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Improving indoor air quality: a new challenge for local authorities

Committee on Sustainable Development
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Summary

Indoor air quality has only recently been considered a major health issue, unlike outdoor pollution which is subject to extensive regulation and media attention. However, recent public health scares have alerted public authorities and public opinion to the fact that pollution levels in indoor air are often higher than those outside. This is a cause for concern as Europeans spend up to 90 % of their lives in closed environments.

Public authorities need to make a paradigm shift and pay serious attention to the quality of indoor air. Adequate regulations and appropriate management and prevention measures need to be put in place. Delaying action in this field could put people's health at risk and damage both the environment and the economy.

Many local authorities have already set up ambitious programmes to improve indoor air quality which go way beyond the scope of existing legislation. These approaches include taking preventive action in order that all indoor spaces under their authority, whether public or private, are of the highest environmental quality. Local authorities also have a responsibility to raise public awareness and to facilitate training on the issue of improved indoor air quality and a healthy environment.

[1] L: Chamber of Local Authorities / R: Chamber of Regions
ILDG: Independent and Liberal Democrat Group of the Congress
EPP/CD: European People's Party – Christian Democrats of the Congress
SOC: Socialist Group of the Congress
NR: Members not belonging to a Political Group of the Congress

A. DRAFT RESOLUTION[2]

1. Until recently indoor air quality had not been considered a major health issue, unlike outdoor pollution which is subject to extensive regulation and attracts all media attention. However, recent public health scares relating to the indoor environment and a rapid rise in the number of people suffering from allergies and respiratory illnesses have alerted public authorities and public opinion to the fact that pollution levels in indoor air are often higher than those found in outdoor air.

2. The Congress of Local and Regional Authorities of the Council of Europe is convinced that local authorities must pay more attention to the quality of indoor air, as Europeans spend almost 90% of their time in closed environments. The quality of indoor air varies according to the exposure to pollutants linked to buildings, materials, the external environment and occupants' behaviour. The consequences of poor quality indoor air are numerous and pose a problem for public health.

3. Citizens are demanding ambitious policies to protect their health and well-being. Their awareness of the global ecological challenges is growing; the threat of climate change, in particular, has focused people's attention on the need for urgent action. This state of mind has repercussions on the action they expect to see from public authorities with regard to indoor air quality.

4. Strong political will is required to protect citizens from the risks and to compensate for the gaps in air quality legislation. A multidisciplinary approach is called for which recognises the links between the quality of the environment and health. Local authorities should adopt a firm stance and create a new paradigm which tackles indoor pollution on a par with atmospheric pollution.

5. Local authorities are well placed to undertake exemplary integrated environmental health strategies which can serve as a model for citizens. They must ensure that all public indoor spaces under their authority or private indoor spaces such as social housing are of the highest environmental quality. Taking early and preventative action makes economic sense as postponement entails more damage to health and to the environment.

6. Social cohesion and equity should be the driving forces behind public policies in this field as disadvantaged populations tend to be more exposed to a disproportional amount of environmental hazards.

7. Reliable information on indoor air pollutants would enable local authorities to decide on the best way to respond to this problem of indoor air and would help citizens to make properly informed choices. Indeed, civil society expects a radical shift in the direction taken by public authorities towards greater transparency and better access to information. Establishing health-based guideline values on different pollutants provides a concrete basis for action and information to citizens on the negative effects of exposure to toxic substances present in indoor air.

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[2] Preliminary draft Resolution and preliminary draft Recommendation approved by the Committee on Sustainable Development of the Chamber of Local Authorities on 2 March 2009

