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HIGH-LEVEL DIALOGUE ON
ENERGY
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High-level Dialogue on Energy 2021

Technical Working Group II. Energy Transition

Draft Report Outline for review by TWG members. Made available on 15 March 2021

Editorial note

The General Assembly, through resolution 74/225, invited the Secretary-General, with the support of the relevant United Nations system entities, to convene a high-level dialogue in 2021 to promote the implementation of the energy-related goals and targets of the 2030 Agenda for Sustainable Development. The High-level Dialogue will be structured around five overarching themes, to ensure an inclusive process for engagements of Member States and other multi-stakeholders to identify, develop and accelerate action for universal energy access, energy transitions and energy's interlinkages with other SDGs.

This is the annotated outline of the transition theme and will become part of the consolidated report for the Dialogue. The technical advisory group and the champion countries for theme II are asked to provide feedback on this outline to assist the co-lead agencies in developing a balanced first draft.

1. Goal

Present the overall goal and targets for the Theme, setting clear ambition in support of the 2030 Agenda and the Paris Agreement. Approx. 500-1,000 words in total.

This energy transition theme will focus on how a mix of political priorities like climate change, economic development, social inclusion, energy security, health, job creation etc. are driving energy sector transitions in many countries. Many of these transitions are building on the increasingly market-driven growth of renewable energy installations and increased focus on energy efficiency, including in end use sectors like housing (ICT opportunities) and transport (electric vehicles). The theme will also address how to make the transition take place in a just manner, including strategies for coal phase-out.

While energy sector transition is driven nationally by a number of domestic priorities like climate change, economic development, social inclusion, energy security, health, job creation etc., the energy sector as a whole globally is facing a series of interlinked challenges:

- Global population and economic growth combined are resulting in strong pressure on future demand for energy services.
- Providing access to modern energy forms for around 600 million people currently unserved will require new power capacity and infrastructure expansion in countries with limited finances to do so.
- GHG emissions from the energy sector dominate global GHG emissions and will need to be reduced dramatically to stay in line with the goals of the Paris Agreement.
- Transition will need to ensure that a new energy system is resilient and can sustain future economic and environmental shocks.

To meet these challenges, a major transition of the sector is required in all countries, with massive efforts to increase energy efficiency/productivity and expand renewable energy for power supply and

direct use within and across regions. Simultaneously, there is a need to change and expand the electricity sector infrastructure to allow for increased use of variable sources, system flexibility, and electrification of new services, most prominently for personal mobility. The good news is that many solutions already exist, and in some countries and regions, transitions are already underway and being expanded and scaled up.

Goals by 2030 have generally been defined in SDG 7

7.1: Ensure access to affordable, reliable, sustainable and modern energy for all.

7.2 - increase substantially the share of RE in the global energy mix,

7.3 - double the global rate of improvement in energy efficiency.

In order to make these goals more operational and aligned with SDG13, it is proposed to introduce some more specific targets for 2030 (inspired by SRSG slides):

- 100 percent access to modern energy services
- 3 percent annual efficiency improvement in at least xx countries across the world
- 100 percent increase in modern renewables capacity globally compared to 2020
- Reduction of yy billion tonnes of GHG emissions per year in the energy sector.
- Stimulate economic growth and create yy million decent jobs (SDG 8 contribution)

For a transition to successfully reach these goals there will be need for urgent and strong political leadership at both national and international level, clear targets and timetables combined with an enabling policy framework that focuses on job creation, economic and environmental benefits etc., while addressing the issue of making the transition “just” in its broadest sense. For a socially and economically just transition, there will be a need to ensure that no groups are left behind in the process, the benefits are distributed in socially acceptable ways and adverse impacts on people and regions are managed in an orderly fashion.

Question to TAG and Countries : what do you consider to be the most relevant points to be addressed in the ET Theme?

