 35/\text{kW}$ ,  $CM_A = \text{EUR } 90/(\text{kW}\cdot\text{km})$ ,  $CP_B = \text{EUR } 4/\text{kW}$ ,  $CM_B = \text{EUR } 7.5/(\text{kW}\cdot\text{km})$ ;
- P is the power for the purposes of connection, which is equal to the greatest of zero and the additional power required for dispatching (which is in turn the difference, if positive, between the dispatching power requirement and the power already available for the connection before the works);
- $D_A$  is the straight line distance between the connection point and the closest medium/low-voltage transformer substation in use for at least five 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 five years.

In the cases of new connection via underground cable, the distance-based (CM) connection price doubles, whereas in the case of connection of installations which cannot be reached by a carriageable road or which are separated from the existing distribution installations by stretches of sea, lake or wetland, the distance-based 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 prices are more complex.

The connection price is paid by the connection applicant to the grid operator, as to 30% at the time of accepting the quotation, and as to the remaining 70% at the time when completion of the works strictly necessary for the connection is notified. Alternatively, for amounts not exceeding EUR 2 000, grid operators can require in the terms and conditions of their connection agreement that the entire cost of the connection be paid upfront when accepting the quotation.

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 applicant decides to establish the grid connection system on its own.

For the connection of renewable energy installations and high-efficiency CHP plants, the applicant can install independently the connection system as to the parts not involving work on the existing electricity grid, i.e. as a general rule, installation of the electricity line and of the power delivery system. The grid operator can allow the

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- c) powered by biomass, biogas, bioliquids or methane gas or LPGs;
  - d) for which access to net metering is requested at the same time;
  - e) where, falling within the scope of application of the Cultural Heritage and Landscape Code (Legislative Decree No. 42/2004), there are no alterations to the status of the premises and to the external appearance of the buildings;
  - f) having a power generating capacity of less than 50 kW<sub>e</sub>.

applicant to carry out works on the existing grid, subject to the requirements of security and continuity of the electricity service.

After completing the connection works performed independently, the applicant sends to the grid operator the communication of completion of works, together with all the documents necessary for testing, commissioning and managing the relevant sections of the grid. Acceptance testing costs are paid by the applicant, even where the outcome is negative. Within 60 working days from completion of the acceptance testing and in any case not before taking over the installed works, the grid operator shall reimburse the applicant for the amount paid at the time of quotation acceptance, plus the legal interest rate. The grid operator shall also pay a price equal to the difference, if positive, between the cost of the works performed 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 grid operator within the same time limit.

In the event of a set of power generating installations<sup>35</sup>, if the applicant decides to carry out the connection on its own, this must apply to all the connections for the set.

For high- and very-high-voltage connections of renewable energy installations, at the time of submitting the application for the Minimum Technical Requirements (MTRs, i.e. the connection works executive project), the applicant shall pay the grid operator a price 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 EUR 1 250 and the product of multiplying EUR 0.25/kW and connection power, up to a maximum of EUR 25 000. The costs of works on the existing grid are never charged to applicants who have renewable energy installations.

If the applicant did not fully pay the cost charged for the connection at the time the MTRs were accepted, before starting connection works the applicant shall submit, on the grid operator's request, a financial security consisting of a bank guarantee, covering the still-unpaid connection price. This guarantee can be enforced by the grid operator if the connection is not executed within the time limit set out in the specific 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 grid operator is entitled to enforce a share of the guarantee covering the costs incurred up to that date, less any payments already made and plus any costs the grid operator will incur to restore proper operation of the electricity grid.

## Capacity market

Legislative Decree No 379/2003 set up a new remuneration mechanism for the availability of electricity generating capacity capable of both achieving and maintaining sufficient levels of productive capacity, in order to ensure that natural demand and the necessary reserve margins were covered.

By a subsequent Decree of 30 June 2014, the Ministry of Economic Development approved the rules governing the remuneration mechanism for the availability of electricity generating capacity proposed by Terna, pursuant to Article 2 of Legislative Decree No 379 of 19 December 2003. By a communication of 27 October 2016, the Ministry of Economic Development provided further pointers to Terna to serve as a basis for supplementing or amending the Governing Rules and conducting a public consultation.

As things currently stand, the European Commission has been notified of the rules governing the capacity market, and checks are now underway as to whether those rules are compatible with the Guidelines on State Aid. The capacity market may therefore become operational only after the notification process has reached a positive conclusion, which is expected to take place in 2018.

The capacity market should therefore ensure that the grid is at adequate levels in the medium to long-term, by providing suitable flexibility services, to the extent strictly necessary for ensuring the security of the electricity

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<sup>35</sup> A set of power generating installations is a cluster of separate power generating installations using renewable sources and/or high-efficiency CHP plants, located on the same site or on adjacent sites that are separated only by a road, railway line or waterway. The power generating installations making up a set must have a requested power input so as to allow, for each of them, the provision of the connection service exclusively in low or medium voltage.

grid and meeting energy demands, without leading to any electricity price or tariff increases for final customers, through the participation also of distributed generation using renewable sources and demand.

The market is structured through procurement auctions organised by Terna, with a maximum planning horizon of four years, for negotiating (physical) options on productive capacity (physical reliability options).

Participation is voluntary, and is open both to new and existing energy generating installations, whether or not using renewable sources, and to demand. The selected counterparties receive (pay) a premium (EUR/MW/year), known as the fixed price, which represents the clearing price of the auction (marginal price) for which the contract has been awarded.

In return, the counterparties are obliged, for every hour of the delivery period and with reference to the delivery premises, to:

- offer the pledged capacity on the day-ahead market, directly or indirectly via the dispatching user or the market operator, and offer, on the dispatching services market, the share of the pledged capacity not accepted on the day-ahead market;
- pay Terna a variable fee equal to any positive difference (expressed in €/MWh) between the spot price and the strike price.

Over the course of 2017, AEEGSI placed its own guidelines concerning the definition of the technical and economic parameters under consultation, with particular focus being placed on the strike price and the premium. As regards the criteria for defining the strike price, which represents the standard variable cost of the cutting-edge technology identified by Terna in open-cycle gas turbines using natural gas, AEEGSI specifies that the technical and economic parameters to be borne in mind when calculating the aforementioned price are represented by various components for covering the cost of the natural gas, the emission allowance fee to be paid under the Emission Trading Scheme, the cost of additives, chemical products and catalysing agents and of disposing of combustion residuals and waste, together with green taxes, dispatching fees, and other burdens and risks. Based on the new methodology, the strike price for June 2017 would be EUR 25/MWh.

The European Commission has been informed of the consultation being conducted by the regulator, and a final assessment of the Italian mechanism will also take the latter technical and economic factors into account.

### 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).

#### HEATING AND COOLING SECTOR

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

##### White Certificates

White Certificates (also known as Energy Efficiency Securities – EESs) are tradable securities which certify energy savings in final energy uses. The legal basis of the White Certificates scheme was established by the Ministerial Decrees of 24 April 2001, 20 July 2004, 21 December 2007, 28 December 2012 and 11 January 2017.

In the 2015-2016 two-year period, the White Certificates scheme continued to have an effect, in accordance with the Ministerial Decree of 28 December 2012 and the EEN 9/11 guidelines. The details concerning the operation of the White Certificates scheme (savings assessment methods, principles introduced by the EEN 9/11 guidelines, types of EESs obtainable, ‘tau’ durability coefficient, the Certificates’ issue period, etc.) have been described in detail in the earlier editions of this report; hereinafter, the focus will therefore be placed on the major regulatory amendments made to the EES scheme currently in force and the results achieved.

After being published in the Official Journal of the Italian Republic (No 78, of 3 April 2017), the Ministerial Decree of 11 January 2017 came into force, entitled ‘Determination of the national quantitative energy-saving targets that must be achieved by electricity and gas distributors for the years between 2017 and 2020 inclusive, and for approving the new Guidelines for preparing, implementing and assessing energy efficiency projects’. The Decree establishes the criteria, conditions and procedures for carrying out energy efficiency projects in final uses for accessing the White Certificates scheme.

The White Certificates 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-saving targets. The energy-saving targets set by the new Ministerial Decree for the 2017-2020 period are as follows:

##### Annual national quantitative energy-saving targets to be reached through the White Certificates scheme

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

##### Savings to be achieved in final uses of electricity and natural gas

Year	Electricity savings (millions of EESs)	Natural gas savings (millions of EESs)
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) non-obligated electricity and natural gas distributors;
- c) public and private parties holding UNI CEI 11352 certification or having appointed a UNI CEI 11339-certified energy management expert or having an ISO 50001-certified energy management system in place.

The parties which 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 organised by GME (the electricity market operator) or by means of bilateral contracts to obligated parties and to the other parties participating in the scheme. The trade dimension of the White Certificates is equal to 1 tonne of oil equivalent.

The main new elements introduced by the Ministerial Decree of 11 January 2017 are as follows:

- **scrapping of the analytical assessment method:** the Decree provides for only a new ex-post method (designated PC) and a new standardised method (designated PS);
- **new definitions for the concepts of baseline consumption and additional energy saving.** ‘**Baseline consumption**’ now means the consumption of primary energy by the technological system, which is used as a reference point for calculating the additional energy savings for which White Certificates are awarded. The baseline consumption is equivalent to whichever is lower out of the consumption prior to the implementation of the energy efficiency project and the benchmark consumption. In the case of new installations, building or sites however designated, for which there are no energy consumption values prior to the operation, the baseline consumption is equal to the benchmark consumption. ‘**Additional energy saving**’ now means the difference, in terms of primary energy (expressed in toe), between the baseline consumption and the energy consumption following the implementation of a project. This saving is calculated with reference to the same rendered service, thereby ensuring that the conditions influencing energy consumption are standardised;
- **revision of the minimum threshold for projects.** Over the course of the first 12 months of the monitoring period, standardised projects must have generated an additional energy-saving quota of no less than 5 toe, while implemented projects must have generated an additional energy-saving quota of no less than 10 toe;
- **scrapping of the ‘tau’ durability coefficient,** which forecasted cash flows with respect to the actual energy savings achieved. Under the new Ministerial Decree, the technical life of an intervention once again corresponds to its useful life, which is limited to a maximum of 10 years. Upon submitting its application, however, the proposing party may request that, for half of the duration of the useful life of the project, the number of White Certificates issued be multiplied by the factor  $K_1=1.2$ ; in those cases, for the remaining duration of the useful life, the number of White Certificates issued following the final reporting of the actual energy savings achieved and measured is multiplied by the factor  $K_2=0.8$ ;
- **there are now once again four types of Certificates,** namely Type I, Type II, Type III and Type IV. These replace the Type II-CAR, Type V, Type IN and Type E Certificates;
- **access to the scheme** is provided for by drawing up a ‘standard contract’ with GSE;
- **the costs for accessing the scheme** (as established by the Ministerial Decree of 24 December 2014) are now the same as those applicable to the Proposals for Projects and Metering Programmes scheme and the Savings Certification and Assessment Request scheme.

The new guidelines for preparing, implementing and assessing energy efficiency projects and for defining the criteria and procedures for issuing White Certificates are contained in Annexes 1 and 2 to the Ministerial Decree of 11 January 2017. Annex 3, for its part, contains a list of the types of admissible projects and the associated useful-life values.

Various institutional entities are involved in establishing the guidelines and assessing the projects devised to meet the annual targets to be achieved by electricity and natural gas distributors. The Ministry of Economic Development and the Ministry of the Environment and Protection of Land and Sea 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 manages the regulated platforms for the trading of energy efficiency securities. AEEGSI establishes the tariff reimbursements and monitors the scheme. GSE is also responsible for assessing and monitoring all the energy efficiency projects for which access to the White Certificates scheme

has been requested. These assessment and monitoring operations are performed by way of document checks or on-site inspections and visits, without any notice having to be given.

As is highlighted in the earlier editions of this report, in order to enable obligated parties to recover all or part of the costs incurred for carrying out the actions, a component on the electricity and natural gas distribution tariffs has been put in place. For the years 2015 and 2016, the final tariff contributions were set respectively at: EUR 114.83/EES and EUR 118.37/EES (estimated contribution). By Decision 435/2017/R/efr, AEEGSI approved the amendment of the rules for determining the tariff contribution granted to electricity and gas distributors fulfilling the savings requirements for the mandatory years following 2017.

### Presentation of the main results in the years 2015 and 2016

Over the course of 2016, GSE issued a total of 5 517 891 EESs, including 1 936 559 arising from automatic quarterly emissions relating to standard Savings Certification and Assessment Requests. The number of securities issued in 2016 increased by 10% compared to 2015, standing at around 5 million, equivalent to approximately 1.7 Mtoe of primary savings. The number of applications submitted increased by 6%.

As in previous editions, for the purposes of this report, results are shown in terms of value of the EESs issued only in respect of projects approved for participation in the White Certificates scheme and using **renewable heating and cooling technologies**. Result analysis is restricted to those projects for which technical data sheets were prepared for standardised or analytical assessment of the energy savings achieved. It is recalled that the Ministerial Decree of 11 January 2017 scrapped all the technical data sheets concerning the analytical and standardised assessment methods, which were, however, in place throughout 2015 and 2016. In addition, one of the changes that the new Decree brought to the scheme was the scrapping of the analytical assessment method and the  $\tau$  durability coefficient.

### Actions described in this report

Data sheet No	Title of the technical data sheet	Durability coefficient ( $\tau$ )	Assessment method
8T	Use of solar collectors to produce sanitary hot water	2.65	Standardised
15T	Installation of external air intake electric heat pumps in place of boilers in new or renovated residential buildings	2.65	Standardised
21T	Application in the civil sector of small cogeneration systems for space heating and cooling and for producing sanitary hot water	3.36	Analytical
22T	Application in the civil sector of district heating systems for space conditioning and for producing sanitary hot water	3.36	Analytical
26T	Installation of centralised systems for heating/cooling civil-use buildings	2.65 / 1.87	Analytical
27T	Installation of electric heat pumps for producing sanitary hot water in new and existing domestic installations	2.65	Standardised
37E	New installation of single-household heating equipment fuelled by woody biomass with a power output of up to 35 thermal kW	2.65	Standardised
40E	Installation of heating equipment fuelled by woody biomass in greenhouse agriculture	2.65	Standardised

The data on the number of securities issued and on the primary energy savings achieved have been taken from the Annual Reports on the White Certificates scheme published by GSE. The price used to calculate the value of the EESs issued is the average market price for the 2015 and 2016 calendar years. In 2016, the average price surveyed was around EUR 147.85/EES; in 2015 it was EUR 104.56/EES. The results are shown separately for each of the technical data sheets listed in the table above.

### Solar collectors (technical data sheet No 8T)

In 2016, 18 351 EESs were issued from the installation of solar collectors, up from 2015, when the EESs for this type of installation numbered 2 530.

The table below shows the results in terms of overall annual support for the years 2015 and 2016 seen as value of the EESs issued.

**Overall annual support for actions included in technical data sheet No 8T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	2 713 185
2015	104.56	264 528

**Electric heat pumps** (technical data sheet No 15T)

In 2016, 15 EESs were approved for the installation of external air intake electric heat pumps in place of boilers in new or renovated residential buildings. Conversely, in 2015, no EESs were issued for this type of action.

**Overall annual support for actions included in technical data sheet No 15T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	1 922
2015	104.56	-

**Application of small cogeneration systems for space heating and cooling** (technical data sheet No 21T)

The data in the following tables concern the application in the civil sector of small cogeneration systems for space heating and cooling and for producing sanitary hot water. These applications also include the use of low-enthalpy geothermal heat and of heat from cogeneration or geothermal installations or from installations powered by biomass or waste.

In 2016, 2 890 EESs were approved for actions relating to data sheet 21T, down from 2015, when the EESs for this type of installation numbered 9 814. It should be specified that the figure given for the total annual support includes all the actions under data sheet 21T, only a small proportion of which comprises systems using low-enthalpy heat from cogeneration or geothermal installations or from installations powered by biomass or waste.

**Overall annual support for actions included in technical data sheet No 21T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	427 285
2015	104.56	1 026 118

**District heating systems** (technical data sheet No 22T)

The data in the following tables concern the application in the civil sector of district heating systems for space conditioning and for producing sanitary hot water. These applications also include the use of low-enthalpy heat from cogeneration or geothermal installations or from installations powered by biomass or waste.

In 2016, 301 509 EESs were approved for actions relating to data sheet 22T; in 2015, 48 369 such EESs were approved. It should be specified that the figure given for the total annual support includes all the actions under data sheet 22T, only a small proportion of which comprises district heating systems using low-enthalpy heat from cogeneration or geothermal installations or from installations powered by biomass or waste. Among thermal RES projects eligible for the incentive, district heating systems based on biomass-burning installations are the most common type.

**Overall annual support for actions included in technical data sheet No 22T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	44 577 934
2015	104.56	5 057 294

**Centralised heating/cooling systems** (technical data sheet No 26T)

The data in the following tables concern the installation of centralised systems for heating/cooling civil-use buildings. These applications also include the use of low-enthalpy heat from cogeneration or geothermal installations or from installations powered by biomass or waste.

In 2016, 92 015 EESs were approved for actions relating to data sheet 26T; in 2015, 93 230 such EESs were approved. It should be specified that the figure given for the total annual support includes all the actions under data sheet 26T, only a small proportion of which comprises centralised heating/cooling systems using low-enthalpy heat from cogeneration or geothermal installations or from installations powered by biomass or waste.

