DOMANDE URNA A

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INGLESE

1	The air pollution is produced by the indoor or outdoor environmental contamination by chemical, physical or biological agents that modify the natural characteristics of the atmosphere. The machine for the homes heating, the engines of vehicles, industrial plants and forest fires are common sources of air pollution. Pollutants that have great impacts on public health are particulate matter (PM10), carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2) and sulfur (SO2).
2	Air pollution is harmful to human health and the environment. In Italy, emissions of many air pollutants have significantly decreased in recent decades, with consequent improvement of air quality; however, the concentrations of air pollutants are still too high and the air quality pollution persist. This also happens because the report between emissions (what comes from car exhaust pipes or chimneys of houses and industries) and concentrations of pollutants in the atmosphere (which describe the quality of air that

	people breathe) is not generally direct and linear : the concentration observed and its variability in time and space depend in fact, in addition to the load-emissivity, by other factors, related to meteorology and the chemical reactivity.
3	This example is specific for PM10, (O3), (NO2) that in part or all, are formed in the atmosphere from other substances called "precursors". Therefore it is necessary to estimate the emissions, through the inventories of emissions into the atmosphere, and measure the concentrations to assess the air quality in order to study phenomena and plan a series of measures and actions to be taken by means of plans and programs to contrast air pollution.
4	The biodiversity can be defined as the life richness on the earth planet: it means the millions of plants, animals and microorganisms, the genes which they contain, the complex ecosystems that they compose in the biosphere. The Convention on Biological Diversity (CBD) 1, proposed during the Earth Summit in Rio de Janeiro in 1992, defines biodiversity as the variety and variability among living organisms and ecological systems in which they live, highlighting that it includes diversity at different level, such as genetic, specific and ecosystem.
5	This variety does not only refer to the shape and structure of living beings, but also includes diversity in terms of abundance, distribution and interactions between the different components of the ecosystem. In conclusion, biodiversity also includes human cultural diversity, which also suffer the negative effects of these factors that act on the genetic biodiversity.
6	Since the middle of last century fast climate change have been observed by scientists. The earth's climate is subject to seasonal fluctuations, decadal and centuries-old that are related with natural causes such as the Earth's orbit, solar radiation, ocean circulation and volcanic eruptions (climate variability). During the last years, however, more deep and rapid changes of the climate system have been determined by human being, above all due to the increase of greenhouse gas emissions into the atmosphere. With the first global conference on climate change in 1979, scientists have started to study about how to predict and prevent potential man-made changes in nature and that could have a negative effect on the welfare of humanity.
7	The IPCC (Intergovernmental Panel on Climate Change) is the highest world forum of experts concerning climate. The IPCC has the task to assess the information available in the scientific, technical and socio-economic fields related to climate change, their possible impacts and adaptation and mitigation options. The last IPCC report dated 2015 confirmed that the Earth's climate is warming up (the average temperatures on global surface is increased by about 0.6 ° C over the last century) and that human impacts on the climate system is obvious.

