

**Annexes for draft conclusions and recommendations (CSE-28/2019/INF.1):  
Projects for the attention of the UNECE Executive Committee  
on 16 December 2019**

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## 1. Committee on Sustainable Energy: International Centres of Excellence

**Relationship of the activity/project to the work programme:** UNECE's energy sub-programme has developed framework guidelines for energy efficiency standards in buildings, best practice guidance for coal mine methane, and the United Nations Framework Classification for Resources. In each case the Committee has called for wide deployment and dissemination to enhance uptake and impact. To respond to this demand, a series of self-funding centres of excellence is being established.

### **Objective:**

The International Centres of Excellence on High Performance Buildings (ICE-HPB) work to disseminate the Framework Guidelines for Energy Efficiency Standards in Buildings; to engage dialogue among local and international industry leaders to identify challenges, share best practices and build a growing and diverse community of practice; to gather and disseminate knowledge directly, and through partner organizations, including education and training, exhibits, case studies, research, demonstrations, and the production of industry focused print and on-line resources; to catalyse design and construction industry tools and training development, and identify potential barriers to adoption and implementation; and to foster public demand and support for best practices through recognition and awards, open houses and tours, public events, and demonstrations.

The International Centres of Excellence on Coal Mine Methane (ICE-CMM) support capacity-building activities in United Nations Member States and serve as a platform for discussion on safety, environmental and economic aspects of coal mine methane. They work to disseminate the best practice guidance; to train local mining companies and institutions on the techniques, technology, and policy framework to manage methane accumulations in mines; to develop case studies and experience addressing methane issues in different mining conditions; and to engage with local and national authorities on the merits of deploying proper management techniques.

The International Centres of Excellence on Sustainable Resource Management (ICE-SRM) will build national and regional capacities in countries to apply UNFC and UNRMS to all resources to enhance investment in the resource sector and to accelerate countries' attainment of the 2030 Agenda. The principal activities of ICE-SRM designed to achieve these objectives will include multi-stakeholder workshops connecting key institutions in countries to extend the principles of UNFC and UNRMS, high-level consultations with investment banks, development banks and other financial institutions such as stock exchanges and the International Accounting Standards Board (IASB), development of documentation, UNFC- and UNRMS-based reporting codes and application guidelines, coordination with key institutions for deploying the resource management mechanism, training courses for Competent Persons, including a formal designation procedure, preparing case studies and application scenarios, and branding, international outreach and communications.

### **Expected results:**

The ICE-HPB aims to 1) move the dial on building energy performance: grow the number of localities with building codes aligned with UNECE Framework Guidelines; ensure most new buildings are certified compliant; reduce the average energy requirement per square meter in new and for existing buildings; 2) move the dial on GHG emissions and indoor air quality: reduce CO<sub>2</sub> emissions associated with meeting buildings' energy service needs; increase the amount of carbon "stored" in buildings; improve indoor air quality and reduce pollution-linked health issues; 3) improve the global supply chain for the construction business: enhance "carbon storage" by increasing embedded carbon in buildings and building products and by reducing waste; and 4) extend the network: recruit new centres of excellence and academic institutions to accelerate uptake of high performance best practices.

The ICE-CMM raises awareness of and builds stakeholders' capacity for effective capture and use of methane, thereby reducing the amount of methane that accumulates in operating coal mines through promotion and application of the best practice guidance. The centres support capacity-building activities through dissemination of best practices in economically viable methane abatement and utilization, socially acceptable underground coal mine practices, and environmentally responsible methane management. They also serve as repository of knowledge on gas control, gas drainage and gas use.

The ICE-SRM will enable global collaboration in sustainable resource management as called in by the 2030 Agenda for Sustainable Development through the creation of a dedicated platform, the Centre for Sustainable Resource Management (CSRMS). The CSRMS will integrate and support the work of several independent International Centres of Excellence in Sustainable Resource Management (ICE-SRMs) established in different countries and regions globally. Each ICE-SRM will deliver results specifically tailored to a country or region within the overarching global principles and standards as provided by the United Nations Framework Classification for Resources (UNFC) and United Nations Resource Management System (UNRMS).

