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Item 9(a) of the provisional agenda

Impact of the implementation of response measures

Forum and work programme

Subsidiary Body for Implementation

Thirty-ninth session

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Item 15(a) of the provisional agenda

Impact of the implementation of response measures

Forum and work programme

Report on the in-forum expert meeting on area (e)

Note by the Chairs of the subsidiary bodies

Summary

This report presents the outcome of the in-forum expert meeting on area (e) of the work programme on the impact of the implementation of response measures, “Economic modelling and socioeconomic trends”, which was held on 7 June 2013 in Bonn, Germany. The expert meeting provided an opportunity for Parties, relevant organizations and experts to exchange information, experiences, best practices and views in relation to the impact of the implementation of response measures. Such information, experiences and views will serve as input to the relevant discussions of and consideration by the subsidiary bodies, in particular when conducting the review of the work of the forum on the impact of the implementation of response measures at their thirty-ninth sessions, with a view to providing recommendations to the Conference of the Parties at its nineteenth session, as mandated by decision 8/CP.17.

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I. Introduction

A. Mandate

1. The Conference of the Parties (COP), by decision 8/CP.17, adopted a work programme on the impact of the implementation of response measures (hereinafter referred to as the work programme) and modalities for its operationalization, under the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI), with the objective of improving the understanding of the impact of the implementation of response measures in eight areas.¹
2. The COP, by the same decision, established a forum on the impact of the implementation of response measures (hereinafter referred to as the forum), to be convened by the Chairs of the subsidiary bodies, to implement the work programme.
3. At their thirty-sixth sessions, the SBSTA and the SBI requested² the secretariat to support, under the guidance of the Chairs of the subsidiary bodies, the implementation of the work programme. In response to that request, an in-forum expert meeting on area (e) of the work programme, “Economic modelling and socioeconomic trends”, was organized.

B. Possible action by the subsidiary bodies

4. The subsidiary bodies may wish to take note of the information contained in this report when conducting the review of the work of the forum, including on the need for its continuation, at their thirty-ninth sessions, with a view to providing recommendations to COP 19, as mandated by decision 8/CP.17.

II. Proceedings

5. The in-forum expert meeting referred to in paragraph 3 above was held in Bonn, Germany, on 7 June 2013, and was co-chaired by Mr. Richard Muyungi, Chair of the SBSTA, and Mr. Tomasz Chruszczow, Chair of the SBI. It was attended by 67 participants including representatives of Parties, international organizations and research institutions, and experts.
6. The expert meeting was divided into three parts, namely:
 - (a) Information, experiences, best practices and views presented by Parties;
 - (b) Information, experiences, best practices and views presented by organizations and experts;
 - (c) Concluding remarks made by workshop participants.
7. The in-forum meeting agenda and the presentations made are available on the UNFCCC website.³

¹ Decision 8/CP.17, paragraphs 1 and 2.

² FCCC/SBSTA/2012/2, paragraph 45, and FCCC/SBI/2012/15, paragraph 167.

³ <<http://unfccc.int/7588>>.

A. Information, experiences, best practices and views presented by Parties

8. The Chairs opened the expert meeting by noting that although the topic of economic modelling had been referred to in previous forum discussions, the meeting presented an opportunity for in-depth discussion.

9. A representative of Argentina, on behalf of the Group of 77 and China, presented views on the following: the significance of economic modelling and socioeconomic trends; economic modelling features; modelling system; activities that could be carried out under the Convention; domestic activities for modelling; and how to advance the work in this area.

10. On the significance of economic modelling and socioeconomic trends, she cited the following Convention articles and provisions as important mandates for undertaking work on area (e) of the forum: Article 3, paragraphs 1, 4 and 5, Article 4, paragraphs 3, 5, 7, 8 and 9, and preamble paragraphs 17, 21 and 23. She emphasized that economic modelling is needed in the context of the full consideration of what action is necessary under the Convention to meet the specific needs and concerns of developing country Parties arising from the impact of the implementation of response measures.