Members of the Committee :
G. Doganoglu (Chair), *F. Cecchini (Vice Chair)*, *A. Mediratta (Vice Chair)*, A. Apostolov, W. Borsus, *I. De La Serna Hernaiz*, M. Fügl, V. Gorodetskiy (*alternate: K. Skomorokhin*), *E. Gurvits*, *H. Himmelsbach*, *P. Hugon*, L. Iliescu, *S. James*, *S. Kalev*, I. Khalilov (*alternate: S. Mansurova*), D. Larese Filon, M. Kichkovskyy, A. King, V. Klitschko (*alternate: O. Luk'Ianchenko*), *A. Kurti*, J. Mattei-Fazi, I. Milatic, *L. Milicevic*, *G. Neff*, *JJ. Nygaard*, R. Onderka, D. Petrosyan, V. Petrovic, J. Petusik *(alternate: J. Hlinka*), CA. Pinto, *G. Roger*, *P. Rondelli*, *U. Rozenbergs*, *S. Savva*, S. Svavarsdottir, *M. Tamilos*, *B. Toce*, V. Tskhadaia, *L. Vennesland*, M. Yurevich (*alternate: V. Novikov*).

NB: The names of members who took part in the vote are in italics.

Secretariat of the Committee: M. Moras and J. Hunting

8. *The Congress invites the local and regional authorities of Council of Europe member states to:*

a. implement integrated public policies on the environment and on health with a view to improving the quality of indoor air in public buildings, based in particular on the monitoring and evaluation of pollution levels and new emerging risks;

b. introduce exemplary procedures to improve the quality of indoor air in particular in public buildings through improved building design, construction and operation;

c. impose high environmental quality standards, including indoor air quality, in public procurement procedures;

d. raise public awareness on the extent of the impact of unhealthy indoor air based upon reliable, scientifically-based information and through local information centres which offer concrete and practical solutions to citizens;

e. promote training on indoor pollution for local authority staff and all people with responsibilities in the environmental, construction, health and education sectors.

9. *The Congress instructs its Committee on Sustainable Development* to reinforce its work on the quality of the environment and on the issues at stake for public health.

B. DRAFT RECOMMENDATION[3]

1. The threat from indoor pollution has been grossly underestimated by both public authorities and civil society. Policies, research and resources have mostly focused on atmospheric pollution even though numerous studies point out that indoor air is likely to be more than twice as polluted as outdoor air. This is all the more preoccupying as modern lifestyles mean that Europeans spend up to 90% of their lives indoors.

2. The Congress of Local and Regional Authorities of the Council of Europe asks public authorities at all levels of governance to meet their responsibilities to guarantee a healthy and sustainable environment for all. A new paradigm is required which defines clean air policies, taking into account total air exposure, both indoor and outdoor air. Moreover, there is also a need for greater recognition of the links between policies on the environment, health, energy, transport, spatial planning and agriculture.

3. The Congress notes with satisfaction that many local authorities are already undertaking ambitious programmes to improve indoor air quality which go beyond the scope of existing legislation. Such initiatives highlight the need for new regulations which would extend existing legislation on air pollution to include indoor pollution and which define quantifiable targets for all types of pollutants.

4. Any environmentally responsible policy must be developed in collaboration with all stakeholders; air quality regulations can only be truly effective if they are understood and endorsed by both public authorities and by the people they are meant to protect.

[3] See footnote 2

5. Information on the extent and impact of the threat from indoor pollution is insufficient. This lack of reliable data makes it difficult for public authorities to properly assess the dangers and implement appropriate solutions. It also leaves citizens unsure of how best to protect themselves from risk. Local authorities are particularly well-placed to protect the public and make them more aware of the issues at stake and more able to take informed decisions.

6. Creating a healthy indoor environment is beneficial as it leads to improved health and productivity. Furthermore, experience shows that taking strong and early action to regulate the use of indoor pollutants can, in the end, be less expensive than the harm caused through inaction.

7. The Congress calls for a strong commitment from international intergovernmental organisations in the fight against indoor pollution and the health risks it causes. In this regard, it notes the lead taken by the World Health Organisation in recognising the significance of indoor pollution and welcomes its publication on Guidelines for Indoor Air Quality.

8. It also welcomes the Council of Europe Parliamentary Assembly Recommendation on “Environment and health: a better prevention of environment-related hazards”, in particular its focus on new emerging pathologies and on the need for early detection procedures, monitoring and prevention measures regarding indoor air quality.