8	Climate change will produce not only a global warming, but also an intensification of the hydrological cycle. At global level this implies a rise of evaporation and precipitation. At the regional level the impacts depend by the area around. The Mediterranean basin is considered an area particularly vulnerable (hot spot) to the climate change. For the future, a further increase in greenhouse gas emissions could be associated with other significant changes compared to the past, such as an additional warming, changes in the amount and type of precipitation, rising sea level and changes of extreme weather events (floods, droughts, cyclones, etc) for frequency and quantity. Also in case the growth of concentrations of greenhouse gas in the atmosphere would be stopped during this century, climate change and the sea level rising will continue for centuries, determined by past, current and future human activities.
9	People living in low- and middle-income countries disproportionately experience the burden of outdoor air pollution with 91% (of the 4.2 million premature deaths) occurring in low- and middle-income countries, and the greatest burden in the WHO South-East Asia and Western Pacific regions. The latest burden estimates reflect the very significant role air pollution plays in cardiovascular illness and death. More and more, evidence demonstrating the linkages between ambient air pollution and the cardiovascular disease risk is becoming available, including studies from highly polluted areas.
10	There are many examples of successful policies in transport, urban planning, power generation and industry that reduce air pollution: - for industry: clean technologies that reduce industrial smokestack emissions; improved management of urban and agricultural waste, including capture of methane gas emitted from waste sites as an alternative to incineration (for use as biogas); - for energy: ensuring access to affordable clean household energy solutions for cooking, heating and lighting; - for transport: shifting to clean modes of power generation; prioritizing rapid urban transit, walking and cycling networks in cities as well as rail interurban freight and passenger travel; shifting to cleaner heavy-duty diesel vehicles and low-emissions vehicles and fuels, including fuels with reduced sulfur content; - for urban planning: improving the energy efficiency of buildings and making cities more green and compact, and thus energy efficient;

11	PM is a common proxy indicator for air pollution. It affects more people than any other pollutant. The major components of PM are sulfate, nitrates, ammonia, sodium chloride, black carbon, mineral dust and water. It consists of a complex mixture of solid and liquid particles of organic and inorganic substances suspended in the air. While particles with a diameter of 10 microns or less, (≤ PM10) can penetrate and lodge deep inside the lungs, the even more health-damaging particles are those with a diameter of 2.5 microns or less, (≤ PM2.5). PM2.5 can penetrate the lung barrier and enter the blood system.
12	There is a close, quantitative relationship between exposure to high concentrations of small particulates (PM10 and PM2.5) and increased mortality or morbidity, both daily and over time. Conversely, when concentrations of small and fine particulates are reduced, related mortality will also go down – presuming other factors remain the same. This allows policy-makers to project the population health improvements that could be expected if particulate air pollution is reduced. Small particulate pollution has health impacts even at very low concentrations – indeed no threshold has been identified below which no damage to health is observed. Therefore, the WHO 2005 guideline limits aimed to achieve the lowest concentrations of PM possible.
13	Excessive noise seriously harms human health and interferes with people's daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour. Traffic noise alone is harmful to the health of almost every third person in the WHO European Region. One in five Europeans is regularly exposed to sound levels at night that could significantly damage health.
14	Clean water is an essential resource for human health, agriculture, energy production, transport and nature. But it is also under multiple pressures. Currently, only 40% of Europe's surface water bodies achieve good ecological status. In addition, even though EU countries have managed to reduce selected pressures, the status of our marine ecosystems remains critical, both in terms of species and habitats. More efforts are needed to achieve Europe's freshwater and marine-related environmental targets.
15	Land and its soils are the foundation for producing food, feed and other ecosystem services such as regulating water quality and quantity. Ecosystem services related to land use are critical for Europe's economy and quality of life. Competition for land and intensive land use affects the condition of soils and ecosystems, altering their capacity to provide these services. It also reduces landscape and species diversity.

