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Pathways to sustainable energy

Pathways to Sustainable Energy Programme Concept Note

Prepared by the secretariat

I. Introduction

1. This document sets forth the concept for the next phases of the Pathways Programme. The Pathways to Sustainable Energy project (formally, "Strengthening capacity of the member States to achieve the energy-related Sustainable Development Goals – Pathways to Sustainable Energy") was conceived to contribute to climate change mitigation and sustainable development by helping the countries of the United Nations Economic Commission for Europe (ECE) region deploy energy policies that support their commitments and by improving their understanding of the perspectives, objectives and actions of other countries. Keeping global temperature rises well below 2°C while attaining sustainable development will require reducing net greenhouse gas (GHG) emissions while securing access to affordable energy services.

2. The Committee on Sustainable Energy has stressed the need for continuous dialogue on pathways to sustainable energy. As such, Phase 1 of the Pathways project was the starting point for more in-depth policy and technology analyses in the ECE region. It initiated a process with a view to developing recommendations for ECE countries on the different options that are available to achieve a desired future. At the conclusion of Phase 1 of the Pathways Programme:

- A fully vetted modelling architecture is in place
- A first set of results has been obtained, and
- A concept for an early warning system has been developed.

3. The results point to a need for critical appraisal of input assumptions and for closer consideration of both regional specificities and alternative policy approaches.

II. Phase 2 of the Pathways Programme

4. Phase 2 of the Pathways Programme is conceived to provide closer appraisal of input assumptions and closer consideration of both regional specificities and alternative policy approaches. An intermediate step on the pathway to energy for sustainable development is

considered to be achieving carbon neutrality, though that premise needs to be tested. The Pathways Programme therefore comprises multiple inter-related projects:

(a) **Deep dives on ECE sub-regions.** A sub-regional deep dive would include an assessment of specific opportunities and challenges in the sub-region (including reflection on relevant alternative technologies and policy approaches), testing strategic options using the outcomes of the regional assessment, and dialogue and dissemination; capacity-building to assist member States in using the analytical architecture developed in Phase 1, further development of an early warning instrument to permit energy experts to test adaptive responses using the developed modelling capability. A concept for a deep dive on Central Asia has been developed and is included in Annex II. The project has not yet been funded. The proposal for a deep dive will be presented to and agreed with the beneficiary countries. There are opportunities for cooperation, coordination, and collaboration with other initiatives underway, including for example the European Union's Sustainable Energy Connectivity in Central Asia (SECCA) programme. The next steps will involve engaging with the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and with the European Commission's Directorate-General for International Partnerships regarding collaboration on a deep dive analysis and dialogue on Central Asia and discussions with potential donors regarding the financing of that deep dive. If the full range of regional deep dives is conducted, then the stage will be set for broader high-level political dialogue among ECE member States;