9. *The Congress invites the Committee of Ministers of the Council of Europe* to ask member states to:

a. extend their policies on atmospheric pollution to include indoor air and, in cooperation with territorial authorities and NGOs, draw up programmes on indoor air quality. These programmes could focus on regular monitoring of indoor air and new emerging risks; on setting up environmental indicators and health-based guidelines; and on the development of specific labelling of materials, particularly for construction, decorating and maintenance;

b. facilitate, in collaboration with local authorities, the provision of reliable and targeted information on indoor air quality thereby raising public awareness on the noxious effects of pollutants found in indoor spaces;

c. foster ambitious research and development programmes which encourage innovation and technological progress to develop safer and more ecological products, thereby making preventative approaches practicable at all levels of governance.

10. *The Congress recommends that the Committee of Ministers of the Council of Europe ask the European Commission* to:

a. support local authority actions and pilot projects which address indoor pollution, and encourage an exchange of good practices and multidisciplinary research on this issue;

b. extend the scope of the REACH Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals, to ensure that they all sufficiently regulated, regardless of their place of production.

C. EXPLANATORY MEMORANDUM

I. Introduction

1. Citizens are convinced that the indoor environment, be it at home, at work or in public or commercial buildings, offers protection from the pollution to be found in the outside environment. Homes in particular are considered to be safe places providing a healthy environment for individuals and their families.

2. This is far from being the case however; indoor air is at times twice as polluted as outdoor air. Most of this pollution does not come from the transfer of air from outdoors, but rather originates in the construction materials, furniture and chemical products found inside the building.

3. Recent health scares concerning Legionnaires' disease, asbestos and lead poisoning or the ever growing number of people suffering from asthma or allergies have alerted both public opinion and public authorities to the extent of the threat posed by indoor pollution.

4. Tackling indoor air pollution is a major societal problem which can no longer be addressed only by specialists. Public authorities and citizens are increasingly aware of the negative societal, environmental and public health impacts of poor quality indoor air.

5. The stakes are high and there is a need for a new paradigm which takes into account all sources of risk, both indoors and outdoors. This paradigm should also set standards and norms to regulate indoor pollution to at least the levels in place for the air outdoors. An integrated approach to planning and policy-making must be adopted which takes preventative action based on the most accurate available scientific information.

6. Whilst ten years have passed since the international community, particularly the World Health Organisation (WHO), began to recognise indoor air pollution as a major public health challenge, the necessary legislation and information to tackle the issue remain inadequate and does not meet public expectations.

7. Almost all existing European and national monitoring and limit values on air quality only address outdoor air quality. European regulations and national guidelines on products found indoors are generally limited to a few high-risk substances. Indeed, it is rather paradoxical that regulations governing construction take more account of relatively rare risks such as earthquakes than of the frequent, even probable, risks found in construction and decorating materials.

8. Citizens expect public authorities to adopt policies to improve the quality of indoor air. They want a radical shift in priorities so that transparency and access to reliable information is made possible. This will enable them to make decisions based on how to create a healthy environment in their homes and elsewhere.

9. The onus is on public authorities to ensure that the health of individuals and communities is put first. They have an important role to play in making clear the benefits of healthier homes, workplaces and lifestyles to improve health and productivity and more widely in social and economic terms. Indeed experience shows, for example in the case of asbestos, that taking early action to regulate the use of a polluting substance can, in the long-run, far outweigh the economic costs of not acting.

10. Whilst matters of regulation, research and standard setting are mostly addressed at international and national levels, local authorities have nonetheless a major role to play in reducing indoor pollution. They are in a position to initiate integrated environmental, health and educational strategies and to apply high environmental standards in the public and private closed spaces under their responsibility. They can also work with all stakeholders and raise awareness of the threat and provide trustworthy information on ways to tackle it.

11. The Congress thus has felt it timely to examine the issue of indoor pollution. This work is taking place in parallel with the Parliamentary Assembly of the Council of Europe which is addressing 'Environment and health: a better prevention of environment-related hazards'. The Parliamentary

Assembly recommends better implementation of preventative health policies and of the precautionary principle. It also calls for more training in environmental medicine.

