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Transboundary Air Pollution

Working Group on Strategies and Review

Fifty-sixth session

Geneva, 22–25 May 2018

Report of the Working Group on Strategies and Review on its fifty-sixth session

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I. Introduction

1. The fifty-sixth session of the Working Group on Strategies and Review under the Convention on Long-range Transboundary Air Pollution was held in Geneva from 22 to 25 May 2018.

A. Attendance

2. The session was attended by representatives of the following Parties to the Convention: Albania, Armenia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Cyprus, Czechia, Denmark, Estonia, European Union, Finland, France, Georgia, Germany, Hungary, Ireland, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of Moldova, Romania, Russian Federation, Slovakia, Spain, Sweden, Switzerland, the former Yugoslav Republic of Macedonia, Ukraine, United Kingdom of Great Britain and Northern Ireland and United States of America. Delegates from Chile and Tajikistan also attended the meeting as observers.

3. Representatives from the World Health Organization (WHO) participated in the session.

4. Also present at the meeting were independent experts and representatives from non-governmental organizations, scientific institutions and industrial associations, including the Centre for Integrated Assessment Modelling, the European Committee of Manufacturers of Domestic Heating and Cooking Appliances, the European Environmental Bureau, the European Federation of Clean Air and Environmental Protection Associations, the International Cryosphere Climate Initiative and the Meteorological Synthesizing Centre-East.

B. Organizational matters

5. The meeting was chaired by Jennifer Kerr (Canada).

6. The Working Group adopted the agenda for its fifty-sixth session, as set out in document ECE/EB.AIR/WG.5/119, with changes proposed by the Chair.¹

II. Adoption of the report of the fifty-fifth session

7. The Working Group adopted the report on its fifty-fifth session as set out in document ECE/EB.AIR/WG.5/118.

III. Recommendations of the Saltsjöbaden VI workshop

8. A representative of Sweden presented the outcomes of the Saltsjöbaden VI workshop (Gothenburg, Sweden, 19–21 March 2018), which had been held on the theme “Clean Air for a Sustainable Future – Goals and Challenges”. It had been the sixth in a series of workshops joining policymakers, scientists and other stakeholders for informal discussions on air pollution awareness and control on an international scale. The workshop participants had come up with a number of recommendations addressed to countries, international

¹ All documentation for the meeting is available on the web page for the session: <http://www.unece.org/index.php?id=45535>.

organizations, conventions, in particular the Convention on Long-range Transboundary Air Pollution and the bodies under the Convention, and other actors in the field of air pollution. The speaker gave an overview of the recommendations for the Convention, the Working Group on Strategies and Review and its task forces.

9. The Working Group took note of the recommendations of the Saltsjöbaden VI workshop addressed to it and its task forces and invited the Executive Body, as appropriate, to consider the recommendations from the workshop, especially those related to:

(a) The need for a higher political profile of the Convention in Eastern Europe, the Caucasus and Central Asia;

(b) The introduction of flexibilities for countries in Eastern Europe, the Caucasus and Central Asia, including for the ratification of protocols to the Convention;

(c) Future activities proposed for the Task Force on Reactive Nitrogen, the Task Force on Techno-economic Issues and the Task Force on Integrated Assessment Modelling;

(d) The creation of a task force to consider next steps on broader cooperation on air pollution abatement, including the appropriate role for the Convention, and on the design of a platform for information-sharing and policy cooperation.

IV. Progress in the implementation of the 2018–2019 workplan

10. The Working Group took note of the reports by the Co-Chairs of the Task Force on Techno-economic Issues (ECE/EB.AIR/WG.5/2018/1) and the Co-Chairs of the Task Force on Reactive Nitrogen (ECE/EB.AIR/WG.5/2018/2) on the progress made by those bodies in the implementation of the 2018–2019 workplan for the implementation of the Convention (ECE/EB.AIR/140/Add.1) and planned activities.

11. The Working Group agreed that the review and update of the control costs used and the report on the costs of control versus the costs of inaction under items 2.3.9 and 2.3.10 of the workplan, led by the Task Force on Techno-economic Issues in cooperation with the Task Force on Integrated Assessment Modelling, should be focused on countries in Eastern Europe, the Caucasus and Central Asia.

