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SUBMISSION BY IRELAND AND THE EUROPEAN COMMISSION ON BEHALF OF THE EUROPEAN UNION AND ITS MEMBER STATES.

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Dublin, 29 May 2013

Subject: **Supplementary information related to the Technical paper Compilation of information on mitigation benefits of actions, initiatives and options to enhance mitigation ambition FCCC/TP/2013/4**

Introduction

1. The EU welcomes the recently published technical paper by the Secretariat compiling information on the mitigation benefits of actions, initiatives and options to enhance mitigation ambition identified in the submissions by Parties and accredited observer organizations. We believe that this living document will be a very valuable technical input in the discussions on workstream 2 (pre 2020 ambition) that will facilitate political discussions and decisions needed to deliver a successful outcome under this workstream including the identification of concrete outcomes for Warsaw.

2. The EU wants to build on the progress achieved during the first part of the second session of the ADP, in order to bring more structure to our efforts to identify and explore in 2013 options for a range of actions that can close the pre-2020 ambition gap. To this end, workstream 2 should provide specific results-oriented options for the ADP to realize untapped mitigation potential prior to 2020 and to enhance the ambition of actions and initiatives, including on some of the areas with greatest mitigation potential, such as those identified by the ADP co-Chairs in their reflections from the first part of the session and their information note for the resumed session.

3. This supplementary information should be seen as a complement to the EU submissions of 1st March[1] aiming to provide additional input, drawing on the new information brought by Parties and experts at the April session and new scientific reports, that could help Parties to further engage on specific discussions in the resumed session on these topics and that could be captured in the next iteration of the Technical Paper by the Secretariat. The EU will keep providing further technical information on options to enhance mitigation ambition as more information may seem relevant for the discussions of this workstream, this paper is also an initial contribution to the workshop on energy transformation, and provides technical background to our submission on HFCs[2].

Enabling the phase down of Hydrofluorocarbons (HFCs)

4. HFCs are powerful GHGs used in refrigeration and air conditioning which have a global warming impact from hundreds to several thousand times that of CO2. HFC emissions have been growing rapidly as

[1] See EU submission from March 1st on Implementation of all the elements of decision 1/CP. 17, ((b) Matters related to paragraphs 7 and 8

[2] See EU submission of 27 May 2013 - *A Proposed Decision Relating to Phasing Down of Hydrofluorocarbons under the Montreal Protocol* (http://unfccc.int/bodies/awg/items/7398.php)

industrialized countries use them to replace ozone depleting substances being phased out by the Montreal Protocol[3].

5. At the April session of the ADP in Bonn, the EU and other Parties raised a phase-down of HFCs as a significant potential action to close the emissions gap, and the EU has made a submission to the UNFCCC on the topic.

A. Mitigation potential – cost-effective and scalable action

6. HFCs currently represent around 1% of global greenhouse gas emissions. Although their contribution is still relatively small, it is expected to soar in the coming decades as HFCs replace ozone depleting substances with emissions predicted to increase at a rate of 10-15% a year.

7. A phase-down would be expected to avoid 1 billion tons CO_2eq by 2020, and **more than 100 billion tons CO_2eq cumulatively by 2050**.

8. Low global warming potential alternatives to HFCs are widely available in most sectors, and so moving from HFCs or ozone depleting substances to climate friendly alternatives can be achieved if we act quickly internationally.

9. Furthermore, those countries that have not phased in HFCs to replace ozone depleting substances could leapfrog the HFC challenge where there are viable alternatives to avoid transitioning to high-GWP alternatives by moving directly to low-GWP alternatives. This potential to leapfrog would avoid needing to regulate the relevant sectors twice, and would thus be a more cost-effective approach.

10. The best option for regulating HFCs is use of the Montreal Protocol, which already regulates the relevant sectors globally. As a global legally binding treaty, this provides the ultimate scalability through a complete global phase-down.

B. Concrete policies and measures/best practices in these areas

11. A number of national and regional approaches are already being put into practice to phase down HFC production and consumption. These includes the proposed EU F-Gas regulations, with similar approaches as guiding best practices being implemented in Switzerland, Australia and Japan. Ghana are planning national legislation, and other developing countries are looking into taking national action.