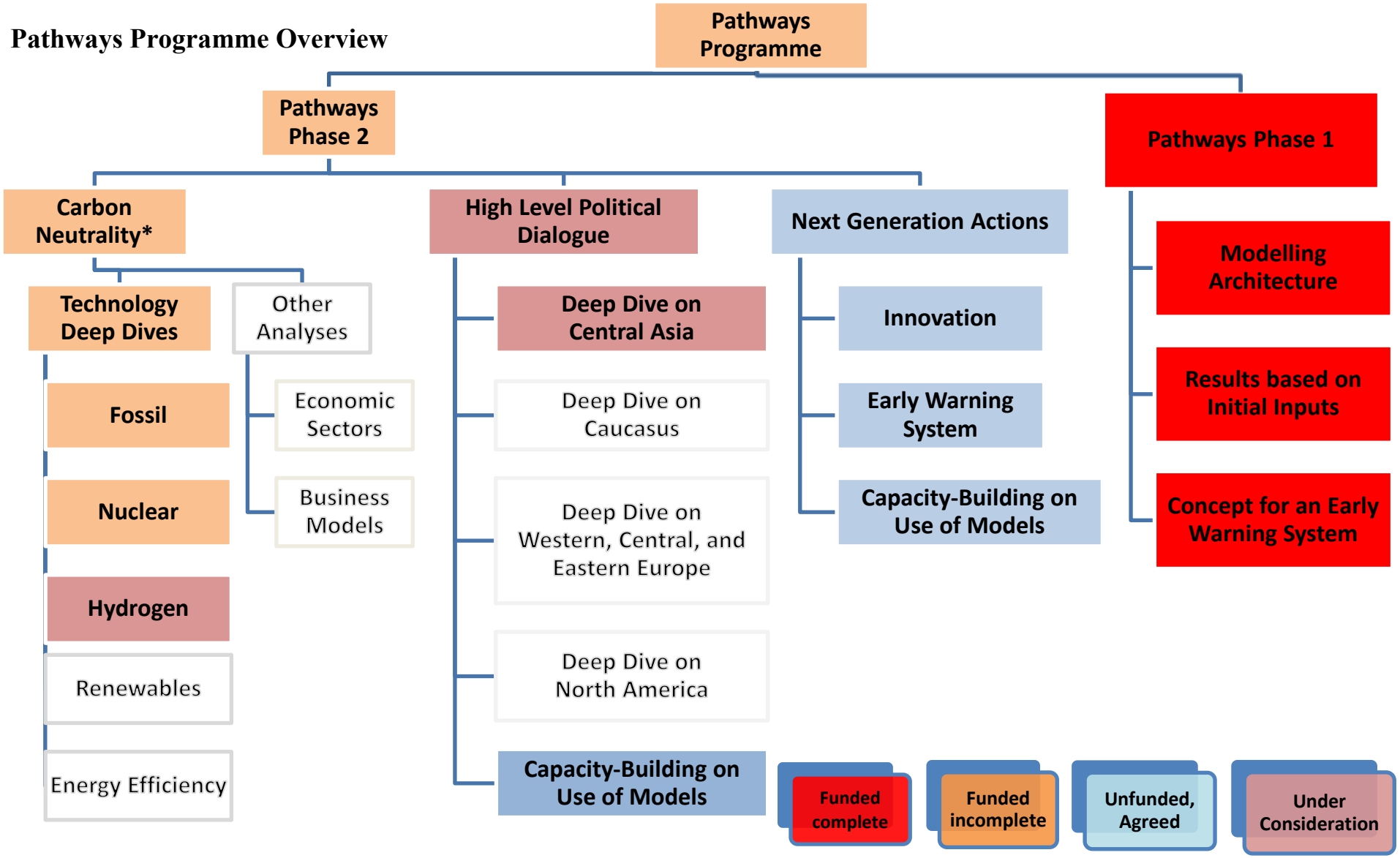
(b) **Achieving carbon neutrality.** The Committee requested that the Group of Experts on Cleaner Electricity Systems oversee a project on achieving carbon neutrality (Enhancing the understanding of the implications and opportunities of moving to carbon neutrality in the ECE region across the power and energy intensive industries by 2050 (Carbon Neutrality project)). The Carbon Neutrality project has been developed, funded, and approved by the ECE Executive Committee, and it is underway under the auspices of the Group of Experts on Cleaner Electricity Systems. The project involves appraising fully the input assumptions used to develop the first results of the Pathways project and reconfiguring the modelling to prioritize achieving carbon neutrality as opposed to achieving the full spectrum of energy objectives of the 2030 Agenda for Sustainable Development. The objective of the current project is to identify the least cost options for achieving carbon neutrality in the power sector and energy-intensive industries. The implications of pursuing carbon neutrality as a priority rather than optimizing energy for sustainable development in an integrated way will be assessed and presented.

5. ECE member States recognise that they take different views regarding the use of fossil fuels/Carbon capture and storage (CCS)/Carbon capture, use and storage (CCUS) and nuclear power. Additional funding is sought for deep dives on sustainable hydrogen, renewable energy, and energy efficiency, each supported by its respective expert group. A generic hydrogen proposal is in development. In addition, experts have expressed an interest in closer analysis of additional economic end-use sectors, alternative business models, and management of natural systems. Upon conclusion, the results of the carbon neutrality project should inform future strategic dialogue under the sustainable energy subprogramme. Interim results will be made available, but final conclusions on the outcomes of the work will be drawn only when the full slate of analyses has been completed.

6. Project proposals have been developed for funding of various elements of Pathways Phase 2, including sub-regional analyses as well as assessments of technology options, progress tracking, and further development of the early warning system. The secretariat, supported by the Bureau of the Committee on Sustainable Energy and ECE member States, will seek funding for the range of elements of the Pathways Programme.

Annex I

Pathways Programme Overview



Note: Project managed by the Group of Experts on Cleaner Electricity Systems, as per ECE/ENERGY/123, paras 34-42.

Annex II

Pathways Project Deep Dive on Central Asia

I. Background

1. The overall objective of what has become known as the Pathways project has been to support ECE countries to develop and implement national sustainable energy policies aligned with international agreements and track attainment of objectives. The project has explored countries' strategic options for closing the gaps between current efforts and both the commitments they have made under the 2030 Agenda for Sustainable Development and the Paris Agreement and what is needed to meet long-term sustainability objectives.

2. During the course of the Committee on Sustainable Energy Bureau meeting held on 16 December 2019, Germany, the Russian Federation, and the United States agreed in principle to support a sub-regional deep dive on Central Asia.