**Overall annual support for actions included in technical data sheet No 26T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	13 604 365
2015	104.56	9 747 804

**Installation of electric heat pumps for producing sanitary hot water in new and existing installations** (technical data sheet No 27T)

Data sheet 27T was introduced by the Electricity and Gas Authority (AEEG, the forerunner to AEEGSI) in 2010 by Decision EEN 15/1. The number of actions falling under that data sheet has been negligible for years. In 2016, 11 EESs were approved for actions relating to data sheet 27T; in 2015, 15 such EESs were approved.

**Overall annual support for actions included in technical data sheet No 27T**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	1 626
2015	104.56	1 568

**New installation of single-household heating equipment fuelled by woody biomass with a power output of up to 35 thermal kW** (technical data sheet No 37E)

Data sheet 37E was introduced by the Ministerial Decree of 28 December 2012 (the ‘White Certificates’ Decree). In 2016, 1 382 EESs were issued for actions involving the new installation of single-household heating equipment fuelled by woody biomass with a power output of up to 35 thermal kW. In 2015, 860 such EESs were issued.

The table below shows the results in terms of total annual support for the years 2016 and 2015, seen as value of the EESs issued for projects under data sheet 37E.

**Overall annual support for actions included in technical data sheet No 37E**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	204 328
2015	104.56	89 919

**Installation of heating equipment fuelled by woody biomass in greenhouse agriculture** (technical data sheet No 40E)

Data sheet 40E was introduced by the Ministerial Decree of 28 December 2012 (the ‘White Certificates’ Decree). In 2016, 21 661 EESs were issued for actions involving the installation of heating equipment fuelled by woody biomass in greenhouse agriculture. In 2015, 75 758 such EESs were issued.

**Overall annual support for actions included in technical data sheet No 40E**

Reference year	Average price of EESs (EUR/EES)	Total annual support (EUR)
2016	147.85	3 202 567
2015	104.56	7 920 993

## Thermal Account

The Ministerial Decree of 16 February 2016, which came into force on 31 May 2016, updated the 'Thermal Account' (TA), strengthening and simplifying the support mechanism that had been introduced by the Decree of 28 December 2012, which provided incentives for projects aimed at improving energy efficiency and producing thermal energy from renewable sources. The funds made available each year amount to EUR 900 million. The beneficiaries of the mechanism are public administrative bodies, which receive EUR 200 million for carrying out projects for improving energy efficiency and producing thermal energy from renewable sources, and companies and private entities, to which EUR 700 million is made available solely for thermal energy generating installations using renewable sources.

The incentive consists in providing, in one or more instalments, a capital grant which, within set parameters, criteria and specific expenditure limits, may cover between 40% and 65% of the investment costs incurred, depending on the project in question.

Compared to what is described in the earlier editions of this report, the new Thermal Account is a mechanism that has been completely overhauled with respect to what was set out by the Decree of 2012. The Ministerial Decree of 16 February 2016 introduced elements for promoting technological innovation, referring, in setting out the requirements to be met for accessing the incentives, to the most up-to-date technical regulation governing the sector, awarding the best performing technological standards on the market and simplifying the procedures for gaining access to the incentives. As well as simplifying those procedures and making more parties eligible (in-house companies and resident groups can now also receive grants), the Decree also introduced a new set of energy efficiency measures. The most significant changes also related to the size of the eligible installations, which was increased, while the procedure for gaining direct access to the equipment featuring in a specific catalogue was streamlined.

Changes were also made to the incentives themselves: the threshold for paying them in a single instalment was raised from EUR 600 to EUR 5 000, and the payment deadlines were brought down from six months to two months.

The new Thermal Account makes it possible to refurbish buildings in order to improve their energy performance levels, reducing fuel consumption costs and thus recovering, in a short space of time, some of the costs incurred. In addition, the new TA allows public administrative bodies to perform the exemplary role placed on them by the Energy Efficiency Directive.

There are two procedures by which incentives can be applied for: direct access (following completion of the works) or reservation (upon commencement of the works). The first procedure is open to both public and private entities, whereas the second is reserved solely for public administrative bodies. The procedure for accessing incentives by entries in registers, as set out in the previous version, has been abolished.

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

- **Category 1 - Projects eligible for incentives to public administrative bodies:**
  - thermal insulation of opaque surfaces;
  - replacement of windows;
  - replacement of existing winter heating systems with others using condensing boilers;
  - installation of screening and/or shading systems;
  - conversion of buildings into NZEBs;
  - replacement of existing internal lighting systems and external appurtenances with energy-efficient lighting systems;
  - installation of building automation technologies for the heating and electricity systems of buildings.
  
- **Category 2 - Projects eligible for incentives to public administrative bodies and private entities:**
  - replacement of existing heating systems with others equipped with heat pumps, up to 2 000 kW;
  - replacement of existing heating systems with biomass-fired boilers, up to 2 000 kW;
  - installation of thermal solar collectors, up to 2 500 m<sup>2</sup>;
  - replacement of existing electric water heaters with heat-pump water heaters;
  - replacement of existing heating systems with new hybrid systems (condensing boilers + heat pump).

For Category 2 projects, the incentive, which cannot exceed 65% of eligible expenditure, is calculated on the basis of the estimated thermal energy output, and as a function of the technology, installation size and climate zone, with premiums being awarded for low particulate emissions in the case of biomass-fired boilers.

One interesting development lies in the support provided for converting existing buildings into Nearly Zero-Energy Buildings (NZEBs). This involves refurbishment work, including extensions of up to 25% of the original surface area, in order to convert buildings owned by public administrative bodies into NZEBs, in accordance with the requirements set out in the Ministerial Decree of 26 June 2015. Among the refundable costs are those relating to any work for earthquake-proofing the foundations of the building, by either reinforcing or reconstructing them, which could also improve insulation. Buildings may also be demolished and then rebuilt on a different site.

The introduction of support for building automation projects should also be highlighted. These involve installing technologies for automatically controlling and managing the heating and electricity systems of buildings in order to make them more energy efficient (in terms of heating, cooling, ventilation and air-conditioning, production of sanitary hot water, lighting, control of solar shading systems, integrated control and centralisation of various applications, analysing and tracking consumption levels), and thus bring them up to at least Class B of Standard EN15232.

The new Decree has also amended the payment procedures: under the new system, grants are paid in one, two or five annual instalments, depending on the size and type of project, and for applications submitted by private entities, one-off payments of up to EUR 5 000 can now be made; for public administrative bodies, meanwhile, one-off payments of more than that figure are now provided for.

### Results achieved in 2015 and 2016

The following table shows how many applications for incentives were submitted in 2015 and 2016, and the total amount of the incentives applied for. The figures for 2015 include applications submitted through entries into registers. This method of access was scrapped by the new version of the mechanism that came into force in 2016.

#### Summary of overall results for the years 2015 and 2016

YEAR	DIRECT ACCESS		RESERVATION		REGISTERS		TOTAL	
	Number of applications	Incentives applied for (EUR m)	Number of applications	Incentives applied for (EUR m)	Number of applications	Incentives applied for (EUR m)	Number of applications	Incentives applied for (EUR m)
2015	8 241	34.7	5	0.2	17	3.2	8 263	38.1
2016	14 814	49.5	141	18.8	-	-	14 955	68.3

The direct access procedure is the most common way of accessing the incentives (99% of applications).

The following table shows the data broken down by type of project implemented, showing their relative share, the number of projects implemented, the total number of incentives granted, the average incentive granted, the expenditure incurred for the projects by the responsible parties, and the average expenditure. The expenditure incurred for each project was declared by the responsible party via the IT system (Portaltermico) and supported by invoices and payment statements.

**Direct access - breakdown of applications submitted by type of project in 2015 and 2016**

TYPE OF PROJECT	2015			2016		
	Number of projects	Incentives applied for (EUR m)	Average incentive (EUR/project)	Number of projects	Incentives applied for (EUR m)	Average incentive (EUR/project)
1.A - Opaque envelope	64	3.130	48 908	175	9.09	51 923
1.B - Transparent surfaces	69	1.638	23 735	135	3.89	28 815
1.C - Condensing boilers	121	0.999	8 258	548	2.21	4 036
1.D - Screens/shades	3	0.038	12 619	23	0.17	7 541
1.E - NZEBs				21	9.66	460 163
1.F - Lighting systems				67	1.13	16 922
1.G - Building automation				40	0.45	11 251
2.A - Heat pumps	71	0.221	3 114	374	3.11	8 316
2.B – Biomass-fired boilers	2 512	10.833	4 312	7 503	21.21	2 814
2.C - Thermal solar	5 121	14.300	2 792	6 319	16.41	2 588
2.D - Heat-pump water heaters	94	0.052	555	227	0.14	613
2-E - Hybrid systems				24	0.06	2 290
Total	8 055	31.211	3 875	15 456	67.53	4 369
Audits and energy performance certificate (A+EPC)	185	0.370		266	0.79	
TOTAL		31.581			68.32	

The projects implemented, with respect to applications with contracts activated in 2015, amount to 8 055: this number is higher than the number of applications granted (7 842) because some applications covered more than one project, implemented at the same time. In 2015, the type of project for which most applications for incentives were submitted was the fitting of thermal solar installations, with 5 121 applications and incentives applied for totalling more than EUR 14 million. This was followed by the replacement of existing winter heating systems with biomass-fired boilers, with over 2 500 applications and incentives applied for totalling more than EUR 10.8 million.

In 2016, the type of project for which most applications were submitted was the replacement of existing winter heating systems with biomass-fired boilers, with over 7 500 applications and incentives applied for totalling more than EUR 21 million; this was followed by thermal solar installations, with over 6 300 applications and incentives applied for totalling slightly more than EUR 16 million. Condensing boilers were in third place, with over 540 applications and incentives applied for totalling around EUR 2.2 million; in terms of the total amount of incentives applied for, conversely, projects for converting buildings into NZEBs actually came in third, with the 21 applications submitted via the reservation procedure totalling EUR 9.7 million.

In 2015, some of the projects listed in the table were not eligible for the incentives provided by the Ministerial Decree of 28 December 2012.

The following table shows that, in 2016, following the entry into force of the new Thermal Account, there was a substantial increase in the number of applications submitted, with the average amount of the incentive applied for also rising.

**Breakdown of applications submitted by type of project in 2016 and relevant Decree**

TYPE OF PROJECT	Ministerial Decree of 28 December 2012 (T.A. 1.0)			Ministerial Decree of 16 February 2016 (T.A. 2.0)		
	Number of projects	Incentives applied for (EUR m)	Average incentive (EUR/project)	Number of projects	Incentives applied for (EUR m)	Average incentive (EUR/project)
1.A - Opaque envelope	54	1.93	35 666	121	7.16	59 178
1.B - Transparent surfaces	37	0.95	25 739	98	2.94	29 975
1.C - Condensing boilers	218	1.01	4 634	330	1.20	3 641
1.D - Screens/shades	2	0.03	15 400	21	0.14	6 792
1.E - NZEBs	-	-	-	21	9.66	460 163
1.F - Lighting systems	-	-	-	67	1.13	16 922
1.G - Building automation	-	-	-	40	0.45	11 251
2.A - Heat pumps	37	0.25	12 602	337	2.86	8 493
2.B - Biomass-fired boilers	2 254	8.55	3 793	5 249	12.66	2 412
2.C - Thermal solar	2 789	9.72	3 485	3 530	6.68	1 894
2.D - Heat-pump water heaters	92	0.06	599	135	0.09	656
2-E - Hybrid systems				24	0.06	2 290
Total	5 483	22.49	4 102	9 973	45.04	4 516
Audits and energy performance certificate (A+EPC)	158	0.28		208	0.51	
TOTAL		22.78			45.54	

## Tax relief 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 a scheme for incentivising energy-saving projects in the building sector via tax deductions. This is a voluntary scheme, whereby individuals or businesses may deduct respectively from their personal (IRPEF) or corporate (IRES) income tax a percentage of the expenditure incurred for certain types of energy upgrading works on existing buildings. The deduction is staggered over 10 years.

Tax relief for energy-saving projects is covered by the State annual and multi-annual budget. The scheme entered into force in 2007 (Law No 296/2006 – 2007 Budget Law) and has been amended and extended over time. The 2017 Budget Law (Law No 232 of 11 December 2016) extended the deadline for claiming tax deductions of up to 65% (from IRPEF and from IRES), for works aimed at improving the energy efficiency of buildings, to 31 December 2017. The draft 2018 Budget Law, which is currently under discussion, retains this environmental bonus for 2018, but with some modifications concerning, *inter alia*, the amounts that can be deducted (which could fall to 50% for some works).

In the years covered by this report (2015 and 2016), the deduction stood at 65%.

Deductions for works on the communal areas of condominiums and on all the property units in an individual condominium have been extended to 31 December 2021. These type of projects receive higher deductions when they achieve specific energy performance levels. Consequently, deductions of 70% or 75% can be granted, to be calculated by multiplying the total expenditure (which cannot exceed EUR 40 000) by the number of property units in the building.

Caps have been placed on these deductions according to the type of project. These caps are given in the following table:

### Maximum deductions granted

TYPE OF PROJECT	MAXIMUM DEDUCTION
Energy upgrading of existing buildings	EUR 100 000
Building envelope (e.g. walls, windows, including frames and shadings, on existing buildings)	EUR 60 000
Installation of solar panels	EUR 60 000
Replacement of winter heating systems	EUR 30 000
Purchase and installation of the solar shading systems listed in Annex M to Legislative Decree No 311/2006 (only for the years 2015, 2016 and 2017)	EUR 60 000
Purchase and installation of winter heating systems using biomass-fuelled boilers (only for the years 2015, 2016 and 2017)	EUR 30 000
Multimedia devices for controlling systems remotely (only for the years 2016 and 2017)	no maximum amount
Works on the communal areas of condominiums for which deductions of 70% or 75% may be granted	EUR 40 000, multiplied by the number of property units in the building

The tax deduction can be granted to all resident and non-resident taxpayers, including businesses, holding the property concerned under any title. In particular, the tax deduction is granted to:

- natural persons, including those who conduct crafts and professional services;
- taxpayers having income from business activities (natural persons, partnerships, limited liability companies);
- groups of professionals;
- public and private entities not pursuing business activities.

In 2016, reductions were also made available to social housing associations, however designated, for work conducted on the buildings they owned that had been earmarked for social housing. From 2017 to 2021, these associations may only receive the largest reductions of 70% and 75%.

## Main results

The following table summarises the investments – divided by technology/project – made in total between 2014 and 2015 and in 2016, which benefited from the energy-saving tax relief.

### Investments (EUR m) by technology, for 2016 and for 2014-2015 combined

Technology/project	2016 (EUR m)	2014-2015 (EUR m)
Horizontal or inclined walls	651.2	1 734
Vertical walls	301.1	1 074
Doors and windows	1 447.9	4 357
Thermal solar	56.4	223
Solar shading systems	148.4	249
Condensing boilers	543.3	1 412
Biomass-fired boilers	16.1	39
Geothermal systems	4.1	11
Heat pumps	110.3	297
Building automation	3.5	9
Heat-pump water heaters for producing sanitary hot water	20.7	59
<b>TOTAL</b>	<b>3 302.9</b>	<b>9 463</b>

Source: ENEA 2017 ANNUAL REPORT - Tax deductions of 65%

## Tax relief for building renovations

Projects carried out to achieve energy savings, especially relating to the installation of energy generating systems using renewable sources, may also benefit from tax relief for building renovation work. One example of an eligible project is the fitting of a photovoltaic installation for generating electricity (Resolution No 22/E of the Revenue Office of 2 April 2013).

The relief consists of an IRPEF deduction of 50% of the costs incurred, up to a maximum total amount of EUR 96 000 for each property unit.

Tax relief for building renovations is covered by the State annual and multi-annual budget. The scheme entered into force in 1986 (Article 16-bis of President Decree No 917/86) and has been amended and extended over time. Recently, the 2017 Budget Law (Law No 232 of 11 December 2016) extended the deadline for receiving the maximum IRPEF deduction (50%) to 31 December 2017, with the maximum amount of expenses possible to claim back standing at EUR 96 000 for each property unit. The draft 2018 Budget Law, which is currently under discussion, will extend the 50% deduction into 2018.

The 2017 Budget Law also extended the 50% reduction to cost of purchasing furniture and large domestic electrical appliances of minimum class A+ (A for ovens), as part of the purchase of property units to be renovated. In addition, the 2017 Budget Law extended the deductions applicable to the costs arising from carrying out earthquake-proofing work to 31 December 2021, and introduced new and more specific rules for gaining access to those deductions, by differentiating them according to the results obtained by conducting the work, and to the type of building and its location.

In the years covered by this report (2015 and 2016), the deduction stood at 50%.

All taxpayers paying personal income tax (IRPEF), whether or not residing in Italy, may receive deductions from renovation costs. The relief is available not only to owners of buildings but also to holders of real/personal rights of enjoyment of properties in which such renovation work takes place, who incur the associated costs:

- owners or beneficial owners;
- holders of a real right of enjoyment (usufruct, use, residence or leasehold) who are tenants;
- partners in divided or undivided cooperatives;
- individual entrepreneurs, for property not classed as capital goods or assets;
- the entities listed in Article 5 of the Consolidated Text on Income Tax, which generate income in associated form (simple partnerships, business partnerships, general partnerships and entities equivalent thereto, family-owned companies), under the same conditions as those in place for individual entrepreneurs.