II. Indoor pollution: the facts surrounding a major health threat

12. The indoor environment is a complex issue in terms of evaluating the toxicology of indoor spaces and related health risks. Analysis indicates that indoor air is highly polluted with over 900 chemicals, particles and biological materials with potential health effects detected in indoor air. Many different factors influence indoor air quality, for example ventilation, building properties, cleaning conditions and products used indoors and the quality of the air outdoors.

13. The impact of each substance is variable according to its concentration and the levels to which people are exposed to the substances. According to some estimates, human exposure to a typical pollutant released indoors is 1000 times greater indoors than the same substance released outdoors. Furthermore, many pollutants when combined may give rise to what is known as the 'cocktail effect' and the impact of these is exceedingly difficult to assess and measure.

14. Europeans spend up to 90% of their lives in closed spaces, with over 60% of that time in the home. It is hardly surprising to observe in medical evidence an increase in a certain number of medical conditions linked to poor indoor air quality (allergies, migraines, respiratory problems and even cancers).

The main factors affecting indoor air quality

15. The hazards associated with chemicals and their effects on health are not always well known, particularly for long term exposure. The chemicals found in indoor spaces come from either products intended for use, for example cleaning materials and air fresheners, or unintentional emissions from different sources such as building and decorating materials, furniture and toys. Poor heating systems can lead to carbon monoxide emissions which are produced by the incomplete burning of various fuels (coal, wood, charcoal, oil, propane and natural gas).

16. Indoor air contains a significant number of suspended particles which can be inhaled such as formaldehyde, benzene, phthalates and brominated flame retardants. They come from a wide range of inorganic sources including tobacco smoke, wood or coal burning, asbestos. Heavy metal particles may come from indoor sources such as lead paint or from exhaust fumes outdoors. Organic sources of these particles include pollens, spores and food remnants.

17. Tobacco smoke is composed of fine dust which is a complex mixture of over 4,000 compounds, more than 40 of which are known to cause cancer or to be strong irritants.

18. Endocrine disrupters are chemicals which disrupt the development of the endocrine system. Even low doses can be hazardous, particularly for infants and children as the effects of exposure during development are lasting. These chemicals are found, for example, in plant constituents, pesticides, compounds used in the plastics industry and in consumer products.

19. Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently up to ten times higher indoors than outdoors. They are emitted by thousands of products including paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment (photocopiers and printers) and cosmetics. They are also found in fuels.

20. Radon, a gas that occurs naturally in soil and rock in some regions, can be found inside buildings by diffusing through the soil. In indoor air it can lead to lung cancer.

21. The widespread use of thermal insulating materials linked to poor ventilation and reduced air exchanges with the outside can lead to too high or too low indoor temperatures or result in humidity problems. Humidity and temperature also play an important role with regard to indoor atmospheric pollution. There is an optimal level of humidity in indoor air. Too low humidity causes eye irritation, dry skin, and rashes, whereas too high humidity results in water damage and mould problems and dust

mites. Some micro-organisms such as fungi and viruses may cause biological contamination and play a role in the development of asthma and allergies.

22. Pests, house dust mites, cockroaches and mice etc are important sources of allergens which can lead to diseases of the airways, rhinitis and asthma. Exposure varies depending on the type of environment and on cultural habits. The extent to which contact with pets affects the development of asthma remains unclear.

23. Ventilation is one of the most important factors determining indoor air quality. Poorly aired buildings can affect health, work or academic performance. Controlled ventilation is especially important in heavily insulated buildings that allow little air exchange with the outside.

24. Nanoparticles are increasingly found in common consumer products such as cosmetics, electronics, optical devices, medicine, and food packaging materials. As yet, it is not known how nanomaterials interact with ecosystems, whether they're capable of entering a food chain or whether they concentrate higher up the chain. However, early evidence indicates that they do not degrade in the environment but tend to bio-accumulate in the organism. Their high reactivity could generate oxidants which may react with chemicals in cells and even alter the cells' DNA.

25. Finally, the extent of the danger posed by electromagnetic fields (EMF) remains highly controversial. Suspected sources include electric power lines, interior wiring and grounding of buildings, electric appliances and mobile telephones and antennae. There are fears that exposure to EMF may be a cause of childhood leukaemia and may set the stage for adult cancers and other pathologies later in life.