12. The Working Group noted the proposal of the Task Force on Reactive Nitrogen to organize a joint workshop on air quality and climate interactions in agriculture in collaboration with the Subsidiary Body for Scientific and Technological Advice of the United Nations Framework Convention on Climate Change. It recommended that, at its thirty-eighth session (10–14 December 2018), the Executive Body consider including such a workshop in the activities of the Task Force for 2018–2019. The Working Group further noted the need for additional support from States for the work of the Task Force on Reactive Nitrogen and invited Parties to contribute to it.

13. The Working Group took note of the presentation by the Co-Chair of the Task Force on Integrated Assessment Modelling on current progress in the implementation of the 2018–2019 workplan and planned activities of the Task Force. It agreed that the mandate of the Task Force should be updated to include work on multi-scale, multi-objective integrated assessment modelling. The Working Group expressed its support for national experts to communicate new cost data to the Centre for Integrated Assessment Modelling. It furthermore noted that the report referenced in workplan item 1.1.3.2 would focus on costs of inaction related to addressing ammonia and would be produced in collaboration with the Task Force on Modelling and Mapping and the Task Force on Reactive Nitrogen. The Working Group also noted the need to extend the integrated assessment modelling expert

network to the local and hemispheric scales, and encouraged Parties to support their experts' participation in local and hemispheric assessments.

14. The secretariat reported on the implementation of workplan item 2.1.1 with regard to the exchange of information on national, subregional and regional policies and strategies for the control of major air pollutants. It also shared information on the implementation of capacity-building and outreach activities. The Working Group took note of the information provided and expressed satisfaction concerning the capacity-building and outreach activities, noting the importance of the continuation of such activities to support the strategic priorities of the Convention.

15. With regard to workplan item 2.1.3, the Working Group agreed to start the policy discussion at its fifty-seventh session, taking into consideration relevant recommendations from the Saltsjöbaden VI workshop, the updates to the long-term strategy for the Convention and any additional scientific and technical information that might be brought to its attention by the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) and the Working Group on Effects, in preparation for the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol).

16. The Working Group agreed to move forward with the workshop described under workplan item 2.2, and that, in view of the scarce resources and lack of funding, a feasible option would be to hold the workshop as part of the Working Group's fifty-seventh session, in lieu of a thematic session. It also agreed to explore the option of combining the workshop under workplan item 2.2 with the workshop under item 5.3.5. The Working Group requested its Chair and its Bureau to further develop those options in collaboration with the Executive Body Bureau.

17. The Chair of the Working Group introduced the draft revised mandates of the Task Force on Techno-economic Issues and the Task Force on Reactive Nitrogen (ECE/EB.AIR/WG.5/2018/4). In the ensuing discussion, a number of participants expressed their support for the revision process and noted its timeliness. Several delegates indicated their intention to submit comments in writing, with a view to aligning the mandates of the task forces, both with each other and with the draft revised mandates of the scientific task forces and centres, and for greater clarity and consistency with the recommendations of the ad hoc policy review group of experts on the 2016 scientific assessment of the Convention² (policy review group). A representative of Switzerland suggested to stress in the mandate of the Task Force on Reactive Nitrogen the Task Force's role in reducing emissions of ammonia from agriculture. Participants expressed different views regarding the level of detail to be included in the revised mandates. A representative of the Russian Federation raised the issue of differentiating between a "mandate" and "terms of reference", and stressed the need to consider whether the mandates should be developed into terms of reference. He also pointed to the need to indicate in the documents that experts participated in the work of the task forces in their personal capacity. The Chair of the Working Group on Effects suggested that the structure of the mandates be aligned with that of the scientific task forces and centres under the Convention, and that the mandate of the Task Force on Reactive Nitrogen reflect the work done by its panels. The Working Group agreed that the Chair of the Working Group, in cooperation with the Co-Chairs of the task forces and in consultation with Executive Body Bureau, would produce revised drafts of the task forces mandates, taking into account the

² See Rob Maas and Peringe Grennfelt, eds., *Towards Cleaner Air: Scientific Assessment Report 2016* (Oslo, 2016) and United States Environmental Protection Agency and Environment and Climate Change Canada, *Towards Cleaner Air: Scientific Assessment Report 2016 — North America* (2016, online report).

discussions held and any written comments provided, for consideration by the Executive Body at its thirty-eighth session.