## ELECTRICITY SECTOR

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

During the 2015-2016 period, the following incentive schemes for new installations generating electricity from renewable sources were in place in Italy:

- **the Ministerial Decree of 6 July 2012**, in support of installations using renewable sources other than photovoltaic, which, from January 2013, replaced Green Certificates and All-Inclusive Tariffs.
- **the Ministerial Decree of 23 June 2016**, which updated the schemes already introduced by the Ministerial Decree of 6 July 2012 for providing incentives for electricity generated by installations using renewable sources other than photovoltaic. That Decree included thermal solar installations among the installations eligible for those schemes, annulling the Ministerial Decree of 11 April 2008.

Support to electricity generation from renewable sources is also provided by the following simplified energy take-off 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 the sake of completeness, mention may be made, in addition to the incentive schemes cited above, of the schemes which had previously been launched and which, despite no longer being accessible in the period under examination, have continued to support a significant number of installations still in operation.

Among those earlier schemes, the first to be introduced in Italy, back in 1992, was **CIP 6/92**, a form of administrative payment for energy generated from renewable sources and other similar sources through a feed-in tariff, the value of which is updated over time. It is a type of 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.

**Green Certificates**, up until 2015, were securities which were issued proportionate to the energy generated by installations using renewable sources and by some CHP plants, and which were traded at market prices between their holders and producers and importers of electricity generated from traditional sources (which were obliged to inject into the national electricity grid each year a set quota of electricity generated from renewable sources; this quota was abolished in 2016), or else withdrawn by GSE at regulated prices.

As of 2016, any installations still entitled to a period of Green Certificates receive, for the remaining period of entitlement, an incentive on the supported net production, which supplements revenue made from energy pricing.

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

As regards the photovoltaic sector, since 2013 it has no longer been possible (save for exceptional circumstances) to access the **Energy Account** tariffs, since the budget that had been made available (EUR 6.7 billion/year) has been completely exhausted. Any operations that took place in 2015 and 2016 were instead mainly supported through Net Metering and/or tax deductions (the latter only being available to small installations fitted on buildings).

The **Ministerial Decree of 6 July 2012** introduced a new scheme for providing incentives for electricity generated by installations using renewable sources other than photovoltaic and commissioned from

1 January 2013, this scheme replacing the Green Certificates and All-Inclusive Tariffs. 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 benchmark tariff and the hourly zonal price of the energy. 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 schemes already introduced by the Ministerial Decree of 6 July 2012 for providing incentives for electricity generated by installations using renewable sources other than photovoltaic, also including thermal solar installations (annulling the Ministerial Decree of 11 April 2008, which provided the previous incentive scheme for thermal solar installations). 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 those supplying more than 500 kW receive an incentive equal to the difference between a benchmark tariff and the hourly zonal price of the energy. 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 chart summarises the time sequence of the various schemes that have been launched in Italy for incentivising electricity generation from renewable sources. The periods shown in the chart represent the time windows for accessing the schemes and not the duration of the incentives themselves. In any case, this is an approximate rendition which, for instance, does not include transitional periods or the actual commencement of the incentives to installations which applied for inclusion in a given scheme close to its end date.

#### Incentive systems in force between 1992 and 2016



## Incentive schemes for electricity generated from renewable sources

Incentive scheme	Access period <sup>(1)</sup>	Incentive duration <sup>(1)</sup>	Sources/ technologies	Power output <sup>(2)</sup>	Incentive type <sup>(3)</sup>	Incentive value	Type of incentivised energy	Value of energy supplied <sup>(4)</sup>
<b>MD of 23 June 2016</b>	from 2016	15-30 years	Non-PV elec. RES and CSP	≤500 kW	FIT	Constant tariff	Supplied	Included in the tariff
				>500 kW	SFIP	Tariff obtained by difference with energy price	Supplied	Market
<b>MD of 6 July 2012</b>	2013-2016	15-30 years	Non-PV elec. RES	≤1 MW	FIT	Constant tariff	Supplied	Included in the tariff
				>1 MW	SFIP	Tariff obtained by difference with energy price	Supplied	Market
<b>5<sup>th</sup> Energy Account</b>	2012-2013	20 years	PV	≤1 MW	FIT + PT	Constant tariff	Generated	Included in the tariff
				>1 MW	SFIP + PT	Tariff obtained by difference with energy price	Generated	Market
<b>Thermal Solar Energy Account</b>	2008-2016	25 years	PV	Any	FIP	Constant tariff	Generated	Market or SPSAs or NM
<b>All-Inclusive Tariff</b>	2008-2012	15 years	CSP	≤1 MW <sup>(5)</sup>	FIT	Constant tariff	Supplied	Included in the tariff
<b>1<sup>st</sup>-4<sup>th</sup> PV Energy Account</b>	2006-2012	20 years	Non-PV elec. RES	Any	FIP <sup>(6)</sup>	Constant tariff	Generated	Market or SPSAs or NM
<b>Green Certificates / Feed-in tariff under GCs</b>	2002-2012	8-15 years	Elec. RES <sup>(7)</sup>	Any	Green Certificates / SFIP	GC market or GC withdrawal at energy price indicative value / tariff obtained by difference with energy price	Generated	Market or SPSAs or NM
<b>CIP 6/92</b>	1992-2001	8-15 years	Elec. RES and similar	Any	FIT	Tariff partly index-linked with fuel prices	Supplied	Included in the tariff

### Notes to the table

- (1) indicative period of admissibility to the scheme and incentive duration, save for any specific or interim provisions
- (2) not lower than 1 kW
- (3) FIT: Feed-In Tariff (all-inclusive tariff for energy supplied to the grid)  
FIP: Feed-In Premium (constant premium tariff supplementing the market value of the energy)  
SFIP: Sliding Feed-In Premium (premium tariff calculated as the difference with respect to the market price of the 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 of installation and its power output
- (5) 200 kW for wind turbines
- (6) the 4<sup>th</sup> Energy Account provided a FIT + PT for installations that were commissioned from 2013
- (7) includes specific CHP plants connected to district heating networks

## Ministerial Decree of 23 June 2016

The Ministerial Decree of 23 June 2016 updated the schemes already introduced by the Ministerial Decree of 6 July 2012 for providing incentives for electricity generated by installations using renewable sources other than photovoltaic. That Decree included thermal solar installations among the installations eligible for those schemes, annulling the Ministerial Decree of 11 April 2008. The incentives under the Decree apply to installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded, and commissioned from 1 January 2013. Access to the incentives laid down in the Ministerial Decree of 23 June 2016 is alternative to the Net Metering and Simplified Purchase and Sale Arrangements systems.

### Types of incentives

The incentives are granted for the net amount of generated electricity that is fed into the grid, which is equal to whichever is the lower value out of the net amount generated (gross generation less the electricity taken up by auxiliary services and losses) and the electricity actually fed into the grid. Consequently, any self-consumed electricity cannot benefit from the incentives.

The Decree provides for two separate incentive schemes, based on the type of installation in question, its power output, and the renewable source it uses:

- 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 sum of any premium tariffs to which the installation may be entitled;
- B. An **Incentive** (I) for installations with a power output in excess of 500 kW, calculated as the difference between the base feed-in tariff – to which are added any premium tariffs – and the hourly zonal price of energy (in the market zone where the electricity generated by the installation is fed into the grid). The energy generated by the installations eligible for the incentive (I) remains available to the producer, which is required to price it independently.

The values of the base tariffs for the different classes of power output and power supply sources are, in general, less than or equal to those introduced in 2012. However, provision has been made for installations to have access to the tariffs and premiums set out under the Ministerial Decree of 6 July 2012 (albeit via the updated procedures), provided that they were commissioned within a year of the new Decree coming into force.

### 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 is established, net of any reductions or premiums, for the conventional 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**

Renewable source	Type	Power output	Useful life of the installations	Tariff
		kW	years	EUR/MWh
Wind	Onshore	1 < P ≤ 20	20	250
		20 < P ≤ 60	20	190
		60 < P ≤ 200	20	160
		200 < P ≤ 1 000	20	140
		1 000 < P ≤ 5 000	20	130
	P > 5 000	20	110	
	Offshore	1 < P ≤ 5 000	-	-
P > 5 000		25	165	
Hydropower	Run-of-the-river hydroelectric	1 < P ≤ 250	20	210
		250 < P ≤ 500	20	195
		500 < P ≤ 1 000	20	150
		1 000 < P ≤ 5 000	25	125
	Conventional (dams) or pumped-storage hydroelectric	P > 5 000	30	90
		1 < P ≤ 5 000	25	101
Ocean (including tide and wave)	P > 5 000	30	90	
	1 < P ≤ 5 000	15	300	
Geothermal	1 < P ≤ 1 000	-	-	
	1 000 < P ≤ 5 000	20	134	
	P > 5 000	25	98	
Landfill gas	1 < P ≤ 1 000	20	84	
	1 000 < P ≤ 5 000	20	99	
	P > 5 000	-	-	
Sewage treatment plant gas	1 < P ≤ 1 000	20	111	
	1 000 < P ≤ 5 000	20	88	
	P > 5 000	-	-	
Biogas	a) products of biological origin listed in Table 1-B	1 < P ≤ 300	20	170
		300 < P ≤ 600	20	140
		600 < P ≤ 1 000	20	120
		1 000 < P ≤ 5 000	20	97
		P > 5 000	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 ≤ 1 000	20	160
		1 000 < P ≤ 5 000	20	112
		P > 5 000	-	-
Biomass	a) products of biological origin listed in Table 1-B	1 < P ≤ 300	20	210
		300 < P ≤ 1 000	20	150
		1 000 < P ≤ 5 000	20	115
		P > 5 000	-	-
	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 ≤ 1 000	20	185
		1 000 < P ≤ 5 000	20	140
		P > 5 000	-	-
	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 ≤ 5 000	-	-
		P > 5 000	20	119
Sustainable bioliquids	1 < P ≤ 5 000	20	60	
	P > 5 000	-	-	
Thermal solar	1 < P ≤ 250	25	324	
	250 < P ≤ 5 000	25	296	
	P > 5 000	25	291	

## Ways of accessing the incentives

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

- **direct access**, in the case of ‘low-threshold’ installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded (the latter category of work leading to an increased capacity);
- entry in **registers**, so as to enable applicants to fall within the annual quotas of supported capacity assigned to different sources, in the case of ‘medium-threshold’ installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded (the latter category of work leading to an increased capacity);
- incentives awarded following participation in **descending-price auctions**, so as to enable applicants to fall within the annual quotas of supported capacity assigned to different sources, in the case of installations that are newly built, entirely rebuilt, reactivated, renovated or upgraded (the latter category of work leading to an increased capacity);
- entry in **registers**, so as to enable applicants to fall within the annual quotas of supported capacity assigned to different sources, in the case of **renovations** of installations having a capacity greater than the threshold permitted for direct access.

The Ministerial Decree of 23 June 2016 most notably made it possible for hydroelectric plants to benefit from direct access only if they met specific environmental requirements, and introduced, for all sources, a single capacity threshold value of 5 MW, beyond which incentives may only be accessed following participation in auction proceedings (the previous Ministerial Decree of 6 July 2012 had set out different threshold values: 20 MW for geothermal electric plants, 10 MW for hydroelectric plants, and 5 MW for other type of installations using renewable sources).

The new Decree provided for a single session for assigning the entire capacity of the various quotas of the registers, registers for renovations and auction proceedings. The three bands were published on 20 August 2016, and the timeframes for submitting applications opened on 30 August 2016, with the deadlines set at 28 October 2016 for registers and 27 November 2016 for auction proceedings.

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, were granted beneficiary status in the register and auction lists that were published respectively on 25 November 2016 and on 22 December 2016. The details of the applications and a summary of the results are given in the following tables.

### Ministerial Decree of 23 June 2016 - Applications for Entry in Auction Proceedings

TYPE OF INSTALLATION	QUOTA	APPLICATIONS SUBMITTED			APPLICATIONS GRANTED BENEFICIARY STATUS		
	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 electric	20.0	1	19.8	99.00%	1	19.8	99.00%
Thermal solar	100.0	1	41.0	41.00%	0	0.0	0.00%
<b>TOTAL</b>	<b>1 000.0</b>	<b>100</b>	<b>2 083.1</b>		<b>41</b>	<b>869.8</b>	

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

TYPE OF INSTALLATION	QUOTA	APPLICATIONS SUBMITTED			APPLICATIONS GRANTED BENEFICIARY STATUS		
	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%
Hydroelectric	79.0	565	248.6	314.91%	125	79.0	100.00%
Geothermal electric	30.0	10	49.3	164.33%	7	30.0	100.00%
Biomass and Biogas in accordance with 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%
Thermal solar	20.0	14	33.2	161.04%	8	20.0	100.00%
<b>TOTAL</b>	<b>281.4</b>	<b>1 078</b>	<b>631.0</b>		<b>382</b>	<b>275.4</b>	

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

TYPE OF INSTALLATION	QUOTA	APPLICATIONS SUBMITTED			APPLICATIONS GRANTED BENEFICIARY STATUS		
	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%
Hydroelectric	30.0	77	160.5	534.93%	19	30.0	100.00%
Geothermal electric	20.0	1	16.0	80.00%	1	16.0	80.00%
<b>TOTAL</b>	<b>90.0</b>	<b>83</b>	<b>185.6</b>		<b>25</b>	<b>55.1</b>	

**Results of the incentive scheme**

The results of the incentive scheme provided by the Ministerial Decree of 23 June 2016 are summarised below, correct as at 31 December 2016, six months after the Decree came into force.

For each type of installation, the available capacity corresponds to the capacity indicated in the Decree for the respective quotas; for the registers alone, the capacity indicated in the Decree has been decreased by a proportion equal to the capacity of the direct-access installations that were commissioned on the date of publication of the band.

The granted capacity corresponds to the capacity of the installations granted beneficiary status in the register and auction lists. As at 31 December 2016, none of those installations had subsequently been excluded following a surrender or cancellation/rejection. The capacity eligible for the incentive scheme as at 31 December 2016 is therefore the same as the granted capacity.

The table also gives a breakdown of the capacity share of the eligible installations, commissioned as at 31 December 2016, for which applications for accessing the incentives were submitted.

With respect to direct access, the table indicates the capacity of the installations commissioned as at 31 December 2016 and the capacity excluded, as at the same date, following an inquiry conducted by GSE.

In all, 467 installations were in operation as at 31 December 2016, giving a total capacity of 57.2 MW. The majority of these installations were wind turbines (348), followed by run-of-the-river hydroelectric plants (67). Wind turbines also came top in terms of installed capacity (21.7 MW), ahead of run-of-the-river hydroelectric plants (17.6 MW).

As well as the installations in operation, there was a significant number of installations (397, giving a capacity of 1 167 MW) that had been awarded incentives following auction proceedings, or had been granted beneficiary

status in registers, which had not been commissioned by 31 December 2016 but which were still eligible for the incentive scheme.

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

ACCESS PROCEDURE AND TYPE OF INSTALLATION	AVAILABLE CAPACITY	GRANTED CAPACITY	ELIGIBLE CAPACITY AS AT 31/12/2016	BREAKDOWN OF ELIGIBLE CAPACITY AS AT 31/12/2016		EXCLUDED CAPACITY AS AT 31/12/2016
				In operation	Not in operation	
<b>Auctions</b>	<b>1 000.0</b>	<b>869.8</b>	<b>869.8</b>	<b>0.0</b>	<b>869.8</b>	-
Onshore wind	800.0	800.0	800.0	-	800.0	-
Offshore wind	30.0	30.0	30.0	-	30.0	-
Geothermal electric	20.0	19.8	19.8	-	19.8	-
Waste (Biomass C and D)	50.0	20.0	20.0	-	20.0	-
Thermal solar	100.0	-	-	-	-	-
<b>Registers</b>	<b>281.4</b>	<b>275.4</b>	<b>275.4</b>	<b>33.1</b>	<b>242.2</b>	-
Hydroelectric	79.0	79.0	79.0	14.6	64.3	-
Onshore wind	56.9	56.9	56.9	3.9	53.0	-
Geothermal electric	30.0	30.0	30.0	-	30.0	-
Ocean	6.0	-	-	-	-	-
Bioenergy (excluding Biomass C waste)	89.5	89.5	89.5	14.6	74.9	-
Thermal solar	20.0	20.0	20.0	-	20.0	-
<b>Registers for renovations</b>	<b>90.0</b>	<b>55.1</b>	<b>55.1</b>	<b>0.0</b>	<b>55.1</b>	-
Hydroelectric	30.0	30.0	30.0	-	30.0	-
Onshore wind	40.0	9.1	9.1	-	9.1	-
Geothermal electric	20.0	16.0	16.0	-	16.0	-
<b>Auctions/Registers/ Registers for renovations total</b>	<b>1 371.4</b>	<b>1 200.3</b>	<b>1 200.3</b>	<b>33.1</b>	<b>1 167.1</b>	-
<b>Direct access</b>				<b>24.0</b>		<b>0.1</b>
Hydroelectric				3.0		-
Wind				17.8		0.1
Geothermal electric				-		-
Ocean				0.1		-
Bioenergy (excluding waste)				3.2		-
<b>Sum total</b>	<b>1 371.4</b>	<b>1 200.3</b>	<b>1 200.3</b>	<b>57.2</b>	<b>1 167.1</b>	<b>0.1</b>

## Indicative annual cost of incentives for electricity generation from renewable sources

### Non-photovoltaic sources

The 'renewable sources cost counter' is the operative instrument that is used to display, on GSE's website, the 'indicative annual cost of incentives' granted to installations using renewable sources other than photovoltaic.

The counter was introduced by the Ministerial Decree of 6 July 2012, and was updated in 2016 in accordance with the Ministerial Decree of 23 June 2016, which, under Article 27, amended the scope of the installations to be taken into account and the calculation methods.