11. She stressed the importance of taking into consideration the specific national priorities, circumstances, conditions and needs of developing countries in the modelling tasks. Modelling activities should produce quantitative assessment outputs which are complemented by qualitative assessment outputs on such elements as gross domestic product (GDP), employment outlook, investment and trade. Considering all of these factors is important for promoting sustainable development.

12. Among the steps that should be undertaken in a modelling system that would fulfil the work mandated under the forum, she listed the following:

(a) An ex ante assessment of proposed response measures by developed countries, including unilateral measures, and their expected economic and social consequences for developing countries;

(b) An ex post assessment of the current response measures of developed countries, including unilateral measures, in order to analyse the economic and social consequences for developing countries of those response measures;

(c) An analysis in the forum of the assessments undertaken by developed countries mentioned in paragraph 12(a) and (b) above;

(d) Continuous evaluation of existing economic modelling tools to investigate whether the uncertainties, risks and specific conditions of developing countries are addressed adequately in the methodologies.

13. Regarding tasks that could be carried out under the Convention, she noted the following:

(a) Dissemination of modelling tools;

(b) Ensuring increased collaboration on modelling developments;

(c) Exchange of views, information and expertise in order to inform policy choices of developed country Parties regarding response measures, especially those that minimize the economic and social consequences of response measures on developing countries;

(d) Sharing assessment outcomes by developed countries in the forum, by analysing the economic and social consequences of response measures and ways to minimize negative impacts on developing countries.

B. Information, experiences, best practices and views presented by organizations and experts

14. A representative of the World Health Organization (WHO) stated that one of the difficulties in modelling exercises is understanding the health effects of mitigation measures. She explained the uncertainties in the relationships between greenhouse gas (GHG) emissions, health impacts, mitigation measures, human behaviours and economic values. Despite those uncertainties, it is clear that GHG-emitting sectors contribute to the global burden of disease through multiple pathways. Taking appropriate mitigation measures in a number of those sectors will therefore result in definite health benefits. Energy, transport, building and health-care sectors were mentioned as high emitters of GHGs.

15. The representative informed the meeting that, in the energy sector, health benefits from reduced air pollution resulting from reduced GHG emissions may offset a substantial fraction of mitigation costs if the effects of energy security, air pollution and mitigation policies are combined (IPCC, 2007).⁴ In the building sector, housing-related energy-efficiency measures in the United Kingdom of Great Britain and Northern Ireland have resulted in the reduction of cancer, acute and chronic respiratory disease, cardiovascular disease, and winter/cold-related deaths. In India and other developing countries, indoor pollution is a high risk factor for the health of women. The introduction of 'green' stoves in those countries has led to a significant reduction in the number of deaths due to indoor pollution.

16. Studies of the transport sector (carried out in developed countries) have shown that measures that encourage walking and cycling help to reduce obesity. This so-called active transport can reduce the incidence of heart disease, cerebrovascular disease, dementia, cancer (breast, lung and colon), road traffic injuries, diabetes and depression. In 13 European cities, every euro that was invested in public transport in 2005 provided EUR 2 to EUR 2.5 in local GDP. In Auckland, Australia, shifting 5 per cent of short urban trips from private motor vehicles to bicycles would save about 22 million litres of fuel and 0.4 per cent of transport-related GHG emissions.

17. In order to improve the understanding of the impact of response measures on health, she recommended addressing the following issues: the adverse health effects of response measures; inequalities; immediate community benefits of actions; developing more case studies on health-related economic benefits; inclusion of health outcomes in sustainable development goals; and targeting health issues when assessing policy impacts.

18. In providing a background to his presentation, the representative of the International Centre for Trade and Sustainable Development (ICTSD) began by explaining ICTSD's sustainable energy trade initiatives, which aim at promoting sustainable energy by enabling governance and frameworks at the international level to facilitate trade in renewable energy goods and services and ensure robust markets. Those energy trade initiatives can be in a form of legally binding trade agreements, such as a sustainable energy trade agreement with specific energy chapters in a regional or bilateral trade agreement.

