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## Economic Commission for Europe

### Committee on Sustainable Energy

#### Twenty-fifth session

Geneva, 28–30 September 2016

Items 6 and 7 of the provisional agenda

#### **International Fora on Energy for Sustainable Development and Energy Ministerial Complexity and decision-making in conditions of uncertainty**

### **Pathways to Sustainable Energy**

#### **Note by the secretariat**

## **I. Introduction**

1. During the twenty-fourth session of the Committee on Sustainable Energy (the Committee) on 19–21 November 2015, the Committee endorsed the project “Pathways to Sustainable Energy” and requested its Bureau and the secretariat to submit a project proposal for approval to the Executive Committee with supporting documentation (ECE/ENERGY/99, paras. 79-81).

2. This document has been prepared for the Committee to take note of the developments since its last meeting, provide background information and inform about next steps. Countries are invited to participate in the implementation of the project by sharing political and technical contexts and possibly provide financial or in-kind resources to strengthen the project results.

3. The purpose of this document also is to ask the Committee to endorse a request to prepare a report on the project results in 2018, to endorse the United Nations Economic Commission for Europe’s (ECE) collaboration with the World Bank and the other regional commissions on the Global Tracking Framework (GTF) (see paras. 13 & 19) for 2017 and beyond.

## **II. Developments since the twenty-fourth session**

4. Following the request by the Committee, the Chair presented the project to the United Nations Economic for Europe Executive Committee (EXCOM) at its seventy-fifth session on 10 February 2015 (Informal Doc. 2015/2, EXCOM/CONCLU/75), its seventy-eight session on 30 June 2015 (Informal Doc. 2015/19, EXCOM/CONCLU/78), and its

eighty-third session on 14 March 2016 (Informal Doc. 2016/11, EXCOM/CONCLU/83). EXCOM recommended to resubmit the proposal upon the receipt of donor letters and has invited the Committee to present the project at its eighty-sixth session on 16 September 2016.

5. For this purpose, a project concept note and terms of references (TOR) have been prepared by the secretariat with guidance from the Bureau and international energy experts. A workshop organized from 19–20 April 2016 in Geneva with attendance of energy and modelling experts facilitated the framing of the project and the formulation of specific TOR. The concept note is included to this document as Annex I while the TORs are available upon request. The TORs will serve as a basis for selecting suitable modelling institutions to quantify and describe how different sustainable energy futures might play out in the ECE region to 2050.

6. The project is divided into two phases from 2016 to 2018. The first phase focuses on the modelling of pathways, while the second phase will build upon the modelling outputs to develop adaptive policy pathways, undertake policy dialogues, and build the early-warning system (see paras. 2-4 & 18-20, Annex I).

### **III. Background**

7. The ECE region will play an important role in attaining the international energy and climate objectives that were being agreed in 2015. Seventeen Sustainable Development Goals (SDGs) were announced in September, with goal number 7 defining targets to “ensure access to affordable, reliable, sustainable and modern energy for all”. The results of the climate agreement made at COP21 in Paris will shape national energy policies through a global climate change mitigation agenda. Energy underpins most of the goals, and the energy sector plays a critical role in finding solutions for both sustainable development and climate change mitigation.

8. There is as yet no clear view of the starting point or how to achieve these important objectives. Divergent economic development, resource availability and energy mixes are being reflected in national energy strategies and thus set different priorities how to achieve the overarching goals. Countries have not yet found a common definition of “sustainable energy” nor agreed on an expedient pathway to achieve it. This conundrum is particularly relevant for the ECE region with its highly diverse membership. There is a gap between the ambitious targets set for the future, and the strategies and systems in place today. Further, the combined greenhouse gas emission reductions based on 2015 submitted Intended Nationally Determined Contributions (INDCs) would not be sufficient to keep global warming under 2°C, so there is a second gap between the INDCs and the ambitions set forth in Paris.

9. More ambitious strategies and policies will be needed to fill the gaps to achieve the sustainable development targets and sustainable energy, while addressing climate change. There is an important opportunity today to explore the implications of different sustainable energy strategies for the region.