The indicative annual cost of incentives constitutes an indicative estimate of the potential annual cost of incentives granted to installations using non-photovoltaic renewable sources, pursuant to the various incentivisation measures that have been rolled out.

Besides calculating the figure for the relevant month of publication, as provided for by Article 27 of the Ministerial Decree of 23 June 2016, the indicative annual cost is calculated for all future months for which the commissioning of installations having access to tariff-related incentive schemes is scheduled to take place, with any expected changes in the market price of electricity also being taken into consideration.

Based on the changes to the indicative cost thus projected, GSE takes the monthly values forecast for the next three years and calculates the average thereof. This average is identified as the ‘average indicative annual cost of incentives’, and is published by GSE on its website, with updates being made each month.

Article 3 of the Ministerial Decree of 23 June 2016 provides for this average indicative annual cost of incentives to be compared with the limit of **EUR 5.8 billion**, as previously set by the Ministerial Decree of 6 July 2012: once this limit has been reached, more applications for direct access to incentives may be granted.

As at 31 December 2016, the RES-Electricity counter stood at **EUR 5 579 million**, shared amongst the various incentive schemes as follows: EUR 3 167 million for the former Green Certificates incentive; EUR 1 856 million for the All-Inclusive Tariff; EUR 162 million for CIP 6/92; EUR 367 million for installations commissioned in accordance with the Ministerial Decree of 6 July 2012; EUR 26 million for installations commissioned in accordance with the Ministerial Decree of 23 June 2012; EUR 1 million for installations benefiting from the thermal solar energy account.

The indicative average cost, calculated as the average of the monthly values for the upcoming three years, stands at EUR 5 437 million, and in the average period exhibits a profoundly downward trend, owing primarily to the impacts of departures from the scope of incentivisation scope.

**Indicative annual cost for renewable energy sources other than photovoltaic for generating electricity, as at 31 December 2016 [EUR m]**

	Former GC incentive	AIT	CIP 6/92	MD of 6 July 2012	MD of 23 June 2016	Thermal solar	Total
Wave	0	0		0	0	0	0
CSP	0		0	0	0	1	1
Geothermal	123	0		10	0	0	134
Bioliquids	395	131		0	0	0	526
Biomass	495	80	159	44	6	0	783
Hydropower	733	276		119	11	0	1 138
Wind	1 341	5	1	128	4	0	1 480
Biogas	80	1 365	1	66	5	0	1 518
<b>TOTAL</b>	<b>3 167</b>	<b>1 856</b>	<b>162</b>	<b>367</b>	<b>26</b>	<b>1</b>	<b>5 579</b>

**Photovoltaic**

Photovoltaic solar installations have benefited from five incentive schemes known collectively as the ‘Energy Account’, which were rolled out between 2006 and 2012. The most recent version, the fifth Energy Account, was introduced by the Ministerial Decree of 5 July 2012, and ceased to apply (in the sense that no operators, other than those which had previously been made eligible for incentives, could access the scheme) on 6 July 2013, thirty days after the indicative total annual cost of **EUR 6.7 billion** had been reached.

As at 31 December 2016, 550 587 installations had been commissioned under the Energy Account, for a total capacity of 17 734 MW, of which:

- 5 723 under the first Energy Account, for a capacity of 163 MW;
- 203 726 under the second Energy Account, for a capacity of 6 840 MW;
- 38 660 under the third Energy Account, for a capacity of 1 555 MW;
- 204 562 under the fourth Energy Account, for a capacity of 7 772 MW;
- 97 916 under the fifth Energy Account, for a capacity of 1 404 MW.

Over time, several events have taken place that have resulted in changes in the total budget for providing incentives to installations under the Energy Account.

Among them was the entry into force of Decree Law No 91 of 24 June 2014, which restructured the incentives due to photovoltaic installations having a supported capacity of greater than 200 kW (the so-called ‘incentive-spreading’ regulation). Overall, it can be estimated that all of restructuring options signed up to resulted in the indicative annual cost for 2016 dropping by around EUR 400 million, compared to what could have happened had the aforementioned Decree Law not come into force.

The annual variability of solar radiation constitutes a significant factor that determines the magnitude of the costs for providing incentives to photovoltaic installations; in 2016, average radiation was around 4% lower than the previous year, which led to a reduction in photovoltaic power generation and the incentivisation costs relating thereto. In 2016, the incentivisation costs concerning all of the photovoltaic installations under the 'Energy Account' amounted to just over **EUR 6 billion**.

## TRANSPORT SECTOR

### Biofuels

#### The release-for-consumption obligation

In Italy, those parties that release for consumption petrol and diesel from fossil sources for use in transport must release for consumption in the national territory a minimum quota 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, one 'Release-for-Consumption Certificate' is issued per 10 Gcal of biofuel released). This system (biofuel blending obligation), introduced by Law No 81 of 11 March 2006, provides an incentive for the use of biofuels in transport.

During the period from 2012 to 2014, the minimum quota 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, amounted to 4.5%. The Ministerial Decree of 10 October 2014 updated the criteria, conditions and procedures for complying with this obligation. Specifically, the Decree established for the years after 2015 the minimum quantity of biofuels which must be released for consumption in a given year, and divided that quantity into different shares among the different types of biofuels. The same 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.

The Decree defines the minimum amount of biofuels to be released for consumption in a given year 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.

More recently, the Ministerial Decree of 13 December 2017 updated the minimum percentages of biofuels and advanced biofuels that had to be released for consumption for the years 2018, 2019 and 2020. The following table shows the minimum quantities of biofuels to be released for consumption from 2015 onwards.

#### Minimum quota of biofuels that must be released for consumption in a given year

Year	Biofuels quota	Advanced biofuels quota
2015	5.0%	
2016	5.5%	
2017	6.5%	
2018	7.0%	0.1%
2019	8.0%	0.2%
2020	9.0%	1.0%
2021	10.0%	1.6%
2022 onwards	10.0%	2.0%

As shown by the table, from 2018 onwards a growing share of the release-for-consumption obligation must be fulfilled through the so-called 'advanced biofuels', which are 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:

- algae if cultivated on land in ponds or photobioreactors;
- biomass fraction of mixed municipal waste, but not non-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 agro-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, including 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 vegetal oils, sugars, starches and protein have been extracted), and material from bio-waste;
- 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.

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

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

### **Release-for-Consumption Certificates**

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

An essential requirement for RCCs to be issued is that the biofuels meet the EU sustainability criteria. To ensure compliance with these criteria, all the entities involved in the biofuel production chain must join the National Certification System (established and governed by the Decree of the Minister for the Environment and Protection of Land and Sea of 23 January 2012) or a voluntary system approved by the European Commission, or must conform 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 for consumption in order to obtain a certificate is lower. Specifically, for biofuels produced 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), a certificate is granted for every 5 Gcal released (double counting).

The by-products eligible for double counting are those listed in the abovementioned Annex I (Part 2-bis, Sections A and B) to Legislative Decree No 28/2011, as amended by Legislative Decree No 51/2017. In order to allow operators to adapt to the new incentive scheme, the double counting premium shall be applicable, up to 30 June 2018, also to biofuels produced 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.

Moreover, from 2013 to 31 March 2014, the obligated parties which released particular types of biofuels, known as 'premium', for consumption received one RCC for every 8 Gcal. The production plants of these biofuels had to be accredited for that purpose and comply with sustainability criteria established at EU level. The premium was abolished by Law No 9 of 21 February 2014.

Failure to comply with the release-for-consumption obligation carries a fine ranging from EUR 600 to EUR 900 for every missing RCC. The amount of the fine rises in parallel with the seriousness of the infringement. New rules were put in place as of 2016, imposing a universal fine of EUR 750 for each missing RCC (Decree of the Minister for Economic Development of 20 January 2015). Payment of that fine does not absolve the party concerned of its obligations; following the introduction of the new Decree, in fact, any party not fulfilling its obligations shall not only have to pay the fine imposed on it, but also have in its possession, in the following year, a sufficient number of RCCs to also offset the deficiencies for which it had been fined.

The Ministry of Economic Development is responsible for operating and managing all biofuel-related schemes, and implements them 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. The latter in particular, in addition to being a member of the Committee and acting as Technical Secretariat for it, works on behalf of the Ministry of Economic Development in overseeing the various phases of the release-for-consumption mechanism, which include: receiving annual self-declarations on the release of fuels and biofuels, accrediting premium biofuel producers, issuing RCCs and trading them on the dedicated web platform developed to validate bilateral agreements, ensuring that the obligation is being fulfilled (including by conducting on-the-spot checks at operators' premises), and gathering data on CO<sub>2</sub> emissions also from LPG and methane suppliers.

The costs and charges of the release-for-consumption mechanism are borne by the obligated parties and are calculated and paid to GSE. For the year 2014, the applicable procedures were those established by the Decree of 11 December 2013, issued by the Minister for Economic Development together with the Minister for the Economy and Finance; from 2015, the applicable procedures are those set out in the Decree of the Minister for Economic Development of 24 December 2014.

### **Release-for-Consumption Certificates issued between 2013 and 2016**

With respect to the quantity of sustainable biofuels released for consumption in 2015, GSE issued to the obligated parties 1 637 million Release-for-Consumption Certificates in 2016, up from the previous year (when 1 315 million such certificates were issued); this upward trend is linked with changes in the amounts of petrol and diesel that were released for consumption in 2014, even surpassing the number of RCCs issued in 2014 (1 529 million), but not reaching the number of RCCs issued in 2013 (1 806 million).

### **Biomethane**

Article 21 of Legislative Decree No 28/2011 of 3 March 2011, transposing Directive 2009/28/EC, stipulated that biomethane injected into the natural gas grid may, on the producer's request, receive incentives in one of the following ways:

- a. through the issuing of incentives for generating electricity from renewable sources, when the biomethane is used in high-efficiency CHP plants;
- b. through the issuing of Release-for-Consumption Certificates, when the biomethane is used in transport;
- c. through the awarding of a specific incentive having a set duration and value, when the biomethane is injected into the natural gas grid irrespective of its use.

The Decree of the Italian Ministry of Economic Development of 5 December 2013 implemented the provisions of Legislative Decree No 28/2011, thus completing the legislative and regulatory framework concerning the promotion of energy from renewable sources deriving from the transposition of Directive 2009/28/EC.

The Ministerial Decree of 5 December 2013 applies to:

- new installations constructed in the national territory and commissioned after 18 December 2013 (the date on which the Decree came into force) and no later than five years after that date;
- existing installations located in the national territory for the production and use of biogas, which, after 18 December 2013 and no later than five years thereafter, were partially or entirely converted to biomethane production.

Biomethane produced by biogas installations already in operation as at 18 December 2013 and which after that date were entirely converted to biomethane production or used part of the gas or biogas produced in order to obtain biomethane, is eligible for:

- 70% of the incentive granted to an equivalent new installation if used in transport, after injection into the natural gas network;
- 40% of the incentives granted to an equivalent new installation if injected into the natural gas transportation and distribution grid or used in high-efficiency CHP plants.

In the case of converted installations, the period of eligibility for the incentives is the same as:

- the period of eligibility granted to new installations, if the installation to be converted is not receiving incentives for generating electricity from renewable sources;
- the remaining period of eligibility for the incentives to generate electricity, plus five years if the installation to be converted is receiving incentives for generating electricity.

### **Biomethane used in transport**

Biomethane injected into the natural gas network and used in transport receives incentives through the issuing of Release-for-Consumption Certificates (RCCs) for 20 years from the start of operation of the installation.

Like other biofuels, the issuing of RCCs is subject to the biomethane released for consumption in transport meeting sustainability requirements.

Premiums are granted according to the organic matrix delivered to the biomethane production plant. Specifically, if the construction and operation permit of the biomethane production plant specifies the sole use of one or more specific raw materials, the biomethane produced may be granted double the normal number of RCCs (1 RCC for every 5 Gcal – double counting). Such materials include:

- the biodegradable fraction of sorted municipal waste;
- the by-products intended for fuel production or for energy generation (Article 33(5-ter) of Legislative Decree No 28/11);
- algae and non-food materials listed in Table 1.B of the Ministerial Decree of 6 July 2012;
- the by-products referred to in Table 1.A of the Ministerial Decree of 6 July 2012.

This premium is only granted to 70% of biomethane production if these matrices are co-digested with other products of biological origin making up no more than 30% of the total by weight.

In addition, if the biomethane is released for consumption in transport, not via the natural gas transportation and distribution grid, but instead via a new transport biomethane distribution facility built by the producer at its own expense and having had its first acceptance testing after 18 December 2013, then 50% more RCCs are issued for 10 years.

### **Biomethane injected into the natural gas grid without a specific intended use**

The incentive for biomethane injected into the natural gas transportation and distribution grid without a specific intended use is calculated on the basis of the quantity of biomethane injected into the grid, net of the energy consumption arising from the processes for producing the biomethane and from compressing it for injection into the grid.

If the producer sells the gas directly on the market, the benefit is granted for 20 years from the date on which the installation entered into operation, and is equal (expressed in EUR/MWh) to double the annual average price of natural gas, as surveyed in 2012 on the natural gas balancing market managed by GME, less the average monthly price of natural gas on the same market, recorded for every month that the biomethane is injected into the grid. These values, expressed in EUR/MWh, are published by GME on its website.

The value of the incentive thus determined is then adjusted according to the installation's production capacity; specifically:

- it is increased by 10% for installations having a production capacity of up to 500 standard m<sup>3</sup>/hour;
- it remains unchanged for installations having a production capacity of between 501 and 1 000 standard m<sup>3</sup>/hour;

- it is reduced by 10% for installations having a production capacity of greater than 1 000 standard m<sup>3</sup>/hour.

The Decree also grants a 50% increase to the resulting amount (incentive + adjustment) if the biomethane is produced solely from by-products, as defined in Table 1.A of the Decree of 6 July 2012, and/or from waste.

### **Biomethane used in high-efficiency CHP plants**

Biomethane used in high-efficiency CHP plants is incentivised by applying the tariffs for electricity generation set out in the Ministerial Decree of 6 July 2012, for biogas.

The incentivised electricity is the net cogenerated electricity fed into the grid.

If biomethane is transported to the site of use via the natural gas grid, the biomethane producer must conclude a contract, a copy of which must be sent to GSE, with the party that will use it to generate electricity (in a recognised high-efficiency CHP plant), stating expressly the duration of the supply.

### **Early results**

GSE qualifies biomethane production plants and, where appropriate, certifies eligibility for the incentive established according to the final use of the biomethane produced. The qualification application must be sent to GSE in accordance with the application procedures prepared and published by GSE in 2015 following completion of the regulatory framework (which includes the rules issued by AEEGSI concerning connection of biomethane installations to the natural gas grids, the set amounts of biomethane eligible for the incentives, and the market processes for injecting biomethane into the natural gas transportation and distribution grids).

Up to 2016, only two draft qualification applications had been received for biomethane production plants (both newly constructed), respectively providing for the injection of biomethane into the natural gas transportation and distribution grids, and the release of biomethane for consumption in transport.

In 2017, GSE received a draft qualification application for a biomethane production plant for injecting biomethane into the natural gas transportation and distribution grids, and an operational qualification application for a biomethane production plant for releasing biomethane for consumption in transport.

### **New Decree**

In order to further facilitate access to the incentives, the Ministry of Economic Development, in partnership with the Ministry of the Environment and Protection of Land and Sea and with the Ministry of Agricultural, Food and Forestry Policies, placed for public consultation, from 13 December 2016 to 13 January 2017, a draft for a new Interministerial Decree on the use of biomethane and biofuels, including advanced biofuels.

The draft Decree aims, in particular, to provide incentives for producing biomethane to be used in the transport sector, in order to help reach the 2020 target of 10% use of renewable sources in that sector, and also allows installations that have already been qualified or are in the process of being qualified, in accordance with the Ministerial Decree of the Ministry of Economic Development of 5 December 2013, to make the transition to the new rules. The draft Decree also makes it possible for those installations to withdraw, at a cost, the Release-for-Consumption Certificates obtained for advanced biomethane by GSE, at a fixed price set by that Decree, with the withdrawal costs being borne by the entities having to meet the release-for-consumption obligation with respect to biofuels (in accordance with the Ministerial Decree of the Ministry of Economic Development of 10 October 2014, as amended and supplemented). The simple collection of RCCs at a cost is also granted in respect of advanced biofuels other than biomethane. The new draft Decree also confirms the possibility of physically withdrawing biomethane, extending the application thereof to installations of any productive capacity, limited to advanced biomethane released for consumption in transport.

In addition to the premiums already in place for constructing new natural gas distribution facilities for transport being confirmed, new incentive schemes for constructing biomethane liquefaction plants are introduced, in order to promote the widespread use of biomethane also in liquid form.

Operations to partially or entirely convert existing biogas production plants, including by increasing their production capacity, are facilitated, with provision being made for a longer incentivisation period than that allowed by the regulations currently in force. Lastly, in order to prove the renewable origin of that fuel, Guarantees of Origin (GOs) are introduced for biomethane not benefiting from other types of incentives, the management of which requires GSE to set up a 'National Register of Guarantees of Origin for Biomethane'.

The aforementioned Decree for providing incentives for producing biomethane is scheduled to be published in 2018.

### 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 (the Fuel Mix Decree), electricity suppliers are required to inform final customers of the composition of the energy mix for the electricity fed into the grid and the environmental impact of its generation. This form of protection through the provision of information to final customers was introduced at EU level by Directive 2003/54/EC and subsequently 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.