12. The Climate and Clean Air Coalition is taking action on HFCs via its HFC initiative. This is organizing technology conferences to highlight available alternative technologies, carrying out inventory work including trend assessment and evaluation of barriers to change, and funding demonstration projects to show the feasibility of new technologies.

13. Although it does not yet regulate HFCs, the Montreal Protocol represents a tried and tested method of phasing down chemicals in these sectors, primarily air conditioning and refrigeration, which is has been doing successfully for 25 years (with over 100 chemicals already phased down).

14. The conclusions of the Rio+20 summit 'supports a gradual-phasedown in the consumption and production of HFCs'[4].

C. Quantified mitigation potential in various locations, and costs of implementation

15. Analysis for the European Commission demonstrated regulation to be the most cost effective option to address HFCs in the EU[5].

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[3] UNEP, 2011. '*HFCs: A Critical Link in Protecting Climate and the Ozone Layer*' www.**unep**.org/dewa/portals/67/pdf/**HFC**_report.pdf

[4] UNEP, 2012. 'The Future We Want – Rio+20 Outcome Document'. http://sustainabledevelopment.un.org/futurewewant.html

16. The Montreal Protocol has a successful financial mechanism (the Multilateral Fund) and delivers means of implementation through full agreed incremental costs. The costs of a global phase-down would be borne almost entirely by developed countries in this scenario. Details are publically available[6], including of the financial mechanism (Article 10), technology transfer (article 10A), financial provisions (Article 13)

D. Understand the obstacles to the application, replication and upscaling of best practices

17. Efforts have been made to arrange an agreement on HFCs under the Montreal Protocol, culminating in the Bali Declaration which received 112 signatories. However a Decision has been blocked on the basis that HFCs are climate forcers covered by the UNFCCC rather than ozone depleting substance. Therefore, a clear signal from the UNFCCC is required for the Montreal Protocol to deliver a phase-down.

E. Tools and mechanisms to overcome them including collaborative initiatives and provision of Means of implementation

18. The primary tool to facilitate an HFC phase-down is a Decision from the UNFCCC encouraging the Montreal Protocol to take action. This would cover Means of Implementation through the Multilateral Fund, and provisions for technology transfer already agreed through the Montreal Protocol.

19. There are well-documented examples from the EU, Japan and Australia that can be used as bases for developing nationally appropriate regulations[7].

20. Alternative technologies are readily available, and have been demonstrated to be effective[8, 9]

F. Benefits attached

21. Gains in energy efficiency would be expected in specific appliances.

Promoting further national and international initiatives for renewables and energy efficiency

22. Energy production and use accounts for approximately 2/3 of global emissions *(UNEP Bridging the Gap Report 2012)*. Action in energy efficiency and renewable energy can bring significant co-benefits; reducing the cost of supply infrastructure and consumer bills, reduce air pollution and health costs, increase energy security and competitiveness, whilst also avoiding high carbon lock-in.

23. The energy sector is a broad area; a number of processes outside the UNFCCC are supporting the deployment of renewable energy and energy efficiency technologies and best practices.

24. The EU is keen to explore the questions set out in the AOSIS non-paper of 2 May[10] to focus efforts and add value from more work in this area within the Durban Platform. The EU is looking forward to engaging in further discussions on the technical paper which has gathered the information provided by Parties and experts. With this submission the EU is providing some further technical inputs that other Parties can add to and enrich.

G. Mitigation potential – cost-effective and scalable actions

25. Realizing the full short term cost effective mitigation potential for improving energy efficiency and deploying renewables could reduce global emissions by 5Gt by 2020 (*IEA World Energy Outlook 2012*). Current policies for renewable energy can be enhanced to deliver at least another 0.7 GtCO2e emission

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[5] Schwarz et al 2011, 'Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases'
[6] Montreal Protocol website, list of Decisions. http://ozone.unep.org/new_site/en/Treaties/treaties_decisions-hb.php?sec_id=25

