

Environment and energy

Current definitions

Acidification

The main atmospheric emissions which contribute to the formation of acid rain are of nitrogen oxides (NO_x), sulphur oxides (SO_x) and ammonia (NH₃). In order to aggregate the emissions of the various pollutants which contribute to the phenomenon of “acidification” the different potential of each must be taken into consideration (Potential acid equivalent – PAE), thereby creating a common unit of measurement. Measurement in “PAE” tonnes is obtained by taking account of the quantity of hydrogen ions which would be formed for each gas if its deposition was complete. The following coefficients are used: 1/46 for NO_x; 1/32 for SO_x; 1/17 for NH₃.

Air temperature

The variable physical measurement that represents the thermal state of the atmosphere in a specific point at a given moment. Temperature expresses the energy level of the air, or the average kinetic energy associated with the air molecules due to the inducted heating from the sun's radiation. This aspect makes temperature one of the most important meteorological elements, as its space-time distribution is closely linked to the solar energy received by the earth's surface and the atmosphere. Temperature is measured using a *thermometer*, *thermograph* or *electronic temperature sensor*.

Apparent consumption of material resources - Total

Also known as “Direct material consumption”, this aggregate represents that part of the total use of material resources (or Direct material input) necessary to meet domestic end demand. In fact, this covers all uses of materials extracted from the Italian territory or from abroad, while materials incorporated in the goods exported or purchased by non-residents in the country are excluded. The final result is expressed in terms of weight, without counting the air and water used. The figure is different from that resulting from the difference between *Total use of material resources* and *Financial flows abroad*.

Atmospheric pollutants

- **CO₂ – Carbon dioxide.** Human activities which cause most of the release of carbon dioxide are those involving the combustion of fossil fuels. Carbon dioxide is one of the main “greenhouse gases”.
- **CH₄ – Methane.** The main sources of methane emission are the decomposition of organic waste in landfill sites, the combustion of agricultural waste, the extraction and transport of fossil fuels, the process of digestion of animals and fertilisation using organic compounds. Methane emissions contribute to the formation of “greenhouse gases” and tropospheric ozone.
- **N₂O – Nitrous oxide.** Nitrous oxide is essentially produced from the use of nitrates in fertiliser, by some processes typically used in organic and inorganic chemical industry and by some combustion processes. Nitrous oxide contributes to the formation of “greenhouse gases”.
- **NO_x – Nitrogen oxides.** Nitrogen oxides (nitric oxide NO and nitrogen dioxide NO₂) are produced mainly during the course of high temperature combustion processes and contribute to the formation of acid rain and the formation of tropospheric ozone.

- *SO_x – Sulphur oxides.* Sulphur dioxide, the main cause of acid rain, derives from the oxidation of sulphur during the combustion of substances containing this element. The main sources are transport, the production of electricity and heat and, to a lesser degree, industrial activities.
- *NH₃ – Ammonia.* Ammonia is a compound of nitrogen and is mainly derived from the degradation of organic substances. It can cause (when spread over the soil or transformed by certain types of bacteria) to soil acidification and, by consequence, groundwater.
- *COVNM (NMVOC) – Non-methane volatile organic compounds.* Non-methane volatile organic compounds are a class of organic compounds that includes: aliphatic hydrocarbons, aromatic hydrocarbons (petrol, toluene, xylene), oxygenated hydrocarbons (aldehydes, ketones), etc. They originate from the evaporation of fuel during replenishment operations in service stations, fuel stocking, the emission of uncombusted products from vehicles and from dry cleaning and dyeing activities. The effects on man and the environment vary widely according to the compound. Petrol is the most dangerous of the aromatic volatile hydrocarbons because it has been found to be carcinogenic. COVNM emissions contribute to the formation of tropospheric ozone.
- *CO – Carbon monoxide.* Carbon monoxide is a gas formed by the incomplete combustion of the hydrocarbons present in fuels and combustibles. It mainly comes from vehicle exhaust fumes and increases in relation to the condition of intense and slowed traffic. It is also emitted by heating systems and by certain industrial processes. CO emissions contribute to the formation of tropospheric ozone.
- *PM₁₀ – Fine particles with a diameter of less than 10 microns (or particulates).* Microscopic particles and drops of organic and inorganic material suspended in the air. These have a very varied composition: metals, asbestos fibres, sand, ashes, sulphates, nitrates, carbon and cement dust or vegetable substances. The main anthropic sources are heating plants and vehicle traffic.
- *PM_{2.5} – Fine particles with a diameter of less than 2.5 microns (or fine particulates).* Particles of PM_{2.5}, caused, as for PM₁₀, mainly by combustion engines and by certain industrial processes, are particularly dangerous for human health as they are capable of penetrating deep into the respiratory system. The especially small dimension of the particles means that they remain in the air for a much longer time than PM₁₀.

