



**EUROPEAN FEDERATION OF CLEAN AIR AND
ENVIRONMENTAL PROTECTION ASSOCIATIONS**
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**Linking air pollution and climate change
A challenge for European legislation**

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European Federation of Clean Air and Environmental Protection Associations

Burg. Scholtenstraat 1
NL-2645 NL DELFGAUW
The Netherlands
info@efca.net
www.efca.net

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Summary for policymakers

The atmosphere of our planet provides vital services for life on earth: it influences the heat balance of the planet, thus stabilising climates and it provides the air which living organisms breathe. Manmade changes in its composition have impacted on both these functions.

This has led to the development of environmental policies and legislation addressing these two atmospheric problems. For predominantly historical reasons this has been done separately, creating institutional and practical separation between the two domains of climate change and clean air, from the UN down to local levels.

The need for an integrated approach, which was demonstrated at several recent occasions [1-3], has been recognised at both the policy and political levels in Europe and elsewhere. The institutional separation of the two domains, however, may not favour its effective implementation. This has triggered an analysis of EU legislation on climate change and air pollution, and induced EFCA to consider the framework to support the introduction of an integrated approach. We report here on both aspects, including the results of an earlier publication on this matter [4].

In the recent Directives agreed as part of the Climate and Energy Package, notably the Directives on Renewable Energy and on Carbon Capture and Storage, the connection with the air quality domain has been signalled as an issue which requires attention. The Regulations on mobile sources reflect an integrated approach to pollutants and greenhouse gases. In other Directives in the domain of air pollution the need for an integrated approach is not reflected in the existing texts.

It was concluded that several responses may be warranted in order to improve the quality of European legislation and to further promote cost-effective approaches in the implementation of the Directives. EFCA feels obliged, and wants, to make a contribution by presenting some recommendations. These range from providing the overall framework for legislation in the two domains to actual modifications to those Directives presently in force, and include institutional matters.

1. The absence of a framework for the protection of the atmosphere against all types of impacts requires actions at several levels. In order to secure an integrated approach in the protection of the atmosphere of the earth in the future a Convention for a Law of the Atmosphere would be the authoritative and most relevant approach. To that end European policymakers are requested to take initiatives in the relevant fora of the United Nations. In support, UNECE may want to prepare the ground and promote and develop the concept of integrating different environmental objectives within overall economic targets in order to increase cost-effectiveness.
2. Anticipating the outcome of a possible UN-process, the Commission may want to propose a European Framework Directive, comparable to the existing integration in the legislation on mobile sources, which would cover all sectors, including industry and agriculture and require integrative approaches at all levels.
3. As these actions require time before they could achieve their effects they cannot, however, be a substitute for short-term action to improve existing European legislation. A cost-effective implementation of Directives in the air quality domain with respect to climate change objectives is a challenge for the hundreds of regional

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and local authorities across Europe, and opportunities to inspire and support them are currently being missed. Four Directives deserve a revision as soon as possible in this respect.