[7] References available through the UNEP OzonAction website http://www.unep.fr/ozonaction/topics/hcfc_legislation.htm
[8] CCAC Technology Conference Outcomes
http://hqweb.unep.org/ccac/Actions/HFCAlternativeTechnologyandStandards/tabid/104667/Default.aspx
[9] http://unfccc.int/methods_and_science/other_methodological_issues/interactions_with_ozone_layer/items/378.php
[10] http://unfccc.int/files/documentation/submissions_from_parties/adp/application/pdf/adp_workstream2_aosis_02052013_.pdf

reductions by 2020, and 3 GtCO2 by 2030 (IEA WEO2012). Fostering additional energy efficiency improvements could deliver at least 2.2 GtCO2e of new emission reductions by 2020 (IEA WEO2012)

26. The total global technical potential for renewable energy is substantially higher than global energy demand (*2011 IPCC Special Report on Renewable Energies* (SRREN) and renewable energy technologies are already fit to provide modern access to energy to the most vulnerable groups (*Energy for a Sustainable Future 2010 Report of the UN Secretary-General's Advisory Group on Energy and Climate Change*).

27. Markets are ready to scale up technologies deployment and investments in renewable energy have reached record highs in 2012 and were worth nearly $250 billion USD worldwide (*BNEF 2013 Global trends in clean energy investment*). The photo voltaic industry grew in Europe by an average of over 40% per year over 10 years and in 2011 the global output reached 65 GW (IEA) and the milestone of 100 GW of installed wind power capacity has already been passed (GWEC *Global Wind Report 2012*). Photo voltaic module costs have a learning rate of 22% - implying that costs will decline by just over a fifth with every doubling of capacity (IRENA *Renewable Power Generation Costs in 2012: An Overview*).

28. Leaving unattended the subsidies to fossil fuels increases the risk of sub-optimal depletion of fossil fuel resources, mute price signals that encourage efficient use of energy and discourage some of the most cost-effective mitigation options. According to the IEA, phase-out of fossil fuel subsidies could cut energy-related CO_2 emissions by 1.7 gigatonnes (Gt), or 4.7%, in 2020 and 2.6 Gt, or 5.8%, in 2035, relative to the prospects if subsidy rates remain unchanged[11]. And OECD estimates that a multilateral removal of energy subsidies could cut GHG emissions globally by 10% by 2050 relative to business as usual, and that this reduction could be increased if developed countries were to adopt binding emission caps[12]. Countries embarking on reforming these subsidies are experiencing a more efficient use of energy domestically, new investments in renewable and energy efficiency, and in fossil fuel producing countries a new export potential.

29. In short a lot is happening in the areas of renewable energy and energy efficiency deployment but huge potentials still exist and could be reaped at low costs.

H. Concrete policies and measures/best practices in these areas

30. An even larger group of countries than the 90 countries who put forward a pledge as contribution to pre-2020 mitigation efforts under the UNFCCC have put in place policies promoting renewable energy and energy efficiency improvements (see: IEA database on policies and measures for renewable energy and for energy efficiency http://www.iea.org/policiesandmeasures/; *REN21 2012 Renewables Global Status Report*; *IEA 2011 G-20 Clean energy, and energy efficiency and energy efficiency deployment and policy progress*)

31. In the low emission development strategies that countries have already developed, enhanced actions promoting renewable energy and energy efficiency are pivotal to the transformation of all sectors to a low-emission future. (http://mitigationpartnership.net/map)

32. The UNEP gap report 2012 Chapter 4 compiles information about cost-effective and scalable policies to promote renewable and energy efficiency. A suite of reports by experts provide further information on national policies of relevance for other countries (for instance see: *the Climate Policy Initiative 2013 report on national policies for Buildings*).

33. The IMF has identified from country experiences with reforming subsidies fossil fuels key elements for maximizing the economic, social and environmental benefits of such evolutions in the policy framework (*IMF January 2013 Case studies on energy subsidy reform: lessons and implications*).