Atmospheric pollution

Any modification to the normal composition or physical state of the atmosphere, due to the presence of one or more substances in such a quantity and with such features as to: alter the normal environmental conditions and air quality; form a direct or indirect danger or threat to human health; compromise recreational activities and other legitimate uses of the environment; alter the biological resources, ecosystems and public or private assets.

Average temperature

The average of maximum and minimum temperatures in the period considered.

Average maximum temperature

The average of maximum daily temperatures in the period considered.

Average minimum temperature

The average of minimum daily temperatures in the period considered.

Biomass

In the energy field, biomass indicates the quantity of organic material that can be used to produce energy through combustion or fermentation. Biomasses useful for energy production include wood, liquid waste and animal manure, agricultural, forestry and paper waste. The concept of biomass energy is closely linked to that of “productivity”, which indicates the production of biomass by unite of time and is a functional parameter useful for studying environmental quality and the evolutionary state of an ecosystem.

Calorific value

The maximum amount of heat that can be produced by the complete combustion of 1kg of a combustible substance (or 1 m³ of gas) at 0 °C and 1 atm. *Lower heating value* is conventionally defined as "higher heating value less the heat of vaporisation during combustion".

Coppice with standards

A wooded area covered by a mix of high forest and simple coppiced areas.

Day with over 1 mm of precipitation

A day when at least one millimetre of precipitation was recorded.

Domestic extraction of material resources unused

Also known as "unused material from domestic extraction", this aggregate includes all materials, measured in terms of weight, which are intentionally extracted from the natural environment, but not for use. These are materials that are not incorporated in products, whose movement depends on the extraction of useful material or as a result of human activities (typically, construction activities). As for used materials, these figures do not include air and water.

This aggregate does include biomass material (waste from agricultural activities, forestry and fishing) in addition to non-valorised minerals deriving from mining and quarrying activities (discarded materials from the extraction of fossil fuels and non-energy producing materials) and from excavations (soil and rock that is not reused, resulting from the construction of buildings, roads and railways).

Domestic extraction of material resources used

Also known as "domestic extraction of used materials", this aggregate includes all the materials, with the exception of air and water, extracted from the natural environment of the Country to be incorporated in products, measured in terms of weight. For example, the aggregate includes all the ferrous mineral extracted from mines, including the parts or components which are subsequently discarded in the refining process. The earth removed, however, is not included, although it is moved in the course of the economic activity. Within domestic extraction of used material, a first level of disaggregation includes the following types of material: biomasses, energy and non-energy producing minerals.

Electricity for water pumping

Electricity used to raise water, through pumps, with the single aim of subsequently using it to produce electricity.

Electricity sector's own consumption

Includes the energy absorbed by auxiliary services in electricity transformation, transmission and distribution plants, warehouses and offices in the energy sector.

Emission

Release into the atmosphere of substances produced by specific or general sources.

