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Noise and light pollution

Report

Committee on the Environment, Agriculture and Local and Regional Affairs

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Summary

Noise and light pollution may cause serious harm to humans and to the environment.

The report reviews the damage caused by noise and light pollution to humans and other living species. These types of pollution can have serious repercussions, such as disturbing ecosystems and provoking diseases in humans.

In the countries in which reliable statistics are available it is considered that around 40% of the population is exposed to noise levels exceeding 55 decibels (dB) during the day and 22% of the population to levels of more than 65 dB. Over 30% of the population is believed to be exposed to noise levels exceeding 55 dB during the night (the acoustic nuisance scale begins at 65 dB). Prolonged exposure to noise, particularly among the young, poses a real health threat.

The fight against noise and light pollution is a major environmental and public health challenge. The report calls for an integrated approach to the problem and for efforts to raise awareness of the whole society. It is also suggested that all member states take measures to introduce threshold levels for noise and light and impose penalties for exceeding those levels.



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A. Draft resolution

1. The Parliamentary Assembly notes and deplores the fact that the continent of Europe is particularly affected, in environmental terms, by both noise and light nuisances.
2. It refers in this connection to the World Health Organisation Guidelines for community noise, which were intended to provide legislative guidance without binding effect in themselves, and European Union [Directive 2002/49/EC](#) relating to the assessment and management of environmental noise, proposing a common approach by member states and requiring strategic noise mapping and introduction of action plans in the countries of the European Union.
3. The Assembly recalls that noise pollution may have multiple causes, with mobile mechanical sources (chiefly motor vehicles and aircraft), isolated mechanical sources (machines, factories etc.), occasional or ongoing operations and work sites (quarrying), public demonstrations and events (one-off or, more seldom, sustained): celebrations, fireworks, festivals, concerts and other places of musical entertainment, stadiums; animal sources (barking, noises from livestock farms, shelters etc.), the neighbourhood (poor soundproofing of buildings, lawn mowers, children, accidentally triggered alarms), portable audio devices and mobile phones in collective transport, etc.
4. Its effects can be serious, possibly disastrous for the environment overall, through disturbance of ecosystems (terrestrial as well as marine and aquatic), but also through the development of pathologies in man.
5. As to light pollution, the Assembly emphasises that the Starlight Declaration, signed by UNESCO in 1992, seeks chiefly to preserve an “unpolluted” night sky, and hopes that similar provision will be made in all national legislations.
6. Furthermore, light pollution affecting flora and fauna poses one of the worst threats to urban biodiversity but above all has harmful effects on the human metabolism.
7. Moreover, the energy consumption caused by excessive lighting has indirect implications for the environment, for example the pollution linked with production and transmission of the energy.
8. Bearing in mind the Stockholm Declaration of 1972, adopted by the United Nations Conference on the Human Environment, which expressly acknowledged the link between protection of the environment and human rights, its Recommendations 1863 (2009) on Environment and health: better prevention of environment-related health hazards and 1885 (2009) on Drafting an additional protocol to the European Convention on Human Rights concerning the right to a healthy environment, the Assembly invites member and non member states to find a common approach for combating the harmful effects of noise and light pollution by taking measures aimed at:
 - 8.1. introducing threshold values for noise and light into environmental medicine, imposing penalties and establishing maximum reference values for noise in connection with the WHO guidelines;
 - 8.2. creating permanent observatories for noise as tools for aiding decision-making and public information as well as regional observatories for light covering the entire territory;
 - 8.3. disseminating the findings of noise pollution observation in real time, as is often the case with air pollution or road traffic;
 - 8.4. developing plans for preventing and combating noise in all municipalities in the same ways as urban development plans and encouraging participative arrangements;
 - 8.5. taking account of noise “peaks” and event noise indicators to complement energy level indicators, to better reflect the nuisance levels expressed by communities;
 - 8.6. establishing a classification of rolling stock, along the lines of the International Civil Aviation Organisation classification of aircraft, and further tightening constraints in relation to noise emissions;
 - 8.7. rationalising lighting in all municipalities by preparing plans with participation by scientists – particularly astronomers - and associations for the protection of the environment and the sky and defining maximum lighting levels for roadways and sky;
 - 8.8. controlling light spillage from all properties;
 - 8.9. harmonising and simplifying noise and light pollution indicators, as an indispensable measure for comprehension of the respective issues at the level of the general public;
 - 8.10. extending high environmental quality standards (HQE, France) to noise and light;

8.11. studying noise and light issues on school curricula and educating the public, particularly young people who are particularly exposed to high level noise in places of entertainment or from listening to loud music via earphones.

9. The Assembly also invites member and non-member states to:

9.1. frame policies to reduce traffic and convert it to soft modes, via the areas of urban planning, taxation, vehicle technology, individual and collective behaviour, etc;

9.2. assist and support economically weak sectors (such as rail freight) that work towards noise abatement;

9.3. promote coordinated noise/energy intervention on housing stock, based on suitable training of the trades concerned and collective procedures on the scale of the districts or building complexes dealt with, ensuring that all regulations are rigorously enforced and deemed to apply strictly the threshold levels tested and to take appropriate measures if ineffective;

9.4. involve acoustic technicians in all major development projects;

9.5. make acoustics part of architects' training;

9.6. support efforts to achieve noise abatement in the transport sector, particularly regarding goods trains (at the level of the rails, using long welded rails, and using preferably disk brakes), road surfaces and the development of soft transportation modes;

9.7. abate or even eliminate light pollution in the area of public lighting by using directional low-pressure sodium lamps and presence detectors and exploiting natural light;

9.8. integrate noise and light pollution problems into programmes geared to aiding research and technological development.

B. Draft recommendation

1. The Parliamentary Assembly, referring to its Resolution ... (2010), underlines the significant harmful effects of noise and light pollution on the environment in general, and on biodiversity and human health in particular.
2. It recommends that the Committee of Ministers:
 - 2.1. invite member and observer states of the Council of Europe to review their legislation regarding noise and light pollution to ensure that it is relevant to the present-day situation;
 - 2.2. consider whether or not it would be appropriate to draft a framework convention on the measures to be taken, at pan-European level, to address the acute problem of noise and light pollution.