⁴ IPCC (Intergovernmental Panel on Climate Change). 2007. *Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Available at <http://www.ipcc.ch/publications_and_data/ar4/wg3/en/tssts-ts-11-5-co-benefits-of.html>.

19. He informed the meeting that ICTSD has used the GTAP-E model⁵ to examine the effects of policy reform on the production of renewable energy. The four policy reforms were the removal of fossil fuel subsidies and adding carbon taxes, lowering import tariffs on renewable energy products, removing feed-in tariffs (FiTs)⁶ and removing the local content requirements⁷ in the clean energy sector. For each country, inputs into the model comprised a list of renewable goods and information on trade, GHG emissions and population. The GDP value was set at 90 per cent of the country's total at the time of the modelling.

20. He pointed out that the International Monetary Fund has documented that eliminating fossil fuel subsidies together with imposing carbon taxes would reduce worldwide carbon dioxide (CO₂) emissions by 13 per cent. If solely the fossil fuel subsidies in certain developing countries were eliminated, GHG emissions would be reduced by more than 10 per cent by 2050, compared to the baseline (OECD).⁸

21. The following are some of the outcomes of the modelling exercise related to the removal of subsidies:

- (a) Economic output and trade in renewable products will increase;
- (b) Despite the potential gain from removing subsidies, some negative effects have been observed, including a reduction in economic output;
- (c) There may be a reduction in employment and in trade in currently competitive wind products;
- (d) Creating a renewable energy industry will require targeted policies and support in addition to the removal of subsidies.

22. The following are some of the outcomes of the modelling exercise related to the lowering of import tariffs on renewable energy products:

- (a) Increases in employment and the output of renewable goods;
- (b) A reduction in GHG emissions and electricity prices;
- (c) An increase of up to 26 per cent in imports of climate-friendly technologies in developing countries.

23. The following are some of the outcomes of the modelling exercise related to FiTs:

- (a) Providing FiTs supports the creation of jobs in the renewable energy industry;
- (b) The removal of FiTs results in the following:
 - (i) An increase in the production of renewable energy equipment;
 - (ii) A reduction in GHG emissions;
 - (iii) Higher electricity prices;

⁵ An extended computable general equilibrium model, which uses the Global Trade Analysis Project database with energy substitution.

⁶ A FiT is an amount of money paid by the government to homeowners, business and organizations, including schools and community groups, to generate their own electricity through small-scale green energy installations such as solar panels.

⁷ Local content requirements are policy measures that typically require a certain percentage of intermediate goods used in the production processes to be sourced from domestic manufacturers.

⁸ OECD (Organisation for Economic Co-operation and Development). 2009. *Tackling Climate Change and Growing the Economy: Key messages and recommendations from recent OECD work*. Available at <<http://www.oecd.org/dataoecd/28/18/44287948.pdf>>.

(iv) Decreases in GDP (in some cases);

(c) As the cost of generating renewable power is equal and sometimes even less than the price of power from the normal electricity grid in a number of countries, FiTs are becoming unnecessary.

24. The following are some of the outcomes of the modelling exercise related to removing local content requirements:

(a) The removal of local content requirements facilitates achieving increases in the production of renewable power in a number of countries;

(b) India experiences a slight decrease in solar power production, especially if FiTs are also removed.

25. As a result of the above-mentioned outcomes of the modelling exercises, the following conclusions were made:

(a) Removing fossil fuel subsidies can reduce emissions, but does not directly create a renewable energy industry;

(b) The results of the modelling are not the same in all countries;

(c) It is important to use the right mix of policies in order to achieve renewable energy production and thus GHG emission reduction;

(d) Energy efficiency and carbon capture and storage are more important in reducing emissions than the use of renewable energy;

(e) It is more important to achieve sustainable development in the long term than to achieve short-term economic gain.