**Target group and beneficiaries:** The beneficiaries of the proposed centres of excellence are member States and the range of stakeholders in the related industries, notably the communities involved in the area of impact of each respective centre.

**Expected duration:** The centres of excellence are expected to be enduring and self-sustaining. The centres will operate under the auspices of the respective groups of experts and report every year on what they have achieved and what they are planning going forward. This is not a plug and play system, but rather a closely watched process with TORs and criteria for becoming an ICE. The intent is to establish many of these over the coming years – the value of a network is enhanced as more members join and more experiences are shared.

**Target amount of XB-funding sought:** One of the criteria for an ICE is that they be self-funded. There nevertheless is a need for support to provide the coordination, technical support and administration of the networks, including secretariat support, travel, documentation, and the like. The programme will extend over time as the number of centres and the scope of activities expands. The request for mandate is to secure the resources needed to support the programme. The sources and uses of resources will be reported to the relevant Group of Experts.

**Donors/potential donor(s) to be approached:** The International Centres of Excellence are collaborative networks of local, community, or national organisations focused on supporting the relevant industries in the dissemination and development of the respective UNECE product, whether framework guidelines, best practice guidance, or resource management system. The centres provide education, training, and other critical resources to industry practitioners, enhancing their own capabilities while sharing their skills and resources globally through collaboration with other network participants. Potential donors include the Centres themselves and the institutions hosting them, the energy industries and member States. UNECE's Sustainable Energy Subprogramme is actively recruiting partners to establish international centres of excellence to disseminate our products and implement our programmes.

## 2. Committee on Sustainable Energy: Modernization of the Energy Sector

### Relationship of the activity/project to the work programme:

At its twenty-fifth session the Committee on Sustainable Requested that the Group of Experts on Coal Mine Methane make a proposal to the twenty-sixth session of the Committee on Sustainable Energy on expanding the mandate of the Group of Experts to encompass work on the transition of traditional mining companies to become integrated service companies and to explore the impact this transition might have on the contributions of the energy sector on sustainable development. At its twenty-seventh session the Committee endorsed development of a case-specific model to demonstrate how to modernize an industrial complex that evolved over time to embrace up-stream energy production, industrial facilities, and accompanying residential/urban infrastructure. The work is to bring to bear the range of expertise found in the ECE energy subprogramme (managing methane accumulations, efficient energy production from coal and gas, improving industrial and end-use energy efficiency, optimizing resource management, and enabling the introduction of renewable energy technology) to enhance the environmental, social, and economic performance of the site in line with the 2030 Agenda. The Committee further requested all its subsidiary bodies to contribute to this initiative and invited countries to engage in the project to identify an industrial site for the pilot stage of the venture.

### Objective:

The project seeks to assist UNECE member States to develop integrated approaches to catalysing the deep structural shift that is about to happen in energy infrastructure and large industrial complexes towards consistent elements of greener economies. The intention is to develop a replicable and flexible business model that provides countries and financial institutions with tools to improve resource efficiency and to lower emissions through the application of modern energy technologies and a strategic switch to cleaner energy sources.

Being adjustable to local needs and particularities, it will help countries develop a case-specific innovation-led, socially and environmentally responsible sustainable national energy strategy that provides energy security and abides by the country's nationally determined commitment under the Paris Agreement, and thus it will lay foundations for building an integrated economy that is in harmony with the needs and capabilities of that country, its population, and its commitments. Having a holistic approach bring together - in a spirit of inclusion and democratic governance - social progress, environmental protection, and economic success, the project will allow countries to have an honest conversation about the challenges and opportunities of an upcoming (just) transition.