C. Explanatory memorandum by Mr Huseynov, rapporteur

1. A growing environmental and public health issue

1. By 2050, over four fifths of the total population of the Council of Europe's member states will live in densely populated urban areas. This concentration of human life will have a growing impact on the functioning of individual areas and ecosystems as well as ramifications for people's lifestyle and health.
2. Already today, the Eurobarometer survey of public opinion on the environment, implemented at the initiative of the European Commission, shows that, despite considerably heightened awareness of environmental challenges as a whole, urban pollution is still the biggest environmental problem in the European Union. Indeed, the same could very likely be said for the entire European continent. Yet, efforts to combat this pollution vary enormously between individual countries and spheres.
3. While public policy tackles the most obvious sources of pollution left as a legacy of the Industrial Revolution (particularly in the spheres of air and water pollution, waste production and chemical degradation of natural habitats), other nuisances which are just as harmful are escalating. These include excessive noise and light levels, two negative consequences of spatial planning and development.
4. Today, the scientific community recognises that noise and light nuisances can have grave repercussions not only for animal and plant life but also for citizens' physical and mental health. However, those nuisances are still more often than not regarded as the inevitable price to pay for growth and progress.
5. Thanks to the trend in illuminating cities since the 1970s, the magic of the bright lights of Las Vegas or Broadway in the United States, the fascination of tourists and residents for the illuminations in the Pudong and Bund districts of Shanghai or the Eiffel Tower in Paris, light is still seen as a symbol of festivity, well-being and prestige. Yet, the nuisance or even danger it represents for ecosystems is very real.
6. It was not until the energy crisis, compounded by fears over effects of greenhouse gas emissions on global warming, that excessive lighting for the purposes of security and architectural enhancement was called into question.
7. The European continent is particularly affected by excessive light levels. Together with North America, the Far East and the Gulf, Europe forms the bulk of the 20% of the Earth's surface considered to be affected by light pollution. Studies by a team of researchers working under the Italian astronomer Cinzano show that two thirds of the world's population, including 99% of the population of the European Union and the United States (excluding Alaska and Hawaii), live under a polluted night-time sky. Measurements recorded by satellite show that the intensity of the light halo is increasing in Europe by over 5% a year. Its rate of growth can reach up to 10% a year at certain points of the globe.
8. At the same time, the noise generated by "civilisation" disrupts ecosystems. It hampers or blocks the vital exchanges within an ecosystem or between different ecosystems. Communication, reproduction or fleeing from predators is becoming difficult.
9. Furthermore, noise remains a major nuisance for the populations of Europe and varies in step with the size of built-up areas. The noise pollution at fault comes mainly from transport and neighbours. Whether it is desired (concerts, fireworks, mobile telephones, etc.) or suffered (transport, machinery in the workplace), dispersed, continuous or "event noise" (passing aircraft, motorbikes or snow-mobiles, for example), high sound volumes, for all people, are always synonymous with nervous fatigue and sleep disorders (when noise occurs during the night), often generating aggressive attitudes and the taking of medication.
10. These forms of pollution are combining to inflict ever more obvious damage to nature and humankind. Despite the recent efforts of the World Health Organization (WHO) and the European Commission where the European Union member states are concerned, the indicators established with a view to remedying the situation are still partial and disparate. The scientific, political, administrative and civil expertise that can be mobilised is essentially inadequate and too fragmented to achieve swift and lasting action.
11. The Council of Europe cannot remain inert in the face of this two-fold pollution which can only become worse and challenges the human right to a healthy environment. The intention of this report is to identify the challenges and propose some possible lines of action.

1.1. Reference framework

1.1.1. For noise pollution

12. European Union [Directive 2002/49/EC](#) on the assessment and management of environmental noise, which proposes a joint approach by the member states and requires the drawing up of strategic noise maps and the setting up of action plans in the countries of the Union, was an innovative step (see Section III.i.b below).

13. This report is about pollution, that is, the damage suffered, but it will nevertheless consider noise pollution as a whole as there is an undeniable link between the noise suffered and noise deliberately generated by humankind. The greater the noise from the urban environment outside, the higher the sound is turned up on audio and video devices, mobile telephones, home cinema television, etc. In turn, the noise generated by people themselves, particularly within their immediate neighbourhood, will be all the louder since they have become accustomed to higher sound levels.

14. The Parliamentary Assembly is looking to foster an approach that sets threshold values and proposes a more specific framework for defining a quiet or noisy area.

1.1.2. For light pollution

15. The regulations laid down by Arizona in 1986, the Starlight Declaration signed by UNESCO in 1992 and the laws against light pollution adopted by Chile and then by the Czech Republic in 2002, deal with the effects of artificial light and excessive lighting on the observation of the night-time sky, the potential for energy saving and also, in part, the safeguarding of the nocturnal life necessary for the development of fauna and flora. They say less about the consequences of intrusive light (neon, illuminated displays) on the human metabolism. Similarly, they do not consider dazzling light (car headlights, excessive brightness of PC screens at work or at home) as an aggression on the organism that is damaging to health.

16. That said, is it necessary to follow this conventional approach? Or should we advocate a more global, proactive approach calling for truly preventive action? It is undeniably the latter route that should be taken by the Council of Europe.

17. In addition, as for noise, there is the problem of how the nuisance is expressed, with light intensity (Lux) being just one parameter.

1.2. Impact of noise pollution

1.2.1. Disruption of ecosystems

18. The human ear perceives sound between 20 hertz (Hz) and 20 kilohertz (kHz) (below that range it is infrasound, and above ultrasound). The benchmark values for perceiving and emitting sounds are therefore based on human hearing whereas most animals perceive sounds in a different range. Accordingly, there is noise pollution that we are not aware of, sometimes of an intense level, which seriously disrupts ecosystems. This is particularly the case with threats logged in the marine environment. It could also be a major factor in the decline of bird populations.

1.2.1.1. In marine and aquatic environments

19. Some 4 500 bio-acousticians meeting in Paris in 2008, at the invitation of the French Research Institute for Exploitation of the Sea (IFREMER), raised the alert: the development of human activities at sea over the last hundred years had generated a level of noise never attained during the previous millennia in the “world of silence” championed by Commander Cousteau. Their analysis took account of natural noise produced by fauna, seismic motion, waves and bad weather conditions.

20. These human activities encompass maritime transport, oil and gas prospecting, sometimes carried out using compressed air cannons, the use of explosives and sonar by military ships and submarines, supersonic aircraft, oil rigs and offshore wind farms.