10. Recognising this opportunity, the Russian Federation proposed that ECE member States investigate and assess pathways for the region to attain sustainable energy and identify early warning indicators if objectives are not being met. In response, the Committee on Sustainable Energy at its twenty-third session on 19–21 November 2015 requested its Bureau to develop an approach and process for implementing such a project. In this context, three workshops were held on 26 May 2015, 2 September 2015, and 19–20 April in Geneva with leading international experts to shape further work on this topic.

11. The proposed project is intended to enhance the understanding of sustainable energy policy drivers in ECE member States, promote a policy dialogue and provide awareness-raising of different outcomes that could emerge over time. The overall vision of the project is to inform governments in the ECE region about options on how to attain sustainable energy in the future while meeting international development and climate targets.

12. The project will facilitate a high-level policy dialogue to support governments, energy industries and other private sector, non-governmental and international organizations that are involved in energy in the ECE region and develop an instrument for transparent model-based analysis of pathways for sustainable energy in the ECE region. It further will develop an early warning system if achievement of sustainable energy objectives is not on track. The project will organize exchanges among international energy modelling experts to coordinate and improve existing models, instruments and results (including consistency, potential duplication and final added value issues), culminating in a high-level (ministerial) dialogue about how to attain sustainable energy outcomes in the region. More details about the project outputs can be found in the Annex I.

13. The project is further linked to the World Bank's Global Tracking Framework for Sustainable Energy. The third edition of the Global Tracking Framework, scheduled for publication at the start of April 2017, will be the first to be produced after the approval of the sustainable development goals. It is considered particularly important for the third edition to bring the process and the findings of the Global Tracking Framework much closer to national level energy policy makers and statisticians. To this end, the five United Nations Regional Commissions have been asked to join the Global Tracking Framework consortium to provide a higher degree of proximity and customization to the regional context to be reflected in targeted regional analysis that will help to: standardize the structure and format of data presentation among the 5 United Nations Regional Commissions; highlight differences among countries and regions in terms of progress towards achieving the targets set out in the Sustainable Energy for All (SE4All) initiative as well as in the SDG7; provide the opportunity to interpret the drivers behind specific country performances; and pinpoint areas of weakness in the capacity of countries to gather and vet data. Fundamentally, the report will assess whether the world is moving fast enough to achieve 2030 Agenda goals. With a publication date in April 2017, the results will be ready for consideration by the participants of the Energy Ministerial in Kazakhstan in June 2017. The World Bank and the International Energy Agency (IEA) lead the work, supported by 20 other organizations. The United Nations Regional Commissions are considered to be ideally placed to contribute with solutions and to implement recommendations into national action plans to accelerate progress towards meeting the SDGs.

#### **IV. Next steps**

14. The secretariat is preparing the submission of documents to the next EXCOM session on 16 September 2016 to seek approval for the project. Documents include a donor funding letter, the project document based on the concept note, and the EXCOM approval form.

15. Based on the granted EXCOM approval to implement the project, the secretariat will conduct the selection and subsequent contracting process for the modelling institution to commence the modelling by Q1/2017.

16. The project will be implemented between Q4/2016 and Q4/2018. It is divided into two phases: The first phase of the modelling of sustainable energy pathways will require 1.5 years, starting from Q4/2016. The second phase focusing on the policy dialogue and the early-warning system will commence in the second half of 2017 and shall terminate by

Q4/2018. A detailed draft timeline highlighting all activities is given in Annex I, paras. 21-34.

17. The project will be discussed at the forthcoming twenty-fifth, twenty-sixth, and twenty-seventh sessions of the CSE aiming to facilitate the transition to a sustainable energy future.

18. At its twenty-fifth session, the Committee is asked to endorse a request to prepare a publication (report) on the project results in 2018.

19. The Committee is further invited to endorse the ECE collaboration with SE4All and the World Bank on the 2017 edition of the Global Tracking Framework at its 25th session and its follow-up activities.