The health impacts

26. The connection between chronic exposure at low doses to the substances referred to above and the onset or reinforcement of numerous medical conditions is well established in particular allergies, respiratory diseases and some cancers.

27. However, whilst technological and industrial advances have brought unprecedented social and economic benefits, the evidence indicates that Europeans are now exposed - to an unprecedented extent - to thousands of hazardous substances the risks of which are not really known.

28. Medical conditions are increasingly being detected where a link between exposure to indoor pollutants and the problem are suspected but where cause and effect cannot as yet be confirmed. Examples include infertility (now affecting one in seven couples in Europe) and a rise in malign tumours such as leukaemia and brain cancer in children.

29. New illnesses or syndromes are also appearing such as MCS (multiple chemical sensitivity), CFS (chronic fatigue syndrome) and sick-building syndrome (SBS) in which the occupants of a building experience acute health and discomfort that appear to be linked to time spent there.

30. Finally, in spite of the limited regulation, guidelines and monitoring of indoor pollution which make it hard to assess the extent of the threat, the European Environment Agency's (EEA) "Fourth Assessment of Europe's environments" warned about the 'adverse impacts of exposures to low levels of chemicals, often in complex mixtures. Several adult diseases are suggested to be linked to exposure in very early childhood or exposure of parents before conception. Persistent chemicals with long-term effects, and those used in long-life articles, may present risks even after their production as been phased out'.

More vulnerable populations

Infants and children particularly under threat

31. The specific vulnerability of children to air pollution was recognised by the Fourth Ministerial Conference on the Environment and Health (Budapest, June 2004) which adopted the Children's Environmental Health Action Plan for Europe (CEHAPE). The Action Plan defines Regional Priority Goals. Goal III aims to 'prevent and reduce respiratory disease due to outdoor and indoor air pollution, thereby contributing to a reduction in the frequency of asthmatic attacks, in order to ensure that

children can live in an environment with clean air ' and Goal IV aims to 'reduce the risk of disease and disability arising from exposure to hazardous chemicals (such as heavy metals), physical agents (eg excessive noise) and biological agents and to hazardous working environments during pregnancy, childhood and adolescence'.

32. Infants and children are particularly vulnerable to indoor pollution, their small size and developing airways being more exposed than adults. Furthermore, pregnant women's exposure to pollutants found indoors can cause damage to the foetus.

33. Known health effects of indoor pollutants on children include, other than asthma and allergies, delays in developmental including effects on vision, hearing, intelligence and learning as well as on growth. Furthermore, poor indoor air quality in schools causes both short- and long-term health problems in students, teachers and other staff.

34. Local authorities recognise the need to prioritise improvements to indoor air quality in those places most frequented by children, in particular places within their remit such as crèches, schools, swimming pools and ice-skating rinks. Many are taking initiatives to improve the quality of indoor air especially in schools. Such initiatives are most effective when they involve all stakeholders including urban planners, architects, maintenance staff, teachers, parents and the children themselves. One such example is in Sweden where the Goteborg programme 'Environmental Diplomas' evaluates, sets standards and provides guidance for air quality in buildings, much of its work is undertaken in schools and kindergartens. In the Netherlands, The Hague is currently running a project to raise awareness amongst planners and teachers of the importance of adequate ventilation and appropriate cleaning in schools.

Disadvantaged populations most at risk

35. Unsurprisingly, higher rates of pollution are found in the most densely populated areas, poorer neighbourhoods and in insalubrious buildings. Some population groups, in particular those on low incomes, are exposed to a disproportional amount of environmental hazards both indoors and outdoors. Furthermore, their low income limits their chances to improve their situation, whether at home or in the workplace.

36. Other vulnerable or sensitive groups include the elderly and housebound, people with existing health problems such as cardiovascular or respiratory problems, and people who show particular physiological or genetic sensitivities to pollutants.

37. Public responses to protect and foster the health and well-being of citizens need to take these considerations into account and address the overall quality of buildings. They should prioritise the protection of the most vulnerable with a view to reinforcing environmental fairness and social cohesion.