21. These sound emissions are particularly severe for marine mammals, which find their bearings through echolocation. Whales, which are capable of communicating with other whales several thousand kilometres away using very low frequency sonar, can suffer lesions that irreversibly alter their sensory organs. This is one of the explanations put forward for mass beaching of whales. It is also why the use of military sonar is banned off the coast of California.

22. “While it is not necessarily fatal, noise pollution from human activity creates an acoustic mist which masks the signals emitted and sensed by marine mammals, disrupting the mechanisms necessary for communication, feeding and reproduction”, explains Michel André, Director of the Polytechnic College of Catalonia (Spain) and specialist in animal bioacoustics.

1.2.1.2. Among insects and vertebrates

23. Insects, amphibians, birds and mammals are particularly sensitive to sound. Pigeons and ducks can perceive very low frequency waves (up to 1 Hz) useful as a navigation aid for migratory birds.

24. Within the sounds produced in nature, each species occupies a different sound range, which enables them to communicate, recognise one another, breed and protect themselves. The synchronised song of certain groups, such as amphibians, protects them from predators by making them difficult to locate. The intrusion of noise generated by human activity causes interruptions, which jeopardise the survival of the species in danger.

25. Measuring intensity is not enough to gauge the disruption caused to animals. Few species seem to be disturbed by sound level alone. They are more affected by the type of noise, and whether it suggests a threat or not. The distance within which wild animals may be approached varies between Holland and France, where more hunters are encountered. Finally, noise pollution undermines the natural heritage by destroying an irreplaceable and special soundscape, which differs from one ecosystem to another.

1.2.2. Development of incapacitating pathologies in humans

26. More and more Europeans believe that they are inconvenienced by noise. Prolonged exposure to noise can endanger health. It may lead to hearing loss (in the event of prolonged exposure to background noise exceeding 80 dB) as well as other pathologies:

- sleep disorders: delayed falling asleep, prolonged night-time awakening, altered quality of sleep;
- effects on the vegetative sphere: hypertension, accelerated rates of respiration, ulcers;
- effects on the endocrine system: secretion of adrenalin and noradrenaline, leading to increased heart rate and blood pressure or cardiac arrhythmia, platelet aggregation or increased fat metabolism;
- weakening of the immune system;
- effects on the mental health of individuals suffering from depression and anxiety.

27. Noise also hampers communication, memorisation and work, except where routine tasks are concerned. Difficulties and backwardness at school are very evident among children living in noisy environments.

28. Infrasound (sounds with a frequency below 20 Hz) is perceived as an inconvenience, although no health effects have been observed in humans, even at high levels of exposure.

29. Furthermore, subjective habituation to noise is a fact, borne out by surveys on targeted populations (residents, professionals). Train drivers are less sensitive to train noise, those working in open-plan offices are less inconvenienced by the noise made by their colleagues, Mediterranean populations are less bothered by noise in general, etc. However, such habituation cannot disguise the health problems.

30. The ear distinguishes sounds between 0 dB, hearing threshold, and 120 dB, pain threshold. The acoustic nuisance scale begins at 65 dB, with harmful noises rated at 85 dB and over, and noises that may have an immediate impact on hearing at 105 dB. Nevertheless, sound level (intensity) is not the only risk factor: duration of exposure is a factor in harmfulness regardless of the level. The impulsive nature of noise and its pitch (low/high) are also major factors.

31. The impact of noise on human health hinges on several parameters:

- sound frequency: high-pitched, and therefore high-frequency, sounds, are more harmful than low-pitched sounds at the same intensity;

- purity of sound: a pure sound (whose intensity is concentrated within a narrow frequency band) of high intensity is more harmful for the inner ear than a broad-spectrum noise; fortunately, pure sounds are rarely encountered in our environment;
- noise intensity: above 85 dB, the ciliary structures of the inner ear may suffer rumpling, or even tearing or ruptures when sound levels exceed 105 dB; on the other hand, exposure to sound levels lower than 80 dB does not cause lesions;
- emergence, that is, the difference between environmental noise level and the residual noise level;
- noise repetition;
- duration of exposure;
- the period when the noise occurs (a night-time noise is considered more of an annoyance than a day-time noise)
- individual biological make-up.

32. The notion of annoyance incorporates other factors such as sociocultural habits, the state of stress, the general environment of individuals and the relationship with the source of nuisances. This gives noise a psychological and sociological dimension, with informational and affective content, beyond the physical, acoustic dimension.

33. In the European Union, around 40% of the population is thought to be exposed to transport noise of 55 dB during the day and 22% (representing 80 million people) to 65 dB. Over 30% of the population is believed to be exposed to noise levels exceeding 55 dB during the night.

34. Attempts to evaluate transport noise in economic terms have resulted in estimates ranging from 0.20% (European Commission green paper, 1995) or 0.26% (Boîteux/Commissariat général du plan, 2001) to 0.51% of GDP (International Union of Railways, 2004): which are not negligible amounts, and all the more so as these assessments do not take account of the risks linked to exposure to noise at work, or backwardness at school resulting from difficulties with learning, or noise from neighbours and their impact on social life.

1.3. Impact of light pollution

1.3.1. A threat to fauna and flora

35. This less well-known form of pollution is particularly damaging for flora and fauna and is one of the biggest threats to biodiversity in towns.

1.3.1.1. There is a string of repercussions felt from plant to animal

36. As plants are sensitive to light duration, they mature according to a particular photovegetative and photoperiodical cycle. Artificial light, which takes over when natural light fades, accelerates the plant's cycle, with cascading consequences, as herbivorous fauna develops in step with the availability of food. If the rate of plant development no longer corresponds to that of the animal, there will be a food shortage with ramifications along the food chain.

1.3.1.2. Cascading traps for night-time fauna

37. Nocturnal insects, which are more numerous than day-time insects (there are over 4 500 species of moth compared with 260 species of butterfly), do not survive the attraction of light. Experiments carried out around a point of light have shown that remarkable species disappear within a distance of more than 200 metres in two years. After pesticides, light is the second cause of insect mortality. This is not without its consequences for flora, as most moths are pollinators.

38. Light is also a trap for amphibians, which are unable to differentiate between their own kind and predators and wait for darkness that is unlikely to come in order to breed. It is the second mortality factor for these species after the drying up of wetlands. In addition, a New York University research centre has shown that tadpoles suffer malformations and do not reach adulthood in cases of prolonged exposure to artificial light.

39. Inversely, the species which avoid light and mammals which hunt at night are leaving lit areas. The species commonly found in Paris a century ago are now relegated to areas 70 km from the metropolis.