Emissions from energy use with combustion (per cent)

For a given economic activity:

- *greenhouse effect resulting from energy use with combustion (per cent)* is obtained by dividing greenhouse gases generated by the combustion of the energy products out of total greenhouse gases produced by the economic activity in question (expressed in tonnes of CO₂ equivalent); the result is multiplied by one hundred;
- *acidification resulting from energy use with combustion (per cent)* is obtained by dividing the acidifying emissions generated by the combustion of the energy products out of total acidifying emissions produced by the economic activity in question (expressed in tonnes of potential acidification equivalent); the result is multiplied by one hundred;
- *tropospheric ozone resulting from energy use with combustion (per cent)* is obtained by dividing the photochemical smog created by the combustion of the energy products out of total

photochemical smog generated by the economic activity in question (expressed in tonnes of potential tropospheric ozone formation); the result is multiplied by one hundred.

Energy

Energy is defined as the capacity of a body or system to perform *work*. The unit of measurement for energy and its work is the *joule* (J), which expresses the amount of energy used (or work done) to exercise the force of one newton over a distance of one metre. Each system contains or stores or is formed by a certain quantity of energy which is presented in various forms (mechanical, chemical, nuclear, electric, luminous, thermal, biochemical) which can be converted from one to another. Energy transformations obey the laws of thermodynamics.

The *first law of thermodynamics* states that energy may be transformed from one form into another, but cannot be created or destroyed. In all energy transformations, however, a part of the energy is converted into heat and lost in this form without being used to perform work. In general, the energy lost as heat in an energy transformation is not destroyed in that it is still present in the environment, but it is no longer available to perform a useful task. It is said, therefore, to have been degraded.

The *second law of thermodynamics* states that in all transformations and exchanges of energy that take place inside a closed system, the potential energy (i.e. the energy that has not yet been used) present at the end will always be less than that present at the beginning. Processes in accordance with the second law of thermodynamics are known as exergonic and may take place spontaneously. However, processes known as endergonic processes also exist, in which the potential energy is greater than the initial energy. These processes do not take place spontaneously as they require an external source of energy.

Energy industries

The energy industries are the economic units whose *primary activity* is the production, transformation and distribution of energy products (for example, electricity and heating plants, petrol and gas extraction, carbon mines, petrol refineries, etc.)

Energy products

Energy products are those products exclusively or mainly used as energy sources. These include:

- *fuels* which are produced/generated by an economic unit (including households) and are used or can be used as energy sources. Conventions:
 - all *fossil fuels* (coal, crude oil and natural gas) are included independently of whether they are used as energy sources or not;
 - *fossil fuel derivatives* are included if used (or intended for use) as *fuel*;
 - *fossil fuel derivatives* which are used for *non-energy uses* are included if they represent an output from an *energy industry* (these are included because they account for how much of the apparent energy resource is used for non-energy purposes, and also allow for a complete overview of the industry in question);¹
 - *non-fossil fuels* (waste, agricultural waste and other biomasses) are included only if burned to produce electricity or heat;
- the *electricity* which is produced/generated by an economic unit (including households);
- the *heat* produced/generated and sold to third parties by an economic unit.

Energy required by a network in a set period

Production destined for consumption less the electricity exported plus the electricity imported. Demand for electricity is also equal to the sum of electricity consumption by end users and losses during transmission and distribution.

Financial flows abroad (exports and other domestic purchases by non-residents)

This aggregate includes all exports in addition to purchases made directly in Italy by foreign residents,

¹ For example: *lubricant oils* produced by an oil refinery, the production and use of which, even if normally used for non-energy uses, is recorded in energy statistics in order to monitor the various products derived by refinery and the amount of oil used for non-energy producing purposes; *plastic*, the use of which is not recorded as it does not represent an energy industry output, although derived from a fossil fuel (crude oil).

all expressed in terms of weight.

Within the category, an initial distinction is made between the following types of material: products derived from biomasses, products derived from energy producing minerals, products derived from non-energy producing minerals, composite products.

Financial flows from abroad (imports and other foreign purchases by residents)

This aggregate includes all imports in addition to purchases made directly abroad by Italian residents, all expressed in terms of weight. Within the category an initial distinction is made between the following types of material: products derived from biomasses, products derived from energy producing minerals, products derived from non-energy producing minerals, composite products.

Forest area

The total stocked and unstocked area of a forest.