- The Air Quality Directive (AQD) should refer to the challenges of addressing the climate change problem in its considerations and thus provide an incentive to favour co-benefits and prevent unwanted impacts on climate from policies which aim at meeting the requirements of the AQD. In particular, the co-benefits of the PM₁₀/PM_{2.5} requirements for the reduction of black carbon as climate forcer and similarly of ozone precursors for tropospheric ozone should be emphasized.
 - The Environmental Impact Assessment Directive (EIAD) should refer in its considerations to the challenges of addressing the climate change problem and thus provide an incentive to explore alternatives which minimise emissions of GHGs.
 - The National Emissions Ceilings Directive (NECD) should refer in its considerations to the challenges of addressing the climate change problem; it should point out the co-benefits of stringent ceiling levels for the precursors of tropospheric ozone: nitrogen oxides (NO_x) and volatile organic compounds (VOCs), in climate change policies; in addition, it should point out the co-benefits of emission ceilings for acidifying components (sulphur dioxide (SO₂), nitrogen oxides and ammonia (NH₃)) which reduce the carbon sequestration capability of soils and potentially increase the emission of nitrous oxide (N₂O)
 - The Integrated Pollution Prevention and Control Directive (IPPC) ‘explicitly excludes’ emissions of greenhouse gases as these are being covered differently. To meet the stringent emission limits for toxic emissions in the Directive a system of reference documents on Best Available Technologies is being made available, the so-called BREFs, primarily describing downstream solutions. However, end-of-pipe technologies require additional energy and increase emissions of GHGs and their precursors. The IPPC Directive should refer to this connection in its considerations; in line with this, the revision process for existing BREF’s should be modified to include the emission of toxic pollutants as well as GHGs in an integrated way.
4. However, these revision processes may also take several years and climate change is urging us to undertake action immediately. In order to further a cost-effective implementation of the Directives in the air quality domain the European Commission may want to release a policy statement which calls for a coordinated approach of air pollution and climate change at all relevant levels in the implementation of present regulations. In addition, it is recommended to involve the R&D community and the private sector to develop solutions to that end.
 5. Further to that end, pointing out the potential of increased cost-effectiveness, attention could be drawn to the optimal conditions – institutional, structural and organizational - for policy integration of air pollution and climate change, at all levels in the public as well as in the private sector.

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Abbreviations

AP	Air Pollution
AQD	Air Quality Directive
BAT	Best Available Techniques
BREFs	BAT Reference documents
CC	Climate Change
CCS	Carbon Capture and Storage
CLRTAP	Convention on Long-range Transboundary Air Pollution of UN-ECE
CO ₂	Carbon Dioxide
EFCA	European Federation of Clean Air and Environmental Protection Associations
EIA	Environmental Impact Statement
EIAD	Environmental Impact Assessment Directive
ETS	Emission Trading Scheme
GHG	Greenhouse gas
IPPC	Integrated Pollution Prevention and Control
IUAPPA	International Union of Air Pollution Prevention and Environmental Protection Associations
LCPs	Large Combustion Plants
NECD	National Emission Ceilings Directive
NH ₃	Ammonia
NO _x	Nitrogen oxides
N ₂ O	Nitrous oxide
PM	Particulate Matter
SO ₂	Sulphur dioxide
UN	United Nations
UN-ECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
VOCs	Volatile Organic Compounds

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1. Introduction

The problems of air pollution (AP) and climate change (CC) relate to the same atmosphere. They are caused by emissions which often have common sources: combustion of fuels in both stationary and mobile applications, industrial processes, agriculture and forestry, and waste treatment. Furthermore, the two phenomena have mutual interactions in the atmosphere through both physical and chemical processes. Policies which address these problems should reflect these interactions and ideally be developed within an integrated approach. These views expressed in this document constitute the main outcomes of a European symposium [1] sponsored by EFCA in November 2008, as well as those of a previous conference in Stockholm organised by IUAPPA under the auspices of UNEP and UN ECE/CLRTAP, in September 2008 [2].

For historical reasons the policy domains of air pollution and climate change have been developed separately, in Europe as well as in other parts of the world. While the regulations in one domain may create co-benefits in the other there is also concern that some measures can also cause trade-offs. A number of different studies have highlighted the interaction mechanisms and provided assessment tools for coordinated approaches [1, 2]. There is a general feeling that presently not all potential co-benefits are being fully harvested and that antagonistic effects of policies are not being reduced to minimum levels.

The need for an integrated approach to the two domains has now been widely recognised among policymakers. In response to the present lack of coordination frameworks and policies, the Swedish presidency of the European Union hosted a workshop in October 2009 in Gothenburg with the objective to consider the matter in more detail and provide guidance for future policy development [3]. An international legislative framework which would enforce and support integrated approaches of AP and CC policies is presently not in place, neither at the UN level, nor at that of the EU. In this report we discuss opportunities for it in different international bodies.