40. Natural habitats – key components in the protection of species – are now increasingly fragmented and isolated, as a result of areas being lit at night, which endangers populations. There must be nocturnal corridors alongside biological corridors.

41. Light pollution is very harmful to migratory birds of which two thirds fly at night. Their sense of direction is disrupted by the loss of the horizon and lighting in coastal areas and large built-up areas. They can collide with buildings and their superstructures, bridges and viaducts when lit. According to the Canadian NGO FLAP (Fatal Light Awareness Program), the number of migrating birds killed each year in the United States on the windows of lit buildings could be a hundred million. Several millions die in Toronto alone, which is on a migration route.

42. On the Øresundsbron Bridge linking Malmö with Copenhagen, the number of birds killed against the bridge's structure on the rainy and misty (light-induced) night of its inauguration on 8 October 2000 was put at around 1 000. Since then, the lighting of engineering structures in Sweden has been reduced during the migration period on bad-weather nights.

43. Similarly, it is known, for example, that puffin chicks, like those of certain other seabirds (petrels, shearwaters), are attracted by lights close to the nest, and if their first flight, which will last only 20 or 30 seconds, does not take them to the sea, where they can feed, they will have a very low chance of survival.

44. According to the experts of the National Association for the Protection of the Sky and the Environment at Night (France), underwater flora and fauna are not spared either. The balance between seaweed, which grows during the day, and the plankton, which rises at night to eat it, has been upset. The lighting of shores and bridges scares the plankton and contributes to the eutrophication of waterways.

1.3.2. Disturbing for humans

45. Growing urban development and greater density of areas make light pollution a growing threat to residents' health.

46. This pollution comes from various sources: public lighting, often as an excessive response to needs for security, signposting and enhancement, private lighting installations, often for advertising using luminous signs or medium to long-range, sometimes moving, spotlights, left on all night. In addition, there is mood or prestige lighting of corporate buildings and the not inconsiderable impact of headlights of night-time road traffic.

47. This results in three types of pollution:

- excessive illumination, creating an abnormal sky-glow at night;
- dazzling caused by strong light intensity or a contrast between light and dark areas;
- intrusive light, disturbing people in their homes.
- Damage caused to human health

48. Intrusive light, an undesirable presence in the home (from illuminated signs, urban lighting, headlights), disturbs residents' sleep, reducing its restorative properties in the same way as noise. It deregulates biorhythms.

49. And according to the New York Academy of Sciences, repeated intrusions of light, even at low levels, night after night, can have repercussions for health. In darkness, the pineal gland secretes melatonin, also known as the "sleep hormone", during sleep. This is a powerful antioxidant whose production is inhibited or even blocked by light. The consequences, increasingly mentioned, are the faster development of certain cancers, diabetes, depressive states, failure at school, difficulties in concentrating, etc. Moreover, the light from car headlights is generally accompanied by noise.

50. In June 2009, the American Medical Association decided to study the effects of night-time light pollution on human health more closely.

- Car headlights and dazzling

51. Every driver knows that the headlights of oncoming cars is a source of fatigue and stress and can therefore cause accidents. This is particularly the case when headlights are incorrectly adjusted. It is also the case, for many car drivers, and particularly those affected by myopia, who have to cope with a flood of white light when it rains. It would appear that the yellow headlights used in France in previous decades are regarded by many as less harsh on the eyes.

52. The same applies for the sequences of shadow and light in built-up districts where every other lamp-post is lit to save energy. The time required for the eyes to readjust does not allow the driver to make out a pedestrian in the middle of the road.

53. The same phenomenon of dazzling occurs on motorways with intermittent protective hedging between opposite carriageways creating windows of dazzling light.

– Disruption of scientific research

54. In the 19th century, the astronomic observatories were moved out of towns and away from street lighting. In the 1960s, astronomers alerted public opinion and the public authorities to the fact that the stars were disappearing from their telescopes. In the 1980s, environmental protection associations took up the campaign. Today, the urban light halo around towns makes the Milky Way invisible for dozens of kilometres around.

55. Excessive lighting is a hindrance to the observation of night skies. A number of observation facilities in urban areas, such as the Royal Observatory in the London suburb of Greenwich, have had to cease their activities. The astronomers at the observatory in the German city of Osnabrück, which has 160 000 inhabitants, complain that, in wet weather, the city's light aura is brighter than the Milky Way.

56. Observing distant celestial bodies, such as planets outside the solar system, of which the first was discovered at the Haute-Provence observatory in 1995, is often only possible during the new moon phase and requires controlled night-time lighting of the neighbouring settlements which is impossible to achieve in an urban district.

57. Dark sky parks are starting to appear in Europe at astronomers' initiative (Pic du Midi de Bigorre in the French Pyrenees), like the one created on Mont Mégantic in Quebec.

– The disappearing nightscape

58. Night-time lighting also means the loss of an invaluable skyscape. In a sky free of light pollution there are over 3 000 stars visible to the naked eye. The Milky Way has never actually been seen by many children, who know of it only through books or cinematographic works ... such as *Star wars*.

2. A human rights issue

59. As seen by the basic texts:

60. Article 8 of the European Convention on Human Rights stipulates that "Everyone has the right to respect for his private and family life, his home and his correspondence". The environment is one of those rights.

2.1. Case law of the European Court of Human Rights

61. There is European Court of Human Rights case law for Article 8. In the Court's eyes, it is applicable to "severe environmental pollution [which] may affect individuals' well-being and prevent them from enjoying their homes in such a way as to affect their private and family life adversely, without, however, seriously endangering their health" (*López Ostra v. Spain*, judgment of 9 December 1994). The Court stresses that "there is no explicit right in the Convention to a clean and quiet environment, but where an individual is directly and seriously affected by noise or other pollution, an issue may arise under Article 8". It leaves the state a "wide margin of discretion", by essentially ensuring that "the decision-making process leading to measures of interference must be fair and such as to afford due respect to the interests safeguarded to the individual by Article 8" (*Hatton and Others v. the United Kingdom*, 8 July 2003). In this judgment, concerning a complaint by people living close to Heathrow Airport exasperated by night-time plane noise, the Court held that, given the regulatory measures taken by the airport and the fact that residents' property had not lost its market value, there had been no violation by the state of Article 8 of the Convention.