26. A representative of the Gesellschaft für Wirtschaftliche Strukturforschung (GWS) began his presentation with a brief overview of the Global Interindustry Forecasting System (GINFORS). The model was developed for a global analysis of economic–environmental interdependencies as a tool for concrete policy planning. He presented the results of modelling studies on the economic impacts of carbon price regimes. Different scenarios for international participation in post-Kyoto Protocol carbon regimes show small economic losses for participating countries. In relation to the expected costs of climate change or the impacts of the current financial crisis, however, the macroeconomic impacts are small. Smart designs for post-Kyoto Protocol climate regimes may adjust and reduce the macroeconomic costs (in percentages of GDP) in industrialized and emerging economies. However, high GDP losses are projected for exporters of fossil fuels.

27. He stressed the need to ensure that analyses are related to underlying research questions. He noted that many state-of-the-art studies concentrate on issues such as burden-sharing between Parties included in Annex I to the Convention (Annex I Parties) and/or emissions-intensive emerging economies and possible carbon leakage or relocation of industries to low/zero carbon price countries. Furthermore, they assume a constant global fossil fuel supply, which translates into a reduction in international energy prices.

28. Other positive impacts of response measures, such as technology spillovers from renewable energy deployment in industrialized countries, should be taken into account when evaluating response measures.

29. The representative of GWS concluded his presentation by observing that further research on the economic impacts of international climate mitigation measures should focus on Parties not included in Annex I to the Convention and the feedback options. National specifics and potential positive impacts or ideas on how they might be stimulated need to be considered. Capacity-building in modelling in developing countries is a prerequisite for

making macroeconomic modelling a tool for enhancing the understanding of the impacts of the implementation of response measures and for adjusting policies accordingly.

30. The final presentation was made by an expert from the Tyndall Centre for Climate Change Research at the University of East Anglia. She introduced the Centre's energy–environment–economy model at the global level (E3MG) and expressed her views on the economic modelling of the impacts of climate change policies.

31. She noted that it is important to take into account the differences between countries, industries and income groups and to treat the economy as a system with feedback effects when the economic impacts of climate change policies are modelled. She presented a current study on decarbonizing the global economy, which examines the economy-wide effects of reducing global GHG emissions by an amount that ensures a medium chance of achieving the target of holding the increase in global average temperature below 2 °C above preindustrial levels.

32. She stated that auction revenues can be used beneficially, for example for research and development of low-carbon technologies, which can have a positive effect on GDP while reducing CO₂ emissions. However, decarbonizing industries one by one can also lead to perverse effects. For example, in the case of land transport, switching to electric vehicles without decarbonizing the electricity sector is likely to result in higher CO₂ emissions, owing to a more extensive use of coal for electricity generation.

33. She showed a slide from a study on market-based instruments for international shipping and aviation that modelled policy impacts on 10 selected case-study countries and worldwide. She noted that if investment impacts are taken into account, the negative global economic effects could be reverted or reduced. However, for the 10 case-study countries, which included least developed countries and small island developing States, obtaining data and country participation in the study is problematic. The estimated impacts on the 10 countries varied, with some countries suffering more than others.

C. Concluding remarks made by the workshop participants

34. While making their concluding remarks, a number of developing country Parties (China, India, Iraq, Indonesia, Saudi Arabia, United Arab Emirates, and Venezuela (Bolivarian Republic of)), expressed their concerns about inadequate reference to issues that affect them. They pointed out that most of the examples in the presentations dealt with situations in developed countries, which cannot easily be applied to developing countries. They asked a number of questions and suggested what should be taken into consideration (e.g. the effects of possible unilateral measures) in the next round of discussions on the modelling of the impact of the implementation of response measures.

35. The representative of India commented on the presentation by the representative of ICTSD regarding subsidies. She informed the meeting that subsidies being offered in India are transparent and target poverty eradication as the overriding priority of the country.

36. Commenting on the ICTSD presentation, the representative of Indonesia cautioned against the hasty removal of fossil fuel subsidies, as this may cause unrest. He recalled the experience some years ago when the then Government of Indonesia was forced out of power as a result of such policies.

37. The representative of Iraq added his view that the discussion at the forum should be expanded to cover guidance on modelling expertise, knowledge and research, with a focus on building the capacity of developing country Parties.