## Annex

### Project Concept Note (Status: 20 July 2016)

#### I. Short description: Objective and content

1. The project aims at strengthening capacity of the United Nations Economic Commission for Europe's (ECE) member States to achieve sustainable energy objectives. It will increase the understanding of governments on what a sustainable energy future might look like and how this can inform national energy policy making. It will improve the capacity of governments to develop and implement sustainable energy action plans by addressing the challenges faced by each of the very diverse countries on how to embark on a sustainable energy path while integrating international agreements in their national energy policy making.

2. In a first phase, the illustration of sustainable energy futures to 2050 will be enabled through the utilisation of existing energy models from some modelling institutions. The pathways to be modelled build upon storylines developed through a participative approach organized by the Committee on Sustainable Energy and which are aligned with the Intergovernmental Panel on Climate Change's (IPCC) Shared Socio-economic Pathways and respective datasets. The assessment of selected existing strategies within the scenarios shall help to understand the gap between current policy making and future targets. The identification and testing of policy options will help formulate adaptive sustainable energy policy pathways and develop strategic recommendations that countries can consider.

3. Building upon the modelling results, the second phase of the project aims to facilitate a high-level dialogue among ECE member States, energy industries and other private sector, non-governmental and international organizations on how to attain sustainable energy outcomes in the region. As a result, the project will enhance the understanding of sustainable energy policy drivers in countries and will help attain the objectives of energy for sustainable development and contribute to climate change mitigation.

4. A further output will be an early warning system to track progress and to allow corrective collective measures if the achievements of sustainable energy objectives are not on track.

5. The project is seen as the starting point for more in-depth policy and technology analysis in the ECE region with a view to develop recommendations for ECE countries on the different pathways that are available to achieve a sustainable energy future.

#### II. Project concept

##### A. Baseline

6. Affordable, reliable and sustainable energy is key to sustainable development and the transition to modern society. Energy remains crucial for social and economic welfare, ending poverty, ensuring healthy lives, and raising standards of living. The goal to create the energy system of the future can be achieved through sustainable management of natural resources, ensuring innovative production and consumption patterns, and sustainable industrialization founded on resilient energy infrastructure developed through proper and coordinated planning of the overall energy system.

7. 2015 was a crucial year for framing international energy and climate objectives for the future. The 17 sustainable development goals were announced in September, with goal number 7 defining targets to “ensure access to affordable, reliable, sustainable and modern energy for all”. Energy underpins most of the goals. In addition, the results of the climate agreement in December 2015 will shape national energy policies through a global climate change mitigation agenda. In total 162 submissions of Intended Nationally Determined Contributions (INDCs), reflecting 189 Parties (as of 4 April 2016), were received by the United Nations Framework Convention on Climate Change (UNFCCC) prior to COP21. Of the 56 ECE member States, all but one submitted their pledges.

8. There is no clear view of the starting point or how to achieve these important objectives. Countries do not have a common understanding of sustainable energy and what sustainable energy pathways could look like. National energy strategies reflect a range of national priorities such as economic growth, environmental and climate concerns, energy access, energy security, and resource efficiency, among others. Analyses of submitted INDCs show that the combined greenhouse gas emission reductions would not be sufficient to keep global warming under 2°C<sup>1</sup> More ambitious strategies and policies must be put in place to combat climate change, with the energy sector playing a critical role in finding solutions.

9. The ECE region has a highly diverse membership that highlights the ambiguities of “sustainable energy” and how to achieve sustainable energy for all. The region comprises high and low income countries, countries that are energy rich and energy poor, and countries that are in the midst of economic transition. It plays a crucial role in achieving sustainable development and climate targets as fossil fuels represent 60% of primary energy, making the ECE region one of the largest emitters of greenhouse gases, accounting for about half of global emissions. The region further produces 40% of the world's energy while consuming 45%, is home to important energy industries, generates nearly 50% of global economic output and is dominant in the world's financial infrastructure.