Forest fires

These cover all the fires that occur in forest areas, or that could have extended to forests, which produced damage on an economic level or to the protective and recreational functions of the forest (Framework Regulation no. 353 dated 2000, art. 2).

Fossil fuels

Any form of hydrocarbon which can be exploited to generate heat or power. These are created from the transformation of an organic substance into more stable and richer forms of carbon. Fossil fuels are non-renewable energy sources, as their current rate of use is threatening their availability for future generations. Crude oil (and other natural hydrocarbons), carbon (in all its forms, from peat to black coal) and natural gas are all types of fossil fuel.

Fuel

Primary or secondary energy source which must be used in combustion or fission in order for the energy stored to be released for use.

Geothermal energy

Energy generated by geological heat sources, which may be considered a renewable source of energy if evaluated on a short term basis. Geothermal energy is based on the production of natural heat by the Earth (geothermia) fed by the thermal energy released in processes of nuclear decay of radioactive elements such as uranium, taurine and potassium naturally contained within the Earth.

Greenhouse gases

Gases present in the atmosphere, of natural and anthropogenic origin, which absorb and emit infrared radiation at specific wavelengths, causing a phenomenon known as the "greenhouse effect". These gases mainly include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF₆). The "greenhouse gases" allow solar radiation to pass through the atmosphere and impede infrared radiation from the Earth from passing into space, thereby contributing to global warming. Each of these gases has a specific potential warming power. In order to calculate total emissions of greenhouse gases, the quantity of emissions from each single pollutant is converted into "equivalent tonnes of CO₂", obtained by multiplying the emissions of each gas by its Global warming potential (GWP), expressed in relation to the GWP of carbon dioxide. To this end, the following coefficients are applied: 1 per CO₂; 310 per N₂O; 21 per CH₄.

Gross electricity generation (with reference to a group of generation plants, in a set period)

Gross electricity generation from a group of generation plants, in a set period, is equal to the total amount of electricity produced and measured in electric generator terminals.

Gross national electricity consumption

Gross national electricity consumption is equal to gross electricity production plus the balance of exchanges with abroad. It is defined as either gross or net of pumping according to whether gross

electricity production includes pumping in production figures.

Greenhouse effect

The natural phenomenon that occurs each time a semi-transparent membrane completely occludes a semi-reflective surface. As a result, as the sun's rays penetrate the semi-transparent membrane they lose a quota of energy and, therefore, become longer. The lengthened rays reach the semi-reflective surface which, while absorbing another quota of energy, reflects them and extends them even further. The reflected solar rays return to the semi-transparent membrane which once more allows only the lower frequency light rays to pass.

Heavy metals

The term heavy metal refers to all metallic chemical elements with a relatively high density and which are toxic in low concentrations. Heavy metals are natural components of the earth's surface. A small amount enters the human body through food, water and air. Like trace elements, some heavy metals are essential for maintaining the metabolism of the human body – however, at higher concentrations they can cause poisoning.