The essence of policy developments in the EU up to the present has been laid down in a number of Directives and Regulations. Member States are obliged to implement these within their territory, which results in actions at national, regional and local level. The national and sub-national authority levels are currently in a position to either develop integrated approaches on climate change and air pollution when implementing the European legislation or to miss the opportunity altogether. However, examples of separate approaches have been reported and may still be common practice. EFCA is presently preparing an international workshop later this year to address this problem. As a point of general interest, one would want to know whether the present legislation provides the necessary incentives to develop solutions at national or local levels which deliver cost-effective results in the two domains of air quality and climate change. This point was raised from the side of EFCA during the discussions at the Gothenburg workshop, on the basis of a preliminary screening of selected Directives [4].

EFCA is aware that the integration of climate change and air quality policies is just one of the challenges on the road towards a better world. A wider integration framework which includes economic and social challenges was depicted by EFCA's past-president at the start of our present investigation and has been included as Annex I of reference [4].

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In this Position paper an analysis of an enlarged selection of EU-legislation in the domains of air quality and climate change and including the most recent regulations on mobile sources, is reported. Obviously, there are other sorts of European legislation with a bearing for one or both the air quality and the climate change domain. The Directive on the Energy performance of buildings [5], e.g. has a potential impact on indoor air quality and similar impacts may result from regulations under the Eco-design Directive [6]. The intention of this paper, however, is not to be exhaustive, but to present a balanced, representative and focused overview of the present legislative situation in the European Union.

2. European legislation: the air quality domain

2.1. Air Quality Directive

The Directive on Ambient Air Quality [7] defines and establishes “...*objectives for ambient air quality designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole*”. The expression “*the environment as a whole*” is invoked several times, but never specified. In practice the Directive addresses conventional primary pollutants only in order to “...*minimize harmful effects on human health*”. In the thirty-three “*Whereas*” of the preamble neither climate change nor greenhouses gases (GHGs) are mentioned.

The perceived message, thus, is that climate change is not connected with air quality (nor human health or “*the environment as a whole*”). Indeed, the Directive requires measurements of ozone, which is a GHG, and of its precursor substances in order to analyse their trends and “... *check the efficiency of emission reduction strategies*”; a reference to its role in global warming and the clear co-benefits of reduction strategies for ozone is missed here. Also, the Directive provides requirements for measurement of particulate matter (PM) and air quality targets for their atmospheric concentration (PM₁₀ and PM_{2.5}). However, while specifying size characteristics, the Directive does not discriminate between the capacity to reflect sunlight and the colour of PM from different sources; this property is relevant for their role in global warming.

Unbalanced implementation of the Directive may have a negative impact on climate change policies. An example of this is the introduction of a traffic circulation plan in order to reduce pollutant levels at ‘hot spots’. Such plans could result in larger distances between destinations or increased congestion within cities and so increase emissions of CO₂ and conventional pollutants.

2.2. Environmental Impact Assessment Directive

The Environmental Impact Assessment Directive (85/337/EEC) dates from 1985 and has been amended twice: 97/11/EEC and 2003/35/EEC [8]. In the preamble to all three versions of the Directive a reference to the challenges of climate change is missing. In Article 3, which calls for the direct and indirect effects of a project, the areas of the environment which may feel effects from a project are listed as: soil, water, air, climate and landscape. In this context however, ‘climate’ is likely to refer here to local effects like the ‘heat island’. This is confirmed upon reading the requirements for an Environmental Impact Statement (EIS) of a project where climate has been changed to ‘climatic factors’ (Annex IV of later versions). The general provision that a project initiator should avoid impacts on the

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environment as much as possible has resulted in national obligations to include climate change among the impacts to be assessed in an EIS. However, this situation occurs in some but not all Member States.

Under the present legislation it is not assured that the EIA Directive furthers a reduction of the carbon footprint of projects. On the contrary, by identifying technical solutions which reduce 'conventional' impacts, generally by adding air pollutant abatement measures and devices, the energy requirements of the project may increase.