16	Land take and soil sealing continue, predominantly at the expense of agricultural land, reducing its production potential. While the annual rate of land take and consequent habitat loss has gradually slowed, ecosystems are under pressure from fragmentation of peri-urban and rural landscapes. Land recycling accounts for only 13 % of urban developments in the EU. The EU 2050 target of no net land take is unlikely to be met unless annual rates of land take are further reduced and/or land recycling is increased.
17	European policy aims to develop the bioeconomy but while new uses for biomass and increasing food and fodder consumption require increasing agricultural output, land for agricultural use has decreased. This leads to growing pressures on the available agricultural land and soil resources which are exacerbated by the impacts of climate change. The lack of a comprehensive and coherent policy framework for protecting Europe's land and soil resources is a key gap that reduces the effectiveness of the existing incentives and measures and may limit Europe's ability to achieve future objectives related to development of green infrastructure and the bioeconomy.
18	Circular economy in Europe requires the implementation and upscaling of circular business models on a wide scale. Meeting circular economy goals (e.g. reuse, repair, recycling) requires innovation in the type of business model used (e.g. moving from sales to leasing), technological innovation (new technologies) and social innovation (new ways of interacting or connecting business and people).
19	In all phases of the product life cycle — often referred to by business as its value chain — companies can pursue circular goals, such as reuse, repair and recycling, by implementing different strategies to create, deliver or capture value into their business models. The relevance of the different circular goals is not the same for each lifecycle phase, and the actors that operate in each phase are not the same.
20	Incremental innovation in process efficiency and optimisation has contributed to lower resource use in production and distribution processes. More radical innovation is required, however, to achieve decoupling of resource use from economic growth. Such innovation is partly technological (e.g. the introduction of digital, distributed production technology), partly business model-related (service models or take-back models), and partly social (consumers adopting new practices such as sharing or pay-per-use models or acknowledging the residual value of goods after use).
21	Noise pollution is a major environmental health concern in Europe. It is caused by noise coming from a variety of sources and is widely present not only in the busiest urban environments but increasingly in once natural environments. The adverse effects on those exposed to noise pollution include threats to the well-being of human populations, the deteriorating health and distribution of wildlife on land and in the sea, the decreased abilities of our children to learn properly at school and the high economic price society must pay as a result.

22	Prolonged exposure to environmental noise can lead to negative cardiovascular and metabolic effects, reduced cognitive performance in children as well as severe annoyance and sleep disturbance. Long-term exposure to environmental noise is estimated to cause 12.000 premature deaths and to contribute to 48.000 new cases of ischemic heart disease per year in the European territory. It is estimated that 22 million people suffer chronic high annoyance and 6.5 million people suffer chronic high sleep disturbance. As a result of aircraft noise, 12500 schoolchildren are estimated to suffer learning impairment in school.
23	Manufactured chemicals play a key role in the provision of a large range of goods and services that support our lifestyles and economies. However, even small amounts of some chemicals can endanger human health and the environment. With increasing quantities of such chemicals in the environment and improved scientific understanding of their effects on people and ecosystems, the challenge is to find the right balance between the benefits and risks of chemicals.
24	Human ingenuity has produced well over 100 000 new chemicals — substances which have never before been part of the terrestrial environment. Some, such as substances containing heavy metals and 'persistent organic pollutants', have been known to be dangerous for many years already, while fears have been raised about many others recently. For most of these chemicals, however, we simply do not know how they pass through the environment, whether they are accumulated, dispersed or transformed, and how they affect living organisms at different concentrations.
25	Europe relies heavily on material resources for almost all of society’s activities. Its extraction and production of material resources have significant impacts on the environment and human health, as well as on the economy. It is essential to reuse such resources in European economies, keeping their value high, delivering value for longer periods and reducing the need to use virgin materials. While progress is being made in Europe, by implementing an ambitious waste policy and the Circular Economy Framework, significant amounts of valuable resources are still lost through inefficient waste management practices.
26	Europeans have adopted urban lifestyles, and they enjoy city amenities such as cultural, educational and health services. Cities are the engines of Europe’s economy and the creators of its wealth. However, they depend heavily on regions outside the city to meet their demand for resources such as energy, water and food, and to dispose of and disperse waste and emissions. In this context, the main challenge is to find a way to accommodate a greater number of people while reducing impacts on the environment and from climate change and improving the quality of life of city residents. To give citizens a healthy living space and increase the sustainability of urban environment will require a radical transformation of the current model of urban development.