- *As – Arsenic.* Large quantities of arsenic are used in the glass-making industry to eliminate the green colour caused by the presence of impurities. It is sometimes added to lead to harden it, and it is used in the preparation of toxic gases for military use. Some compounds, such as gallium arsenide are, on the other hand, used in the production of semi-conductors and laser materials. Arsenic sulphide (As_2S_3), also known as red orpiment, is used as a pigment in the preparation of fireworks and paints.
- *Cd – Cadmium.* Cadmium is used to protect iron sheeting and for manufacturing negative plates for nickel-cadmium accumulators. It is also present in many low-temperature melting alloys used in manufacturing electric cables. Given its high absorption of neutrons, cadmium is used in the measurement bars in atomic batteries.
- *Cr – Chromium.* Chromium is used in the production of special alloys and in the paint, dyes and leather tanning industries. Alloys with a high chromium content are also used in manufacturing steel and cast iron. Certain nickel-chromium alloys are used for the construction of electric resistances and wires for thermoelectric coupling.
- *Cu – Copper.* Copper has the highest electric conduction properties of all the metals for industrial use. It is used in the production of electric wires and cables, electronic devices (engine parts, switches, metres, etc.). Thanks to its excellent heat-conducting properties, it is also used to construct boilers, alembic stills, heat exchangers, etc. Its characteristic resistance to atmospheric corrosion also makes it useful for the construction of tubes and external building surfaces.
- *Hg – Mercury.* In its pure state mercury is used for its high specific weight and its high electric and thermal conductive properties. In its liquid state it is used in electronic equipment and physics instruments (metres, rectifiers, pressure metres, etc.).
- *Ni – Nickel.* Thanks to its inalterability in air, nickel is used for galvanic coatings (galvanising) and, carefully divided, as a catalyser in hydrogenation processes for organic substances. It is often used for the preparation of stainless steel and special alloys for covers for precision instruments. It is also used for coins and electric cabling.
- *Pb – Lead.* Lead is used in batteries and as a coating for electric cables, tubes, tanks and in X-ray machines. Thanks to its high density and wide capture section, lead is used as a shielding substance for radioactive material. Numerous alloys with a high lead content are used for welding, printing and gears. A considerable quantity of lead is also used in paint and pigments. Furthermore, as lead is resistant to sulphuric acid, it is used for equipment in the chemical industry (lead rooms) and in the manufacturing process for accumulators. Lead compounds can be used as fuel additives.
- *Se – Selenium.* Selenium conducts heat and electricity and its resistance decreases when illuminated, leading to its use in some photoelectric cells.
- *Zn – Zinc.* Thanks to its inalterability in air, zinc is used in roof sheeting or tiling. In the form of sheets or plates, it is also used in graphic arts and dry batteries. In its melted form it is used in the manufacturing of various objects to be electroplated with a special alloy which

lends objects a bronzed appearance. Zinc has an efficient protective action on iron and steel exposed in certain environments, such as water, steam, organic substances, petrol or chlorine solvents. This protection is created using various processes. Zinc is also included in numerous copper alloys.

High forest

A stocked area in which plants are destined to be grown as high plants and prevalently renew themselves naturally (by seed) or artificially (by cuttings). Regarding species of tree, high forests are divided into conifer forests (or resinous trees), hardwood trees or mixed species.

Hydroelectricity

Energy which exploits the transformation of potential gravitational energy (held by raised masses of water) into kinetic energy when the water changes level. This kinetic energy is transformed via an alternator coupled with a turbine into electricity.

Hydrometric level

The measurement of the difference between the water level of a river and its altimetric point of reference, which may be average sea-level or the “zero” level of the hydrometer itself (known as “hydrometric zero”).

Macroseismic intensity

A numeric value representing the effects of an earthquake felt in a certain place. This value is assigned by comparing the real effects of a given scenario with those described in various scales of intensity commonly used. The intensity in a certain point depends not only on the magnitude of the earthquake but also on the distance from its centre, the local geological conditions and the type of buildings. The scales of macroseismic intensity therefore have the task of classifying earthquakes according to the damage done to people, buildings and the environment. The scale of intensity most often used in Italy is the Mercalli Cancani Sieberg (Mcs) scale. A European macroseismic scale has also been recently created (Ems).

Magnitude

The measurement of the power of an earthquake at its origin (hypocentre) which is calculated from the extension or duration of the seismogram. Except in special cases, earthquakes with a magnitude of less than 2.5 are not felt by the population. The Richter scale, also known as local magnitude, is expressed as the decimal logarithm of the relation between the extension recorded by a particular instrument, the Wood-Anderson torsion pendulum and a reference extension. Richter magnitude can only be calculated for earthquakes that occur less than 600 km from the station recording the event. In order to overcome this limitation, other magnitude scales have been introduced allowing for the measurement of the energy irradiated by an earthquake.

Material resource requirements for domestic consumption

Also known as “Total consumption of material resources”, this aggregate takes account of all the material flows necessary on a global level to meet only domestic final demand for national and foreign products, accounting for the movement of both used and unused material in the Country or abroad in order to allow for the Country’s consumption and investment processes. This is equal to *Overall material resource requirements* less *Financial flows abroad* and *Material resources requirements for export production*.