10. There is an important opportunity today to explore the implications of different sustainable energy strategies for the region. The project proposed aims to support this process by combining the modelling of sustainable energy pathways with a policy dialogue, and the development of a mechanism to track implementation of climate and sustainable development obligations as well as to indicate the impact and robustness of chosen policy actions.

## **B. Target group and beneficiaries**

11. The narrative storylines and pathways to be modelled will be developed with a global view until 2050, but recommendations that emerge from the work will focus on the ECE Region (and sub-regions). The target group hence comprises all 56 countries in the ECE region with a focus on political decision-makers. Energy ministries will be informed about potential pathways and how to track implementation of international climate and sustainable development agreements. Future high-level dialogues will include countries outside of the ECE region such as Brazil, China and India that have a significant impact on the region's energy sectors and global energy security.

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<sup>1</sup> The latest synthesis report by the UNFCCC Secretariat finds that full implementation of actions outlined in the INDCs would result in total aggregate global emission levels of 55 Gt carbon dioxide-equivalent (CO<sub>2</sub>eq) in 2025 and 56.2 Gt CO<sub>2</sub>-eq in 2030. While this emissions trajectory shows improvement over likely pre-INDC scenarios, it is not consistent with the goal of limiting warming to 1.5°C or even 2°C above pre-industrial levels.

12. Beneficiaries include national governments and the private sector worldwide as the results of this project will provide insights and mechanisms which are applicable on a global scale. The results of the project will further inform the future work of the ECE sustainable energy sub-programme.

### **C. Scope**

#### *(i) Geographical*

13. The project has a geographical focus on the ECE region, comprising countries of Western, Central, South-East and Eastern Europe, Central Asia, North America, Israel, and Turkey. While the narrative storylines and modelled scenarios will outline global futures to sustainable energy, the development of scenarios, policy actions and policy pathways will focus on the ECE region.

#### *(ii) Time*

14. Modelling horizon is 2050, with an intermediate target in 2030.

#### *(iii) Source and form of energy and sectors*

15. Sustainable energy in this context will include all type of energy sources (renewable, fossil fuels, nuclear), and forms (thermal, kinetic, electric). Sectors include electricity, transport, industry, residential, and commercial.

### **D. Overarching goal (Outcome)**

16. The capacities of ECE member states to develop, implement and track national sustainable energy policies aligned with international agreements are increased and contribute to climate change mitigation and sustainable development.

### **E. Specific goals (Outputs)**

#### *(i) Phase I: October 2016 to Mar 2018 (starting date TBC, duration: 1.5 years)*

##### *a. Output 1: Modelling of Sustainable Energy Scenarios and Formulation of Policy Pathways*

17. Results from the modelling of sustainable energy scenarios for the ECE region enable the identification of policy options and inform national energy strategies of member States.

#### *(ii) Phase II: starting mid/end 2017, until end 2018 (TBC) (building on Output 1)*

##### *b. Output 2: Conceptualisation of an early-warning system*

18. A mechanism including indicators to track successful implementation of international climate and sustainable development agreements is conceptualised and information are disseminated to member States

##### *c. Output 3: Policy Dialogue and further analysis on adaptive policy pathways*

19. The understanding and capacities of national energy ministries to develop, implement and track national sustainable energy strategies is increased, and a regional dialogue exchange format is established.

## **F. Planned activities**

### *(i) Phase I*

#### *a. Under Output 1*

20. 3 in-person meetings among modellers (kick-off in Q4/2016, one intermediate meeting in 2017, presentation of final results in 2018 (possibly linked to policy dialogue – see Output 3) to discuss intermediate and final results and formulation of policy recommendations. Additional virtual meetings in 2017 and 2018.

21. Finalization of narrative storylines for sustainable energy futures and related assumptions, risks and challenges: Aligning four ECE storylines developed since 2015 with existing five SSP scenarios, utilizing available quantified datasets from Shared Socio-Economic Pathways (SSPs);

22. Conducting technology survey on technology development and costs incl. crucial milestones to outline full technology portfolio in 2050.