V. Status of ratification of the protocols to the Convention

18. The Chair of the Working Group invited delegations to indicate the status of acceptance and ratification of the Gothenburg Protocol, the Protocol on Heavy Metals and the Protocol on Persistent Organic Pollutants and plans for ratification in 2018–2019 in their respective States. The secretariat noted that 11 out of 27 Parties to the Gothenburg Protocol and 16 out of 34 Parties to the Protocol on Heavy Metals had accepted amendments to the respective protocols. It also indicated that, with regard to the Protocol on Persistent Organic Pollutants, 15 out of 33 Parties had accepted amendments to annexes I and II to the Protocol and 17 Parties had accepted amendments to the text of the Protocol and to its annexes I, II, III, IV, VI and VIII. The Working Group noted that the number of Parties that had accepted or were planning to accept the amendments to the three most recent protocols to the Convention in 2018 and 2019 continued to grow and encouraged Parties to move as swiftly as possible to achieve entry into force of the amendments in 2019.

VI. Update of the long-term strategy for the Convention

19. The Chair of the policy review group presented the proposed updates and revisions to the long-term strategy for the Convention (ECE/EB.AIR/WG.5/2018/3). The document, prepared in line with the guidance and elements provided by the Executive Body at its thirty-seventh session (ECE/EB.AIR/140, annex III), set out a vision for the Convention to 2030 and beyond. Delegations expressed appreciation to the policy review group for its work. Several changes to the proposed text were suggested by delegates during the session.

20. A representative of the European Union, providing some preliminary views, expressed agreement with the document in general, noting that it had been developed in line with respective decisions and the guidance provided. However, it was noted that a more detailed discussion would take place at the thirty-eighth session of the Executive Body.

21. A representative of Canada acknowledged that the highest priority for the Convention was to maximize the impact of the Convention and its protocols through increased ratification and implementation, in particular by countries in Eastern and South-Eastern Europe, the Caucasus and Central Asia. She suggested that preparatory work for a review of the Gothenburg Protocol should begin prior to the actual start of the review process, to provide the necessary scientific and technical foundation. The delegate pointed to the need for broader coordination, outreach and information sharing on the Convention beyond the ECE region and proposed developing a summary of the revised long-term strategy to support such efforts.

22. A representative of the United States expressed support for updating models of the cost-effectiveness of abatement measures and for more effective information sharing and technical support for countries to improve implementation. There was a need to continue to focus on ratification, entry into force and implementation of the existing protocols, in particular by countries in Eastern Europe, the Caucasus and Central Asia. At the same time, it was premature to discuss further updates to the key protocols before the entry into force of the amendments to them. She supported the recommendation for the experts under the Convention to collaborate with other organizations to better understand the links between ozone, nitrogen, climate and biodiversity, as long as the primary goal of those efforts was to reduce transboundary air pollution, and other environmental benefits remained secondary. The United States delegation would share additional views on the draft document at the

thirty-eighth session of the Executive Body, and would reserve its position on certain issues included in the draft until then.

23. The Working Group discussed the proposed strategy and was satisfied with the text in many areas of the document. It recommended that the policy review group prepare a revised draft of the long-term strategy, taking into account the comments and suggestions made during the Working Group session, consultations with the Steering Body to EMEP and the Working Group on Effects and further consultations with the Executive Body Bureau, and to submit the revised draft for consideration by the Executive Body at its thirty-eighth session. The policy review group should also, as appropriate, take into consideration the recommendations of the Saltsjöbaden VI workshop.

24. The Working Group recommended that the Executive Body consider the draft revised long-term strategy to be submitted to it by the policy review group with a view to adopting the revised strategy at its thirty-eighth session.