38. The representative of China made some suggestions for improving the work of the forum. He encouraged Parties to make submissions on their concerns and topics for discussion. He felt that experts should only be invited when clear objectives have been agreed upon and that modelling teams from both developed countries and developing countries should be encouraged to participate in the forum.

39. The representative of the Bolivarian Republic of Venezuela advised that careful consideration should be taken to assess potential adverse effects before measures are taken and only those measures that avoid negative impacts should be adopted. Monitoring plans and indicators should be developed to enable effective monitoring. He posed questions on the usefulness of modelling for such assessments. He also emphasized that the principles of the Convention must be incorporated in the models.

40. In response to queries from the representatives, the representative of GWS confirmed that the outcome of the model he presented was around a 3 per cent drop in GDP for oil-exporting countries, but he stressed the fact that any such outcome depends on how one integrates and incorporates the benefits in the economy and the needed structural changes/developments. He informed the meeting that it would not be appropriate to use a model from a European or North American perspective in Saudi Arabia, for example, as parameters for a lot of the socioeconomic behaviour and underlying assumptions need to be adjusted in order to adequately model a different society.

41. On responding to a query on the possible benefits of deploying renewable energy at different levels, he noted that the International Renewable Energy Agency would be the appropriate organization to consult.

42. Responding to the point made that developing countries had been left out of the modelling exercises, the expert from the University of East Anglia noted that the study she presented on market measures for shipping and aviation did indeed include developing countries and the least developed countries. She also noted that the result of the study would soon be made public. She further explained that currently it is difficult to get data for modelling exercises on impacts on developing countries. She advised that it is very important that governments cooperate by gathering data and inputs for modelling within their countries.

43. A representative of WHO noted that despite the fact that there is a need to look at the impacts of response measures in developing countries on the health of their populations, very little work in the issue has been done in those countries. She shared with the participants information on two initiatives related to the impacts of deploying renewable energy on indoor pollution in developing countries.

44. Commenting on the issue of health impacts in developing countries, the expert from the University of East Anglia informed the participants that there are studies being undertaken in Mexico and China that are looking at air pollution and impacts on health. On the health impacts of renewable energy, a paper was published in May 2013 that shows the negative impacts of growing crops for renewable energy on people, plants and animals.

45. The representative of ICTSD reminded the meeting that his presentation contained a strong focus on socioeconomic trends and employment in the renewable energy sector in developing countries. He agreed with the representative of India that it is important to carefully consider agriculture subsidies in developing countries. He also agreed that providing more details on the assumption of the models would be useful for the modelling exercises and suggested that invited experts be provided with detailed terms of reference, well in advance of the meeting, on the scope of work required from them.

46. The representative of the European Union noted that the experts' presentations provided ideas that may help countries in the process of taking policy decisions with a view

to improving their economic, social and environmental conditions. He referred to the economic modelling portal on the UNFCCC website and suggested that the portal be updated and developed to allow more interaction among Parties.

47. He expressed a wish to understand more about the work being undertaken on the health benefits of policies in areas such as energy, the climate and air pollution in both developing countries and developed countries. He urged participants to inform themselves about the many studies and dialogues happening elsewhere in order to enrich the work on the response measures forum. He cited the energy-modelling forum mentioned by the representative of the Organization of the Petroleum Exporting Countries, the exchanges in the context of the Organisation for Economic Co-operation and Development and the energy modelling carried out by the International Energy Agency. Commenting on the possibility of eliminating fossil fuel subsidies, he indicated that the subsidies are not something that is simply taken away, but rather should be subject to a focus on the overall synergy of policies.

48. The representative of Saudi Arabia felt that the meeting should have aimed at capacity-building, sharing experiences and creating a dynamic process to evaluate the assumptions in the models. With regard to the presentation by the representative of WHO, she advised that it would have been more relevant to discuss the impact of response measures on livelihoods and job creation in developing countries and look at how that could affect access to health care. She asked the representative of GWS for more details on the GDP losses in oil-exporting countries.