2. Context

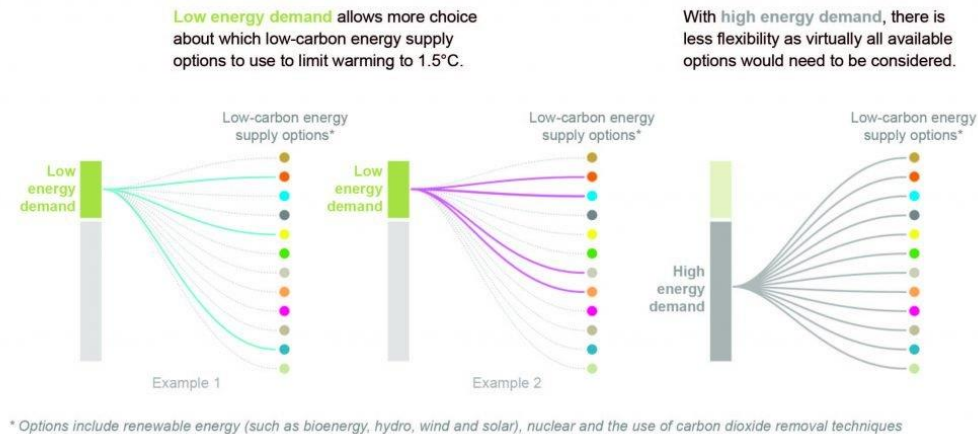
Section 2 Introductory section with a state of the [energy] sector assessment, providing background and current landscape of the thematic area. *Approx. 1,000 words-2,000 in total.*

The IPCC published in 2018 its Special Report on 1.5 °Cⁱ. The report assesses impacts of global warming in the range from 1.5 to 2 degrees and different possible pathways to achieving this goal of the Paris Agreement. Depending on how actions are prioritised different reduction options are more or less dominant in the IPCC scenarios. But the Panel emphasizes that an energy sector transition is crucial to global mitigation efforts, and energy demand and supply need to be addressed simultaneously as lowering demand provides an opportunity to reach the goals with more flexibility on the supply side. In fact, the conclusion is that unless the demanded energy services can be provided in much more efficient ways, all possible options on the supply side will need to be deployed, including significant carbon dioxide capture and storage and potentially direct removal of CO₂ from the atmosphere.

[Figure from IPCC 1.5 report]

FAQ2.2: Energy demand and supply in 1.5°C world

Lower energy demand could allow for greater flexibility in how we structure our energy system.



Energy efficiency, together with renewables and changes in demand for energy services, could account for over 90% of the CO₂ emission reductions needed to be aligned with the 1.5-degree ambition of the Paris Agreement.ⁱⁱ According to the IEA, improvements in energy efficiency has been declining in the last years. It will be important for all end-use sectors and consumers to use energy as efficiently as possible, with coordination and support from all levels of government. Significant action must be taken across the board, such as increasing efficient energy generation and use; decarbonising buildings, hard-to-abate sectors; and greening transport.

For this transition to positively impact the economies and societies, justice and fairness must be at the heart of planning and action. In a post-Covid world there is even a stronger need to focus on economic recovery and job creation. IRENA's annual review of jobs finds that the renewable energy sector accounted for 11.5 million jobs worldwide in 2019. This number can be multiplied, and an ambitious low-carbon energy transition strategy can bring at least three times more jobs than traditional fossil sources. Every million dollars invested in renewables would create at least 25 jobs, while every million dollars invested in efficiency solutions or energy flexibility would create about ten jobsⁱⁱⁱ.