2.3. NEC Directive

The first objective of the NEC Directive [9] was to reduce acidification and pollution by tropospheric ozone and so attain the critical loads and levels for the protection of crops and ecosystems across Europe where possible. It does so by regulating emissions ceilings in the EU15 for the pollutants SO₂, NO_x, VOC and NH₃. The present Directive details the actual emission ceilings to be attained in the year 2010 and the respective obligations of the Member States connected. Later on the reduction of the health burden of the population exposed to these pollutants and the secondary pollutants ozone and inorganic PM became an extra objective to underpin the need for NEC's

In the preamble of the Directive there are no references made to the challenges of climate change.

The Directive has a number of important side-effects:

- reducing emissions of the involved pollutants is also beneficial for public health;
- the ceilings for NO_x and NH₃ also reduce fertilisation by nitrogen and its negative impact on sensitive ecosystems;
- the ceilings for NO_x and NH₃ potentially have the additional effect that emissions of the greenhouse gas nitrous oxide will diminish;
- the ceilings for NO_x and VOC are directly beneficial with regard to climate change policies because they reduce the formation of tropospheric ozone which is a greenhouse gas;
- the ceilings for SO₂ and NO_x will reduce the present masking of climate forcing because of the 'white' aerosols which they produce after atmospheric conversion in sulphates and nitrates droplets and so increase the rate of global warming;
- the ceilings for SO₂, NO_x and NH₃ will, by reducing the acidic deposition on soils, protect them, and possibly increase their natural capacity for carbon sequestration.

While the side-effects on public health and nitrification have been recognised in the considerations of the Directive, the ones which are relevant to global warming have not.

A revision of the Directive was foreseen for 2009 and preparations for this have been made. However, a proposal by the Commission to Council and Parliament is presently pending, in order to harmonise it with the current revision of the Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution of UN-ECE.

2.4. IPPC Directive

The objective of the IPPC Directive is to achieve integrated prevention and control of pollution arising from industrial activities. It lays down measures designed to prevent or,

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where that is not practicable, to reduce emissions to air, water and land from the abovementioned activities, including measures concerning waste, in order to achieve a high level of protection of the environment as a whole.

The IPPC Directive, which concerns the most important industries in Europe (52.000 installations), was issued in 1996 (96/61/EC). It has been amended four times and the latest version is in force since 2008 (2008/1/EC [10]). In December 2007 a recast of the Directive was proposed¹. In the Directive, standards for industrial emissions are set on the basis of reference documents for the Best Available Techniques, known as BREFs, also meant as guidance for the competent authorities in permit procedures.

In line with its objectives to control industrial pollutants, the IPPC Directive presently in force (as well as the proposed recast), explicitly excludes the regulation of greenhouse gases. It is considered that interference with the Emission Trading Scheme is to be avoided. It is clear that emission limits for GHGs, in addition to the ones for 'conventional' pollutants, would reduce the operational space of project initiators for finding cost-effective solutions. However, project initiators have to compromise between the dual challenges of energy efficiency and low-emission technology anyway. Therefore, a more explicit reference to the dual challenge of climate change and pollution reduction in the preamble of the Directive would not seem to be likely to do any significant harm to the objectives and implementation of the ETS, and in view of the high impact of the implementation of the Directive in industry it would be a missed opportunity not to guide the licensing authorities towards an integrated approach in their negotiations with industry.

The connection between industrial pollution and global warming is presently confined to one reference in the preamble to the principle of sustainable development; and in Article 3 under (d) where energy efficiency is mentioned as an essential principle for the operator of the activity. Without a more explicit reference to the climate change problem, however, the IPPC Directive fails to provide an incentive to local authorities to seek integrated solutions when implementing the Directive in permit procedures.