#### Grid for showing the composition of the energy mix

Primary sources used	Composition of the energy mix used for generating the electricity sold by the supplier in the previous two years		Composition of the average national mix used for generating the electricity fed into the electricity grid in the previous two years	
	Year (n-1) [%]	Year (n-2) [%]	Year (n-1) [%]	Year (n-2) [%]
<b>Renewable sources</b>				
<b>Coal</b>				
<b>Natural gas</b>				
<b>Petroleum products</b>				
<b>Nuclear</b>				
<b>Other sources</b>				

The following table shows the percentages assigned to each energy source within the national energy mix in 2013, 2014 and 2015; suppliers' offers may deviate from these percentages.

#### Composition of the average national energy mix (2013, 2014 and 2015)

Primary sources used	2013	2014	2015
	[%]	[%]	[%]
<b>Renewable sources</b>	38.2%	42.5%	41.6%
<b>Coal</b>	18.9%	19.3%	19.6%
<b>Natural gas</b>	33.1%	28.9%	29.3%
<b>Petroleum products</b>	1.0%	1.0%	1.3%
<b>Nuclear</b>	4.2%	4.6%	5.2%
<b>Other sources</b>	4.6%	3.7%	3.1%

By Decision ARG/elt 104/11, AEEGSI established the requirements to be met by sales contracts for the supply of renewable energy in order to protect consumers and ensure that electricity generated from renewable sources 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 suppliers against the data on the electricity supplied by them as 'green supplies'. If the cross-checks show a mismatch, the supplier in question must pay GSE a consideration equal to the product between the number of GOs which it did not secure and the average selling price of GOs registered by GME. Any other non-compliances must be reported to AEEGSI, which will then take appropriate action.

As regards, conversely, the allocation of the costs arising from incentivising the generation of electricity from renewable sources through tariff schemes (feed-in premiums or feed-in tariffs), as detailed above in Section 3, these costs, expressed by tariff component A<sub>3</sub>, are included among the general costs of the electricity grid<sup>36</sup> and are paid by final customers. Component A<sub>3</sub> is paid into the is paid into the '*Account for new installations using renewable and equivalent sources*'<sup>37</sup>.

Under the Commercial Code of Practice, consolidated information concerning all the general charges of the electricity grid must be provided, under the heading of grid services. Final customers may, however, ask their supplier to provide them with a breakdown of the general charges and grid charges, and the supplier must publish, at least once a year, information on the average weight of grid charges on the final price, this information being prepared by AEEGSI and published on its website by 31 January of each year following the year in question.

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<sup>36</sup> Defined by the Decree of 26 January 2000 of the Minister for Industry, Trade and Crafts, in agreement with the Minister for the Treasury, Budget and Economic Planning.

<sup>37</sup> Referred to in Article 54(54.1)(b) of AEEGSI Decision No 348/07 (Consolidated Text on Transport).

#### 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 many legislative provisions for promoting the most environmentally friendly and efficient technologies.

### HEATING AND COOLING SECTOR

To be eligible for the **Thermal Account** incentives (Ministerial Decree of 28 December 2012), biomass-fired boilers must meet specific requirements in terms of efficiency, atmospheric emissions and fuel quality.

The latest version of the Thermal Account (Ministerial Decree of 16 February 2016), which has been in force since 31 May 2016, strengthens and simplifies the mechanism, lays down requirements to be met in terms of efficiency, atmospheric emissions and fuel quality, and also awards premiums (+20% or +50%) in the case of biomass-fired boilers with particularly low particulate emission levels.

### ELECTRICITY SECTOR

The **Ministerial Decree of 23 June 2016** defined and updated the incentive schemes for promoting the generation of electricity from renewable sources that had previously been introduced by the Ministerial Decree of 6 July 2012. In order to determine the All-Inclusive feed-in Tariff or the Incentive, various premiums can be added to the base feed-in tariffs (BTs) set out in Table 1 of Annex 1 to the Ministerial Decree of 23 June 2016.

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 provided 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 reinjection 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 carrying out connection works (Table 1.1 of Annex 1 to the Decree)

The **Ministerial Decree of 6 July 2012**, which had previously outlined new incentive schemes for promoting the generation of electricity from renewable sources, introduced a number of tariff premiums to encourage the most environmentally friendly and efficient renewable energy applications. As regards bioenergies, for example, greater incentives were provided for with respect to the use of by-products and waste, in order to promote the use of virgin biomass for generating thermal energy and for non-energy uses.

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

- premium for using supply-chain biomass (Article 8(6)(b) of the Decree)
- premium for reducing greenhouse gas emissions (Article 8(6)(a) of the Decree)
- premium for reducing pollutant emissions (Article 8(7) of the Decree)
- premium for high-efficiency cogeneration (Article 8(8) of the Decree)
- premium for biogas CHP plants recovering 60% of nitrogen (Article 26(2) of the Decree)
- premium for biogas CHP plants recovering 30% of nitrogen (Article 26(3)(a) of the Decree)
- premium for biogas CHP plants recovering 40% of nitrogen (Article 26(3)(b) of the Decree)

Premiums for geothermal electric plants:

- premium for total reinjection and zero emissions (Article 27(1)(a) of the Decree)

- premium for reducing non-condensable gases (Article 27(1)(c) of the Decree)
- alternative feed-in tariff for advanced geothermal electric technologies that are not yet fully commercial (Article 27(2) of the Decree)

## TRANSPORT SECTOR

In keeping with 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 (using one of the approved means for verification of compliance with sustainability criteria) that they were produced from waste, by-products and non-food materials, as explicitly 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, counts double compared to other biofuels. These materials are accordingly given one Release-for-Consumption Certificate for every 5 Gcal of biofuel (instead of for every 10 Gcal).

In addition, the Ministerial Decree of 10 October 2014 (see Section 3.C) 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. Biofuels are classed as ‘advanced’ if they are obtained 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. From 2018, specified quotas of advanced biofuels will help to cover the obligation to release biofuels for consumption.

The Ministerial Decree of 5 December 2013 (see Section 3.D) introduced premiums for biomethane according to the organic matrix delivered to the biomethane production plant. For example, as regards use in the transport sector, double counting applies in the event of use of the biodegradable share of sorted municipal waste and of several clearly identified by-products.

## RENEWABLE SOURCES IN BUILDINGS

Making the use of renewable sources in buildings more widespread is extremely important. In order to achieve that goal in a cost-effective manner, the ideal time for planning the integration of renewable energy technologies is during construction or renovation work.

Legislative Decree No 244/2016, which entered into force on 30 December 2016, extended the time limit whereby renewable sources could cover just 35% of the energy needs of newly constructed buildings or buildings having undergone major renovation work, in terms of heating, cooling and the production of sanitary hot water. The increase in this percentage from 35% to 50%, which had previously been scheduled for 31 December 2016 by Legislative Decree No 28/2011, would now take place on 31 December 2017. In light of those developments, the obligations and the effective dates updated on the basis of that Decree shall now be analysed.

In accordance with Article 11 of Legislative Decree No 28/2011 and Annex 3 thereto, the obligation to integrate renewable sources in new buildings or ‘buildings undergoing major renovation work’ (existing buildings either having a useful floor area of more than 1 000 m<sup>2</sup>, undergoing full refurbishment of the elements making up the building envelope, or having been demolished and rebuilt, also by way of extraordinary maintenance) came into effect on 31 May 2012.

Under Legislative Decree No 28/2011, installations producing thermal energy must be designed and constructed so as to ensure that the energy from renewable sources covers 50% of the total energy consumption for sanitary hot water and the following percentages of the aggregate energy consumption for sanitary hot water, heating and cooling:

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

These obligations cannot be met by means of renewable energy installations that only generate electricity, which in turn powers devices or systems for producing sanitary hot water, heating and cooling.

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

- 1 kW/80 m<sup>2</sup> for building permit applications submitted between 31 May 2012 and 31 December 2013;
- 1 kW/65 m<sup>2</sup> for building permit applications submitted between 1 January 2014 and 31 December 2016;
- 1 kW/50 m<sup>2</sup> for building permit applications submitted from 1 January 2017.

For public buildings, the obligations of incorporating renewables are 10% higher. Furthermore, building projects which exceed by at least 30% the mandatory minimum values for covering electricity, heating and cooling consumption may add an extra 5% to the permitted building volume.

The rules are national in scope, but Regions and Municipalities, when devising their air quality and environmental protection plans, are entitled to increase the incorporation values set out in the Decree.

Should it prove impossible to fit a renewable energy installation in or on a building, for example in buildings subject to heritage or landscape protection constraints, a technical expert will perform a check and certify that none of the technology solutions present on the eco-sustainability market are feasible, setting out the reasons for the non-compliance with the obligations in a technical report.

The obligation to fit a renewable energy installation does not apply to buildings served by a district heating network, which already covers the buildings' energy requirements as regards both space conditioning and the production of sanitary hot water.

Failure to comply with the obligations detailed above shall result in the building permit not being issued.

## 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 stipulated that the procedures for issuing, acknowledging and using Guarantees of Origin (GOs) for electricity generated from renewable sources, in accordance with Article 15 of Directive 2009/28/EC, would be updated by a subsequent Ministerial Decree.

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 renewable proportion declared in their own energy mixes.

GSE is responsible for carrying out certain tasks relating to the GO mechanism:

- issuing the so-called 'IGO' qualification 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), which include power off-take by GSE (the GOs for the energy generated by those excluded plants are issued and transferred at no charge to GSE to then be assigned through competition procedures);
- issuing GOs for electricity fed into the grid: GSE issues one GO certificate for every MWh of electricity that is fed into the grid, and these certificates are valid up until the end of the twelfth subsequent month from when the electricity is 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 member countries (as at 2016). As a member of the AIB, GSE is obliged to adhere to the collective rules governing the international trading of guarantees laid down by AIB itself, in accordance with Directive 2009/28/EC. In this respect, in January 2016, AIB conducted an audit on the process for managing Guarantees of Origin, in order to check that GSE was complying with the rules for participating on the international trade platform and with the applicable European regulations in force. The positive outcome of this audit confirmed GSE's membership in the association and, as a result, gave operators the opportunity to trade GOs with the countries currently connected to the hub. GOs are also traded nationally on the organised market (M-GO) or on the bilateral platform (BP-GO), which are 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 AEEGSI in Decision ARG/elt 104/11, to prove the renewable origin of the electricity sold to final customers under renewable energy sales contracts.

As at 31 December 2016, 1 016 plants had been granted IGO status, having a combined capacity of 25 GW. Following applications submitted by 667 plants, around 40 million certificates were issued over the course of the year: 18.5 million for electricity generated in 2015, and 21.6 million for electricity generated in 2016.

The table below shows how many GOs in total were issued, cancelled, imported, exported and transferred between 2013 and 2016.

### Changes in GOs (2013-2016)

Year	Issued	Cancelled	Imported	Exported	Transferred
2013	17 615 362	2 704 110	1 106 356	750 474	8 000
2014	10 975 585	922 500	3 495 313	982 093	5 400
2015	35 709 634	34 714 944	11 213 958	11 363 977	6 500
2016	40 206 573	38 796 750	11 602 934	25 525 831	0

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

The data in Table 4 consists of 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 material [1]		Primary energy from domestic raw material (ktoe)		Amount of raw material imported from the EU [1]		Primary energy from raw material imported from the EU (ktoe)		Amount of raw material imported from outside the EU [1]		Primary energy from raw material imported from outside the EU (ktoe)	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
<i>Biomass supply for heating and electricity:</i>												
Direct supply of wood biomass from forests and other wooded land for energy generation (fellings etc.)	17 285 564	16 889 387	5 743	5 612	836 648	779 565	278	259	427 143	417 287	142	139
Indirect supply of wood biomass (residues and by-products from the wood industry etc.) [2]	2 454 428	2 224 963	585	600	1 579 980	1 680 639	625	667	554 896	429 344	218	169
Energy crops (grasses etc.) and short rotation trees	5 437 882	5 397 006	1 338	1 339	76 694	106 263	68	94	812 880	700 630	718	619
Agricultural by-products/processed residues and fishery by-products	4 872 541	5 069 681	1 027	1 053								
Biomass from waste (municipal, industrial, etc.)	5 927 766	6 060 572	1 549	1 604		3 136		3	3 896		3	
Other												
<i>Biomass supply for transport:</i>												
Common arable crops for biofuels	532	999	0	1	26 108	20 850	23	18	357 843	131 577	570	116
Energy crops (grasses etc.) and short rotation trees for biofuels (please specify)												
Other (liquid waste and by-products etc.)	76 384	89 896	67	79	35 463	43 315	31	38	3 844	70 880	3	63

[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 these are not strictly speaking a raw material.

**Table 4.a: Current domestic agricultural land use for production of crops intended for energy production (ha)**

Land use	Total surface area (ha)					
	2011	2012	2013	2014	2015	2016
oat	126 254	120 012	104 862	103 525	108 956	105 118
sugar beet	45 545	53 514	40 712	51 986	38 124	32 297
rapeseed	18 759	10 301	18 550	16 444	12 101	13 542
sunflower	118 099	111 678	127 628	111 350	114 449	110 716
durum wheat	1 198 974	1 260 143	1 270 490	1 287 564	1 328 874	1 383 675
common wheat	533 606	593 494	631 667	586 615	553 642	528 743
corn	994 773	978 543	908 114	869 378	655 993	660 727
barley	270 386	246 127	237 268	232 713	242 895	244 232
rice	246 537	235 052	216 019	219 532	227 331	234 133
rye	4 850	4 988	4 825	3 869	4 113	4 172
soy	165 955	152 993	184 146	232 867	308 979	288 060
sorghum	42 335	38 637	51 066	51 914	45 413	43 840
other crops	21 621	21 389	35 558	37 307	24 206	28 725

Source: Agri Istat

**7. Please provide information on any changes in commodity prices and land use within your Member State in the preceding two 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 your country (Article 22(1)(h) of Directive 2009/28/EC).**

The possible competition between the various intended uses (food, feed, industrial and, in recent years, energy) of agricultural raw materials may, to a more or less significant extent, lead to fluctuations in sector prices and the prices of associated services, both at global level and at local level, and thus have impact on agricultural income and on the future investment choices made by those operating in the primary sector.

The following table shows, for the main crops and by-products that could potentially be used for producing energy (wood-to-energy/biogas/bioliquids) and animal feed, the price variations recorded in Italy between 2011 and 2016. It is recalled that in general, with the exception of certain specific cases, the prices cannot be broken down between energy and non-energy use of the material in question.

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

Crops and direct by-products	examples of indicative prices (EUR/t)					
	2011	2012	2013	2014	2015	2016
<b>WOOD ENERGY (wood-to-energy supply chain)</b>						
firewood	70	69	73	73	56	57
pellets	185	189	205	208	232	224
wood chips	43	41	42	47	40	38
<b>CEREAL CROPS (usable for biogas production)</b>						
durum wheat	286	283	269	301	290	196
common wheat	232	265	234	207	200	179
corn	208	257	186	182	167	178
barley	237	230	217	190	181	160
sorghum	214	241	230	182	171	192
<b>OILSEED CROPS (usable for bioliquid production)</b>						
rapeseed meal	n/a	313	307	276	273	244
sunflower seeds	343	398	338	272	299	314
soy beans	381	454	473	404	363	389
<b>COMMON FEED</b>						
alfalfa	104	114	140	113	85	83
hay	82	61	52	59	48	38
common wheat pellets	155	174	170	137	128	122
common wheat meal	207	214	201	169	167	150
common wheat bran	150	170	165	133	124	156
common wheat groats	161	176	170	139	130	120
durum wheat bran and groats	146	165	163	131	122	114
durum wheat pellets	156	174	171	138	129	123
durum wheat middling	290	275	264	233	225	206
durum wheat meal	179	190	185	150	141	133

Source: AGER Borsa Merci and Chambers of Commerce

The following table provides detailed data on agricultural land use in Italy up to 2016. In this case too, in particular for the sowing choices made in individual agricultural years, it is not possible to identify a precise trend due to the major or minor agro-energy intensity of the crops selected in a given year.

### Changes in land use in Italy

<b>Agricultural land use in Italy</b>						
Utilised agricultural area: 12 400 000 ha						
Total area of Italy: 30 134 000 ha						
Forested area: 11 110 000 ha						
	2011	2012	2013	2014	2015	2016
<b>ARABLE CROPS</b>	<b>6 436 000</b>	<b>5 955 000</b>	<b>6 488 000</b>	<b>6 405 000</b>	<b>6 418 000</b>	<b>6 466 000</b>
cereals and rice	3 439 000	3 350 000	3 460 000	3 393 000	3 191 000	3 233 000
temporary fodder crops	2 009 000	1 826 000	2 121 000	2 153 000	2 223 000	2 239 000
dried legumes	68 000	72 000	68 000	67 000	73 000	87 000
oilseed and industrial crops	424 000	275 000	387 000	413 000	490 000	461 000
vegetables	434 000	374 000	401 000	326 000	392 000	398 000
greenhouse vegetables	37 000	33 000	37 000	38 000	38 000	39 000
tuberous plants	62 000	58 000	51 000	53 000	49 000	48 000
<b>PERMANENT CROPS</b>	<b>2 424 000</b>	<b>2 299 000</b>	<b>2 360 000</b>	<b>2 325 000</b>	<b>2 219 000</b>	<b>2 217 000</b>
fruit orchards	587 000	513 000	529 000	508 000	403 000	404 000
olive groves	1 137 000	1 100 000	1 129 000	1 127 000	1 143 000	1 145 000
vineyards	700 000	686 000	702 000	690 000	673 000	668 000
<b>PASTURES AND GRASSLAND</b>	<b>4 503 000</b>	<b>2 359 000</b>	<b>4 388 000</b>	<b>3 925 000</b>	<b>3 862 000</b>	<b>3 852 000</b>

Source: Agri Istat

According to several estimates, the net area occupied by greenhouses on which photovoltaic panels have been fitted amounts to around 800 hectares, out of a total of almost 40 000 hectares given over to greenhouse farming.