23. Modelling of four scenarios by three modelling institutions using existing models, based on a 2-degrees-target (actual number of scenarios may differ between 4 or 5), including a global model and regional as well as technological zoom-ins, and possible other deep dives (e.g. on nexus and cross-cutting topics).

24. Assessment of existing strategies (such as energy targets) of selected regions, sub-regions and/or countries within the model, followed by the identification of the gap between existing strategies and global targets in reaching sustainable energy in 2050 to inform the policy dialogue and formulate adaptive policy pathways (see phase II).

25. Deriving of inputs from the models and testing of possible policy options to reach sustainable energy in 2050 (possibly through a workshop session with energy experts); initial formulation of sustainable energy policy pathways (to be continued under Output 3 in Phase II).

26. Preparation of a report summarizing modelling findings and outlining strategic policy options for the ECE region, technology pathways, etc.

### *(ii) Phase II*

#### *b. Under Output 2*

27. Building upon Output 1, deriving inputs from the modellers for the early-warning system including sign-posts, Key Performance Indicators (KPIs), etc.

28. Conceptualisation and development of (a) mechanism(s) to track impact and robustness of policy actions chosen and the degree of success in implementing international agreements (World Bank Global Tracking Framework and/or RISE; Hammamet Declaration, Paris Agreement, etc.)

29. Development of information materials to inform member States about the availability and application of the tracking mechanism.

#### *c. Under Output 3*

30. Building upon Output 1 (para. 24), final formulation of possible adaptive policy pathways based upon policy options identified and tested from the modelling exercise and outputs.



31. Formulation of policy recommendations based upon the identified gap between existing strategies and global targets, and preparation of an output document summarizing key recommendations and directions.

32. Initiation and organisation of a policy dialogue between the ECE member States, taking part during the 26th and 27th session of the Committee on Sustainable Energy in Geneva (September 2017 & 2018), and a high-level energy policy dialogue event in 2018 to discuss findings.

33. Organisation of outreach materials and possibly events to disseminate findings and strategic recommendations.

## **G. Impacts**

### *(i) Climate and sustainable development*

34. The results of this project will contribute to the development of national sustainable energy strategies with an increasingly low carbon footprint of the region's energy sector(s). A mechanism functioning as an early-warning system to track national status in moving towards sustainable energy in 2050 and progress in the implementation of SDGs and climate change agreements, notable the Paris Agreement, will help member States to monitor achievements in providing clean and affordable energy for all while implementing nationally determined contributions (NDCs).

### *(ii) Co-Benefits*

35. The increased uptake of sustainable energy strategies will provide opportunities to make energy sectors environmentally sounder, including reduction of air pollution from coal fired power plants and the more efficient use of natural resources. Social benefits include the creation of jobs in a diversifying and growing sector, access to clean energy, rural development and health improvements due to less air and other pollutions. Economic benefits include technical advance and industrial transformation, increased competitiveness, and reduced dependence on energy imports. Overall, increased quality of life can be achieved.

## **III. Project management and partners: Overview**

### **A. Project management**

36. The project will be managed and coordinated by the Bureau of the Committee on Sustainable Energy under the oversight of the Committee on Sustainable Energy (CSE). Secretariat support will be provided by the ECE Sustainable Energy Division (SED).

### **B. Funding organisations / countries**

37. The project will seek the support of multiple countries for in-kind and/or financial contributions. The project is open to all member States and countries are invited to join.

38. This proposal is based on the participation of three "core" donors (Germany, Russian Federation, United States of America) covering activities as specified under 3.6 (including the funding of three modelling institutions)<sup>2</sup>. The project is open for

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<sup>2</sup> References: Minutes CSE Bureau Meeting 06/16/2016; Report of the 24th CSE session: ECE/ENERGY/99, paras. 79-81.

participation of other funding institutions and countries to cover additional measures. This could include the provision of funding for 1 to 2 additional modelling institutions and hosting of high-level meetings.