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[11] IEA, World Energy Outlook, 2011. See Annex One for data on energy subsidies and GHG emissions of top 25 countries surveyed by IEA

[12] OECD, 2009, The Economics of Climate Change Mitigation

I. Quantified mitigation potential in various locations, and costs of implementation

34. Many of the measures improving energy efficiency have negative net costs and often a very short pay back time:
    - Additional investment of $11.8 trillion in more energy-efficient technologies now would boost cumulative economic output to 2035 by an estimated $18 trillion (IEA WEO 2012).
    - Estimates of marginal abatement costs in industrial sectors identified energy efficiency improvements to reap around 2 to 3 GtCO2e mitigation benefits, all at costs of less than 20 euro/tCO2, with a significant number of improvements paying off for themselves (McKinsey & Company 2010. *Pathways to a low-carbon economy: Version 2 of the global greenhouse gas abatement cost curve*).
    - A number of technical studies analyzed projects to improve the energy efficiency of buildings and found out improvements in the range of 30% energy savings were feasible across regions with a payback time of less than 3-4 years, on top of generating jobs. (see for instance *IIASA 2012 Global Energy Assessment: Toward a more Sustainable Future)*
    - Seizing the mitigation potential in building sector represents an investment challenge, it has been estimated that 18 billion Euro investment are needed (additional, cumulative) to decrease by 2050 the global energy consumption for heating and cooling by 46% below 2005 (whilst addressing energy poverty and increasing comfort for all) (IIASA 2012 GEA). But this would also lead to saving 50 billion Euro energy costs until 2050, and it can happen with the available technologies.
35. Renewable technologies are now the most economic solution for new capacity in an increasing number of countries and regions
    - Biomass, hydropower, geothermal technologies are cheap way to generate electricity, with typical cost of electricity below 0.15 US$/kWh, when typical LCOE for diesel-fired electricity production stands above 0.35 US$/kWh. As the cost of renewable power drops, the scope of economically viable applications will increase even further. (*IRENA –Renewable Power Generation Costs in 2012: An Overview)*
    - However, the financial structure of renewable generation projects and the cost of capital vary widely by technology, country, project developer and region, and the cost of capital must be driven down in a number of regions to make projects profitable.

J. Understand the obstacles to the application, replication and up scaling of best practices

36. The transition to a secure competitive low carbon energy requires sustained increased investment in power equipment, grids, transport technologies, infrastructure and efficient buildings. As many regions are facing investment challenges, it is essential to take into account the guidance provided (see for instance *IEA 2013 workshop "Scaling Up Financing to Expand the Renewables Portfolio", UNDP 2013 Report De-risking renewable energy investment*, or by stakeholders: *CPI 2013 report on addressing investment challenges in renewable energy sector*).

37. Sharing experiences is an effective way to scale up current efforts: the first EU Eco design Regulations on electric industrial products (motors, circulators, fans and water pumps) will lead to annual energy savings by 2020 equivalent to the current final energy consumption of Hungary (195 TWh). China is using the European Regulation on motors as a basis for its national legislation, Saudi-Arabia is now considering setting requirements identical to the European motor Regulation, and the US government is also building on the requirements set in European legislation for pumps and fans, considering the benefits for end-users (esp. industry, SMEs).

K. Tools and mechanisms to overcome them including collaborative initiatives and provision of Means of implementation

38. Examples of using means of implementation for promoting renewable and energy efficiency are:
    - EU bilateral, thematic and regional cooperation mobilized on the priority "energy for development". Recent new development: EU sustainable Energy for all Facility as scaling up resources channeled to the Global Energy Efficiency and Renewable Energy Fund (GEEREF) to support investments contributing to

doubling the global rate of improvement in energy efficiency (the initial capital of GEEREF of €112 million was almost fully invested in 2012, at a current leverage factor of over five expected to further increase as clean energy projects reach financial close and start producing renewable energy; total targeted fund size of 200 to 250 MEUR will further mobilise **private risk capital** for energy efficiency and renewable energy project)