Material resources requirements for export production

Also known as “Indirect flows associated with exports”, this aggregate is entirely analogous to *Material resource requirements for imported production*, and is formed of the used and unused materials that it was necessary to mobilize on a global level in order to produce the goods exported, but which are not incorporated in the goods themselves.

Material resource requirements for imported production

Also known as “Indirect flows associated with imports”, this aggregate is formed of the materials, used

or otherwise, that had to be mobilised on a global level in order to produce the imported goods, but which were not incorporated in the goods themselves. These include both used and unused materials. Unused materials were transformed, during the course of production abroad, into waste products and emissions. Taking account of indirect flows connected with importations therefore means also referring to the phases of the product life cycle which are performed abroad, i.e. the transformation of materials upstream of importation. All the emissions and waste products generated abroad during the production of the goods and services in question are therefore included.

Namea

National accounting matrix including environmental accounts, adopted on a European level, which represents the interaction between the economy and the environment in such a way as to guarantee the comparability of economic and social data (output, income, employment, etc.) with those relating to the stress posed by human activities on the natural environment (environmental pressure).

Tropospheric ozone

The formation of tropospheric ozone is a phenomenon with damaging effects on human health, agricultural cultivations and forestry and for historical-artistic heritage. The main atmospheric emissions that contribute to the phenomenon include methane (CH₄), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOCs) and carbon monoxide (CO). These emissions are expressed in tonnes of “potential tropospheric ozone formation”, calculated using the following coefficients: 0.014 for CH₄; 1.22 for NO_x; 1 for COVNM; 0.11 for CO.

National parks

According to Law no. 394/1991 national parks are formed of land, river, lake or sea areas containing one or more intact or partially altered ecosystems, one or more physical, geological, geomorphological or biological formations which have an international or national importance for their natural, scientific, aesthetic, cultural, educational or recreational value such as to require intervention by the State to conserve them for present and future generations.

Net electricity production for consumption

Net production less the quantity of electricity used for pumping.

Net electricity generation (with reference to a group of generation plants, in a set period)

The total amount of electricity produced, measured as it leaves the plants, i.e. less the amount

Network electricity loss in a certain period

The difference between energy demand and consumption, including consumption by the electricity sector itself.

Overall material resource requirements

Also known as “Overall material requirements”, this aggregate gives an overall account of all the material flows necessary on a global level in order to meet final demand, both domestic and foreign, for national and foreign products, accounting for the movement of both used and unused material in the Country and abroad in order to allow for the Country’s production and consumption processes to take place. This includes: domestic extractions of material used, imports, domestic extractions of unused material and indirect flows associated with imports, and is the result of the sum of the *Total use of material resources* and *Material resources for import production*.

Photovoltaic energy

The thermal or electric energy produced by directly exploiting the energy irradiated by the Sun (renewable energy) towards the Earth.

Pollutant

Any substance directly or indirectly released by man into the air or environment which may have a damaging effect on human health or the environment as a whole.

Quantity of rainfall

The total amount of water particles that fall in a set place and time, expressed in millimetres. The height of one millimetre of rainfall corresponds to one litre of water over a flat surface of one square metre.

Rainfall

Any form of atmospheric water which reaches the earth's surface either in a liquid or solid state. Forms include: rain, drizzle, dew, fog, snow, ice, hail and frost. The measurement of rainfall takes place using *totalising rain gauges*, *recording rain gauges* or *electronic precipitation sensors*.

Both solid and liquid rainfall is a discontinuous phenomenon, for which it is important to measure the quality, quantity, intensity, duration and distribution over time. Due to the range of details, rainfall analysis and statistics are very complex and do not always effectively represent the amount of rainfall in question, with reference to the actual representation of average rainfall and its practical utility. It is important to

consider that, while for some measurements such as temperature and pressure, the average measurement and variance from it are capable of providing a good representation of the measurements taken, other meteorological phenomena, such as rainfall (and cloud cover) are harder to represent as the distribution of the data measured cannot be compared to normal values.