VII. Information sharing by Parties on the implementation of the Convention

A. Good practices to strengthen the implementation of air pollution-related policies, strategies and measures

25. The Working Group took note of the information shared by representatives of Albania, Norway, the former Yugoslav Republic of Macedonia and Ukraine on the experiences, good practices and lessons learned by those Parties concerning the implementation of the Convention and its protocols. The Working Group also took note of the information shared by the representatives of Canada, Chile, Estonia, the European Union, Finland, France, Germany, Ireland, Italy, Lithuania, Poland, the Russian Federation, Sweden, Switzerland, the United Kingdom and the United States on the experiences, good practices and lessons learned by those Parties, especially with regard to the reduction of emissions from residential wood combustion (see annex for details).³

26. The Working Group recalled that, in accordance with Executive Body decision 2016/3, the period for reporting the information referred to in article 5, paragraph 1 (a), of the Protocol on Further Reduction of Sulphur Emissions, article 7, paragraph 1 (a), of the Protocol on Heavy Metals, article 9, paragraph 1 (a), of the Protocol on Persistent Organic Pollutants and article 7, paragraph 1 (a), of the Gothenburg Protocol was at least once every four years, and invited those Parties that had not yet reported to do so at the Working Group's next session.

B. Current policy issues: thematic session on residential wood combustion and air pollution

27. In a special thematic session, the Working Group exchanged information on solid fuel residential heating and air pollution. It requested its Chair to prepare a summary of the session for inclusion in the report of its fifty-sixth meeting (see annex).

³ The presentations delivered at this and previous thematic sessions and templates submitted to the secretariat are available from <http://www.unece.org/environmental-policy/conventions/envlrapwelcome/convention-bodies/working-group-on-strategies-and-review/strategies-and-policies-for-the-abatement-of-air-pollution.html>.

28. The Working Group noted that solid fuel residential heating emissions of fine particulate matter (PM_{2.5}) and its precursors were key contributors to ambient particulate matter exposure and that residential heating was a key source of black carbon in the ECE region. It acknowledged that, although much had been learned since the addition of black carbon to the amended Gothenburg Protocol, in particular in terms of understanding the importance of the residential heating sector, there remained key scientific and technical knowledge gaps, and better methods were needed to understand the sources of black carbon, to identify priority targets for its reduction and to monitor progress in that regard. There were technological and policy options available for addressing the residential heating sector, including those related to energy efficiency, but education was required to ensure correct operation, and common standards for awareness-raising (e.g., eco-labelling) were needed. Further evaluation of the effectiveness of policies and additional policy options to address existing sources were also needed, and improvements to “real-life” emissions estimates and possible updates to best available techniques should be undertaken.

29. The Working Group agreed that suggestions for improving the scientific and technical basis for addressing air pollution from residential wood combustion should be considered by the relevant subsidiary bodies in the development of their next biennial workplans. Such suggestions should, along with policy considerations brought to light in the discussion, also serve as inputs to the policy discussions in the framework of the Working Group on Strategies and Review and, as appropriate, the eventual review of the Gothenburg Protocol. It decided that a key step that should be taken was to provide guidance to Parties in their efforts to implement the provisions of the amended Gothenburg Protocol in relation to prioritizing reductions of particulate matter that were also significant sources of black carbon, and requested the Task Force on Techno-economic Issues, in collaboration with the Task Force on Integrated Assessment Modelling, to develop such guidance.

30. The Working Group recommended that the Executive Body invite Parties to the Convention:

- (a) To strengthen their air pollution abatement efforts in the small combustion (residential) sector;
- (b) To take an integrated approach to air quality, energy efficiency and climate;
- (c) To use the guidance document to be prepared by the Task Force on Techno-economic Issues and the Task Force on Integrated Assessment Modelling in prioritizing reductions in their sources of particulate matter that were also significant sources of black carbon.

VIII. Implementation of the Batumi Action for Cleaner Air initiative

31. The Chair invited participants to report on the development and submission of new commitments under the Batumi Action for Cleaner Air initiative and on the implementation of existing commitments. A representative of Germany informed the Working Group about a new commitment to support the organization of a workshop on the use of the Greenhouse Gas – Air Pollution Interaction and Synergies (GAINS) model for countries in Eastern Europe, the Caucasus and Central Asia to facilitate the process of ratification of the Convention’s protocols, in particular the Gothenburg Protocol. A representative of Canada reported on progress in implementing one of its commitments – to reduce methane emissions from upstream oil and gas operations by 40 to 45 per cent below 2012 levels by 2025. Canada had published final regulations to achieve that goal in late April 2018. A representative of Romania reported on progress concerning its commitments to establish a national programme for air pollution control, to improve inventories and to develop and upgrade the National Air

Quality Monitoring Network. A representative of Norway confirmed the Government's continued financial support for ECE activities to build capacity in Eastern Europe, the Caucasus and Central Asia to implement the Convention and its protocols, in addition to its regular contribution to the work under the five ECE environmental conventions, including the Convention on Long-range Transboundary Air Pollution.