Bioenergies play a particularly prevalent role in the agricultural sector; these range from solid biomass (excluding the biodegradable fraction of waste) to biogas and bioliquids. Although agriculture only has a marginal role in the national energy balance, a number of top-performing supply chains have emerged in agro-energy terms, due in particular to the potential benefits in using agricultural by-products and waste for producing energy. This is certainly the case for the biogas sector, which, after having achieved extremely positive results, is now being oriented to produce not only electricity but also biomethane. This confirms the potential strategic role that agriculture could play in the field of energy production in rural areas.

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

As is well known, renewable energy production in rural areas represents, for many agricultural holdings, a significant source of revenue for supplementing their agricultural income.

In the agricultural sector, especially following the latest reforms made to the CAP, reference is often made to multifunctional activities. According to the definition introduced by the Committee for Agriculture of the Organisation for Economic Co-operation and Development, 'beyond its primary function of producing food and fibre, multifunctional agriculture can also shape the landscape, provide environmental benefits such as land conservation, the sustainable management of renewable natural resources and the preservation of biodiversity, contribute to the socio-economic viability of rural areas, and ensure food security'.

As regards multifunctionality, in which Italian agricultural holdings have invested greatly over the last decade, Italy, with an average of EUR 4.6 billion, is leading the way in the EU in terms of support activities, followed by France (EUR 4.2 billion) and Germany (EUR 2.1 billion). Such support activities include subcontracting, the initial processing of products, and land preservation. Italy is also leading the way in terms of secondary activities, with 27.5% of European production, ahead of France (14.2%) and the United Kingdom (9.9%). Italy's dominance when it comes to secondary activities is essentially linked to the rapid development of renewable energy production and the spread of agri-tourism.

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#### Output of support and secondary activities in the agricultural sector between 2011 and 2015

	Current values (EUR m)					Variations in current values (%)	Variations in linked values (%)
	2011	2012	2013	2014	2015	2015/14	2015/14
<b>Support activities</b>							
Cultivating seeds for sowing	209.7	236.9	275.6	266.6	284.3	6.6	0.0
New plantations	235.2	251.5	246.1	222.5	197.7	-11.1	-11.7
Agricultural activities for third parties (subcontracting)	2 522.3	2 706.3	2 820.8	2 934.9	2 964.3	1.0	0.7
Initial processing of agricultural products	2 089.3	2 149.2	2 139.6	2 097.6	2 224.9	6.1	1.8
Land preservation, for keeping it in a good agricultural and ecological condition	492.6	511.1	535.4	546.7	552.2	1.0	0.8
Support activities for rearing livestock	199.8	204.4	204.8	204.1	196.2	-3.9	-2.0
Other support activities	149.9	159.5	166.9	164.4	165.6	0.7	0.3
<b>Total</b>	<b>5 898.8</b>	<b>6 218.9</b>	<b>6 389.3</b>	<b>6 436.7</b>	<b>6 585.2</b>	<b>2.3</b>	<b>0.5</b>
<b>Secondary activities</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2016</b>
Aquaculture	7.0	7.0	7.2	7.4	7.5	1.4	0.5
Processing plant products (fruit)	157.8	152.8	175.1	165.1	183.6	11.2	5.3
Milk processing	301.4	295.0	303.7	321.6	300.9	-6.4	0.3
Agri-tourism, including recreational and social activities, educational workshops and other minor activities	1 164.0	1 114.1	1 138.8	1 153.6	1 188.4	3.0	2.8
Processing animal products (meat)	317.8	315.2	323.8	314.3	296.5	-5.7	2.0
Renewable energy (photovoltaic, biogas, biomass)	\	1 449.0	1 471.5	1 401.5	1 301.0	-7.2	-5.0
Craftwork (woodwork)	59.0	57.8	58.3	59.0	59.4	0.7	0.3
Animal feed production	195.9	201.0	207.1	190.3	169.4	-11.0	-1.2
Landscaping (parks and gardens)	328.4	340.7	356.9	350.9	343.9	-2.0	-2.5
Direct sales/marketing	265.0	266.5	280.3	266.0	293.3	10.3	2.1
<b>Total</b>	<b>3 643.9</b>	<b>4 199.1</b>	<b>4 322.8</b>	<b>4 229.7</b>	<b>4 143.9</b>	<b>-2.0</b>	<b>-0.6</b>

Source: ISTAT

In its annual report entitled ‘Development of the Agricultural Economy’, the National Institute for Statistics (ISTAT) outlines an interesting appraisal of the state of health of the entire primary sector. Energy production is classed as a secondary activity, with respect to activities that essentially relate to agriculture and livestock.

In 2015, there was a downturn in secondary activities (from 8.4% in 2014 to 8.1% in 2015), essentially due to the slowdown in the production of renewable energies from the agricultural sector, following years of sustained growth, with a 0.6% drop in volume; these secondary activities involved not only renewable energies (photovoltaic and biomass in particular), but also educational workshops, recreational activities, social farming, direct sales, animal feed production, landscaping (parks and gardens), agri-tourism, and processing activities.

In 2016, there was an upturn in the secondary activities performed by agricultural holdings (1.4% increase in volume), which accounted for 8.6% of production in the sector. While agri-tourism, social farming, direct sales and processing activities all rose markedly, renewable energy production fell by 1.7%.

### Development of the land-leasing market

The ongoing liquidity crisis in 2015 once again made the leasing of land the most effective way of increasing farm sizes, particularly in the northern regions where the leasing market recorded sharp growth, with rising demand outstripping supply, especially for land given over to high-value crops.

As regards the shifts that have marked the development of the land-leasing market, the drop in investments made in the bioenergy sector, which has caused the lease price of land given over to energy production to fall, should certainly be highlighted. The first signs of this downturn had already been glimpsed in previous years; in all likelihood, it began following the rescaling of the incentives provided to photovoltaic solar installations, especially those situated on agricultural land. The phenomenon has affected all the regions having a long history in this type of energy production, also owing to the functional slowdown in growth of installations using biomass to produce either biogas or biofuels, this slowdown being linked to the process for adjusting between supply and demand at local level. It also cannot be ruled out that the use of imported raw materials may have played a part. At the same time, operators have also observed that fewer and fewer subcontractors are now the key players with respect to the demand of land for agro-energy use, probably due to the increasing numbers of cultivation contracts being entered into between companies managing energy installations and farmers for the supply of biomass.

### Changes in average land values in 2015 (EUR k/ha)

Geographical area	Altitude zone					Total
	Inland mountain	Coastal mountain	Inland hill	Coastal hill	Plain	
Northwest	5.8	17.2	24.7	96.8	33.2	26.1
Northeast	29.9	-	43.5	30.5	44.1	40.6
Centre	9.7	24.0	14.9	16.6	22.6	14.9
South	6.4	9.8	12.1	17.1	17.7	12.9
Islands	5.7	7.1	7.5	8.8	14.1	8.5
<b>Total</b>	<b>11.8</b>	<b>8.9</b>	<b>15.6</b>	<b>14.7</b>	<b>31.4</b>	<b>19.9</b>
Change from 2014 (%)	0.0	0.2	-0.2	-0.1	-1.4	-0.8

SOURCE: CREA, Development of the land market in Italy in 2015.

Although the national average value fell to around EUR 30 000/ha in 2014, significant shifts in the sale and lease prices of land have been recorded in the past decade in areas where bioenergy installations are more greatly concentrated (for instance, the Province of Cremona – biogas), with sale prices as much as EUR 56 000/ha and annual lease prices as much as EUR 800/ha.

By examining the Average Agricultural Land Values (AALVs) recorded for the Province of Cremona over the years, it can be seen that the AALV in 2005 stood at EUR 37 000/ha, and 10 years later had risen to EUR 56 000/ha. In the period of time under consideration, the agricultural market did not experience any

significant developments, apart from the entry into force of the All-Inclusive feed-in Tariff, which, from 2008, has been providing biogas installations of up to 1 MW capacity with a highly beneficial tariff (EUR 280/MWh); this Tariff has been applied to its greatest effect in the heart of the Padana Plan, which boasts three fundamental ingredients required by digesters: a large quantity of livestock effluents generated from intensive livestock farming, fertile land that can be used to grow dedicated crops (primarily corn), and the presence of waste and by-products of agricultural origin or stemming from agro-industrial processing operations.

Lease prices have followed a very similar trend to sales prices, with annual AALVs for leasing charges jumping up from around EUR 600/ha in 2005 to around the EUR 1 200-1 400/ha mark between 2010 and 2013, before dropping to around EUR 800/ha in 2015.

### **Biomass sourced from forests**

The sourcing of wood for energy use is still in decline, falling by almost 18% in a single year and dropping below 3 500 000 m<sup>3</sup>. This figure, together with the sudden fall in imports of firewood and pellets, confirms the warnings signalled by the wood-to-energy industry, which, until a few years ago, appeared to be capable of generating positive effects at local level, by providing work linked to the design, construction and maintenance of biomass installations.

According to the Global Forest Resources Assessment 2015 published by the FAO, Italy's total forested area stands at 11 110 315 hectares, of which 9 297 078 hectares are classed as 'forest', and the remaining 1 813 237 hectares are classed as 'other wooded land'. The annual rate of increase of forested areas, which includes both the natural regeneration of forests and forestation by planting trees or seeds, was 53 788 ha, while the average annual rate of deforestation between 2005 and 2015 stood at 3 695 hectares. The amount of biomass that could potentially be sourced from forests and used each year stands at 38 370 000 m<sup>3</sup>, but in 2015, only 5 461 155 m<sup>3</sup> of wood was actually used (ISTAT), representing a 12% drop from 2014. In 2015, 61% of the wood collected was used as firewood, with the remaining 39% used as timber.

Among the regulatory developments that occurred in 2015 and 2016 and had a direct impact on this agro-energy sector, mention should be made of the Ministerial Decree of 23 June 2016, which updated the incentive schemes in place for newly built, entirely rebuilt, reactivated and renovated installations using renewable sources other than photovoltaic, with a capacity of greater than 1 kW. Among the priorities provided for, incentives were confirmed for installations using by-products and having a capacity of up to 600 kW, which formed part of the productive cycle of an agricultural holding, livestock farms or, alternatively, logging companies. This priority under the new Decree falls in line with the Sectorial Plan for Bioenergies, approved by the State-Regions Conference on 5 August 2014, which highlighted how the production of bioenergies (dedicated crops and by-products) has become a key element in the energy sector. In supporting this branch, the production of biomass to be used as energy must focus first and foremost on recovering and converting the waste and residues produced from growing crops, rearing livestock and processing agro-food products; dedicated crops may then be used in the second instance, provided that they meet specific sustainability criteria.

**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/CE (ktoe)*

<b>Raw materials listed in Part A of Annex IX to Directive 2009/28/EC</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
(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	6.91	11.99	10.84	7.64
(e) Straw	0.01			
(f) Animal manure and sewage sludge				
(g) Palm oil mill effluent and empty palm fruit bunches				
(h) Tall oil pitch				
(i) Crude glycerine				
(j) Bagasse				
(k) Grape marcs and wine lees	0.88	1.74	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				
<b>Raw materials listed in Part B of Annex IX to Directive 2009/28/EC</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
(a) Used cooking oil	50.12	44.82	67.18	72.26
(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	44.10	70.20	219.26	314.67
<b>Raw materials not listed in Annex IX but counting for double (*)</b>	<b>12.56</b>	<b>57.05</b>	<b>152.25</b>	<b>378.39</b>

(\*) The national transposition measure for the ILUC Directive (Legislative Decree No 51 of 21 March 2017) stipulates that biofuels produced from several by-products not included in Annex IX may be eligible for Double Counting up until 30 June 2018.

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

In Italy, the overall impact of energy crops on the Utilised Agricultural Area – and consequently on closely connected factors such as biodiversity, water resources and soil quality – is negligible, especially for those crops that are subsequently intended to supply the bioliquids and biofuels industries. The prevailing trend, as in so many other production sectors, involves the processing of imported raw materials (e.g. palm oil from Indonesia and other raw materials grown in different European countries).

The main energy crops that are used for producing biofuels and bioliquids are sugar, cereal and oleaginous crops (primarily rapeseed, sunflower and soy), but their use for energy or non-energy purposes is not clearly defined in national statistics. Since only a few thousand hectares of energy crops are grown to produce bioliquids and biofuels, the cultivation of such dedicated crops does not have a significant impact on the rural ecosystem. In any case, the growing focus on the sustainability of bioliquids and biofuels has entailed a constant commitment to guarantee an ecological balance and protect biodiversity, which in Italy relates not only to rural areas of outstanding natural beauty, but also to a vast forestry heritage.

## 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).

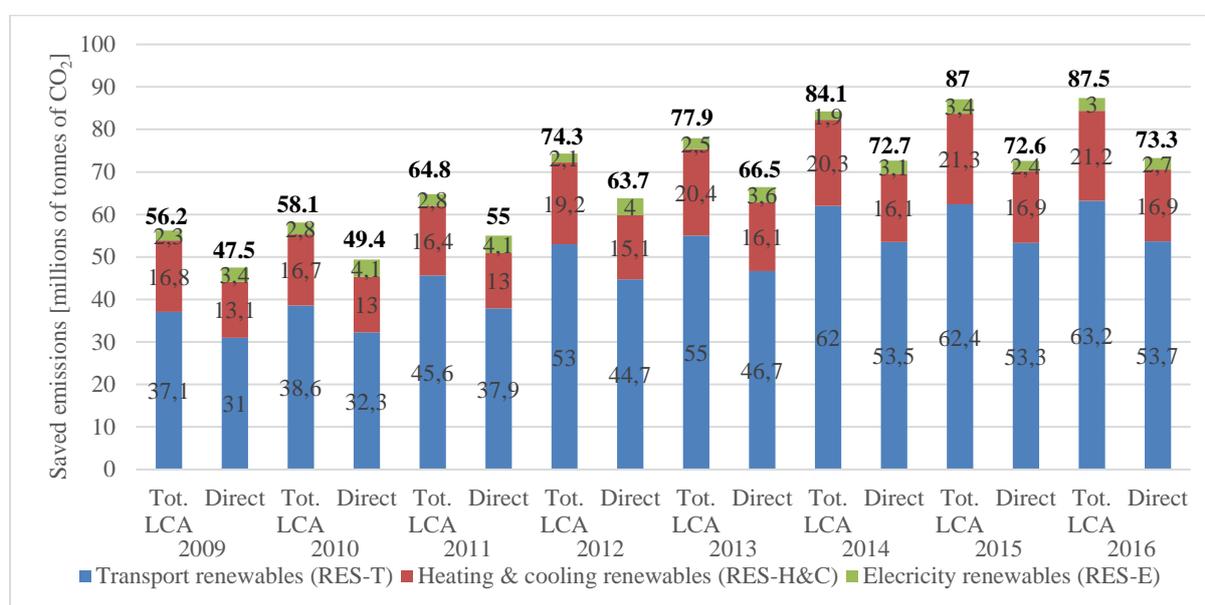
The following table sets out the estimated net greenhouse gas emission savings due to the use of energy from renewable sources in Italy from 2009 to 2016. The values shown have been updated for the entire historical series, thanks to more precise calculation methods, the availability of updated consumption statistics and the adjustment of certain specific emission factors.

The spread of renewable energy sources in the electricity, thermal and transport sectors has led to a steady reduction in greenhouse gas emissions over the years: from 56 million tonnes of CO<sub>2</sub>eq saved in 2009 to almost 88 million in 2016, taking account of the Life-Cycle Assessment approach.

By sector, the main contribution to emission saving 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 included in the figures for the renewables used in transport.

**Table 6: Estimated greenhouse gas emission savings from the use of renewable energy: emissions over the whole life-cycle and emissions solely from energy generation (millions of tonnes of CO<sub>2</sub>eq)**

RES use sector [millions of tonnes of CO <sub>2</sub> eq]	2009		2010		2011		2012		2013		2014		2015		2016	
	Tot. LCA	Direct														
<b>RES Electricity</b>	37.1	31.0	38.6	32.3	45.6	37.9	53.0	44.7	55.0	46.7	62.0	53.5	62.4	53.3	63.2	53.7
<b>RES Heating &amp; Cooling</b>	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	21.2	16.9
<b>RES Transport</b>	2.3	3.4	2.8	4.1	2.8	4.1	2.1	4.0	2.5	3.6	1.9	3.1	3.4	2.4	3.0	2.7
<b>RES Total</b>	<b>56.2</b>	<b>47.5</b>	<b>58.1</b>	<b>49.4</b>	<b>64.8</b>	<b>55.0</b>	<b>74.3</b>	<b>63.7</b>	<b>77.9</b>	<b>66.5</b>	<b>84.1</b>	<b>72.7</b>	<b>87.0</b>	<b>72.6</b>	<b>87.5</b>	<b>73.3</b>



The results of this estimate have been obtained from monitoring greenhouse gas emission reductions achieved through the use of energy from renewable sources, carried out by GSE, as required by Legislative Decree No 28/2011 (Article 40).