A second option relates to the current revision process for the BREFs which presently do not consider climate change objectives. The stringent emission limits suggested for a number of conventional air pollutants may be achieved through up-stream choices and/or along-stream modifications of plants and processes, but largely rely on down-stream solutions, that is on end-of-pipe technologies. Any end-of-pipe technology requires additional energy consumption often together with water and/or additives which, on their turn, need appropriate treatments and/or disposal, thus involving further consumption of energy and therefore resulting in additional CO₂-emissions. With ever more stringent emission limits imposed to abatement plants the likely trend will be a further increase of energy consumption. If BREFs would address BAT solutions which optimise between pollution reduction and energy-efficiency objectives, co-benefits are likely to result and this may actually enhance the operation of the ETS in reducing carbon emissions where most practicable.

¹ In the context of a better-regulation and simplification programme of the EU's legislation, a recast of the IPPC Directive [11] is being debated, under the title of "Industrial Emissions Directive" which is to include six related legislations on industrial emissions (Large Combustion Plants (LCPs), Waste Incineration, Solvents, and Production of Titanium Dioxide). The process of co-decision is currently halfway through. The Council, in its meeting of 25 June 2009, did not agree with the amended version of the Parliament in its first reading. In particular, the different positions on the LCPs will require a second reading [12].

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The Directive on the **Incineration of Waste** [13], which will be integrated in the future Industrial Emissions Directive, while requiring priority to waste prevention, refers to the use of biomass as renewable energy. However, it does not consider the impacts on climate change of waste incineration in comparison to other waste treatment solutions.

2.5. Regulation on mobile sources

The Euro 5 and 6 standards for emissions from light vehicles [14, 15] and the EURO V and VI standards for heavy vehicles [16] have a strong focus on air quality, in particular NO_x- and PM-emissions. However, both regulations were accompanied by Impact Assessment documents [17, 18] in which the effects of the standards on fuel-efficiency and CO₂-emissions have been quantified.

For light vehicles the approach of the Commission was followed by a proposal for a Directive on increased fuel-efficiency which has been adopted as part of the Energy Package. In the preparatory phase for the heavy vehicles regulation a number of sub-options were presented in a hearing among stakeholders; the preferred option of the majority, compromising between lowest toxic emissions and highest fuel-efficiency, was then selected and incorporated in the regulation.

The procedures for the regulation of emissions from mobile sources clearly follow the necessary integrated approach. It should be noted that the regulation on mobile sources is targeting the type approval of new models. The automobile industry is responsible for the implementation of the measures. The actual emissions of pollutants and greenhouse gases in traffic conditions, which are of concern for national and local authorities, are not addressed in the regulations and cannot be influenced directly by them. In spite of the valuable integrated approach, the regulations still do not provide incentives for integrated policies at the regional or local level. The above described integrated approach has been formally laid down last year in Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles [19].

3. European legislation: the climate change domain

Legislation in the domain of climate change consists primarily of the Climate and Energy package based on the 20-20-20 in 2020 approach. The elements of the package have varying interference with the air quality domain.

The **agreement on 30% CO₂ reduction** [20], of which 20% is binding, by 2020 does not consider the air quality impact.

The **target of 20% energy conservation** [21] does consider such co-benefits and with an average reduction of 15% in emissions of the most important air pollutants it is a well documented co-benefit.

The **Directive on the Emission Trading System** [22] may have a similar positive impact on emissions of air pollutants but the matter is not addressed within the Directive.

As discussed in paragraph 2.5 the **Directive on CO₂ Emissions from Passenger Cars** [23] is to be considered as a legislative product of the integrated approach for climate change and air pollution.

The **Directive on Renewable Energy** [24] was agreed after a thorough discussion between Commission, Council and Parliament on the risks of the 20% target in 2020 for the

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impacts of its production, in particular the 10% biofuels for transport purposes. The Directive reflects this in a number of considerations requiring sustainable production in general, and also requiring conditions when licensing installations for their production. It further calls for coherence between the objectives of the Directive and the Community's other environmental legislation. And finally, it recognises the present uncertainty regarding the feasibility of the target by requiring that a Committee should provide sustainability criteria on the production of biofuels. There is presently no indication, however, that specific pollutant emissions from diverse types of biofuels will be addressed, as well as the impacts of indirect land use change, notably on N₂O emissions.