III. Aiming for an environment which respects human health

Tackling indoor pollution as rigorously as outdoor pollution

38. In Europe, indoor pollution has been woefully neglected in public policies at all levels of governance. Regulations and legislation on air pollution have tended to focus on outdoor air or indoor air in the workplace. This imbalance should be redressed through legislation and directives on pollution in indoor spaces which are at least as rigorous as those in place for outdoor air.

39. Innovative policies should respond to the growing clamour from citizens for a healthy environment. Sustainable public policies must give precedence to societal concerns over short-term economic interests and be guided by an understanding of the close link between protection of the environment and effective public health protection.

40. Recognition of these links makes clear the need for an integrated, multi-disciplinary approach which brings together environmental concerns, spatial planning and mobility policies, education policies, energy strategies and agricultural policy. Cooperation between all stakeholders is required and good governance practices offer a valuable tool to develop sustainable solutions to the

environmental and health crisis. Building participative democracy facilitates the task of public authorities to introduce ambitious policies commensurate with the extent of the threat.

41. They can do this most successfully when it is clear they are responding to citizens' demands for a healthier environment. An example of this approach is provided by the Grenelle Environment Forum in France which aims to implement an ambitious National Environmental Action Plan based on the findings of multi-disciplinary stakeholder working groups. It builds on the 2004 'Plan National Santé Environnement' which already recognised indoor air quality as a national priority.

The protection of citizens: a social and economic priority

42. Public action to reduce the impact of indoor pollution on citizens' health should be guided by the precautionary principle. This implies that whenever reasonable evidence indicates that a substance poses a serious health threat, public action and preventive measures, proportional to the potential risk, should be taken until scientific certainty is established.

43. Such an approach can be used to stimulate innovation and research, particularly if public action also supports the principle of substitution - whereby hazardous substances are replaced by safer ones. This means fostering research and development into safer and more sustainable products which meet human needs with lower health and ecological costs.

44. Green chemistry and engineering offer promising opportunities in this respect. Giving greater importance to research into this is essential to foster a fundamental shift away from an economy dependent on hazardous chemicals, towards more sustainable processes and products.

45. Finally, the relationship between indoor and outdoor environments must not be neglected. Healthy indoor environments are easier to achieve when outdoor environmental quality is high. An increasing number of local authorities is recognising the need for innovative integrated approaches to improve the quality of the air in cities.

Improving international regulation of indoor pollution

46. The WHO is one of the first international organisations to become fully aware of the world-wide importance of indoor air pollution. It recognised sick building syndrome as early as 1983 and published in 2009 Guidelines for Indoor Air Quality.

47. Similarly, the World Bank ranks indoor air pollution as one of the four most critical environmental problems. It should be noted that whilst indoor air pollution is a major concern in developed countries, it poses a far greater threat in the developing world where some 3.5 billion people, mostly in rural areas but also in many cities, are subject to very high exposures of indoor pollutants.

48. The United Nations Economic Commission for Europe Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) heralded a new approach which links environmental rights and human rights and puts sustainability and the involvement of all stakeholders at the heart of its concerns. Two protocols, adopted in 1998, strengthen its capacity to address air pollution levels: one focuses on a list of 16 high-risk substances and the other targets three particularly harmful metals: cadmium, lead and mercury. The European Parliament suggests that the Aarhus Convention provides an ideal framework for the EU environment and health monitoring system.[4]

49. A significant step forward in improving knowledge and monitoring of indoor pollution was taken in June 2007 when the European Commission Regulation REACH: Registration, Evaluation, Authorisation and Restriction of Chemical substances entered into force. This regulation is underpinned by the precautionary principle and obliges industry to study the toxicological properties of their products and their adverse effect on human health or the environment. REACH's intention is to replace the most hazardous chemicals with safer ones. The European Union expects that some 30 000 substances will be registered over 11 years, the most hazardous chemicals and those used in the largest volumes being registered first.