It will be critically important for governments and companies to prevent locking in expensive high-carbon energy assets with long lifespans, such as coal-fired power plants. Globally, about 27% of primary energy needs are met by coal.^{iv} Coal plants currently under construction or planned for construction would lead to approximately 150 GtCO₂ over an assumed 40-year lifetime.^v Much of this planned capacity is in the Asia-Pacific region, which accounts for around 94% of coal plants under construction, planned or announced.^{vi} A positive trend the last couple of years has been several cancellations of planned expansion of coal power capacity by governments in several countries, and this trend is supported by a study from IRENA documenting that 500 GW of existing coal plants with the highest operating costs could be economically replaced with new utility-scale solar PV and onshore wind.^{vii}

Limiting the rise in average global temperatures to 1.5°C presents significant short term policy, economic/financial and social challenges, particularly in some highly energy-intensive sectors such as buildings, industry and transport. Four of the most energy-intensive industries and three key transport sectors stand out as the hardest to decarbonise. Those seven sectors could account for 38% of energy and process emissions and 43% of final energy use by 2050^{viii} unless major policy changes are pursued now.

Decarbonising transport must be a priority. The global passenger car fleet is projected to double by 2050, with an estimated 75% growth in developing markets.^{ix} The transition to increasingly electrified

forms of transport and space heating, when combined with increased renewable power generation, can deliver around 75% of the energy-related CO₂ emissions reductions needed to limit warming well-below 2°C.^x Cutting transport emissions will in addition, have huge benefits for health by reducing air-pollution esp. in urban areas.

Question to TAG and Countries : what do you consider to be the top three challenges to accelerating Energy Transition in your country/region/city?

3. Challenges and Opportunities

Section 3 Challenges (~2000 words): Identification of critical barriers and opportunities for progress by Theme. These may be categorised, e.g., as political, policy and regulatory, financial, market design, and/or behavioural, and levels of urgency can be attached to each barrier, with due consideration to the different circumstances of countries and regions.

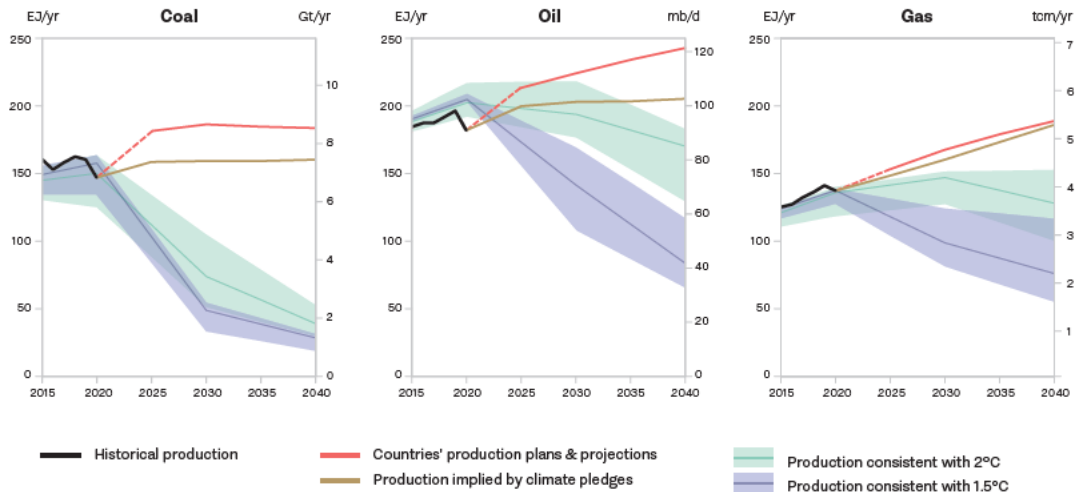
This section will discuss barriers and opportunities in key action areas for energy sector transition. These may be categorised, e.g., as political, policy and regulatory, financial, technological, market design, and/or related to behaviour by key actors. Possible compact focus areas are indicated initially for inspiration and the full paper will go in more detail as possible compacts are built.