62. The Court's case law on noise and light nuisances remains limited. A search using the keywords "noise pollution" and "light pollution" in its HUDOC database identifies only a handful of judgments, relating to disputes over the deterioration of life quality of individual residents living close to a transport infrastructure, an airfield or a noisy establishment (such as a nightclub), where noise is just one of the issues complained of, and light pollution is hardly ever mentioned. In its interpretation of Article 8, the Court generally rejects

applications directed against the nuisance facility itself (such as a transport infrastructure) but does find against a state which fails to enforce police measures intended to guarantee the individual rights enshrined in Article 8 (in the case of nightclubs, for example).

2.2. Activities in progress

63. On 27 June 2003 the Council of Europe Parliamentary Assembly adopted [Recommendation 1614 \(2003\)](#) on environment and human rights and, on 30 September 2009, [Recommendation 1885 \(2009\)](#) on drafting an additional protocol to the European Convention on Human Rights concerning the right to a healthy environment, in which it recommends that the Committee of Ministers draw up such an additional protocol, which would recognise the right to a healthy and safe environment ([Doc. 12003](#)).

3. Corrective measures adopted

3.1. Regulatory and control measures

3.1.1. At the level of the United Nations Organisation

64. It was the Stockholm Declaration adopted by the United Nations Conference on the human environment in 1972 that was the first to expressly recognise the link between environmental protection and human rights.

65. The World Health Organization (WHO) published *Guidelines for community noise* in 2000, which are shortly to be updated on the basis of a 2007 report. These guidelines are not binding in their own right but are there to guide the legislator.

66. The WHO sets 35 dB as the maximum sound level in bedrooms for a good night's sleep and in classrooms for proper teaching conditions. Its evaluation of the effects of noise on sleep is as follows:

- less than 30 dB: no problem;
- from 30 to 40 dB: slight annoyance, sleep disturbance, without being a real disturbance of vulnerable individuals (children, elderly, sick);
- from 40 to 55 dB: disturbance of vulnerable individuals;
- over 55 dB: danger for public health, effects on cardiovascular system.

67. The WHO also recommends levels lower than 50 dB outside residential areas to avoid any noise disturbance during the day or evening. This level is set at 45 dB for night-time.

68. The WHO guidelines are a good guide, even if they seem difficult to apply in densely populated urban areas.

69. Light pollution is not dealt with by the WHO at present. It will be for its general assembly to decide whether to include it in the organisation's activities, the next session being in May 2010.

70. The WHO has set up a European Centre for the Environment and Health in Bonn and Rome. One of the issues focused on by the centre is noise. It has produced analyses of the effects of noise on target populations (city-dwellers, people living near airports, children) which confirm its negative impact on health. It is currently working, together with the European Commission's Joint Research Centre in Ispra, on a guide to the evaluation of health risks resulting from exposure to community noise.

3.1.2. At European level

71. The Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters, adopted on 25 June 1998 at the initiative of the United Nations Economic Commission for Europe, upholds "the right of every person of present and future generations to live in an environment adequate to his or her health and well-being".

72. The European Union has focused on the problem of noise nuisances for many years. Its regulations firstly provided a framework for motor vehicles ([Directive 70/157/EEC](#) for cars and lorries). The maximum noise levels authorised were then gradually lowered, by around 10 dB over a quarter of a century, making it possible to peg noise levels near major roads despite increases in traffic. It should be emphasised that without the tightening of these regulations, the noise level by roads would now have increased by 10 dB. Two-wheel

vehicles were regulated at a later date ([Directive 92/61/EEC](#)). The European Union then tackled sound emissions by equipment for use outdoors ([Directive 2000/14/EC](#), the so-called Outdoor Directive). This text applies to certain types of construction and outdoor maintenance machinery, setting maximum noise levels in some cases. It also imposed EU marking on equipment and a declaration of EU conformity.

73. More recently the European Union has produced two major legislative texts:

- [Directive 2002/30/EC](#) of 26 March 2002 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Community airports;
- [Directive 2002/49/EC](#) of 25 June 2002 relating to the assessment and management of environmental noise.

74. The former authorises public authorities to restrict airport access to the least noisy aircraft within the meaning of the Convention on International Civil Aviation (Appendix 16, Volume 1, third edition, July 1993), in compliance with the requirements of the internal market (non-discrimination by nationality or company, constraint proportionate to the environmental objective sought). On that basis, the planes listed in Chapters 1 and 2 of the classification of the International Civil Aviation Organisation (ICAO) (designed before October 1977) have been banned in Europe since 1 April 2002.

75. The directive on assessment and management of environmental noise seeks to provide a framework in which the member states can draw up “action plans” aimed at cutting noise emissions from the prime sources, particularly land and air transport infrastructures and industry. To that end, it stipulates the production of “strategic noise maps” and “action plans” for large urban areas, major roads, major railways and major airports. It outlines the methodology for drawing up the maps (calculation methods to be used, etc.) and recommends the production of common indicators such as *Lden* and *Lnight*. It also advocates, for the first time, the management of noise as a whole and not, as previously, by source of pollution. It introduces the notion of “quiet area”.

76. However, this directive does not include the nuisances inflicted by humankind on itself, whether voluntary (by listening to amplified music, for example), imposed by one’s professional position and activity (particularly noise in the workplace) or resulting from problems in the neighbourhood. The indicators imposed (*Lden* and *Lnight*) are known as “energy level” indicators covering noise over an entire period but not taking account of event noises, despite the fact that people regard these as a major annoyance. In addition, strategic mapping is not imposed as a reference for urban zoning, particularly in the vicinity of airports and railways where noise is sporadic. Finally, the directive leaves the designation of threshold values to the discretion of the states and gives no precise definition of a “quiet area”.

77. According to its Guidelines on State Aid for Environmental Protection (2008/C 82/01), the European Commission allows public-funded aid, to an extent, for projects that go beyond the requirements of Community regulations. Its communication on “Rail noise abatement measures addressing the existing fleet” (COM(2008)432 final) stipulates the conditions in the case of existing rolling stock, stating that it is in favour of introducing noise-differentiated track access charges, possibly by amending rail directives, and of state aid for retrofitting.

78. Specifically on rolling stock, it adopted the technical specification for interoperability (TSI), which entered into force in June 2006 and stipulated the noise limits not to be exceeded for each equipment type. It applies to both new and renewed or retrofitted stock, where such retrofitting affects the braking system (90% of cases). Given the long life cycle of railway vehicles, the TSI states that it is also necessary to take measures on the existing fleet of rolling stock, with priority for freight wagons, to foster a noticeable reduction of the perceived noise level within a reasonable time period. The European Commission launched a consultation process in May 2007 concerning the measures to be envisaged for fitting the majority of existing wagons with composite brake blocks by 2017.