[4] European Parliament Resolution on the European Environment and Health Action Plan 2004-2010 (2004/2132 (INI))

50. REACH has been described by some as the most important EU legislation for 20 years. It is also highly controversial: the chemical industry suggests it will have an adverse effect on the economy and stifle innovation whilst the trade unions and environmental groups regret that REACH does not apply to chemicals in finished products. They point out that this means that products made outside the EU could contain chemicals that are not registered under REACH.

51. Until recently, health and environment action plans from international bodies such as the WHO, the EEA and the European Union have focused mainly on outdoor air pollution. However, there is a realisation that this approach is inadequate and that the orientation needs to shift towards a better recognition of all the environmental risk factors on human health. It is recommended that future clean air policies take into account the total exposure to air pollution.

IV. Public policies which protect the indoor environment

Filling the information gaps

52. Independent research data on the risks to human health from indoor air quality is scarce and often insufficient. The long-term effects of thousands of chemicals and other potential hazardous substances widely used in products freely available are unknown. Reliable data on the health implications of pollutants of substances found indoors is limited to a few major pollutants such as radon, carbon monoxide, carbon dioxide, lead and asbestos.

53. Most existing studies on indoor air pollution have tended to focus on the workplace where the type and duration of exposure is very different to those experienced in the home or in public spaces. The issue is further complicated by the large mixture of substances found indoor which can give rise to a 'cocktail effect' which is extremely difficult to evaluate. A lack of trustworthy data makes it more difficult for public authorities to evaluate the potential impacts of substances that may pose a health threat and implement determined environmental health strategies. Moreover, improved research and evaluation are hampered by widespread economic pressures to resist tighter regulation and monitoring.

54. Furthermore, the current separation between medical and environmental professionals prevents adequate exploration of possible links between particular ailments and environmental causes. Environmental medicine aims to redress this imbalance. In-service training in this field for health professionals remains fragmentary and deserves greater recognition and promotion. The response to these needs is therefore a matter for research, education and practical experience.

55. In its 'Opinion on risk assessment on indoor air quality', the Scientific Committee on Health and Environmental Risks (SCHER) of the European Commission[5] regrets the poverty of research data and recommends that all relevant sources known to affect the quality of indoor air be evaluated through European-wide multidisciplinary research. Nonetheless, a lack of complete data should not be used as an excuse for inaction or postponement.

Monitoring and indicators to clarify the extent of the threat

56. Public policies should be based on quantifiable objectives and health-based guidelines on potential exposure limits for indoor air quality, founded on health impact criteria and on the best scientific evidence available. In parallel to this, a list of priority substances to be regulated in indoor environments should be drawn up.

57. Several European countries have established indoor air quality observatories at national level to measure pollution levels, increase awareness of the issues at stake and make recommendations and indicators to improve the quality of indoor air. Examples include the German Federal Environment Agency (UBA), the Belgian Scientific Institute of Public Health, the Observatory for Air Quality in France, and the Swedish Institute of Environmental Medicine.

[5] 'Opinion on risk assessment on indoor air quality' of the Scientific Committee on Health and Environmental Risks (SCHER) of the European Commission, Directorate-General Health and Consumer Protection, approved at the 17th plenary 29 May 2007

58. Monitoring the impacts of pollutants on human health can also be undertaken through biomonitoring to facilitate early identification of potential harm to human health. The European Parliament recommends creating a biomonitoring system throughout the European Union with priority being given to monitoring the most vulnerable populations.[6]

Towards greater transparency: the role of local authorities

59. However, the growing awareness of the extent of the threat to health posed by poor indoor air quality has not been accompanied by reliable information on the causes, the possible impacts of indoor pollutants and on prevention methods. Local authorities have a key role to play in overcoming the lack of information and transparency. It is in particular through indoor air quality monitoring and by using health based guidelines that citizens' awareness can be raised on the threat which, in turn, will facilitate changes in their behaviour.

60. The systematic labelling of substances forms an essential element of pollution management strategies and a tool for changing individuals' behaviour. An easily understood labelling system will allow consumers to assess health risks and make informed choices among building materials and consumer products used indoors.