The **Directive on Carbon Capture and Storage** [25] also suggests an integrated approach by explicitly referring to the applicability of the EIA Directive and the IPPC Directive to CCS installations and sites. In addition, the CCS Directive contains a number of amendments to be included in existing Directives and Regulations.

4. An integrative framework?

4.1. Fundamental considerations

The Earth's atmosphere is one of the precious commons of the majority of living beings, including mankind; others are the land, including its soils and freshwater systems, the oceans, and biodiversity. While nearly all land is owned by sovereign states which are responsible for its quality, the oceans and the atmosphere are shared commons; it is not possible to hold a single country responsible for their quality. In recognition the United Nations have taken several initiatives; for the Oceans this has resulted in the UN Convention on the Law of the Sea (1982; effective since 1994) [26]. The various threats to the atmosphere are presently being addressed separately. A similar approach for the atmosphere, by agreeing on a Law of the Atmosphere, would be most logical. It has been explored and discussed incidentally over the last two decades, primarily in academic circles [27-30]. It could serve as a framework for existing and future integrated legislation for the protection of the Earth's atmosphere and those who inhabit it.

A guiding way to approach the problem could be found in the original, common, world-wide accepted definition of air pollution, as a release into the atmosphere of gaseous, liquid or solid substances which, at certain level of concentration, of persistence in time and under certain circumstances, may interfere with public health and damage the environment. Therefore air pollution, whenever involved, must be considered inclusive of all kind of substances (primary and secondary), all kind of sources (anthropogenic and natural), and all kind of consequences (short- and long-term, short- and long-distance, direct and indirect). This definition includes greenhouse gases, making it suitable to serve the integrated approach for air quality and climate change.

An approach following the 'one atmosphere' concept may require the creation of a new legislative framework which explains the coherence, and is suitable to accommodate existing legislation from the domains of both air quality and climate change. Its further value would exist in defining objectives which are then to be respected in legislation in other domains, as well in all subordinate legislation. It would certainly bring the protection of our environment and the quality of our legislation to a higher level. It is, however, important to consider the effectiveness of such a new approach.

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4.2. Feasibility considerations

4.2.1. United Nations

At the level of the United Nations, the decision in 1992 to address the challenges of global warming prevention in the framework of sustainable development has resulted in the establishment of a separate UN organisation for this purpose; actually, this means that an institutional barrier now exists between the domains of environmental quality and climate change. The challenges of carrying the process towards global emission reductions for greenhouse gases forward presently prevent the start of discussion on further integration of objectives. And if the issue ever becomes part of the political agenda it may take more than a decade to reach an agreement.

In view of the urgency to remove the shortcomings of some of the present legislation, a process towards a Law of the Atmosphere, therefore, seems unsuitable as the sole approach to improvements; it is to be considered, however, as an essential, if long-term, goal to be achieved and so deserves the support of European policymakers.

4.2.2. European Union

In the European Union the successful approach for mobile sources could be copied in other sectors. With climate change now mainly being addressed in its narrow connection with energy policies, a new framework may result which integrates energy, climate change and environmental policies. The modification of existing Directives to make them suitable as subordinate legislation would be compatible with such a process, though it might require a considerable stretch of time before it can be effective. The risk for conflicting developments as a result of separate EU regulation in the domains of air quality and climate change will then continue to exist.