3. Each country has its own starting point in terms of resources, infrastructure, legislative and regulatory framework, and cultural heritage. Consequently, each country has a distinct set of options for how to proceed. It is essential for countries to explore their options and to consider individually and collectively how the objectives of energy for sustainable development might be achieved.

4. A sustainable energy future will reconcile a tight emissions pathway with the global development imperative by exploring synergies and partnerships between low and no carbon alternatives and traditional fuels in terms of technology, policies, market structure, and best practices. Adapted framework conditions are needed to mobilize investments that align with the objectives of the 2030 Agenda for Sustainable Development and that drive the needed transition. Rational economics and systemic improvements in efficiency throughout the energy chains lie at the heart of the sustainable energy agenda. 80% of today's energy is fossil-based, and even under a scenario that meets a 2ºC objective, in 2050 fossil fuels will still represent 56% of the primary energy mix in the ECE region. The number of countries and the number of people whose national incomes and livelihoods depend on fossil energy is important, and we cannot expect them to abandon their quality of life ambitions. At the same time, the world currently is on a path to global average temperatures that are 4-6ºC above pre-industrial levels, levels that are considered a catastrophic, existential threat. There is a critically urgent imperative to find a sustainable balance among competing interests.

II. Regional deep-dives: Conception and Objectives

5. Based on the discussions at its twenty-ninth session, the Committee on Sustainable Energy made a number of requests regarding the Pathways project. These are set forth in full in the report of that meeting (ECE/ENERGY/123). The Committee requested the secretariat to continue implementing the Pathways project until its completion and requested the secretariat to prepare a concept note for Phase 2 of the project for approval by the Bureau of the Committee, followed by consultations with member States at the level of the ECE Executive Committee (EXCOM) before official presentation to EXCOM. The Bureau requested that the Phase 2 project be launched with a detailed exploration of ECE member States in Central Asia. This concept note has been prepared in response to that request.

6. As noted at the project's initiation, the objectives of the Pathways project are to appraise countries' strategic policy and technology options, to provide support for a high-level political dialogue, and to develop an early warning system as conceptualized in Phase 1. The underlying logic for Phase 2 is that much work has been undertaken to develop a tool that can now be used for deeper assessment of policy and technology choices, notably at the sub-regional level, and to both confirm and synthesize the project outcomes for consideration by high-level decision makers. Proposed work in Central Asia is to be

coordinated and developed in close cooperation with United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) that has broadly similar activities underway.

7. The regional deep dive on Central Asia will include the following components:

(a) Assessing specific opportunities and challenges in Central Asia. The appraisal will consider contributions of relevant alternative technologies and policy approaches;

(b) Testing strategic options using the project's models and the outcomes of the regional assessments, looking specifically at possible energy innovations that can be applied;

(c) Capacity-building to assist member States in Central Asia in their own use of the analytical architecture developed in the project to test their choices;

(d) Developing an early warning instrument to permit energy experts to test adaptive responses using the developed modelling capability;

(e) Conducting dialogue on the project outcomes and dissemination of the project results.

A. Assessment of the specific opportunities and challenges in Central Asia, including consideration of contributions from alternative technologies and policy approaches

8. Every country has its own endowment of resources and its unique cultural, regulatory, and legislative heritage. As a consequence, each country will pursue its own pathway to meet its commitments under the 2030 Agenda and the Paris Agreement. The assessment proposed in Phase 2 will explore specific opportunities and challenges in Central Asia and develop more detailed strategic options specifically relevant to regional situation in terms of resource endowment and existing infrastructure. The assessment will include interactive workshops with experts in the ECE member States in the region.

9. The analyses to be conducted in Central Asia in Phase 2 would validate the input assumptions and policy options from a modelling perspective by engaging key players in workshops to confirm the assumptions made and to explore policy choices. The workshops also would provide capacity-building training in the use of the modelling and analytical tools developed. The exploration process will confirm countries' policy options.

10. The activities to deliver this component include:

(a) Conduct two-day expert workshops in the Central Asia sub-region to:

(i) review input assumptions on technologies, natural resources, and economic structural outlooks;

(ii) review and develop strategic options including relevant energy innovations;

(iii) provide updates of modelling input assumptions; summary report for use by modellers.

(b) Prepare a summary report.

B. Testing strategic options using the project's models

11. The outcomes of the sub-regional assessments, previously outlined, will be integrated into a developed set of assumptions for Central Asia to be tested under the different scenarios developed in the project using the project analytic architecture and modelling capability. The strategic options will be confirmed and summarized in a final report on Central Asia.

12. Energy policy cannot be conceived and deployed in isolation from other policy objectives as countries are committed to achieving the range of outcomes set forth in the 2030 Agenda. This assessment will explore the opportunities presented by nexus policy approaches and consider their implications for the energy sector. Nexus approaches would include pursuit of sustainable resource management and circular economy principles, just transition, integrated water-food-energy-ecosystems management, the design and

development of smart, sustainable cities, and sustainable mobility, among others as appropriate.