79. The question of light pollution is not dealt with by the European Commission at present. At the level of its individual departments, it would be of interest to DG Environment and SANCO (health and consumer protection).

80. In the wake of the Harmonoise project (2001-05) the European consortium Imagine (Improved Methods for the Assessment of the Generic Impact of Noise in the Environment) is developing guidelines for the mapping of noisy areas as an obligation for the states.

81. Also to be borne in mind is [Directive 2003/10/EC](#) of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise).

3.1.3. At the level of the states

82. National regulations more or less cover the entire area of noise pollution. In France, for example, there is the law of 31 December 1992 on noise from land transport infrastructures, the decree of 31 August 2006 for neighbourhood noise and the orders of 14 June 1969 and 30 June 1999 for the soundproofing of sensitive housing and buildings. The regulations are based on sound levels for ordinary noise (transport), police regulations for neighbourhood noise and noise abatement levels for buildings (orders of 1969 and 1999). Noise abatement sets transmission levels from one dwelling to another at 45 dB (see order of 1969) and 53 dB (in housing incorporated in sensitive premises such as teaching, health, care, social welfare and leisure and sports establishments, as well as hotels and tourist accommodation, see order of 1999).

83. The regulations concerning buildings are backed up by incentive labels or HQE marks (high environmental quality) in France, the American LEED, the English BREEAM or the CASBEE in Japan, which seek to define a total quality approach, of which acoustic protection is one component.

84. Where sound emissions from noisy installations are concerned, a study by the French Agency for Environmental and Occupational Health Safety (AFSSET) on the noise produced by wind turbines suggests two possible types of approach:

- an approach based on absolute values not to be exceeded, which is the case in Germany (TA-Lärm recommendations), Denmark, Greece and Sweden;
- an approach also based on emergence values, that is, the difference in sound level between total noise, including that of the installation, and the ambient noise when noise from the installation is absent: this is the case in the United Kingdom (ETSU R 97 recommendations), Australia, New Zealand (Standard 6808) and France (decree of 31 August 2006).

85. The references in this area vary significantly: by 10 dB in the first group, and by 10 dB (between 30 dB and 40 dB) for the background noise tolerated in the second group (emergence being roughly equal across the board at 5 dB, with slight variations in France). Within the states' own regulations, there are other variations: in France, for example, where the tolerated background noise (below which no emergence is identified) is 30 dB for neighbourhood noise, but 35 dB for installations classified for environmental protection purposes.

86. Where light pollution is concerned, a number of European countries including the Czech Republic, the United Kingdom, Belgium and Italy have incorporated it into their legislation. A British law of 2006 tackles the problem of intrusive light on grounds that it may adversely affect people's health.

87. Among the states with a federal system it should be noted that most of the Italian regions have promulgated laws to combat light pollution and promote energy-saving, with the result that over two thirds of Italy's population is now governed by laws regulating outside lighting.

88. The decree issued by the Lombardy region (Italy's most populated, with 9 million inhabitants and the most heavily polluted by light) – entitled "Urgent measures for energy-saving on outside lighting and the combating of light pollution" – is exemplary: all new installations must comply with the provisions concerning light pollution. No light may be emitted above the horizontal; lighting facilities must be equipped with the most efficient lamps possible and with systems allowing for the reduction of light emission at a given time; ground lighting must not exceed certain levels. Moreover, in the protection zones around observatories, the existing lighting systems must be replaced within four years to bring them into line with the new standards.

3.2. Economic measures

89. Combating noise in existing building stock, particularly housing, has so far taken the form of the clearing up of black spots on the road network. This is a fairly costly initiative. In France, the clearing up of the 35 000 black spots not yet dealt with on the non-franchised national road network alone was estimated in 2008 (Grenelle Environnement working group) at €14 million/year over seven years. Then there is the cost of works on local road networks, which would doubtless be more substantial, and a cost of between €1 500 million and €2 000 million for the clearing up of rail black spots, which is yet to be tackled (just one operation, in Aix-les-Bains, having been carried out to date).

90. Works on dwellings themselves cost a good deal less. However, acoustic protection (€10 000 for dwellings affected by aircraft noise, a little less for land transport noise) often costs as much as a full renovation (energy and comfort). It is an undeniable deterrent for public authority support for these works.

91. The fitting of low-noise brake blocks on a rail wagon costs between €8 000 and €10 000. The operational fleet in France is estimated at 100 000 wagons, of which 30% would require this work, given their age; this represents expenditure of some €40 million/year over seven years. Germany has also adopted this strategy, for higher amounts. But under Community rules on competition, it must obtain agreement from the European Commission (which has stated its favourable position; see its guidelines on state aid in the area of transport and environment, OJEC of 1 April 2008, and its communication on rail noise of 8 July 2008).

92. Compensation for residents in the vicinity of airports is usually covered by ad hoc arrangements. In France, there is a tax on airborne noise nuisances (TNSA) levied on airlines according to the polluter-pays principle. It is entirely earmarked for the soundproofing of homes near airfields. Revenues from this tax amount to some €60 million/year. The management of soundproofing dossiers is entrusted to the entities managing airports. The airport noise nuisance control authority (ACNUSA) approves the 7 000 dwellings soundproofed each year.

93. The Grenelle Environnement working group estimates the total expenditure necessary for protection from land and air transport noise in France at €500 million/year for seven years, then less in the following years. It is difficult to extrapolate this to the scale of Europe, despite studies such as those carried out by the International Union of Railways, and all the more so as the directive sets no obligations on results, noise limits or means.

94. Economic instruments such as taxes created under the polluter-pays principle may be an effective response and not overly costly on the whole. However, as certain fragile economic sectors are involved, such as rail freight transport, substantial public aid (European in this case, given the mobility of the wagons) will be required.