27	A habitat can be a salt marsh, a meadow or a pine forest, but a habitat can also be recognised at the landscape level of a tundra type or a deep-sea mud covering several hundreds of square kilometres. At the other extreme, it may be a microhabitat of less than 1 m², for example decaying wood, or animal dung in grassland environments. A habitat or a group of related habitats can be considered an ecosystem. Ecosystems are dynamic complexes of plant, animal and micro-organism communities and their non-living environment, which interact to form functional units. Habitats change over time. Changes can be slow or rapid, natural or human induced.
28	We need to invest in a green recovery to restart the economy. The European Green Deal puts climate change mitigation at the core of its efforts to recover sustainably from the COVID-19 crisis. Renewable electricity could increase to 70 % of all power generation by 2030 to allow a net 55 % reduction in greenhouse gas emissions by that year and climate neutrality to be reached by 2050. Despite multiple benefits for human health and the environment associated with the reduction in fossil fuel use for energy, increasing renewable power supply is not impact free. Concerns have been raised that renewable electricity could shift environmental burdens in ways that do not always lower overall pressures. This briefing investigates changes in the electricity mix since 2005, and their trade-offs from a life cycle perspective to help policymakers and individuals focus on areas that offer opportunities for improvement.
29	Financial incentives and taxes set by countries can encourage consumers to buy passenger cars with lower carbon dioxide (CO2) emissions. An increase in the uptake of electric vehicles reduces emissions of CO2 and air pollutants such as nitrogen oxide (NOx) and particulate matter (PM). Examples from a number of countries show that this uptake can be enhanced by well-designed incentives and taxes. In contrast, tax schemes that promote conventional cars labelled as cleaner do not always result in reduced emissions.
30	Green infrastructure networks consist of strategically planned natural and man-made green structures, designed to deliver a wide range of ecosystem services. These services include water and air purification, space for recreation and climate mitigation and adaptation.
31	The average annual surface temperature in Europe has been increasing at a faster rate than that of the global average temperature. The largest temperature increases have occurred in southern Europe in summer and in the Arctic region in winter.
32	At the same time, precipitation is generally decreasing in southern Europe and increasing in the north, albeit with significant seasonal variations. Moreover, projected increases in the intensity and frequency of heat waves and floods, and changes in the distribution of some infectious diseases and pollen can adversely affect human health.

33	Climate change represents an additional pressure on ecosystems. It causes northward and uphill shifts in the distribution of many plant and animal species, which can lead to local extinctions. Furthermore, climate change impacts many socio-economic sectors, including agriculture, forestry, energy production, tourism and infrastructure. Finally, most of the projected economic impacts in Europe are adverse.
34	Evaluating the effects of existing policies can help decision-makers to make better and more informed decisions about future policies. This requires a systematic process for assessing policy design, implementation, outputs and impacts. Policymakers from different countries can also learn from each other by making information available on their country's experiences of designing and implementing policies and measures in various sectors, and of assessing and monitoring their effects.
35	Human society relies for its health and well-being on four basic categories of natural resources: food, water, energy and other materials including fibre, minerals and processed chemicals. At the global level, food, water and energy systems are becoming increasingly vulnerable. Global demand for energy and water is projected to rise by 40 % over the next 20 years if no major policy changes are implemented.
36	A major hurdle to the reliable risk assessment and management of chemicals is the lack of harmonised information at European level concerning the exposure of citizens, including workers, to chemicals and their interplay with other concurrent environmental exposures and impact on health. Individuals are exposed to a complex mixture of chemicals in their daily lives through the environment, products, food and drinking water and at work. For many chemicals, the health impacts over a lifetime associated with exposure remain unknown.
37	Human biomonitoring allows us to measure our exposure to chemicals by measuring either the substances themselves, their metabolites or markers of subsequent health effects in body fluids or tissues. Information on human exposure can then be linked to data on sources and epidemiological surveys, in order to inform research on the exposure-response relationships in humans.
38	Introducing lower speed limits on motorways is expected to cut both fuel consumption and pollutant emissions. The exact benefit depends on a number of factors, however, including both technological effects such as the fall in energy consumed when decreasing speed, and non-technological factors such as vehicle fleet composition, driving patterns, frequency of speeding, congestion and traffic diversion due to the speed limit.