- **Power systems.** There will be a general need to reinforce or replace grid infrastructure, connect the future grid to a larger number of local renewable-power-generation sources, and in parallel provide more flexibility to accommodate small-scale residential and commercial energy generation. In addition, there will be an urgent need to develop an electric-vehicle-charging infrastructure in many countries. System operators may be private or public but planning of the future grid structure will be an integral part of national energy policy, increasingly in regional or sub-regional interconnection context. The power sector structure is already changing in many regions and compacts could be made by governments, power system operators, finance institutions, etc.
- **Renewable energy.** For renewable energy power capacity expansion to meet the indicated goal there is a need to accelerate the already positive developments in investments. Conducive policies will be necessary to stimulate this development and are already in place in many countries. Bottlenecks, if any, on the production side will need to be assessed and addressed this could be e.g. use of globally distributed production facilities, use of rare metals, having a sufficiently skilled labor base, etc. Countries could make compacts on domestic RE expansion ambitions. Similarly financial institutions and pension funds could set numerical targets for investments in clean energy and energy efficiency and either make individual compacts or join already existing initiatives.
- **Energy efficiency.** Increasing energy efficiency in all sectors including households, service companies, shops, industries, transport etc. In most cases, technologies are available and affordable on the market, but new incentive structures will need to be put in place through government policy to accelerate the market uptake. Key barriers are linked to regulatory systems, behavioural norms, and poor financial incentive structures. This means that advancing energy efficiency really is a question about implementation across sectors and constituents. Energy efficiency policy will, if properly designed, offer social and economic benefits, energy security and be key to sector decarbonisation, as indicated by the IPCC. Compacts could be

made by countries, local government and cities, private companies committing to e.g. 3% annual efficiency improvement.

- **Transport.** Deep decarbonisation of the transport sector will require a radical shift in the nature and structure of transport demand, major improvements in energy efficiency, changing vehicle types, and significant and rapid transitions in the energy mix used. Looking at the car industry development, it seems that electric vehicles will gradually play a major role. But leapfrogging into e-mobility could be an attractive option linked to major reductions in urban air-pollution. Some of the transport-related climate change mitigation actions that can yield substantial decarbonization as well as economic benefits include: (i) compact urban design; (ii) reducing passenger travel demand; (iii) shifting passenger travel mode and expanding public transit; (iv) improving passenger car efficiency and electrification; (v) improving freight logistics; and (vi) improving freight vehicle efficiency and electrification. Railways are likely to become gradually electrified, while mitigation efforts related to freight transport by road, sea and air are likely to be focusing on biofuel or hydrogen solutions in the longer term. Compacts could focus on EV expansion, fuel efficiency standards, hydrogen or biofuel production.
- **Hard to abate sectors** include cement, steel, aluminum, chemicals where the process heat requirements are difficult to meet with electricity. According to IRENA (2020) likely solutions will require inter-linked sector-level strategies at the local, national and international levels and build on five technology pillars of demand reduction and energy efficiency, renewable electricity, renewable heat and biofuels, green hydrogen and e-fuels, and carbon-removal technologies. Compacts could focus on any of these issues and combine public and private actors.
- **Financing** the transition. The world spent a record \$501.3 billion in 2020 on renewable power, electric vehicles and other technologies to cut the global energy system's dependence on fossil fuels, according to Bloomberg (2021). Financing differs significantly between large infrastructure and RE power plants at one end to investments in small scale energy efficiency efforts or mini-grid systems in remote areas. The role of governments in the area of finance therefore, also differs. Stimulating large scale private investments may require de-risking or guarantees while direct public investments will be dominant in e.g. establishing or renovating energy efficiency efforts in social housing, schools, hospitals etc. Public procurement can also be an important driver for example, for appliance markets. Compacts involving government and finance institutions would be obvious or existing initiatives could be scaled up.
- **Transition challenges.** Managing to make the transition just including in countries with large dependency on fossil fuels. There is no "one-size-fits-all" approach and transition will be country or region specific. There are also significant differences between countries with oil and gas production where the dependency is mainly fiscal and most of the resources are exported compared to coal, where local employment is significant. With a transition towards enhanced efficiency and renewables, the fossil fuel industry will gradually come under pressure and the annual Production Gap report^{xi} presents the transition challenge from the fossil fuel production side. The figure illustrates the current production, official plans and projections compared to trajectories that would make production levels compatible with the temperature goals in the PA. For example for coal this would imply a phase out by 2050 or even before. This is well aligned with the UN SG urging all OECD countries to commit to

phasing out coal by 2030, and for non-OECD countries to do so by 2040. Governments could make compact to implement transitions in a just manner.