- Regional Investment Facilities can be used to overcome barriers for implementing ambitious Energy Efficiency policies – see for instance Latin America Investment Facility support to Mexico energy efficiency investments and low carbon housing for low-income groups, or Investment Facility for Central Asia providing large-scale support to local banks in Kazakhstan for financing energy efficiency projects; regional cooperation program – see for instance the Euro-Mediterranean Partnership prioritizing funds and cooperation for the region to realize 20% energy efficiency improvements by 2020, or the SWITCH-Asia cooperation program strengthening energy efficiency policy-making capacities at regional level and in Malaysia, Thailand, Indonesia and the Philippines; or the Asian Investment Facility pilot project*: "*Carbon-linked Incentive Scheme to support the implementation of Indonesia's energy efficiency and renewable energy policy in industrial processes and product use*"*...
- Recognising some specific risks of sustainable energy project, the EIB, and other European multilateral and bilateral development finance institutions are working to provide guarantees for riskier clean energy investments. For instance, the Geothermal Risk Mitigation Facility for Eastern Africa was established in April 2012, it received a grant of €30 million from the EU's Africa Infrastructure Trust Fund (AITF) to cover a portion of the upfront survey and exploration costs for geothermal energy developers. Initial interest from the developers has been significant and the Facility may be expanded beyond the five pilot countries: Ethiopia, Kenya, Rwanda, Tanzania and Uganda.
- The EIB has stepped up its renewable energy lending – reaching EUR 5.5bn in 2011 - to support the development and expansion of renewable energy projects. Moreover, the EIB has set up a dedicated Energy Sustainability and Security of Supply Facility (ESF): a EUR 3bn facility to finance projects in EU candidate and neighborhood countries, African, Caribbean and Pacific (ACP) countries, South Africa, and Asia and Latin America, to provide funding additional to the financing made available under the EIB's regional mandates.
- Capacity building is also an essential mean to facilitate the development and implementation of the national strategies promoting the sustainable development of energy supply systems. For instance, the Renewables Academy (RENAC) is offering dedicated training on integrating renewables into the electricity grid, with support by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), thereby supporting the establishment of a Regional Centre for Renewable Energy and Energy Efficiency (RCREE) in the Middle East and North Africa region.

39. A number of international initiatives and partnerships facilitate the exchange of best practices, build political momentum and bring together efforts by governments and stakeholders to promote renewable energy and energy efficiency notably:

- In Sept 2012, in Malta, ministers and representatives of island countries and territories, join up forces aiming to upscale renewable energy deployment as an essential element of sustainable development. And now, a **global Renewable Energy Islands Network** (GREIN) is hosted by IRENA as a platform for pooling knowledge, sharing best practices, and seeking innovative solutions for accelerated uptake of clean and cost-effective renewable energy technologies on islands.
- At the last Pacific Energy Summit, the EU, EIB and ADB agreed at the highest political level to **reinforce dialogue on sustainable energy investments in the Pacific Region**.
- The UN **Sustainable Energy for All** initiative is strongly supported by the EU and will be an increasing funding focus. 400 MEUR have been committed until now, with further large scale support to be

mobilised under the EU budget for 2013-2020.

- Over 2,000 European cities signatories to the Covenant of Mayors have submitted their Sustainable Energy Action Plan. This EU initiative in boosting integrated energy planning across municipalities in Europe, as the 2,000-plus Covenant Signatories that have so far submitted their plans aim to achieve an estimated 29% CO2 emissions reduction by 2020, which corresponds to 150 million tonnes of CO2, or more than the overall annual emissions of a country like Belgium.

L. Benefits attached

40. The co-benefits of renewable energy and energy efficiency mitigation policies are well documented and include: improved local air quality and lower health costs; better targeting policy responses to the needs of the poor; improved energy security and competitiveness; and unlocking low carbon development (*UNEP Green economy report / PBL 2012 Roads from Rio+20. Pathways to achieve global sustainability goals by 2050*).

41. In the EU, we are seeing a number of benefits accruing from our policies. For instance:

- The EU legislation for improving the efficiency of new cars (95 g/km, -40% compared to 2007) and vans (147 g/km which is -28% compared to 2007) will get transport end-user save €3000 to €4500 over car's or van's lifetime. There are similar estimates for all countries implementing a fuel efficiency performance standard.
- EU Member states are implementing policies increasing the share of renewable energy sources to 13.0 % of Europe's final energy consumption in 2011, and delivering 20.6% of EU electricity from renewables in 2011. This delivers emission reductions, reduced dependence on third country energy supplies and lowering fossil fuel import bills. Investments in renewable energies to further achieve EU targets have the potential to create three million new jobs by 2020 (today there are already 1.19 million employees in this sector in the EU).
- Meeting the EU's 20% energy efficiency target by 2020 means saving the equivalent of 1.000 coal power plants. Energy efficiency curbs demand for energy, reduces energy imports and mitigates pollution. It also provides a long-term solution to the challenge of fuel poverty and high energy prices in the EU, as in all regions.

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