32. The Working Group took note of the information provided and encouraged countries to report at future sessions on new commitments under the Batumi Action for Cleaner Air and progress in implementing existing ones.

IX. Election of officers

33. In accordance with rule 21 of its rules of procedure, the Working Group re-elected Till Spranger (Germany) for a second term and Ivan Angelov (Bulgaria) for a third term as Vice-Chairs, and elected Dominique Pritula (Canada) for a first term as Vice-Chair, for the period 2019–2020.

X. Adoption of the conclusions and recommendations of the Working Group

34. On 25 May 2018, the Working Group on Strategies and Review adopted the conclusions and recommendations agreed at its fifty-sixth session.

Annex

Chair's summary of the thematic session on residential wood combustion and air pollution

A. Introduction

1. In accordance with a decision taken by the Working Group on Strategies and Review at its fifty-fifth session, a thematic session on solid fuel residential heating as a source of air pollution and short-lived climate forcers was held in the framework of the Working Group's fifty-sixth session. It was organized by the Chair of the Working Group in cooperation with the International Cryosphere Climate Initiative and the Convention secretariat and facilitated by the Chair and Vice-Chairs of the Working Group.
2. Participants in the session looked at the issue of solid fuel residential heating, including its impacts on human health, air quality and climate, and technologies, emissions control or mitigation options and country experiences.
3. The present summary was prepared by the Chair of the Working Group on Strategies and Review with input from panellists, Vice-Chairs of the Working Group and the secretariat.

B. Control of emissions from solid fuel residential heating under the Gothenburg Protocol

4. Residential heating using solid fuels (e.g., wood, pellets and coal) is a major source of particulate matter and black carbon, which is both an air pollutant and a short-lived climate forcer. The sector is a major emitter in the ECE region and is difficult to address given the diffuse nature of residential combustion appliances and the availability of solid fuels. In view of this, Parties to the Convention added particulate matter, including black carbon as a component of fine particulate matter (PM_{2.5}), to the Gothenburg Protocol when it was revised in 2012. In doing so, the Gothenburg Protocol became the first legally binding instrument to include a focus on short-lived climate forcers.
5. The Gothenburg Protocol sets emission reduction targets for PM_{2.5} emissions for 2020. Parties are to facilitate the implementation of their national targets, including for PM_{2.5}, by applying a set of measures, such as those outlined in article 6 of the Protocol. In addition, in implementing measures to achieve their national targets for particulate matter under the amended Protocol, Parties should give priority to emission reduction measures that also significantly reduce black carbon.
6. With regard to new residential combustion installations specifically, the Gothenburg Protocol outlines a list of measures that are summarized in its annex X. These include emission limit values for new residential combustion installations with a rated capacity of less than 500 kW hours and the application of product standards and ecolabels. For existing residential combustion stoves and boilers, it recommends public information and awareness-raising programmes regarding operation, maintenance and fuel quality.

C. Overview of sources, emissions and impacts on air quality, health and climate

Importance of solid fuel residential heating as a source of air pollution

7. The thematic session was opened by the Director of the ECE Environment Division, who gave an overview of the importance of addressing emissions from solid fuel residential heating in the ECE region, particularly with a view to fulfilling the Sustainable Development Goals. He discussed the sources and effects of black carbon in particular, and links with adverse effects on human health, air quality and climate.

8. A representative of the WHO, speaking on behalf of WHO and the WHO European Centre for Environment and Health, stated that outdoor air pollution was responsible for 4.2 million premature deaths globally in 2016. Residential heating with wood and coal was a significant source of air pollution globally, and contributions to particulate matter during the winter (heating) period could reach up to 40 per cent of daily average values. The magnitude of the problem varied greatly depending on the geographical location, the prevalence of solid fuel use and the combustion technologies used.