49. The representative of Egypt sought clarity on some of the statements made by the experts. He stressed that modelling studies carried out in developing countries should include assumptions about national circumstances, such as the growth in the population, and other factors that were missing from the modelling exercises. He suggested that the future work of the forum should relate science to the principles of the Convention, such as equity and common but differentiated responsibilities.

50. Responding to a question from the representative of India on the average annual growth rate of energy demand, the expert from the University of East Anglia confirmed that the presented growth rate of 0.3 per cent did take into account the growing energy demand and was the average figure for all countries.

51. The representative of Singapore shared with the participants the following observations and perspectives:

(a) Energy efficiency and energy intensity targets can play an important role in climate mitigation actions, as shown by the example of Singapore;

(b) Low tariffs on renewable energy products not only positively affect the economic output, but also enhance environmental standards;

(c) Robust economic models are important for accuracy and for scientific evaluation and design of the impact response measures, in order that adverse socioeconomic affects may be minimized;

(d) Economic modelling work should involve economists as well as policymakers and negotiators;

(e) Economic modelling should take into account national circumstances, such as dependence on industries related to fossil fuels and difficulty in switching to alternatives to fossil fuels because of a lack of access to renewable energy options.

52. The representative of Sierra Leone suggested the following:

(a) Response measures taken by developed countries should be communicated to and coordinated with developing countries;

(b) The emission factors used in national communications should be further developed to suit the special circumstances of different countries, and capacity-building is needed so that national experts learn to use those emission factors.

53. The representative of New Zealand referred to the ICTSD presentation, which mentioned that the International Monetary Fund findings related to possible reform of inefficient fossil fuel subsidies (leading to a 10–13 per cent reduction in GHG emissions by 2050) could be of significant benefit for climate change mitigation. He felt that, in the long term, reforming inefficient fossil fuel subsidies may lead to many co-benefits, including increased economic output.

54. However, he noted that a quick adjustment of energy prices has the potential for significant economic and social impacts and that, where possible, reform should be gradual. The issue is to manage the transition using some of the savings from the reform for the most vulnerable and to ease the transition to a lower-energy and carbon-intensive economy.

55. The representative of the United States of America re-emphasized that the decision that established the forum took into consideration the positive and negative impacts of response measures. She was therefore of the view that the work of the modellers, regardless of where they are located, was relevant to the Convention.

56. She responded to the issues raised by the representative of Sierra Leone on energy-efficiency standards and building materials. She stressed that since an economic transition, along with putting into place a large number of new policies, is required to adjust to climate change, it would not be easy for exporting countries to follow every measure that may affect other countries, especially developing countries. This would be a huge endeavour in light of economic globalization. She informed the meeting that the United States was working with other countries to develop their economies and to train their workers for the transition to a cleaner economy.

57. The representative of Australia referred to the report of the Stern Review on the economics of climate change, which featured the issue of underestimating or completely ignoring the costs of unabated climate change. He wished to hear from the modelling experts about how this is dealt with in the models they presented. He also noted the following:

(a) The cost of climate action is lower than the cost of inaction;

(b) Estimates of the cost of climate impacts are rising and the costs of stabilizing GHG emissions will be higher if action is delayed. The global energy demand is increasing, which creates huge opportunities for new capital investment, with direct benefits to developing countries from developed country mitigation actions, such as technology spillovers, foreign direct investments and green technology manufacturing;

(c) Costs and benefits need to be considered if actions are to be assessed, as an action cannot be taken in isolation. Therefore information on specific impacts on developing countries is needed.

58. The representatives of Australia and Saudi Arabia inquired whether the Chairs had decided on the means to capture the outcome of the work of the forum, as they wanted a summary of the proceedings.

59. The Chairs reminded the participants that in accordance with the conclusions of the thirty-seventh sessions of the subsidiary bodies, workshop and expert meeting reports would be prepared and published on the UNFCCC website at the end of every event. It is expected that at the United Nations Climate Change Conference to be held in Warsaw,

Poland, the reports will be summarized for the purposes of reviewing the work of the forum and for recommending the next steps to the COP.