Question to TAG and Countries : what are key areas for energy compacts and where can we build on existing initiatives?

3. Recommendations/Plan of Action

The section aims to offer a proposed menu of solutions and policy options that respond to the challenges identified, and presented in the form of a plan of action to achieve the goal of the Theme.

Guiding Questions:

With the notion that essentially all countries will need to go through an energy sector transition, it will be beneficial to distinguish between the current energy sector structures and challenges in countries. Countries have diverse priorities, abilities, endowments, and needs. Having detailed insight will make the recommendations more relevant and credible.

- What/who are the main levers for accelerating action and what conditions are needed?
- How can changes in patterns of energy demand minimise the challenges and possibilities of stranded assets?
- What advances are needed in technologies, policy improvements, finance innovations, and institutional strengthening for successful energy transitions?
- What measures and policies can encourage investment to have the most positive impact and promote a just transition?
- What tools and processes can help countries accelerate energy transitions and promote global solidarity to leave no one behind?
- How can we leverage existing activities and initiatives in the energy space to instigate a decisive shift toward decarbonised and resilient energy future?

4. Impacts

Assessment of catalytic potential impacts of the proposed recommendations on SDG7 in support of the SDGs and net-zero emissions by 2050. (1 – 2.000 words)

Will be developed when the nature of the recommendations and compacts have become clearer.

5. References

See endnotes – this is a preliminary list and will be further elaborated in the full paper. Similarly the figures included at this stage are indicative and some will change as new studies are released the coming months.

6. Energy Compact concepts

It would be useful to get suggestions from the TAG on possible compact areas and from champion countries on plans and initiatives at this stage.

ⁱ IPCC, Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. (2018) available at [Global Warming of 1.5 °C — \(ipcc.ch\)](https://www.ipcc.ch)

ⁱⁱ IRENA, *World Energy Transitions Outlook - A preview* (2021), available at: <https://www.irena.org/publications/2021>

ⁱⁱⁱ IRENA (2020), *The post-COVID recovery: An agenda for resilience, development and equality*

^{iv} BP, *Statistical Review of World Energy* (2019), available at: <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy/coal.html.html#coal-consumption>

^v UNEP, *The Emissions Gap Report 2017: Synthesis report* (2017), available at:

<https://www.unep.org/resources/report/emissions-gap-report-2017-synthesis>

^{vi} UNESCAP, *Coal Phase-out and Energy Transition Pathways for Asia and the Pacific* (2021), available at:

<https://www.unescap.org/kp/2021/coal-phase-out-and-energy-transition-pathways-asia-and-pacific#>

^{vii} IRENA, *Renewable Energy Generation Costs in 2019* (2020), available at

<https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019>

^{viii} IRENA, *Reaching Zero with Renewables* (2020), available at <https://www.irena.org/publications/2020/Sep/Reaching-Zero-with-Renewables>

^{ix} UNEP, *Why does Electric Mobility matter*, available at: <https://www.unep.org/explore-topics/transport/what-we-do/electric-mobility/why-does-electric-mobility-matter>

^x IRENA, *Global Renewables Outlook: Energy Transformation 2050* (2020), available at:

<https://www.irena.org/publications/2020/Apr/Global-Renewables-Outlook-2020>

^{xi} SEI, *The Production Gap Report 2020*. (2020) available at [The Production Gap Report 2020 | SEI](https://www.sei.org/publications/2020/01/the-production-gap-report-2020)