### **C. Implementing partners**

(i) *Within the UN system, ECE will seek to cooperate with the following entities*

39. The other four United Nations Regional Commissions through the forthcoming International Fora on Energy for Sustainable Energy to be held in Azerbaijan on 18-21 October 2016 and Kazakhstan on 12–14 June 2017.

40. The World Bank Group through the Global Tracking Framework and the Readiness for Investment in Sustainable Energy (RISE) project providing indicators that compare the investment climate of countries across the three focus areas of the Sustainable Energy for All (SE4All) initiative: energy efficiency, energy access and renewable energy.

(i) *Outside the UN system, ECE will seek to cooperate with the following entities*

41. Three modelling institutions will act as implementing partners for the project and will be contracted by either ECE or directly by a member State. All modelling results shall be made available to ECE to steer the combined analysis of all modelling results, formulate policy pathways, draw recommendations for policy makers, and develop a policy dialogue with the region and its member States.

42. A larger group of modelling experts is set-up in the framework of this project in order to enable the exchange among modellers and seek for collaboration.

### **D. Timeframe**

43. Oct 2016 – Dec 2018 (27 months), about 1.5 years for the modelling (phase 1).

### **E. Location**

44. The project management will be coordinated in Geneva. The overall coordination will be undertaken by ECE's Committee on Sustainable Energy and its Bureau with support of the ECE Sustainable Energy Division (SED) Secretariat.

45. Target countries include all 56 ECE member States. The modelling will be undertaken on global scale, with outputs targeted at the ECE region.

## **IV. Project budget for phase I and phase II (modelling based outputs)**

### **A. United Nations Economic Commission for Europe Committee on Sustainable Energy secretariat funding needs**

(i) *ECE CSE secretariat support*

46. Staffing needs include 8 months for a P2 over 27 months; 0.5 months each of professional, director, and administrative staff.

47. Funds are required for traveling for ECE Secretariat staff for the participation in coordination meetings and workshops outside of Geneva.

(ii) *Logistics: Workshops in and outside of Geneva*

48. Funding needs to organize (1) one modellers & donors coordination workshop end 2016/beg 2017 to finalise storylines, agree on modelling approach, and definition of modelling target (success): “Sustainable Energy in 2050”; (2) one modellers coordination workshop in 2017 to discuss intermediate results; (3) ECE member States dialogues within the Committee on Sustainable Energy in Geneva to facilitate a dialogue among member States during the 26th and 27th session (2017/2018) in order to present results and discuss policy recommendations; (4) one high-level (ministerial) meeting in 2018 to discuss final findings and policy recommendations among policy makers, likely outside of Geneva; and (5) the traveling of participants to workshops in and outside Geneva such as experts from the region, key note speakers, etc.

(iii) *Others*

49. Funding needs for communications and outreach activities, including (1) the design and development of electronic and print materials (policy recommendations, reports, etc.), and (2) outreach activities to disseminate modelling results, policy recommendations, and support political dialogue-

50. Funding needs to print a final report and translation into Russian.

## **B. Modelling institutions**

(i) *Contracted services*

51. Funding required to model scenarios and develop policy pathways. Provision of funds for three modelling institutions to develop the methodology, modelling environment, tools and approbation, to assess selected existing energy strategies in the models, to test policy options and to eventually derive policy pathways for a duration of 18 months (Phase I, partly Phase II for modelling based activities).

## V. Draft Activities timeline

Activity	2016				2017												2018												
	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
<b>Output 1</b>																													
a) Modellers coordination meetings																													
b) Finalization of narrative storylines																													
c) Technology survey																													
d) Modelling of scenarios																													
e) Gap analysis with existing strategies																													
f) Deriving policy options (possibly via a WS)																													
g) Report (Findings)																													
<b>Output 2</b>																													
h) Inputs for early warning system																													
i) Conceptualisation of early warning system																													
j) Information materials production																													
<b>Output 3</b>																													
k) Formulating adaptive policy pathways																													
l) Formulating policy recommendations, output document																													
m) Policy Dialogue CSE and external																													
n) Outreach materials & events																													