9. A representative of the Centre for Integrated Assessment Modelling presented an overview of solid fuel residential heating for the ECE region. Results from the GAINS model showed that residential heating contributed nearly 50 per cent of total PM_{2.5} in the European Union and 30 per cent in the whole ECE region, with important regional variability and an increasing trend. Residential heating, which mostly originated from solid fuel (biomass and coal) combustion, was a key source of black carbon in the region, being responsible for nearly 40 per cent of such emissions in 2015, while in some areas it was estimated to contribute up to 80 per cent of total PM_{2.5} emissions. With declining emissions from the transportation sector (i.e., diesel emissions), solid fuel residential heating had become by far the most important source of PM_{2.5} in most countries.

10. Many presenters also shared estimates of the contribution of residential solid fuel combustion emissions to their PM_{2.5} mass burden, such as Lithuania (75 per cent), Ireland (over 50 per cent), Italy (up to 65 per cent) and Chile (up to 95 per cent in some areas).

Source identification

11. Source apportionment methodologies and results were discussed as a means to identify the contribution of solid fuel burning to PM_{2.5}. A representative of Canada shared experiences in source apportionment methods to identify the contribution of wood burning emissions in the city of Montreal, which had led to a subsequent ban on residential burning during smog episodes.

12. Similarly, a representative of France provided an overview of real-time monitoring and analysis techniques for identification of the contributions of wood burning to particulate matter, and some field campaign results that showed the effectiveness of those methodologies. The use of source apportionment techniques for source identification was also highlighted by several other representatives during their presentations (e.g., Estonia).

Emissions inventories

13. The development of more accurate emissions inventories was also a significant point of discussion. In that regard, a representative of the International Cryosphere Climate Initiative shared a protocol⁴ that had been developed in response to a Nordic Council-funded

⁴ Jes Sig Andersen and Morten Gottlieb Jespersen, *A Protocol for Black Carbon Emissions: A Protocol*

project. There was a need for such a protocol to address a gap in developing accurate emissions factors and for the application of standards and ecolabels.

14. A representative of Sweden presented results from the project “Improved Nordic emission inventories of short-lived climate pollutants”.⁵ Similar to the results outlined by the representative of the Centre for Integrated Assessment Modelling for the ECE region, residential wood combustion had been found to be a major source of PM_{2.5} and black carbon in Nordic countries. However, there were significant uncertainties in understanding emissions from that sector. She described a measurement programme and testing protocol to develop emission factors from a series of different types of residential wood stoves and activity data projections for the Nordic countries, and the expected decreases in residential wood combustion emissions. The results indicated that early scrapping of older, more polluting wood stoves and good combustion behaviour had the greatest impact on reductions in pollutants.

D. Technological options and policy context for reducing emissions from solid fuel residential heating

15. A representative of the ECE Sustainable Energy Division talked about the role of energy efficiency in buildings. The ECE Framework Guidelines on Energy Efficiency Standards in Buildings had been conceived with a view to reducing building energy requirements to levels at which residual needs could be met by low- or no-carbon sources of energy. The Guidelines focused on the life cycle management of buildings, and involved building design and construction, efficient systems, low- or no-carbon energy sources and smart connection to the built environment. The benefits of following the Guidelines went well beyond energy efficiency and included benefits for health, safety, affordability, the environment and quality of life generally.

16. A Co-Chair of the Task Force on Techno-economic Issues presented a code of good practice for solid-fuel burning and small combustion installations, which the Task Force was developing. The code would be finalized in 2019.

17. A representative from the European Committee of Manufacturers of Domestic Heating and Cooking Appliances offered some perspectives on technologies available to address emissions from residential heating with solid fuels. Residential heating using wood and pellets represented the most important share of bioheat in Europe. However, regulators faced challenges in integrating approaches across jurisdictions. He provided information on the various technological areas of intervention, namely primary measures that altered combustion conditions (e.g., burning pot, combustion chamber, heat exchangers and flue collectors) and secondary, post-combustion measures (e.g., active systems, such as catalytic converters, and passive systems, such as filters and electrostatic precipitators). Industry was currently working to develop a harmonized European Union-wide quality label to classify appliances in terms of their emissions rating.

18. A Co-Chair of the Task Force on Techno-economic Issues gave an overview of key recommendations in relation to residential solid fuel burning from the Saltsjöbaden VI workshop, including the need for information and awareness-raising campaigns; accelerating the replacement of old stoves; introducing ambitious new legislation including emissions

for Measuring Emissions of Elemental Carbon and Organic Carbon from Residential Wood Burning (Copenhagen, Nordic Council of Ministers, 2016).