The method used to calculate greenhouse gas emission reductions considers the difference between the emissions which would have been produced by the fossil fuels saved (FFS) and the emissions caused by the

renewable energy 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 greenhouse gas emissions considered are those of the main greenhouse gases: CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O, evaluated in terms of CO<sub>2</sub>eq through the conversion factors adopted in the most recent national inventories of greenhouse gases, equal to 1 for CO<sub>2</sub>, 298 for N<sub>2</sub>O and 25 for CH<sub>4</sub>.

As per the LCA approach, the greenhouse gases measured include upstream emissions (i.e. those linked to production of the energy source), the emissions caused by construction of the installation that will use the energy source, and the emissions produced during use (e.g. combustion) of the source itself 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 to each source;
- identify the amount of energy from renewable sources consumed each year in each use sector;
- calculate the *emission balance* by 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 two 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) and (m) of Directive 2009/28/EC).**

As part of the review of the national energy system’s policy priorities, in November 2017, Italy updated the National Energy Strategy (NES 2017) addressing all energy-related issues. Under the Strategy, the share of final consumption covered by renewable sources is expected to reach 19-20% by 2020, without prejudice to the fact that the only binding commitment is to achieve the 17% share assigned to Italy by the EU. On these premises, new forecasting trajectories can be traced for the growth of the share of energy from renewable resources on total consumption, to be taken as scenarios consistent with the new objectives identified by Italy on its own initiative as part of NES 2017.

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 for the quantity of energy from renewable sources has been identified, by interpolation. The data on actual final consumption of energy from renewable sources in 2015 and 2016 and the estimates for the subsequent years have been used to obtain, by subtraction, the actual data (up to 2016) and predictions of excess/deficit energy production for the subsequent years.

As a consequence of the reduction in total (non-RES and RES) final energy consumption and of the concurrent greater-than-predicted increase in production from renewable sources in the two years in question, Italy recorded a surplus of 10.9 Mtoe and 9.6 Mtoe respectively in 2013 and 2014, compared to the above-mentioned minimum reference trajectory.

**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)<sup>[1],[2]</sup>**

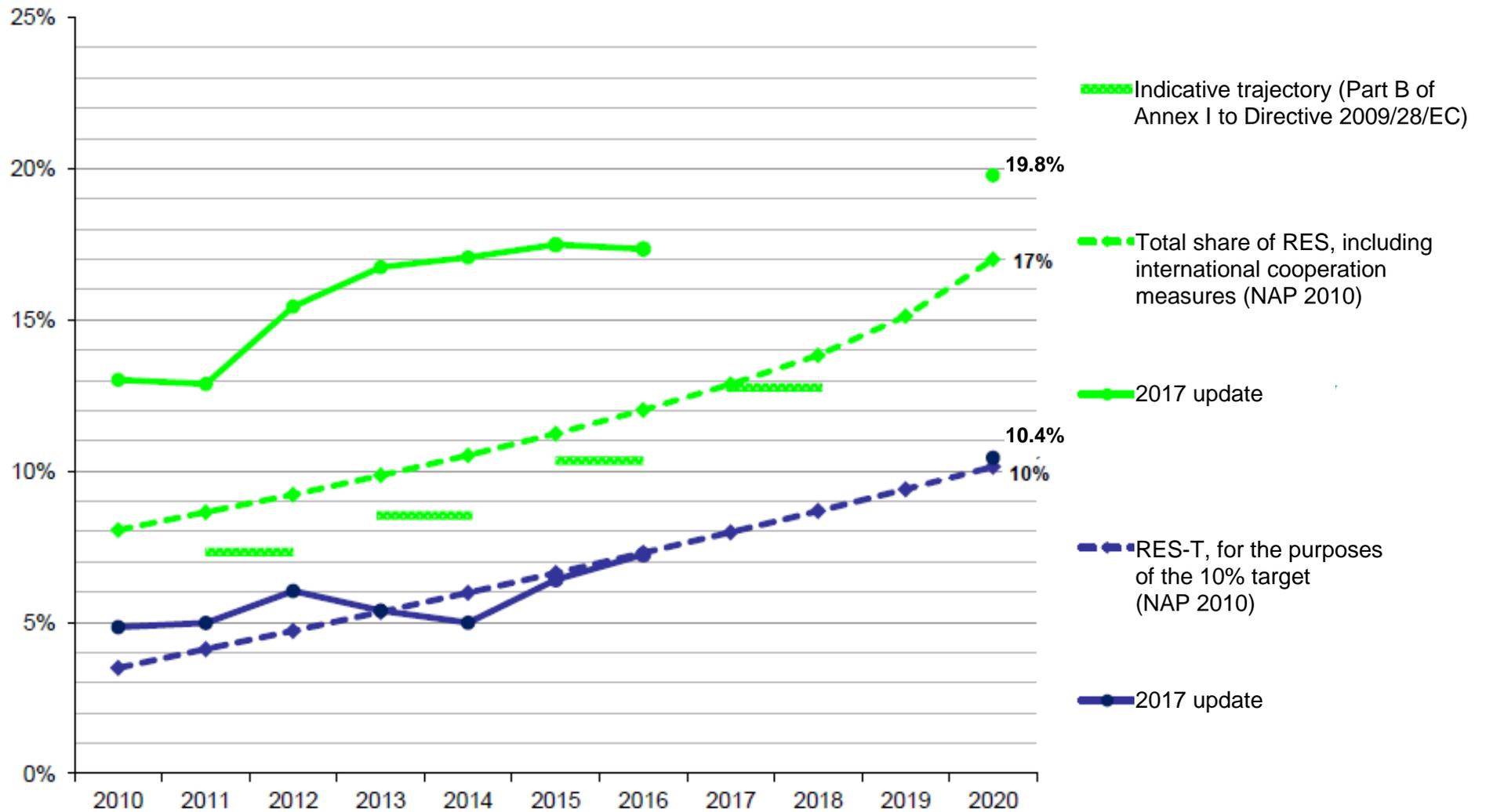
	actual								forecast			
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Actual/estimated excess or deficit production	8 324	8 613	7 405	10 011	10 937	9 343	9 468	7 789	7 259	5 828	4 462	3 397

Based on the data of the past two years and the NES 2017 forecasts, the following three graphs give new hypothesised scenarios (‘2017 update’) for the final consumption of energy from renewable sources, with respect to the scenarios forecasted in the NAP.

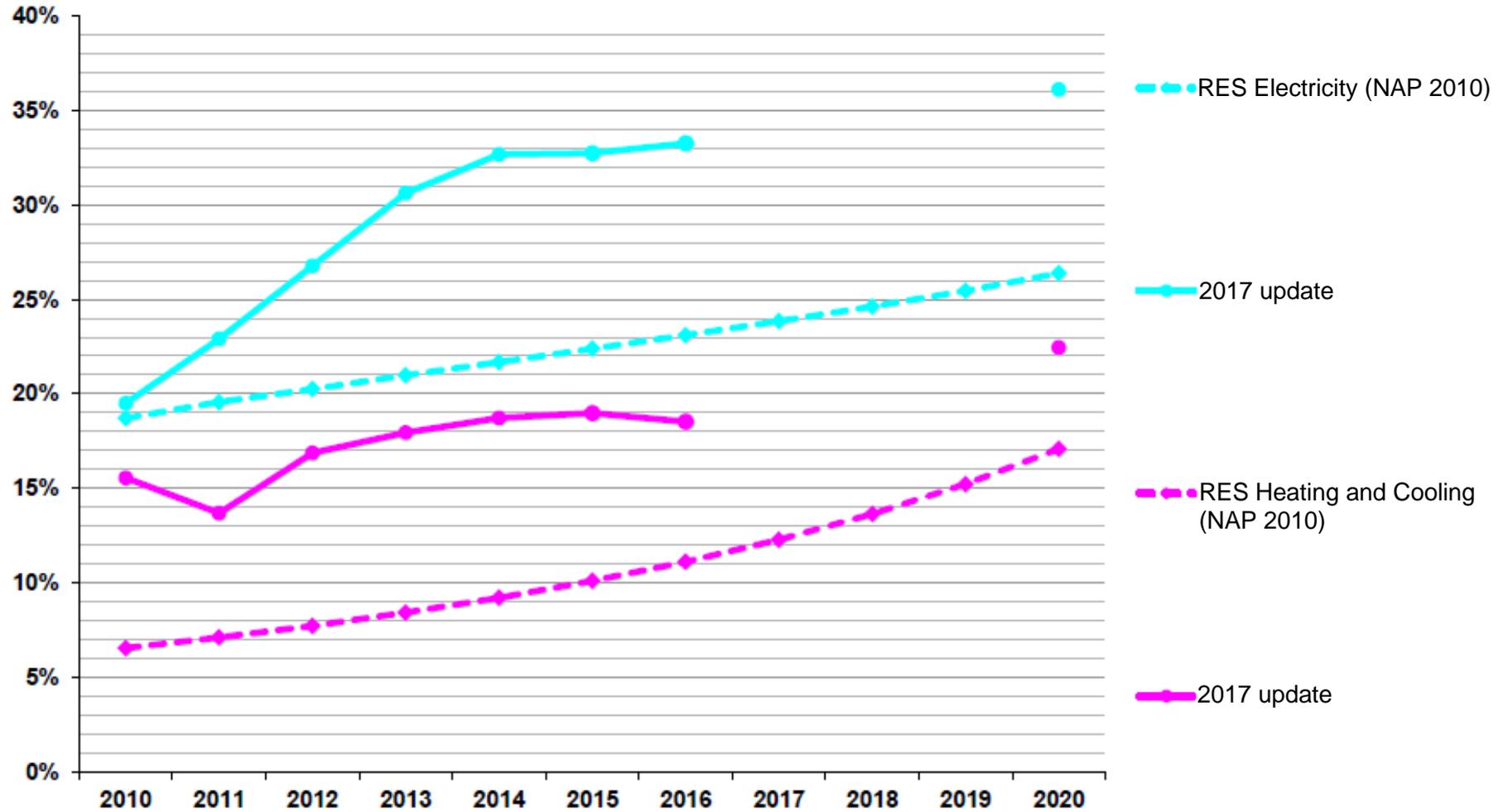
[1] Please use actual figures to report on the excess production in the two years preceding submission of the report, and estimates for the following years up to 2020. In each report the Member State may correct the data of the previous reports.

[2] When filling in the table, for deficit production please mark the shortage of production using negative numbers (e.g. -x ktoe).

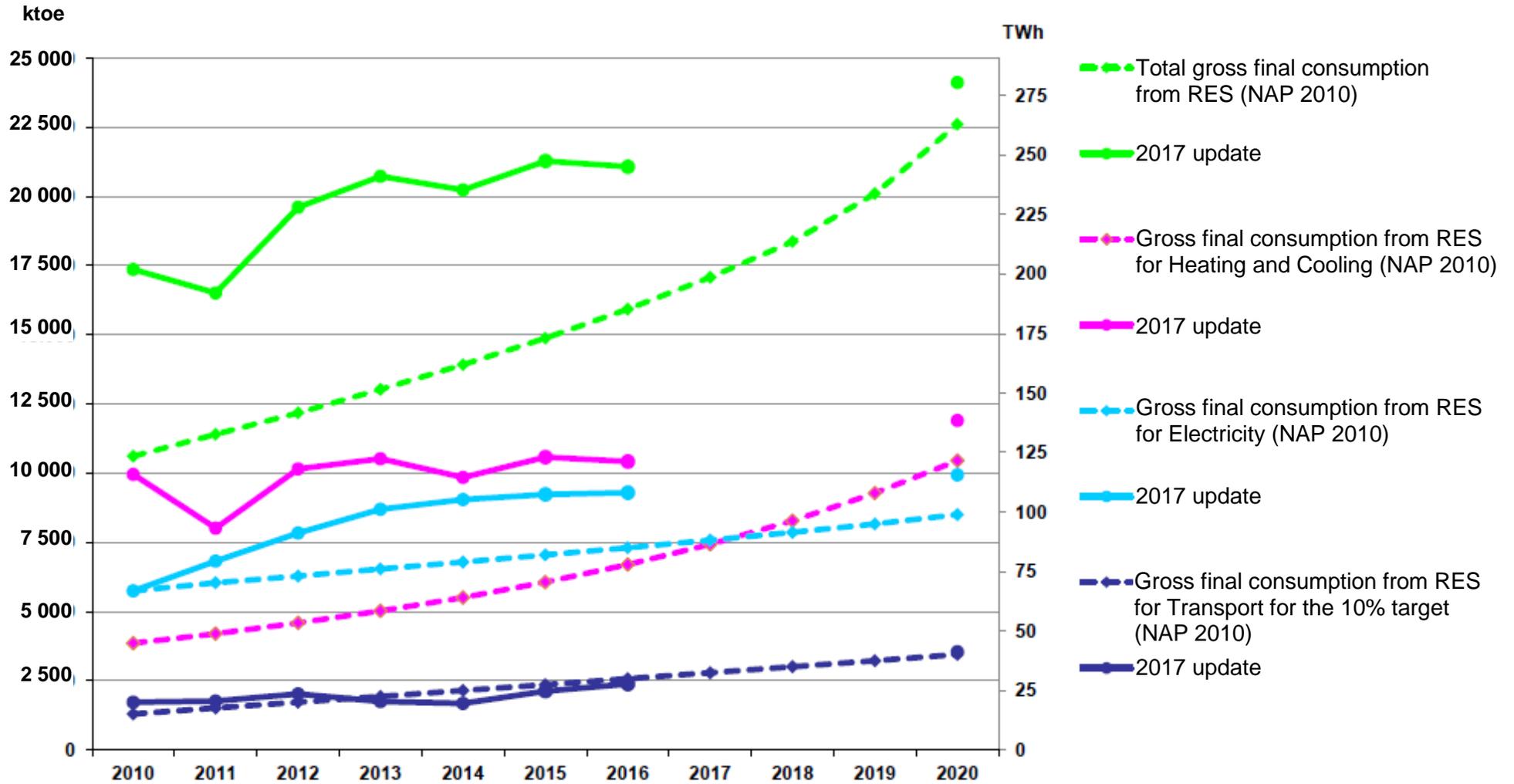
Share of renewable energy in gross final consumption: total and transport for the purposes of the 10% target



Share of renewable energy in gross final energy consumption: heating and cooling and electricity



### Gross final consumption from renewable energy sources



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

The transposition, into national laws, of the State cooperation mechanisms provided for in Directive 2009/28/EC in order to achieve the renewable source targets is at the discretion of each individual 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 35 of Legislative Decree No 28/2011 makes it possible for Italy to 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. Such agreements are promoted when the following conditions apply:

- the intermediary targets set up to 2016 have been found not to have been met;
- the energy forming the object of the statistical transfer, just like the share of energy originating from the joint project, must be supported through an incentive amounting to less than the average weighted value of the incentives for generating electricity from renewable sources provided to installations using renewable sources that are based in Italy, net of the generation of, and incentive values for, electricity from solar sources. In order to define the amount of the incentive, it is established that the relevant year is that preceding the stipulation of the agreement itself;
- the energy forming the object of the statistical transfer, just like the share of energy originating from the joint project, must contribute to the attainment of Italy's renewable source targets;
- appropriate measures must be put in place for monitoring the energy transferred for the purpose of meeting the national renewable energy targets.

In addition, provision is made for the costs for implementing those projects to be covered by electricity and natural gas tariffs calculated according to the procedures established by the Electricity, Gas and Water Authority after the agreements are entered into. Cooperation for joint projects with other States can involve private operators.

### **Joint Projects with Third Countries**

Article 36 of Legislative Decree No 28/2011 makes it possible to provide incentives, for the purpose of meeting the national renewable energy targets, for the importing of electricity generated from renewable sources in third countries and supplied to the Italian electricity grid. Such importing activities must be carried out on the initiative of energy operators on the basis of international agreements entered into with the State from which that energy is imported.

The support given to the energy injected into the Italian electricity grid consists of an incentive of equal duration as, but worth less than, the incentive granted in Italy to energy sources and to the types of installations that generate energy in the importing country; the amount of the incentive must be defined, as part of individual agreements between Italy and the States from which the energy is imported, in accordance with the criteria of increased productivity and efficiency of the installations located in third countries and with the average value of the incentive granted for energy generated by installation using renewable sources that are located in Italy.

The electricity must be generated and imported in ways ensuring that it contributes to the attainment of the national renewable energy targets. To this end, appropriate measures must be put in place for monitoring the energy imported for the purpose of meeting the national target.

To date, no cooperation schemes with Member States or third countries have been set up.

As a final point, the Decree of the Ministry for Economic Development of 23 June 2016, which governs the incentives provided for electricity generated from renewable sources other than photovoltaic, stipulates that installations located in an EU Member State or in a third country adjoining Italy may take part in auction

proceedings in order to access the incentive schemes put in place by the Italian government, provided that an agreement has been entered into between Italy and the Member State/third country in question, drawn up in accordance with the abovementioned Articles of Directive 2009/28/CE focusing 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 on each facility contained in the various editions of the reports (waste type and quantity, operator's economic activity) has made it possible to identify those facilities using solely organic waste. Where data on the consumption of specific types of waste is available, e.g. on secondary solid fuels (SSFs), together with sufficient information to identify their organic share, the waste has been broken down into renewable and non-renewable portions. For all other uses, the waste was assumed to be non-renewable.

Incentives for electricity from biodegradable waste are calculated in two alternative ways under national law:

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

The share of electricity generated from renewable sources and hence eligible for the incentive is set at a fixed rate of 51% of net generation if municipal waste is used downstream of waste separation for recycling and also, under set conditions, if several other specific types of non-municipal waste are used. This fixed rate (very similar to the share considered for statistical purposes) was established through 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 incentive is calculated on the basis of test results, in accordance with European technical standards (C14, selective dissolution, product analysis).