3.3. Technological progress

3.3.1. Noise pollution

95. There is considerable room for progress in sound insulation in the construction industry. But experience shows that this progress is not so straightforward. While thermal isolation has become commonplace, it may sometimes be to the detriment of acoustic performances as the Grenelle Environnement working group in France has quite rightly pointed out:

- glazing (which forms the main acoustic bridge): the acoustic performance of 4/16/4 thermal double glazing (two 4 mm panes separated by a 16 mm airspace) is mediocre, equivalent to 8 mm single glazing, or even less for low frequencies, which can be problematic if there is road traffic noise; simply increasing the thickness of one of the two panes improves performance: 10/10/4 abates noise by 35 dB; double glazing in which one of the panes is formed from laminated glass with an acoustic polyvinyl butyral (PVB) resin film at its core abates noise by 40 dB, which is useful in very noisy environments; beyond those levels, much heavier frames are required, making the work considerably more costly;
- thermal insulation from within: a conventional 16 cm concrete wall has an acoustic insulation value of 56 dB; lining it on the inside with a rigid polyurethane or extruded polystyrene foam thermal insulator may cut its acoustic efficiency by 3 to 6 dB. On the other hand, “thermo-acoustic linings”, based on mineral wool or elasticated polystyrene foam (PSEE), provide an additional gain in acoustic efficiency of 7 dB; porous materials are better insulators, and double-framed building structures (in which the slabs do not touch the outer wall) also improve acoustic performances;
- ventilation installations which are poorly designed and maintained are further noise vectors and create acoustic bridges between rooms.

96. Moreover, insulation from outside noise may actually emphasise noise inside the building (rubbish chutes, lifts, neighbours, etc.) that were previously masked by outside noise. On the other hand, waterproofing and floating slabs contribute at the same time to improved acoustic and thermal performances.

97. This shows the need for co-ordinated intervention, on both the thermal and the acoustic aspects of buildings, by multiskilled professionals, as advocated below.

98. In the area of rail transport, the problem mainly relates to noise from freight trains. The retrofitting of rolling stock includes the replacement of the brake blocks which rub against the running surface of the wheel. The traditional cast-iron blocks deteriorate this surface, making it considerably rougher. In contrast, K blocks made from composite material or LL blocks made from composite or sintered material improve the surface by

polishing it, helping to reduce the sound energy emitted by the system. On new equipment fitted with brake shoes made of composite material or disks, a reduction in sound energy of between 5 and 10 dB has been achieved. Noise reduction measures for rolling stock have been recognised by the European Commission as a good deal more effective and less costly than measures aimed at the infrastructure. In 2006, 66% of the French passenger fleet was refitted in this way. However, *En revanche*, the retrofitting of freight stock is more complex as there is the problem of the sector's economic fragility. Yet, much is at stake here, given the size of the fleet: 370 000 wagons to be retrofitted in Europe. In Germany, the public authorities are financing the reduction of rail noise to the tune of €100 million/year, essentially through the retrofitting of wagons.

99. In the area of road and air transport, where considerable progress has already been made, noise reduction efforts revolve around the plethora of measures already initiated: on behaviour (shift towards soft modes), vehicle technology, road surfaces, lateral protection (noise-blocking walls), airport approach trajectories, limiting or prohibiting the circulation of the noisiest vehicles, etc. Low-noise road surfaces are porous, in order to trap sound. Unfortunately, in urban areas, they quickly become clogged with dirt and lose their acoustic qualities after two years. They must be regularly cleaned. That said, the noise abatement is impressive (6 dB for Nanosoft made by Colas). Further developments are under way (double-layer bitumen, polymer-coated bitumen, etc.).

100. At the level of the European Union, noise is dealt with by two incentive programmes: the Framework Programme for Research and Technological Development (7th PCRD 2007-13) and the LIFE+ programme (2007-13). The 6th PCRD incorporated a SILENCE programme aimed at land transport noise in urban areas. The 7th PCRD, approved on 18 December 2006, focuses on global environment issues. LIFE+ comprises three sections: nature and biodiversity, policy and governance, information and communication.

3.3.2. Light pollution

101. The reduction of light pollution – which is not necessary everywhere (although it very often goes hand in hand with cutting electricity consumption) – uses simple measures such as:

- switching off the lights in buildings standing empty at night, particularly office buildings; installing timer switches or presence detectors to that end; the results are spectacular (see Chicago in 2001);
- switching off all lighting during the latter part of the night;
- not shining lights directly at the sky and avoiding any upward light diffusion, by fitting light sources with shades, preferably reflective ones;
- lighting walls and hoardings from top to bottom and not the other way round;
- avoiding reflective ground coverings;
- installing retro-reflector devices;
- opting for low-pressure sodium lamps which are virtually monochromatic and generate signals interfering with astronomical spectra only on two well-defined frequencies; avoiding high-pressure sodium or high-pressure mercury vapour lamps which, through monochromatic emissions superimposed on a continuum, pollute all the frequencies of the visible spectrum in a manner that is complex and impossible to correct; it is to be noted that a 35 watts directional low-pressure sodium lamp provides the same useful light as a 175 watts mercury vapour lamp.
- removing red – which is disruptive to migratory birds – from the spectrum emitted by lamps, as certain oil rigs do.

102. In France, a standard for light pollution control is being devised under the aegis of the AFNOR standards organisation.

4. The question of noise indicators

103. The question of the evaluation of noise is a complex and fundamental one.

104. The relationship between noise and nuisance hinges on a multitude of factors:

- noise type: continuous or “event noise” (such as a plane flying overhead or certain noise coming from neighbours);
- frequency: the ear does not have the same sensitivity at all frequencies within the audition range of 20 to 20 000 Hz;

- the subjective impact: low-pitched sounds are perceived in fairly negative terms, despite having no effect on people's health;
- subjective habituation: it may be that household noise is no longer registered or, on the contrary, it may acquire a mesmerising effect;
- the time of day: night-time noise is more of an annoyance than day-time noise;
- individual preconceptions: numerous surveys on how noise is perceived by people all demonstrate that, at identical noise levels, road traffic is less well tolerated than a passing train or even a plane overhead.

105. One of the first questions is how to calculate average noise over a reference period. The expression of noise in terms of energy level (the weighted decibel A or dBA, shortened to dB) is the standard used today. Nevertheless, there exist four major competing categories of indices:

- energy level indices describing an overall dose, such as the Leq (equivalent continuous noise level) and its derivatives (Ldn – Lden): [Directive 2002/49/EC](#) is based on the Lden indicator, defined by ISO 1996-2:1987 standard and representing the average noise level weighted over 24 hours, which gives greater weighting, all other things being equal, to noise in the evening (+ 5 dB) and at night (+ 10 dB); energy level indices are well suited to measuring continuous noise of the type coming from major roads; their essential advantage is that they correlate well with the effects on people; for aircraft, the ICAO has proposed a tailored variant, combining maximum noise level when the plane flies over and the duration of the noise, known as “effective perceived noise level” (EPNdB), which is the reference for the acoustic certification of planes and was adopted by Community [directive 2002/30/EC](#);
- statistical indices: noise level exceeded for x% of the time, a notion used in the United Kingdom;
- indices combining the number of events and their maximum level: this was the psophic index in France, adopted after in-depth surveys among residents in the vicinity of Paris airports but dropped in 2002 as it was so complex that it could not be explained to the public;
- indices translating the frequency of events exceeding a given threshold.