⁵ See Karin Kindbom and others, *Emission Factors for Short-lived Climate Pollutants Emissions from Residential Wood Combustion in the Nordic Countries: Improved Emission Inventories of Short-lived Climate Pollutants* (Copenhagen, Nordic Council of Ministers, 2018).

standards; economic incentives to abandon solid fuel burning, such as taxation and public procurement programmes; and improvement of the data basis to develop targeted mitigation measures.

E. International and domestic policy approaches to reducing emissions from solid fuel residential heating

19. A representative of the International Cryosphere Climate Initiative gave an overview of approaches taken by the Nordic and Arctic Councils, the Convention on Long-range Transboundary Air Pollution and the Climate and Clean Air Coalition on heat stoves, “combined” stoves and coal stoves. There were three main approaches to mitigation: “burn right” programmes (e.g., the Climate and Clean Air Coalition and national campaigns) for existing stoves; fuel or technology switching; and the introduction of targeted measures, such as manufacturing standards or regulations to achieve emissions reductions, for new stoves.

20. A representative of the European Union presented the Clean Air Policy Package as it related to solid fuel combustion for residential heating. The policy included a PM_{2.5} annual limit, a European Union average emission reduction obligation for PM_{2.5} of 49 per cent by 2030 from 2015 levels and the Ecodesign and Energy Labelling Directives.⁶ He also outlined related programmes, including the Horizon 2020 programme and LIFE projects.

Educational campaigns

21. There was consensus among participants that educational campaigns were among the most impactful means for achieving emissions reductions. A representative of the International Cryosphere Climate Initiative gave an overview of national educational campaigns in the European Union, touching on key elements, such as the importance of wood seasoning and proper storage, and the value of working with chimney sweeps in public education and outreach, a finding echoed by the representatives of Estonia and the United States.

22. Several countries presented their own “burn right” campaigns, including Chile, Finland, Poland, the United Kingdom and the United States.

Solid fuel burning bans

23. Banning solid fuel burning was also used as an effective tool for improving air quality in certain areas. For instance, a representative of Canada mentioned the implementation of a municipal by-law in the city of Montreal to ban the installation of new wood-burning stoves or fireplaces and banning the use of non-certified wood stoves during smog episodes, unless during a power outage of longer than three hours.

24. Similarly, a representative of the Malopolska Province of Poland stated that Krakow had adopted an anti-smog resolution and would implement a total ban on solid fuels beginning in 2019. Work was under way in other parts of the country to pass similar resolutions, but there was still a lack of fuel quality standards for coal at the national level.

25. A representative of Ireland stated that solid fuel residential combustion accounted for more than 50 per cent of national PM_{2.5} emissions. He gave some historical context, such as

⁶ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products and Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products.

the Dublin coal ban in 1990 to respond to the severe smog episodes of the 1980s, and highlighted results of banning coal use in urban “low smoke zones”, with significant improvements in PM_{2.5} levels in major cities. However, with PM_{2.5} still an issue outside of the low smoke zones, Ireland had agreed on a total phaseout of coal use in the residential sector, to be implemented during a 12-month transition period starting in the fall of 2018.

Changeout programmes

26. The representative of the Malopolska Province of Poland highlighted the European Union LIFE project, which had helped to improve air quality by offering subsidies of up to 100 per cent for the replacement of solid fuel boilers.

27. An example of a significant changeout programme was provided by a representative of Chile, who spoke to the effectiveness of the Chilean programme to replace older stoves with certified models with greater than 70 per cent thermal efficiency. The programme had targeted the changeout of 153,000 eligible installations out of some 400,000 nationally, with 24,000 changeouts achieved thus far. However, relying on public financing alone was not proving to be the most effective mechanism given resource constraints, and a combination of private and public financing might be a more effective model.

Regulatory approaches

28. Several representatives presented their national regulatory approaches to addressing solid fuel residential heating. For instance, the United Kingdom was committing to phasing out the use of bituminous coal and was placing a 2 per cent national limit on sulphur in manufactured solid fuels.