### Expected results:

Short-term:

- Increased awareness and know-how of the targeted countries and regions of mechanisms driving structural change in large legacy industrial complexes based on innovation-led, socially and environmentally responsible national sustainable energy strategies ("just transition").
- Enhanced capacities of private sector, academia, civil society and UNECE member States to develop and implement innovative business models and technology options to facilitate "just transition", as well as modernization and decarbonization of the fossil-based energy sector.
- Improved understanding and knowledge of the financial sector and how attract funding for the project while satisfying the premises of the "just transition" allowing for funding transition-supporting measures in the UNECE member States.

Long-term:

- More modern and "greener" energy policy for countries and regions involved in the project.
- More efficient, more competitive and sustainable, as well as less environmentally harmful industrial sites.
- More efficient use of energy, particularly by the heavy industry.
- Less wasteful and more sustainable resource exploitation.
- Greater uptake and integration of renewable energy and cleaner-fossil fuel technologies.
- Less fossil-fuel subsidies.
- Reduced GHG emissions.
- Better air quality.
- More flexible workforce better suited for the requirements of the green economy.
- Lower unemployment.
- Less social exclusion.
- Development of business models to pre-empt regional desertification and attract new investments and innovation.

**Target group and beneficiaries:**

- State, regional and communal authorities in the targeted countries responsible for economic affairs, as well as for development and implementation of energy, environmental, and social policies.
- All countries interested in “just transition” concepts.
- Legacy industry sites’ owners and operators and all affected businesses, often SMEs.
- Legacy industry sites’ employees.
- Clean-energy project developers.
- CMM/CBM/AMM projects developers.
- Coal Mining regulators and authorities.
- Population of the targeted regions.
- Local, regional, global NGOs interested in structural change.
- Universities/academia.

**Expected duration:**

The Project is to be developed in phases. The duration and scope of each of them depends on available resources. In its entirety the project is conceived as a continued activity helping UN Member States in keeping their energy sectors up-to-date with the requirements of modern, green economy.

**Target amount of XB-funding sought:** Being a continuous activity targeting multiple States and industrial sites, the whole project is a multi-million venture. However, it is to be developed in phases, the duration and scope of which depends on available resources. The short-term objectives should be possible to be achieved with an amount of approximately 1’000’000 USD.

**Donors/potential donor(s) to be approached:** Potential donors include the interested UN Member States; owners and operators of the energy infrastructure; as well as philanthropic foundations and academic/scientific institutions involved in the work on energy modernization, fossil fuels phase out, and/or just transition.

### 3. Committee on Sustainable Energy: Phase 2 of the project: Pathways to Sustainable Energy – how to attain sustainable energy in the UNECE region

#### **Relationship of the activity/project to the work programme:**

At its twenty-third session from 19-21 November 2014, the Committee on Sustainable Energy began an exploration of how ECE member States might attain sustainable energy. The overall objective of what has become known as the Pathways project is to support countries to develop, implement and track national sustainable energy policies aligned with international agreements while contributing to climate change mitigation and sustainable development. The project addresses both the uncertainty and the urgency for countries to embark on sustainable energy pathways that support economic growth and quality of life while meeting their climate objectives. The project aims to undertake modelling of sustainable energy systems to 2050, development of an early-warning system, formulation of adaptive policy pathways, and support for policy dialogue.

The pathways project was conceived to assist member States in attaining their energy-related commitments to the 2030 Agenda for Sustainable Development and to the Paris Climate Agreement. The project is exploring countries' strategic options for closing the gaps between the current circumstances and both the commitments they have made and what is truly needed to meet long-term sustainability objectives. Its primary objective is to explore countries' strategic options in light of both secular trends and critical uncertainties (in population, development, urbanization, climate, technology, industrial organization, business models, and the like). One of the desired outcomes of the project is an early warning system to alert countries individually and collectively if they were not on track to meet their objectives. The project's results are to be used to inform a high-level political dialogue among countries regarding their progress, actions, and commitments. The analysis of sustainable energy systems to 2050 is expected provide insights on how possible sustainable energy futures might evolve. The project will explore if existing national or regional strategies are sufficient to achieve these ambitious targets and highlight gaps to be addressed. Policy options identified to date have been tested through quantitative modelling. The modelling also is expected to help identify indicators for the formulation of an early-warning system to measure success in achieving objectives. The early warning system will advise if countries are on track to achieve the set objectives both nationally and regionally.