106. Over-sophistication often proves counterproductive. It is difficult to explain a composite index to exasperated residents unable to grasp it.

107. Another question is the relation to background noise. Noise level can be expressed:

- as an absolute value;
- in the case of a facility or equipment generating noise, relative to the background noise: this is known as emergence.

108. As we have seen above on the subject of wind turbines, the regulations take one or other of these approaches, depending on the case.

109. Finally, there is the question of methods for evaluating noise level, and the choice between *in situ* measurements – more readily understood by residents – or calculations. Using calculations is inevitable in planning and development because, by definition, the noise under consideration does not yet exist. It is also used, for the sake of convenience, on existing transport routes for noise mapping. [Directive 2002/49/EC](#) is largely based on calculation, even though it does not rule out measurement. Nevertheless, using calculation alone poses serious software problems, which have been left open by the directive: taking account of weather conditions in the propagation of noise, reflective or absorbent surfaces, position of the source in relation to the ground, etc. Moreover, it would appear that most member states still use their own self-developed software which has nothing in common with the methods prescribed by the directive. But above all, mapping based on calculation alone is not convincing for members of the public as it is a static virtual description that does not take account of all everyday noise and its variation in the course of the day, week or month. The general public wants more dynamic data which can be provided *in situ* or even by certain noise simulation tools now available. Noise measurements are indispensable for validating the maps and providing supplementary information on the number of noise peaks over a day, the sources involved, their contribution to noise, etc. This is the role assigned to noise observatories installed in large built-up areas.

5. Conclusions

110. Combating noise pollution and light pollution, which are serious concerns for mankind and other living species, is directly relevant to the work carried out by the Parliamentary Assembly of the Council of Europe on an additional protocol to the European Convention on Human Rights recognising citizens' right to a healthy environment.

111. It also meets the demands of the 1979 Bern Convention on biodiversity and the European Landscape Convention as well as the concerns of the Committee on the Environment, Agriculture and Local and Regional Affairs over problems of environment and health and cutting expenditure on energy. This action also echoes the Countdown 2010 for biodiversity set by the United Nations.

112. There are three conditions for this combat to be effective: an integrated approach, tailored training for trade professionals and a drive to build awareness aimed at the whole of society without which no effective action would be possible.

113. The issue must be tackled on all three levels: European, national and local. This cannot be done without the combined involvement of all the players in urban planning, the environment and the development and protection of given areas, as well as acoustic and lighting technicians. It must be backed by public commitment and support at all stages.

Reporting committee: Committee on the Environment, Agriculture and Local and Regional Affairs

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Members of the committee: Mr Aleksei **Lotman** (Chairman), Mr John Prescott (1st Vice-Chairman), Mrs Elsa **Papadimitriou** (2nd Vice-Chair), Mr Nigel Evans (3rd Vice-Chairman), Mr Remigijus Ačas, Mr Ruhi **Açikgöz**, Mr Artsruni Aghajanyan, Mr Gerolf Annemans (alternate: Mr Karim **Van Overmeire**), Mr Miguel Arias Cañete (alternate: Mr Gonzalo **Robles Orozco**), Mr Alexander Babakov, Mrs Juliette Boulet, Mr Tor Bremer, Mr Vladimiro Crisafulli, Mr Karl Donabauer, Mr Miljenko Dorić, Mr Gianpaolo Dozzo (alternate: Mr Oreste **Tofani**), Mr Tomasz Dudziński, Mr József Ékes, Mr Savo Erić, Mr Bill **Etherington**, Mr Joseph Falzon, Mr Relu **Fenechiu**, Mr Rafael **Huseynov**, Mr Jean Huss, Mr Fazail Ibrahimli, Mr Stanislav **Ivanov**, Mr Igor Ivanovski, Mr Birkir Jon Jonsson, Mr Stanisław Kalemba, Mr Guiorgui Kandelaki, Mr Oskar Kasens, Mr Haluk **Koç**, Mr Juha Korkeaoja, Mr Bojan Kostres, Mr Pavol Kubovic, Mr Paul Lempens, Mr François Loncle, Mrs Kerstin Lundgren, Mr Theo Maissen, Mrs Christine **Marin**, Mr Yevhen Marmazov, Mr Bernard **Marquet**, Mr Alan **Meale**, Mr Peter Mitterrer, Mr Pier Marino Mularoni, Mr Adrian **Năstase**, Mr Aleksandar **Nenkov**, Mr Pasquale **Nessa**, Mr Thomas Nord, Mrs Carina Ohlsson, Mr Joe **O'Reilly**, Mr Holger Ortel, Mr Dimitrios Papadimoulis (alternate: Mr Evangelos **Papachristos**), Mr Germinal Peiro, Mr Ivan Popescu, Mr Cezar Florin **Preda**, Mr Gabino **Puche Rodríguez-Acosta**, Mr Lluís Maria **de Puig i Olivé**, Mrs Jadwiga Rotnicka, Mr René **Rouquet**, Mr Giacinto **Russo**, Mr Džavid Šabović, Mr Fidias Sarikas, Mr Leander Schädler, Mr Mykola Shershun, Mr Hans Kristian Skibby, Mr Ladislav Skopal, Mrs Karin Strentz, Mr Valerij Sudarenkov, Mr Laszlo Szakacs, Mr Vyacheslav Timchenko, Mr Dragan Todorović, Mr Nikolay Tulaev, Mr Tomas Ulehla, Mr Mustafa **Ünal**, Mr Peter Verlič (alternate: Mr Jakob **Presečnik**), Mr Harm Evert Waalkens, Mr Hansjörg Walter.

NB: The names of those members present at the meeting are printed in **bold**

Secretariat to the committee: Mrs Agnès Nollinger, Mr Bogdan Torcătoriu and Mrs Dana Karanjac