As a consequence a bottom-up approach which starts from the existing legislation must be taken and should have priority. Such an approach is likely to deliver its results sooner and therefore be more effective. A major element would be an extension of the preamble for each Directive with considerations which reflect the basics of atmospheric science with respect to their application in policies:

- air pollution refers to all kinds of substances (primary and secondary), all kinds of sources (anthropogenic and natural), and all kinds of consequences (short- and long-term, short- and long-distance, direct and indirect, public health and ecosystem);
- no matter concerning the atmosphere may be completely confined locally and/or temporally;
- any initiative enforced for a specific environmental purpose in a confined region for a limited time may affect somehow other environmental aspects and/or different areas and/or in different time;
- the EU environmental policy is based on a number of principles of subsidiarity, proportionality, precaution, and “polluter pays”; they should always be balanced and not adopted only partially at one’s convenience;
- the environmental problem is one of many social problems and may not necessarily be the most important in a specific locality; that is, world-wide solutions to environmental problems, as well as local solutions, should be framed within an approach that is integrated as much as possible.

A systematic modification of the existing Directives seems feasible and may be part of the periodic revision routines. The delayed proposal for a new NEC Directive could be a first candidate. The revision of the air quality Directive is due for 2013. The IPPC Directive is

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presently in a recast process and new modifications at this stage might complicate its treatment in Parliament.

Although it is one of the shorter-term approaches, it may still take between three to five years before the revised Directives could be in force. During this period it is likely that the many cities across Europe which are presently developing policies towards CO₂-, climate- or energy-neutrality will have decided on their planning until 2020. In order to increase the cost-effectiveness of these local initiatives the European Commission may want to release a policy statement which calls for a coordinated approach towards air pollution and climate change in the implementation of present regulations at all relevant levels, and invite the R&D community and the private sector to develop solutions to that end.

4.2.3. United Nations Commission for Europe (UN-ECE)

UNECE is looking at a more consistent future environmental policy across all fields. To that end, UNECE appointed the 7th Ministerial Conference, to be held in 2011 in Astana, under the title of “Environment for Europe” [31]. One of the two themes, ‘*Greening the economy: Mainstreaming the Environment into Economic Development*’ addresses economic policies to ensure better environmental performance. This could include issues such as the reduction of carbon emissions, energy efficiency, sustainable consumption and production, and the reconfiguration of financing and infrastructure to better accommodate environmental considerations. Though UNECE is not a body with legislative power its ambitions prepare the ground for integrated solutions, including a coordinated approach to climate change and air pollutions policies to the benefit of the whole of Europe.

4.2.4. Institutional considerations

A final consideration concerns the optimisation of institutional, structural and organizational conditions in order to achieve integration of air pollution and climate change. Policy development should be organised in such a way that impacts in different sectors are assessed together to minimise unwanted effects; this applies at international, national as well as local levels. The recent decision to create a separate Directorate General for Climate Change may require coordinated efforts in order to avoid trade-offs and harvest co-benefits.

Integration of staff and capacities within one structure is neither a condition nor a guarantee of higher efficiency; however, well-managed confrontation of different objectives will generally increase the quality of the results. In this respect operational practice is similarly important. The private sector, with its strong culture for cost-effective approaches, deserves, at all administrative levels, a counterpart which is aware of potentially conflicting objectives.

5. Conclusions and recommendations

5.1. Conclusions

1. Four EU Directives may be considered as most relevant ones for the improvement of air quality across Europe: the Air Quality Directive, the Environmental Impact Assessment Directive, the Integrated Pollution Prevention and Control Directive and the National Ceilings Directive (NEC). Of these the NEC Directive will produce substantial co-benefits for climate change objectives. The impact of the three other Directives is dependent on their actual implementation and is likely to be predominantly negative in terms of the objectives of European climate change policies.
2. However, none of these Directives refers to the challenges of the climate change problem, neither in articles or annexes of these Directives, nor in their preambles. The absence of such guidance for competent authorities which are responsible for the implementation of these Directives at national, regional or local level means that opportunities to avoid trade-offs between air quality and climate change objectives may not be reduced to the lowest possible level and that co-benefits may not be fully harvested.
3. In contrast, the most recent Regulations on emissions from mobile sources were found to have been agreed after a thorough process among stakeholders to find a compromise between air quality and climate change objectives. This approach has been confirmed by adopting a Directive on the promotion of clean and energy-efficient road transport vehicles in 2009.
4. Some policy Agreements and Directives in the domain of climate change, primarily those adopted in the Climate and Energy package, may have a negative impact in other environmental domains, including air quality. However, potential risks have been identified and the development of criteria for the prevention of trade-offs in other domains is urgently required.
5. An integrated framework for the protection of the earth atmosphere, be it at the level of the United Nations or that of Europe could prevent legislation which ignores its impact on other atmospheric problems. Such a framework does not exist presently and is badly needed. However, because of the urgency to remove the shortcomings in some of the present legislation, it is unsuitable to consider this as sole approach to improvements,