Phase 1 of the project has been completed substantively and will be discussed at the 28<sup>th</sup> session of the Committee on Sustainable Energy. The first phase succeeded in constructing a robust analytical architecture based on complex modelling by leading institutions and on strategic analysis using a scenario-based assessment of critical unknowns and uncertainties. A preliminary evaluation of strategic options was conducted, and a preliminary sketch of an early warning system was developed.

#### **Objective:**

Phase 2 of the project will develop further the appraisal of countries' strategic options, to provide support for the high-level political dialogue, and to refine the early warning system developed 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 and to both confirm and synthesize the project outcomes for consideration by high-level decision makers. Phase 2 of the project will include the following components:

- Closer assessment of the technologies considered on a preliminary basis in Phase 1;
- Close assessment of the specific opportunities and challenges in UNECE sub-regions;
- Consideration of alternative nexus approaches and business models;
- Preparation of a status report on progress of the UNECE region in meeting commitments under the 2030 Agenda and the Paris Climate Agreement (early warning system report);
- Testing strategic options using the project's models and the outcomes of the technology and regional assessments
- High level political dialogue on the project outcomes
- Dissemination of the project results

#### **A. Closer assessment of the technologies considered on a preliminary basis in Phase 1;**

To complete the analyses done to date, there is a need to explore and confirm or challenge the input assumptions that have been used across the range of technology and policy approaches, including for the range of low- and no-carbon technology options. A family of deep-dive projects (such as the on-going deep dive on natural gas) that will confirm or update the analyses that have been the basis for the Pathways project to date. Other deep dives that are proposed or under consideration will explore hydrogen, coal, nuclear power, renewables, and energy efficiency:

- The deep dive on *natural gas* is exploring: 1) natural gas displacing competing higher carbon-intensity fuels in power generation, transport, heating, and other end-use markets; 2) the possibility of natural gas enhancing the

uptake of renewables by compensating their intermittency (balancing markets); and 3) penetration of new markets through small-scale liquified natural gas (LNG) and compressed natural gas (CNG). An important part of the exploration involves addressing environmental issues associated with natural gas use including both methane management and CO<sub>2</sub> emissions.

- A deep dive on *coal* is proposed to explore: 1) technology options including high efficiency, low emissions technology and carbon capture and storage for reducing the net carbon intensity of coal-fired power; 2) policy option pathways for CCS that are equivalent to other low- or no-carbon technologies at comparable stages of development, including an assessment of the storage volumes that will be required; 3) opportunities for design of coal-fired technology to operate flexibly and support deployment of intermittent energy resources; 4) assessment of the existing fleet of coal-fired power stations and the opportunities either to reduce their net carbon emissions or replace with alternative technology; and 5) economic comparison of power generating technologies to meet demand requirements considering environmental and social constraints and market design issues.
- A deep dive on *nuclear power* will explore the role that nuclear energy could play as a strategic option for those countries that choose to use nuclear power to meet their international commitments. It will examine the economic, operational, and design assumptions embedded in the Pathways analysis and will consider: 1) the potential for advanced nuclear technologies and small modular reactors to minimize capital and operating costs while meeting safety standards and obtaining social license to operate; 2) nuclear energy displacing higher carbon-intensity fuels in power generation, transport, heating, and other end-use markets; and 3) how nuclear energy can work with renewables to achieve the least emissions in the most cost-efficient and diversified way. The deep dive will compare the full life-cycle health, safety and environmental impact of nuclear energy compared to other energy sources. The project will also study the associative aspects of nuclear energy in other sectors of the society, including health, industry, innovation, and gender participation in advanced sciences and technologies.
- A deep dive on *hydrogen* will review the economic, operational, and design assumptions embedded in the Pathways analysis and will consider: 1) ongoing regional and global activities by renowned international organisations on the topic of hydrogen and their gaps; 2) the techno-economic potential of hydrogen to displace hydrocarbon fuel use in the future energy system with particular emphasis on a range of sectors including transport, industry (e.g., chemical, metallurgical) and residential/commercial; 3) the environmental performance of hydrogen and its potential to decarbonise the energy system and improve local air quality; 4) essential technology and infrastructure prerequisites including but not limited to fuel cells, catalytic conversion, onboard hydrogen storage, large-scale hydrogen storage, liquefaction, hydrogen compatible pipelines; 5) Options for hydrogen production (decarbonising natural gas (e.g., steam methane reforming, partial oxidation), coal gasification, biomass gasification, electrolysis of water (power-2-hydrogen-to-X), by-product of industrial processes; and 6) enablers and constraints to creating reliable national and international supply and demand markets for hydrogen. The project will seek partnerships and alliances as appropriate, building on the strengths of the regional commissions as a platform for a global and subregional frank exchange of views and peer learning.
- Other technology deep dives will be conducted as needed and as further donors are identified to complete the technology suite.