61. Pressure from consumers and building professionals for reliable product labelling is pushing some manufacturers to provide product information on a voluntary basis. As such approaches gain currency, some manufacturing and industrial sectors have a greater incentive to make their products safer and to develop better technologies. Sometimes, they work hand-in-hand with public authorities to improve the quality of information, however, we see an overall resistance to stricter regulation of hazardous substances and to clear labelling of the composition of materials and products.

62. Local authorities can rely on participative democracy to give greater legitimacy to their action to combat indoor air pollution. NGOs involved in environmental and health issues and consumer protection are essential partners in the dissemination of information and in confronting more efficiently powerful industrial and economic interests.

Local authorities setting exemplary standards

63. Most local authorities have extensive responsibilities for spatial planning, for the construction and management of buildings and for the provision of local services. As such they are in a position to influence environmental norms and model exemplary standards. Given the inadequacy of existing indoor air regulations, there is a need for local authorities to progress further than existing legislation.

64. Local authorities are also in a position to put environmental health concerns at the heart of their public procurement practices. The focus should be on risk reduction through better building design, construction and operation and through the use of safe, sustainable materials. Thus they contribute not only to improving standards, but to inciting other businesses to modify their production, distribution and working methods in order to respond to this demand. These new policies consequently foster innovation and the development of the green economy.

65. Many public buildings under local authority responsibility are frequented by populations particularly vulnerable to indoor pollution, for example crèches, schools, hospitals and homes for the elderly. Strategies to reduce indoor pollution levels should first focus on these structures and at-risk populations. An important element in improving health and safety in buildings is to ensure these structures are well managed in particular that cleaning and maintenance procedures are of the highest standard and employ ecological products.

66. The majority of local authorities have responsibilities for housing and it is important that they maintain high standards within those homes under their authority. This may be done through remedial action or through rebuilding. They should also consider the use of incentives and grants to improve the quality of social housing and private sector housing.

[6] Op. cit.

67. As well as tackling indoor pollution through radical measures, important improvements to indoor air quality can take place through relatively simple changes in behaviour. For example, frequent ventilation and adequate cleaning of ventilation systems can greatly reduce the toxicity of the air. The advantages of biodiversity in outdoor spaces have been well documented, however research suggests that having plants in the workplace or home encourages cleaner air and a positive atmosphere which in turn increases mental and physical well-being. Local authorities, working in cooperation with stakeholders, are well-placed to ensure that citizens are aware of the ways in which they can act to improve the quality of their environment.

68. Many professions, employed either directly or indirectly by local authorities, can be important multipliers. Training and educational programmes should be offered to specialists such as health workers, construction professionals, building managers, teachers, cleaners and all those having some link with the environment.

V. Conclusion

69. In the past decade enormous strides have been made to reduce outdoor pollution through policies, regulation, research and funding. At the same time, almost imperceptibly, the levels and complexity of indoor pollution have developed to their current worrying and ubiquitous levels.

70. Several factors are making the situation worse. On the one hand, technological advances mean that new, unknown and untested substances and processes are finding their way into indoor spaces, for example nanoparticles and electromagnetic radiation. On the other, better insulation of buildings and changes in culture – such as using air freshener instead of opening a window - mean that indoor spaces are more poorly ventilated.

71. A whole new approach to combating air pollution is required on the part of all levels of governance, civil society and the private sector. The new paradigm means rigorously addressing both indoor and outdoor pollution sources. It means putting environmental health issues at the centre of policies and it means fostering social cohesion by making sure the most vulnerable are protected.

72. The implementation of the precautionary principle should go hand in hand with policies to foster innovation and technological advances. Research and development which focus on environmentally sound products will lead to improvements in health and encourage the green economy.

73. Overall environmental responsibility needs to be reinforced. The onus should be on the industrial and manufacturing sectors to ensure their products do not present a danger to human health or to the environment. Economic players need to understand that sustainability is also in their interests.

74. The threat of climate change has served to raise citizens' awareness of the need for a sustainable environment and for radical and immediate remedial action. This awareness can be built upon with regards to all aspects of environmental and health protection.

75. Policies should place citizens centre stage and decision-making processes should respond to the population's concerns and interests. Awareness-raising and transparency are key tools; measures to protect citizens are only truly effective if they are understood and endorsed by those people they are meant to protect.