5.2. Recommendations

1. The absence of a framework for the protection of the atmosphere against all types of impacts requires actions at several levels. In order to secure an integrated approach to the protection of the atmosphere of the earth in the future a Convention for a Law of the Atmosphere is needed. To that end European policymakers are requested to take initiatives in the relevant fora of the United Nations. In support, UNECE may want to prepare the ground and promote and develop the concept of integrating different environmental objectives within overall economic targets in order to increase cost-effectiveness. The European Union may want to copy its integrated approach in the sector of mobile sources to other sectors, including industry and agriculture.

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2. As these actions require time before they could achieve their effects they cannot be a substitute for short-term action to improve existing European legislation. A cost-effective implementation of Directives in the air quality domain with respect to climate change objectives is a challenge for the hundreds of regional and local authorities across Europe and opportunities to inspire and support them are now being missed. Four Directives deserve as soon as possible a revision in this respect.
 - The Air Quality Directive (AQD) should refer in its considerations to the challenges of addressing the climate change problem and thus provide an incentive to favour co-benefits and prevent unwanted impacts in this domain from policies which aim at meeting the requirements of the AQD. In particular, the co-benefits of the PM₁₀/PM_{2.5} requirements for the reduction of black carbon as climate forcer and similarly of precursors for tropospheric ozone are to be emphasized.
 - The Environmental Impact Assessment Directive (EIAD) should refer in its considerations to the challenges of addressing the climate change problem and thus provide an incentive to explore alternatives which minimise emissions of GHGs.
 - The National Emissions Ceilings Directive (NECD) should refer in its considerations to the challenges of addressing the climate change problem; it should point out the co-benefits to climate change policies of stringent ceiling levels for the precursors of tropospheric ozone, nitrogen oxides (NO_x) and VOC ; in addition, it should point out the co-benefits of emission ceilings of acidifying components (sulphur dioxide (SO₂), nitrogen oxides and ammonia (NH₃) which reduce the carbon sequestration capability of soils and potentially increase the emission of nitrous oxide (N₂O).
 - The Integrated Pollution Prevention and Control Directive (IPPC) explicitly excludes emissions of greenhouse gases as these are being covered separately by the ETS. To meet the stringent emission limits for toxic emissions in the Directive a system of reference documents on Best Available Technologies is being made available, the so-called BREFs which primarily describe downstream solutions. However, end-of-pipe technologies require additional energy and are likely to therefore increase emissions of GHGs. The IPPC Directive should refer to this connection in its considerations; in line with this the revision process of existing BREFs should be modified to include the emission of toxic pollutants as well as GHGs in an integrated way.
3. These revision processes may take several years and climate change is urging us to undertake immediate action. In order to further cost-effective implementation of the Directives in the air quality domain it is recommended that the European Commission releases a policy statement which calls for a coordinated approach of air pollution and climate change in the implementation of present regulations, at all relevant levels. In addition, it is recommended to involve the R&D community and the private sector to develop solutions to that end.
4. Acknowledging that integration of staff and capacities within one structure is neither a condition nor a guarantee of higher efficiency, it is suggested to pay attention at all levels to the institutional, structural and organizational optimal conditions for policy integration of air pollution and climate change.

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