Ricerca di Sistema (RdS) funded by MiSE (Ministry for the Economic Development): Research towards the energy transition

- 1.1 High Efficiency photovoltaics
- 1.2 Energy storage
- 1.3 Advanced materials for energy
- 1.4 Components and materials for the resilience
- 1.5 Technologies, techniques and materials for the improvements of energy and environmental performances of buildings
- 1.6 Energy efficiency of the products and industrial processes
- 1.7 Technologies for the efficient electrification
1.6 Energy efficiency of the products and industrial processes

- 1.6.1 Definition of energy efficiency standards for industrial devices
- 1.6.2 Improvements of energy efficiency processes in industry and buildings
- 1.6.3 Development of techniques and configurations for high efficiency industrial processes
- 1.6.4 Definition of best practices and KPIs for actions towards energy efficiency
- 1.6.5 High efficiency of plants for the treatment of water in industry
1.6.3 Development of techniques and configurations for high efficiency industrial processes (1/2)

- Development of high efficient technology for gas separation
- Recovery and storage of energy in carbon intensive industry (e.g. steel, cement, chemistry)
- Geothermal
- Use of alternative fuels in industrial processes
- Use of H2 in energy intensive industry particularly in iron and steel making processes
1.6.3 Development of techniques and configurations for high efficiency industrial processes (2/2)


- Study and experiments for energy recovery in industry (e.g. high temperature heat pumps).

- Development of modeling and simulation environment for the techno-economic feasibility in the field of material recovery (e.g. carbon, steel slag) and excess of heat in order to select the optimal configuration of low-carbon industrial district.

- Analysis of manufacturing processes and components based on recycled materials (closed loops).
## Overview of Steel Production in Italy

### Production of Crude Steel in Italy

<table>
<thead>
<tr>
<th>Country</th>
<th>2017 Rank</th>
<th>Million Tonnes</th>
<th>2016 Rank</th>
<th>Million Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1</td>
<td>831.7</td>
<td>1</td>
<td>822.8</td>
</tr>
<tr>
<td>Japan</td>
<td>2</td>
<td>104.7</td>
<td>2</td>
<td>110.7</td>
</tr>
<tr>
<td>India</td>
<td>3</td>
<td>101.4</td>
<td>3</td>
<td>87.3</td>
</tr>
<tr>
<td>USA</td>
<td>4</td>
<td>81.6</td>
<td>4</td>
<td>88.2</td>
</tr>
<tr>
<td>Russia</td>
<td>5</td>
<td>71.3</td>
<td>5</td>
<td>71.5</td>
</tr>
<tr>
<td>South Korea</td>
<td>6</td>
<td>71.0</td>
<td>6</td>
<td>71.5</td>
</tr>
<tr>
<td>Germany</td>
<td>7</td>
<td>43.4</td>
<td>7</td>
<td>42.9</td>
</tr>
<tr>
<td>Turkey</td>
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<td>37.5</td>
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<td>33.9</td>
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<tr>
<td>Brazil</td>
<td>9</td>
<td>34.4</td>
<td>9</td>
<td>34.0</td>
</tr>
<tr>
<td>Italy</td>
<td>10</td>
<td>24.1</td>
<td>11</td>
<td>23.7</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>France</td>
<td>15</td>
<td>15.5</td>
<td>15</td>
<td>14.4</td>
</tr>
<tr>
<td>Spain</td>
<td>16</td>
<td>14.5</td>
<td>16</td>
<td>13.6</td>
</tr>
</tbody>
</table>

Crude Steel Production by Process in Italy:

- **EAF**: 80%
- **BOF**: 20%

(124 companies working in the field (31/12/2017))

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L'industria siderurgica Italiana 2017 – Federacciai 2018

Overview of cement production in Italy

19 Italian companies working in the field (2017)

Operating plants

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated facilities</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>Grinding</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>40</td>
</tr>
</tbody>
</table>

EU sold portland cement

2016: 139 Mt
2017: 145 Mt  
Eurostat (2019)

Distribution of sold portland cement

- Germany: 11%
- Greece: 4%
- Spain: 8%
- France: 10%
- Italy: 15%
- Poland: 9%
- Romania: 7%
- UK: 5%
- Others: 19%

Distribution by process

- Dry kiln: 62.5%
- Wet kiln: 12.5%
- Mixed kiln: 25.0%

Geographical distribution

- North: 44.0%
- Centre: 40.3%
- South: 15.7%
Process Integration for deep decarbonisation of efficient industries