29. A representative of Italy provided an overview of the national regulation on environmental certification of small wood burning plants, anticipating the coming into force of the air pollution requirements under the European Union Ecodesign Directive. The national regulation promoted the gradual replacement of old wood stoves with more efficient, certified stoves. The certification applied to stoves, fireplaces, cook stoves and small boilers with a thermal output of less than 500 kW. The regulation provided the impetus for further action, such as national incentives for plants with a minimum of three stars according to the Directive, and regional bans and incentives (e.g., in the Po Valley).

30. A representative of Germany gave a presentation on residential heating using wood fuel. Germany currently met its domestic ambient air quality standards, but like many other jurisdictions in the European Union, exceeded WHO standards. Germany currently had federal regulations that required biomass combustion installations in the scope of that legislation to be constructed and operated using best available techniques. She highlighted that small and medium-sized installations did not need permits, and that the operator was responsible for maintenance.

31. The representative of Ireland stated that despite wood being promoted as a “carbon neutral” energy source under the United Nations Framework Convention on Climate Change, it was not pollution neutral, as it generated elevated levels of black carbon emissions. To address that, a national carbon tax provided a rebate for biomass blends that were “low smoke”, thus concurrently addressing the climate and air impacts of that energy source. He also highlighted the move away from chimneys in new residential buildings in Ireland.

32. A representative of Switzerland gave an overview of Swiss regulations that addressed wood combustion installations with less than 70 kW thermal output. He stressed the importance of periodic inspections and discussed the benefits of soft measures, addressing issues such as fuel quality, and hard measures, such as changeout programmes. The Swiss representative also spoke of the costs and benefits of such measures, with the accumulated benefits outweighing the costs.

33. A representative of France provided an overview of the National Air Pollution Control Programme, adopted in 2017, which provided measures targeting residential heating, such as energy efficiency, a wood stove changeout programme, a burn right campaign, best available techniques and fuel quality standards (regarding sulphur in fuel).

Other issues

34. While many countries were already taking steps to address emissions from solid fuel residential heating, others were considering options and undertaking analysis to determine the correct path forward. In Lithuania, they were considering options such as legislating solid fuel quality requirements, economic incentives to promote the modernization of residential solid fuel heating appliances (a national changeout programme) and burn right campaigns. The representative of Lithuania highlighted the long-term goal of no solid fuel combustion in highly populated urban areas.

35. The representative of the Russian Federation also observed that, as the majority of households in the Russian Federation were heated with central or district heating instead of their own residential heating units, interventions were more likely to be made at the regional or municipal level.

F. Key gaps and opportunities for action

36. Due to time constraints, a planned panel discussion on key gaps and opportunities for action did not take place. Panellists were invited to submit answers to questions provided to the panel, such as how the Gothenburg Protocol could spur further action in the sector, what the challenges were, and how to address them.

37. Challenges raised included differences in national contexts and economic circumstances across the ECE region; differences in market availability of best available technologies, which created different barriers for adoption of best available techniques, particularly for countries in Eastern Europe, the Caucasus and Central Asia; inaccurate or incomplete emissions inventory information across most jurisdictions; a lack of information on the costs and benefits for addressing the issue; and the need to raise awareness of the issue among citizens to change behaviour.

38. It was indicated that more could be done within the framework of the Convention to reduce emissions from solid fuel residential heating. Generally, it was suggested to improve the scientific and technical basis for addressing that sector through the work of the Convention's subsidiary bodies. Those efforts, along with related policy considerations, should serve as inputs into policy discussions in the framework of the Working Group on Strategies and Review and, as appropriate, the eventual review of the Protocol.

39. Target areas for further action under the Convention to address the sector included:

(a) The development of guidance documents on burn right and phaseout programmes, including environmental and cost-benefit information to facilitate decision-making;

(b) Considering guidance on undertaking voluntary performance labelling of new stoves with more stringent emission limit values;

(c) An emissions testing protocol to standardize the emissions testing for black carbon emissions across stoves, measurement methods and laboratories;

(d) Improving national emissions estimates through improved activity data and emissions factors;

(e) Reviewing and revising table 12 of annex X to the amended Gothenburg Protocol;

(f) Tasking the Developing a guidance document for Parties in their efforts to implement the provisions of the amended Gothenburg Protocol in relation to prioritizing reductions of particulate matter that were also significant sources of black carbon.