Renewable energy sources

The sun, wind, water, geothermal resources, tides, waves and the transformation into energy of vegetable, organic or inorganic waste.

Residence principle

According to the residence principle, "A unit is said to be a resident unit of a country when it has a centre of economic interest on the economic territory of that country – that is, when it engages for an extended period (one year or more) in economic activities on this territory" (ESA95 § 1.30).

of electricity used for auxiliary production services (auxiliary plant services and transformation losses).

River discharge

The quantity of water, normally expressed in cubic metres per second, which passes the transversal section of a river in a given unit of time.

Simple coppice

A wooded area in which the plants, exclusively or prevalently born from gem, are destined to naturally renew themselves through asexual reproduction (budding).

Stocked forest area

An area of land not less than half a hectare covered by trees, bushes or grassy forest plants which produce timber or other forest products, covering, when mature, at least 50 per cent of the surface and capable of having an indirect impact on climate and water management.

Tonne of oil equivalent (TOE)

The unit of measurement of energy equivalent to 10 million kcal (kilo calories). The TEP allows for the expression of the various energy sources in single unit of measurement, taking account of their different heating power.

Total energy use / Output (TJ / M€)

For any given economic activity, *Total energy use / Output (TJ / M€)* is obtained by dividing total energy uses (with or without combustion) of energy products (expressed in terajoules) and output value (expressed in millions of euros at basic prices – chained values – year of reference 2000) of the production activity considered. The ratio represents the energy efficiency of the productive activity: the higher the value of the indicator, the less efficient the production activity is from an energy point of view.

Total extraction of resources

Also known as "Overall domestic material requirements", this aggregate includes all the material extracted in Italy, used or otherwise, with the exception of air and water, expressed in terms of weight.

Transmission

The transport and transformation of electricity via the interconnected high and maximum tension network, in order to deliver energy to clients, distributors and the end-users of self-produced energy.

Unstocked forest area

An area of land formed by non-productive areas which are nonetheless necessary for production (forest roads, fire prevention courses, timber warehouses) and by other small areas such as rocky soil, bogs, streams, forest nurseries situated within the forest and destined for its own replenishment, in addition to the homes of forest personnel with annexed land and forest management offices.

Use of energy products

- *energy use with combustion*: includes energy contained in the energy products burnt for the following reasons:
 - *heating*: includes the energy contained in the energy products used to heat homes, shops, offices, plants, enterprises, etc.;
 - *transport*: includes the energy contained in energy products used for road and off-road transport (i.e. by rail, air or sea in addition to all the operations of ships, boats, tractors, construction machinery, lawnmowers, military and other equipment); for households, private transport is considered; for production activities, transport performed as a primary, secondary or ancillary activity is considered;
 - *transformation in electricity*: includes the energy contained in energy products transformed via combustion into electricity;
 - *other energy use with combustion*: includes energy in energy products transformed via combustion into energy products other than electricity (for example, coke transformed into blast furnace gas), energy in energy products used by production activities in production processes in a strict sense (therefore excluding heating, transport and transformation) and energy in energy products used by households for cooking and producing hot water;
- *energy use without combustion*: includes the energy contained in energy products transformed without combustion into other energy products (for example, crude oil transformed into petrol) and the energy included in the electricity used by households and production activities for any purpose;
- *non-energy use*: includes the energy contained in energy products transformed into non-energy products (for example, crude oil transformed into plastic) and the energy included in energy products used for non-energy producing purposes (degreasing, dry cleaning, lubrication, etc.).

Use of material resources - Total

Also known as "Direct material input", this aggregate includes all extractions in Italy, with the exception of air and water, expressed in terms of weight and all imports in addition to purchases made directly abroad by Italian residents. The figure is the total of the *Domestic extraction of material resources unused* and *Financial flows from abroad* aggregates.

Waterflow measuring station

Measurement station for the level of water courses.

Wind power

Wind power is the product of the kinetic conversion of wind into other forms of energy (electric or mechanical) through a wind power plant.