13. Likewise, one of the organizing principles for the scenario analysis in Phase 1 turned on the question of broad economic business models for delivering on the 2030 Agenda. The assessment of business models will explore in more detail the range of alternative business models (traditional, large-scale utilities; distributed generation; energy service companies; green energy; and the like) and their implications for countries' strategic options and financing challenges. The assessment of alternative nexus approaches and business models will engage ECE's expert communities to explore and debate the viability of the alternatives.

14. The activities to deliver this component include:

(a) Running the models with improved data for Central Asia under each scenario;

(b) Using the models to test alternative strategic options including technology, financing and policy choices and alternative business models/market structures;

(c) Conducting a workshop the countries to discuss the outcomes;

(d) Preparing a summary report and presentations.

C. Capacity-building to assist member States in their own use of the analytical architecture developed in the project to test their choices

15. As noted in the background section above, one of the important outputs of Phase 1 of the Pathways project has been development of a robust analytical architecture that allows alternative strategies and policies to be tested holistically in the context of the socioeconomic ecosystems of alternative future scenarios. Donors to the Pathways project have requested that experts in selected countries be trained in the use of the analytical architecture to allow them to test their own strategic options. This activity would be undertaken in cooperation with the Organisation for Economic Co-operation and Development (OECD) and ESCAP. The capacity-building proposed under this activity would make the model available and would engage with experts to train them on the use of the models. Experts will be trained to use the models to provide, for example, independent assessments of scenarios for countries' decarbonization strategies to 2050. The training would include consultations with the modellers.

16. The activities to deliver this component include:

(a) Capacity-building workshops:

(i) Kick-off meeting;

(ii) In-depth training [training for 30 participants over 10 days];

(b) Website for use [based on the ESCAP platform];

(c) Wrap-up workshop to confirm results.

17. A view has been expressed that, longer term, national planners will require longer term support and capacity development to apply the relevant models for their own work. The intent will be to develop and deploy a full economic cost model that address externalities to assess options for the range of energy supply, transformation, trading/transmission and use. Longer-term involvement of national energy planners with international modelling experts will be proposed as an additional project beyond this deep dive project. Coordination with the EU Sustainable Energy Connectivity in Central Asia (SECCA) programme to provide long-term capacity development support based on the provided trainings will be necessary. The efforts could include modelling an integrated regional electricity market and power trading.

D. Further development of an early warning instrument to permit energy experts to test adaptive responses using the developed modelling capability

18. Phase 1 of the project developed a preliminary sketch of what an early warning system might resemble. The information called for in that work largely depends on the availability of confirmed data and statistics, and the work completed under Phase 2 would endeavour to ensure the availability of quality data on a continuing basis. The early warning instrument called for in Phase 2, building on the work done in Phase 1, will permit energy modellers and analysis to explore alternative approaches, notably with respect to natural gas and innovation, to getting the region and the sub-regions to get on track to achieve countries' commitments. Central Asia will be used as a case study for testing the early warning system.

19. In addition, reports based on data that emerge from confirmed statistics from national systems of accounts have lag times of one or more years and hence serve more to track results than to provide early warning. Further work in Phase 2 will explore forward looking signposts that can anticipate in advance fundamental shifts (or not) in the energy system.

E. Dialogue on the project outcomes and dissemination of the project results

20. ECE will assemble member States and experts from Central Asia in a high-level political dialogue on the project outcomes. The intent of the high-level political dialogue will be to enhance the awareness of countries' choices with the expectation that the dialogue will lead to tightened commitments and accelerated action on energy for sustainable development. In addition, the dialogue will be expected to shape the activities of ECE going forward in support of countries' commitments.

21. The activities to deliver this component include inviting experts from Central Asia for presentation and discussion of the results at a meeting(s) of the Committee on Sustainable Energy.

22. The final activity under the project will include engagement with countries and stakeholders in the field to disseminate the project results and to discuss the results and implications of the project findings at national and local level.

23. The activities to deliver this component include:

(a) Preparing a sub-regional report;

(b) Conducting interactive workshops in capitals to discuss findings and implications.

III. Support and Funding

24. Phase 1 of the Pathways project was funded directly by the Russian Federation and by both Germany and the United States through contracts with supporting institutions. Phase 2 of the Pathways project, including the activities described in section II. A to E as well as the other activities described in the Pathways Programme graphic in Annex I will require sustained support from both countries and industry partners, as well as close cooperation with ESCAP. The Committee is asked to approve the suite of activities and to mandate the secretariat to make efforts to solicit and receive the resources needed to complete the work. In each case, the sources and uses of funds would be reported to the Committee on Sustainable Energy and hence to EXCOM.