#### **B. Close assessment of the specific opportunities and challenges in UNECE sub-regions;**

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 Climate Agreement. The assessment proposed in Phase 2 will explore the specific opportunities and challenges in the UNECE regions and develop more detailed strategic options connected to regional situations. The assessment will include outreach activities to engage member States in the region.

Geographic deep dives will be proposed at the sub-regional and, as appropriate, national level. While the project has developed a deep modelling capability, the ECE-level analyses and first cut sub-regional analyses have not had sufficient granularity to inform countries' strategic options at the national or sub-regional level. The sub-regional and national analyses would not only reconsider the input assumptions and policy options from a modelling perspective but would also engage key players within each sub-region or country to confirm assumptions and to explore policy choices. Workshops conducted in selected subregions and countries would then inform the high-level political dialogue across the UNECE region.

**C. Consideration of alternative nexus approaches and business models;**

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. Likewise, one of the organizing principles for the scenario analysis in Phase 1 turned on the question of 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. The assessment of alternative nexus approaches and business models will engage UNECE's expert communities to explore and debate the viability of the alternatives.

**Expected results:****1. Preparation of a status report on progress of the UNECE region in meeting commitments under the 2030 Agenda and the Paris Climate Agreement (early warning system report);**

UNECE previously prepared a regional report as a companion to the Global Tracking Framework report of the World Bank, the IEA, and IRENA. This report would provide an update of the previous report focused on "energy for sustainable development" drawing on the modelling results of phases 1 and 2 of the pathways project. This activity will include engagement with stakeholders to discuss the results and implications of the report findings.

**2. Testing the range of strategic options using the project's models and the outcomes of the technology and regional assessments**

The outcomes of the assessments and analyses included in activities A-C, above, will be integrated into a final and definitive set of assumptions to be tested using the project analytic architecture and modelling capability. The range of strategic options will be confirmed and summarized in a final Phase 2 project report.

**3. High level political dialogue on the project outcomes**

UNECE will work with a host country to assemble member States and experts in a high-level political dialogue on the project outcomes. The intent of the high-level political dialogue will be to enhance the respective 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 UNECE going forward in support of countries' commitments.

**4. Dissemination of the project results**

The final activity under Phase 2 of the Pathways 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.

**Target group and beneficiaries:** UNECE member States, partners and stakeholders.

**Expected duration:** Depending on the funding.

**Target amount of XB-funding sought:** from 300,000 USD

**Donors/potential donor(s) to be approached:** Phase 1 of the pathways project has been 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 bouquet of technology and sub-regional deep dives, the testing of alternative policy approaches and business models, preparation of early warning reports and final project reports, conduct of policy dialogues, and outreach activities, will require sustained support from both countries and industry partners. The Committee is asked to approve the suite of deep dives on technology and on the subregions and to mandate the secretariat 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 and hence to EXCOM.