39	Based on a simulation, cutting motorway speed limits from 120 to 110 km/h could deliver fuel savings for current technology passenger cars of 12–18 %, assuming smooth driving and 100 % compliance with speed limits. However, relaxing these assumptions to a more realistic setting implies a saving of just 2–3 %. Significant fuel savings can be achieved by encouraging drivers to maintain a consistent speed and restrict their speed (eco-driving), including through effective enforcement of speed limits. Cutting speed can also significantly reduce emissions of other pollutants, particularly reducing NOx and particulate matter (PM) output from diesel vehicles. The safety gains from slower driving are also indisputable.
40	The idea of using more stringent speed limits to reduce travelling speeds on motorways and thereby cut fuel consumption and transport emissions has received much attention recently. Among all the potential measures available, stricter speed limits could have an immediate effect on fuel consumption and emissions. Scientific evidence and knowledge sharing could help make lower speed limits more politically acceptable by clarifying the environmental consequences, as well as the impacts on safety and mobility.
41	Sustainability transitions research stresses the crucial role of innovation in triggering systemic change in society's production methods, consumption patterns, lifestyles and cultural norms. A central aspect of transitions governance therefore consists of finding ways to foster experimentation, invention and diffusion of potentially transformative innovations. It is impossible to know in advance precisely what innovations will emerge, how they will be integrated into lifestyles, and how they will affect sustainable outcomes.
42	The urgent pace of technological change in recent decades, and the emergence of related innovations in business models, organisational forms and social interaction, therefore present vital opportunities to catalyse transitions but also significant risks and uncertainties. Disruptive technologies such as the Internet of things (IoT), cloud computing and big data, artificial intelligence (AI), blockchain, robotics, biotech and nanotech will affect resource use, greenhouse gas emissions, fiscal systems and other dimensions of sustainability in complex ways.
43	Technological innovations offer great potential to reduce resource use and carbon emissions, especially in combination with organisational and social innovations, for example, in the circular economy and the sharing economy
44	The effects of technological innovation can be ambiguous, however,because it is neither guided by norprimarily concerned with sustainability. Some novel technologies, such as blockchain, have significant energy appetites. Others, such as self-driving cars and sharing platforms offer potential resource efficiency improvements but may instead lead to increased environmental pressures if they boostdemand (i.e. rebound effects)

45	Technological innovationscan support economic performance in an ageing society by supplying production capacities that have been affected by a shrinking labour force. However, technology-led productivity gains may affect demand for labour. Widespread labour substitution is likely to cause unemployment. If it is biased against older people then it will also exacerbate the public policy problems arising from ageing-related social spending and declining labour tax revenues
46	Environmental noise is an important public health issue, featuring among the top environmental risks to health. It has negative impacts on human health and well-being and is a growing concern among both the general public and policy-makers in Europe.
47	Bio-waste — mainly food and garden waste — is a key waste stream with a high potential for contributing to a more circular economy, delivering valuable soil-improving material and fertiliser as well as biogas, a source of renewable energy
48	About 60 % of bio-waste is food waste. Reducing the demand for food by preventing food waste can decrease the environmental impacts of producing, processing and transporting food. The benefits from reducing such upstream impacts are much higher than any environmental benefits from recycling food waste
49	To enable bio-waste to be used as a source of high-quality fertiliser and soil improver, it needs to be collected separately at source while keeping impurity levels low. Contamination with plastics is a growing concern, and plastics need to be prevented from entering bio-waste.
50	More and more plastic consumer products are labelled as 'compostable' or 'biodegradable', and there has been a proliferation of different labels. This creates risks of confusing consumers, contaminating compost and increasing the costs of treatment. Clear rules on labelling of compostable/biodegradable plastics are needed, and we also need to identify which applications might have overall benefits and under which conditions

F.to il Presidente della Commissione esaminatrice (dott. S.R. de Donato)
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