It is likely that as more experience is gained in performing these tests, certain types of waste will be found to have recurring biodegradability percentage values, which may also be used for statistical purposes.

**13. Please indicate the amounts of biofuels and bioliquids in energy units corresponding to each of the categories or raw materials listed in Part A of Annex VIII that are taken into consideration by the Member State in question in order to comply with the objectives set out in Article 3(1) and (2) and Article 3(4)(1).**

<b>Raw materials group</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Cereals and other starch-rich crops	68.3	7.9	17.2	24.4
Sugars	3.4	-	3.2	6.6
Oil crops	1 627.9	1 576.8	1 434.9	1 063.9

## **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).

More than 50 institutions, environmentalist groups, trade associations and sectoral organisations (including consumer organisations) were contacted directly by the Ministry, which sent them a version 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.

Everybody could submit their observations within a specified period of time. The consultation recorded broad participation and constructive exchanges of views. Many observations were received, and were all duly considered. Many comments concurred with the provisions of the draft Action Plan. One of the outcomes of the consultation was revision of the sectoral targets, with reduction in the share allocated to electricity and increase of the thermal share, as this request was approved by all parties and found to be feasible.

A similar procedure was followed when preparing the National Energy Strategy in 2012 (105 participants in the consultation, including institutions, associations, research bodies and citizens), and then when preparing the 2017 National Energy Strategy (in all, 835 observations were received from 250 different entities, including trade associations, companies, citizens, environmentalist groups, public bodies, etc.).

As regards the stages for devising the implementing plans (one example is the National Transmission Grid Development Plan), in line with the EU rules, Italian legislation requires a prior strategic environmental assessment to be carried out in a manner ensuring broad participation in the consultation and decision-making process.

Similarly, the construction of individual installations and infrastructure is subject to environmental impact assessment, again with broad stakeholder involvement. Note in this respect that, to better elicit and assess public contributions, Legislative Decree No 28/2011 established that the Regions and the autonomous Provinces shall establish the cases in which, when several projects are submitted for constructing installations using renewable sources in the same area or in adjoining areas, they shall be assessed together within the same environmental impact assessment.

## Annex II – Methodology used to estimate greenhouse gas emission savings in Italy

### Emission savings in the electricity sector

The development of RES is contributing to progressive decarbonisation of the electricity generation sector. In 2016, the estimated direct emission savings achieved thanks to production from renewable sources amounted to 63.2 million tonnes of CO<sub>2</sub>eq, 70% greater than the savings recorded in 2009. The renewable sources which contributed the most to these savings were hydropower and solar.

**Table II.1: Net emission savings arising from the generation of electricity from renewable sources between 2009 and 2016 (millions of tonnes of CO<sub>2</sub>eq/year)**

Savings by source [millions of tonnes of CO <sub>2</sub> eq]	2009		2010		2011		2012		2013		2014		2015		2016	
	Tot. LCA	Direct														
BIOGAS	1.0	0.8	1.1	1.0	1.7	1.6	2.2	2.2	3.1	3.3	3.9	4.0	3.8	3.9	3.8	3.9
BIOLIQUIDS	0.5	0.7	1.0	1.5	0.9	1.3	1.0	1.4	1.1	1.6	1.6	2.1	1.7	2.4	1.8	2.2
SOLID BIOMASS	2.3	2.1	2.2	1.9	2.4	2.1	2.5	2.2	2.8	2.5	3.3	2.9	3.3	2.9	3.5	3.0
WIND	4.6	4.0	5.5	4.6	6.1	5.0	7.4	6.2	8.3	6.9	9.2	7.7	9.5	7.9	10.4	8.7
GEOTHERMAL	3.2	2.6	3.1	2.5	3.3	2.7	3.3	2.7	3.2	2.6	3.7	3.1	3.8	3.2	3.9	3.2
HYDROPOWER	25.1	20.5	24.6	20.0	25.1	20.3	25.7	20.9	24.5	19.9	27.0	22.2	26.6	21.6	26.7	21.6
SOLAR	0.4	0.3	1.1	0.9	6.1	5.0	10.8	9.1	11.8	9.9	13.4	11.4	13.6	11.4	13.1	11.0
<b>RES-E TOTAL</b>	<b>37.1</b>	<b>31.0</b>	<b>38.6</b>	<b>32.3</b>	<b>45.6</b>	<b>37.9</b>	<b>53.0</b>	<b>44.7</b>	<b>55.0</b>	<b>46.7</b>	<b>62.0</b>	<b>53.5</b>	<b>62.4</b>	<b>53.3</b>	<b>63.2</b>	<b>53.7</b>
SPECIFIC EMISSIONS AVOIDED [g/kWh]	592	495	560	469	559	465	568	479	532	452	576	497	568	486	572	486

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

$$\text{Emission savings} = \text{Emissions avoided (RFF)} - \text{Emissions produced (RES)}$$

The avoided emissions from fossil fuels and the emissions produced by RES are calculated by means of the following formulas, given by way of example:

$$\text{Avoided emissions from fossil fuels} = \sum_{RFF} (EF_{RFF} \times RF_{RFF}) \times \text{Gross electricity generation}$$

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

$$\text{Emissions produced}_{LCA} = \text{Emissions}_{operation} + \text{Emissions}_{construction} + \text{Emissions}_{upstream}$$

in which *RFF* are replaced fossil fuels, *RF<sub>RFF</sub>* is the replacement factor of each fossil fuel technology [%], *EF<sub>RFF</sub>* 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<sub>RES</sub>* are the emission factors of the possible renewable source-technology combinations per unit of energy produced (g/kWh). This balance was calculated for each phase of the life-cycle of the energy source, including the following phases: upstream, plant construction and plant operation.

Annual RES electricity generation is recorded in the statistical reports produced by GSE (the energy services operator)<sup>38</sup>, supplemented by the statistics published by Terna (the national electricity grid operator)<sup>39</sup>. The electricity generation considered is normalised gross production for wind and hydropower sources, and actual gross production for the other sources. The generation of electricity from bioliquids only considers the share from sustainable bioliquids.

<sup>38</sup> <http://www.gse.it/it/Statistiche/RapportiStatistici/Pagine/default.aspx>

<sup>39</sup> [http://www.terna.it/default/home\\_en/electric\\_system/statistical\\_data.aspx](http://www.terna.it/default/home_en/electric_system/statistical_data.aspx)

The emission factors of greenhouse gases in the different phases of the life-cycle 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, and Communication COM 2010 (11). The emission factors of greenhouse gases produced in the upstream phase were calculated by GSE from the company database containing the certified emission values for the different consignments of bioliquids released for consumption in the country.

The CO<sub>2</sub> released in the bioenergy operation phase has been considered to be zero, while the other greenhouse gases (CH<sub>4</sub>, N<sub>2</sub>O) have been assigned values on the basis of emission factors taken from the abovementioned database. The emission factors of the upstream phase of bioenergies have been obtained 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<sup>40</sup>. The data on electricity generation from bioenergies have been broken down and shown by supply chains of the raw materials linked to the specific upstream emission factors. The supply chains of the biogas and bioliquids used in electricity generation are taken from the statistics on operating installations 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 (e.g. solid woody biomass for electricity generation was assumed to come from wood chips from short rotation forestry, sourced at a distance of 71-200 km).

The determination of the mix of replaced fossil fuel technologies is based on the determination of a specific replacement 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 production data from the main RES (source: Terna<sup>41</sup>) and on the basis of the hourly zonal marginal technology index (statistical data supplied by GME – the energy market operator<sup>42</sup>). By making a weighted average of the zonal hourly marginal technology index on the basis of the hourly and zonal production of each RES<sup>43</sup>, it is possible to estimate the mix of sources which have likely been replaced by the production of each source considered. It was assumed that the marginality of renewable technologies was not significant for the purposes of the analysis<sup>44</sup>; accordingly, the substituted mix was normalised considering solely the national fossil sources and the imports. The emission factors for greenhouse gases produced from national fossil sources were calculated by GSE on the basis of statistical data supplied by Terna (mix of fuels used for 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<sup>45</sup> was used.

**Table II.2: Replaced fossil mix associated with the generation of electricity from RES in 2015 and 2016**

Replaced fossil mix [%]	2015						2016					
	Coal	CCGT	Oil	MCI	TG	Imports	Coal	CCGT	Oil	MCI	TG	Imports
BIOGAS	13.2%	61.0%	7.9%	11.2%	0.5%	6.2%	9.5%	53.8%	11.7%	21.1%	0.3%	3.7%
BIOLIQUIDS	13.2%	61.0%	7.9%	11.2%	0.5%	6.2%	9.5%	53.8%	11.7%	21.1%	0.3%	3.7%
SOLID BIOMASS	13.2%	61.0%	7.9%	11.2%	0.5%	6.2%	9.5%	53.8%	11.7%	21.1%	0.3%	3.7%
WIND	14.7%	57.8%	13.1%	7.2%	1.2%	5.9%	13.7%	57.4%	16.4%	9.3%	0.6%	2.6%
GEOTHERMAL	23.1%	59.5%	0.3%	10.6%	0.3%	6.3%	23.2%	55.7%	0.1%	17.3%	0.2%	3.5%
HYDROPOWER	11.1%	64.3%	5.4%	13.1%	0.3%	5.8%	7.7%	50.6%	9.0%	28.1%	0.2%	4.4%
SOLAR	13.2%	61.6%	9.7%	11.1%	0.5%	3.9%	11.5%	55.8%	12.2%	17.6%	0.4%	2.7%

<sup>40</sup> For solid biomass from waste, the emission factor was considered to be zero, since it is assigned to the waste supply chain.

<sup>41</sup> [http://www.terna.it/default/home\\_en/electric\\_system/transparency\\_report\\_en/generation.aspx](http://www.terna.it/default/home_en/electric_system/transparency_report_en/generation.aspx)

<sup>42</sup> <http://www.mercatoelettrico.org/it/download/DatiStorici.aspx>

<sup>43</sup> The hourly production of installations using bioenergies (totalled together in Terna's data under fossil thermal production) was considered to have a baseload-type profile and be of uniform zonal distribution.

<sup>44</sup> Hydroelectric plants are considered to be marginal for the purpose of optimising production on the basis of appropriate market strategies; the other RES are almost never marginal. It has thus been ruled out electricity generation from renewable sources gives rise to a reciprocal replacement between RES; instead, it replaces only fossil technologies and imports.

<sup>45</sup> R. Edwards et al: ANNEX A. GHG Intensity of the electricity consumption in the EU (by Member State) and outside EUJRC 2017.

**Table II.3: Emission factor of the replaced fossil mix between 2009 and 2016**

Savings by source [millions of tonnes of CO <sub>2</sub> eq]	2009		2010		2011		2012		2013		2014		2015		2016	
	Tot. LCA	Direct														
BIOGAS	611	506	585	479	586	473	593	482	560	452	609	500	603	490	602	487
BIOLIQUIDS	611	506	585	479	586	473	593	482	560	452	609	500	603	490	602	487
SOLID BIOMASS	611	506	585	479	586	473	593	482	560	452	609	500	603	490	602	487
WIND	689	578	633	520	601	489	611	500	602	491	628	518	629	516	640	525
GEOTHERMAL	599	484	576	464	586	475	595	486	561	454	625	518	624	513	625	512
HYDROPOWER	597	485	572	460	576	461	587	475	550	442	595	486	585	470	583	468
SOLAR	626	511	588	472	581	462	594	481	568	460	620	511	612	497	614	498
<b>RES-E TOTAL</b>	<b>609</b>	<b>498</b>	<b>582</b>	<b>471</b>	<b>582</b>	<b>467</b>	<b>593</b>	<b>481</b>	<b>563</b>	<b>455</b>	<b>609</b>	<b>500</b>	<b>602</b>	<b>488</b>	<b>604</b>	<b>488</b>

### Emission savings in the heating and cooling sector

RES penetration in the heating and cooling sector is helping to avoid increasing amounts of emissions in the processing and end-use sectors (industrial, services, residential, other end uses). The main contributor to emission savings is the spread of heat pumps and 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 2016 (millions of tonnes of CO<sub>2</sub>eq/year)**

Emission factor of the replaced fossil sources [millions of tonnes of CO <sub>2</sub> eq]	2009		2010		2011		2012		2013		2014		2015		2016	
	Tot. LCA	Direct														
THERMAL SOLAR	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
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	8.0	9.8	7.9
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
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
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
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
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
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
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
<b>RES-H&amp;C TOTAL</b>	<b>16.8</b>	<b>13.1</b>	<b>16.7</b>	<b>13.0</b>	<b>16.4</b>	<b>13.0</b>	<b>19.2</b>	<b>15.1</b>	<b>20.4</b>	<b>16.1</b>	<b>20.3</b>	<b>16.1</b>	<b>21.3</b>	<b>16.9</b>	<b>21.2</b>	<b>16.9</b>
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	68.1	54.2	67.6	53.6	67.8	53.8

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

The balance of the emissions associated with the use of RES in the heating and cooling sector is assessed individually for each consumption subsector<sup>46</sup>. This assessment is made by sector because the impacts of RES

<sup>46</sup> The subsectors and sources used in the emission balance are modelled on those used in Eurostat's energy balances. The balance also includes heat pumps, as required by Directive 2009/28/EC.

penetration have been found to differ in the end-use sectors according to the different use of RES (supply chains, technologies), the fossil fuel mix and the fossil technologies used which are presumably replaced by the RES.

The replaced fossil fuel mix was determined on the basis of the fossil mix used annually in each sector (source: Eurostat balance), taking into account certain indicative energy conversion performance values of RES and fossil sources<sup>47</sup>. In the processing sector, instead, it was assumed that the renewable source would replace the fossil technology with lowest emission impacts (current BAT), which is a natural gas boiler.

Bioenergies were associated with raw material supply chains in each consumption sector, on the basis of 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 assigned 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 cooling sector and the electricity sector. The RES plants serving district heating networks have been assumed to use the same bioenergy supply chains as CHP plants.
2. End uses sector – 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 of 50% of unprocessed generic residue, the remaining 50% being woodchips from forestry residue.
3. End uses sector – Residential: solid biomass consumption consists of firewood sourced nationally or in Europe and pellets, in shares taken from GSE’s annual statistics (87% wood and 13% pellets in 2016).

The CO<sub>2</sub> released in the bioenergy operation phase has been considered to be zero, while the other greenhouse gases (CH<sub>4</sub>, N<sub>2</sub>O) 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-powered and fossil fuel-powered boilers has been considered to be negligible, whereas it was assigned a value for solar collectors, heat pumps and geothermal plants.

## Emission savings in the transport sector

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

**Table II.5: Net emission savings associated with the use of renewable sources in transport between 2009 and 2016 (millions of tonnes of CO<sub>2</sub>eq/year)**

Savings by source [millions of tonnes of CO <sub>2</sub> eq]	2009		2010		2011		2012		2013		2014		2015		2016	
	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
BIO-ETBE	0.2	0.3	0.2	0.4	0.2	0.3	0.1	0.3	0.1	0.2	0.0	0.0	0.0	0.1	0.1	0.1
BIODIESEL	2.1	3.1	2.6	3.8	2.6	3.7	1.9	3.6	2.3	3.4	1.9	3.1	2.4	3.3	2.6	2.9
<b>RES-T TOTAL</b>	<b>2.3</b>	<b>3.4</b>	<b>2.8</b>	<b>4.1</b>	<b>2.8</b>	<b>4.1</b>	<b>2.1</b>	<b>4.0</b>	<b>2.5</b>	<b>3.6</b>	<b>1.9</b>	<b>3.1</b>	<b>2.4</b>	<b>3.4</b>	<b>2.7</b>	<b>3.0</b>
SPECIFIC EMISSIONS AVOIDED [g/MJ]	47.6	70.3	46.9	69.6	47.1	69.7	35.9	69.3	47.1	69.4	42.4	70.0	50.3	69.7	61.4	69.7

<sup>47</sup> The thermal conversion performance of CHP plants and of district heating thermal plants has been taken from the plants’ operating data supplied by Terna and AIRU. For the conversion performance of individual thermal plants, since detailed statistics on plants in operation are not yet available, some assumptions had to be made on the basis of the values available in the literature and provided by market surveys.

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

Bioethanol and biodiesel/BIO-ETBE are mostly used in transport in mixtures, respectively, with petrol and diesel. Thus, each energy unit of biodiesel and bioethanol is assumed to replace respectively one unit of diesel or petrol and their emissions.

Greenhouse gas emissions of petrol and diesel are calculated on the basis of the average national emissions of the diesel or petrol vehicles in use, published by ISPRA<sup>48</sup> and calculated on the basis of the estimate software Copert 4 (version 11.4, September 2016).

As regards emissions from biofuels when in use, CO<sub>2</sub> emissions are assumed to be zero, while CH<sub>4</sub> and N<sub>2</sub>O emissions are the same as those from the replaced fossil fuel.

Emissions from vehicle production have not been considered, in so far as biofuels are used to dilute fossil fuels (zero balance).

Greenhouse gas emissions in the upstream phase of biofuels have been included by GSE on the 'Release-for-Consumption' Certificates for biofuels, issued by GSE to the obligated parties that release biofuels into the national distribution grid.

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<sup>48</sup> Available at <http://www.sinanet.isprambiente.it/it/sia-ispra/serie-storiche-emissioni/dati-trasporto-strada/view>.