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Report on Second Consultative Science Platform

Bouncing Forward Sustainably: Pathways to a post-COVID World Sustainable Energy

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Acknowledgments

We would like to thank the Chair Hans Olav-Ibrekk and all participants in the 2nd consultative meeting for their valuable contributions. We also appreciate Anastasia Aldelina Lijadi for the administrative and logistic support and for hosting the online consultation.

Report on Second Consultative Science Platform

The IIASA-ISC Consultative Science Platform "Bouncing Forward Sustainably: Pathways to a post-COVID-19 World" aims to harness the transformative power of crisis to imagine a more sustainable world.

The process consists of three consultations. The 1st Consultation took place on 18 June 2020. It brought together experts from various disciplines and regions of the world – with **a focus on science** -to deliberate on the following overarching questions:

- How should COVID-19 and related stimulus and/or recovery packages be directed to maximize the positive impact on the transition to sustainable development?
- How can a decarbonized, decentralized, and digitalized energy system make our society more resilient?
- How can the ability of science, policy and governance systems be enhanced to rapidly respond to unforeseen shocks?

The participants were asked to identify areas of priority for subsequent consultations: the *three areas of priority* identified by the participants were: a) reducing energy demand significantly through unconventional means (e.g. remote working, reshaping the urban spaces and their use, digitalization); b) maximizing sustainable energy independence at local and individual levels based on reliable solutions(e.g. decentralized renewable energy solutions, energy support systems such as certification, incentives, reliability and efficiency enhancing measures); and c) influencing behavior towards responsible consumption (new trends in mobility, less material consumption, sharing vs. ownership models).

The purpose of the 2nd Consultation which took place on July 22, 2020 was to build on the outcome of the first consultation, by further discussing some bold measures for building more resilient societies and explore strategies for just and sustainable recovery pathways from COVID-19 in the areas of priority identified in the first consultation. The meeting brought together experts **from business and private sector, industry, service providers, and NGOs**, to deliberate on policy recommendations to policy and decision makers in the third and final consultation. The following were the guiding questions of the meeting: a) vision: what would you propose as the new and *ideal normal* in the aftermath of COVID-19 and what areas would you propose as priority for action? and b) action: what measures can be adopted to ensure that the new ideal normal can be achieved and societies do not fall back unnecessarily to the previous unsustainable state?

The consultations brought up the contrast of pre COVID-19 period with what we can call the "learning period". In the pre COVID-19 period, the trend was to believe that peak emissions by 2020 was unachievable, there was little focus on demand-side solutions and little attention was paid to behavior change. In the "learning period", the attention focused on demand reduction as the driver of energy transformation (remote working, flexible buildings, urban reimagination which included a big role of digitalization and mobility transformations); energy resilience, not energy security (local empowerment, decentralized, renewable energy-based solutions, social innovations); and shared, service-based economy as a big driver of sustainable consumption, driving energy efficiency and renewable energy. These insights of the 1st and 2nd consultations will serve as the basis of the discussions of the 3rd consultation.

The 3rd Consultation will take place on September 2, 2020. The purpose of this consultation is to bring together a small group of high-level **policy and decision makers, as well as those with the power to influence policy**, to comment on the viability of the recommendations compiled during the 2 previous consultations. This group of high-level experts will also be asked to comment on the priorities and best ways to make these recommendations actionable. The COVID-19 pandemic and the lockdown measures revealed that the energy-economic systems and societies were not fully resilient and prepared for such crises. But they also showed the power and the possibility of transformation with positive effects for climate, pollution, and health. And this is the basis for arguing for a profound transformation of the global energy system (including through the elimination of fossil fuel subsidies-nearly towards a cleaner, affordable, and more resilient path, while boosting

a fair transition that takes care of inequalities (gender, ethnic, etc.) also benefits those who have been impacted more severely. Designing and implementing those measures requires a careful interplay between science, technology and innovation (which should be promoted strongly with considerably increased levels of investments), governance, policy and business as illustrated by the resulting recommendations summarized below and falling into four clusters: reinventing urban space and infrastructure, reimagining decentralized services, reinventing the concept of consumption, and reinventing equity and justice in energy transitions.

1. Re-inventing urban space and its infrastructure

Why the focus on cities?[1]

- Cities account for three-quarters of human-caused global carbon dioxide emissions.
- Cities account for an estimated two thirds of global final energy use.
- 4.2 billion or 55% of the world's population lives in cities (with 2.5 billion more expected by 2050).
- 80% of global GDP is generated in cities.
- Buildings and construction (including infrastructure) account for 36% of final energy use and 40% of energy-related carbon dioxide emission.
- One billion people are currently living in urban slums.

Cities can be both the source of the problem as well as the solution, building on the lessons learned from the COVID-19 crisis, among others. But the challenges are immense: 1) urban infrastructure is rapidly deteriorating requiring major investments to build back better; 2) as major contributors to global carbon dioxide emissions, cities have a major challenge and role to play in the fight against climate change by making zero carbon structures, a key goal more urgent than ever; and 3) as the COVID-19 crisis has revealed with its severely unequal impacts, building safe, livable and healthy cities for everyone with equity and social justice is not only an ethical obligation but a guarantee for a more sustainable future.

The COVID-19 crisis is providing some of the best lessons on how cities around the world are adapting to a new normal. These lessons are showing not only the importance of the need to design cities on a human scale, but also that it is possible to make drastic changes to improve the use of public space and public safety, mobility, and overall livability. The cities are showing that by making these drastic changes, the quality of life has not only improved, but they have managed to remain competitive, attract tourism, investment, and economic activity. They are showing the way on how to permanently redesign cities on a more sustainable basis. Some of these examples, some at early stages of design and implementation, are calling for redesigning cities into urban villages: Paris and its call for self-sufficient neighborhoods, with all the amenities needed (shops, offices, schools, etc.) all within a 15 minutes radius. Several other cities around the world like Melbourne with its "20-minute neighborhoods" and Copenhagen's Nordhavn "5-minute neighborhood", are all promoting a new standard for use of space and sustainable mobility. San Francisco with its "slow streets" campaign that limits vehicle traffic and promote walking and cycling; Bogota which has added 80 kilometers of temporary bike lines. And Buenos Aires pedestrianizing over 100 streets are adding to this experience.[2]

Cities must re-invent the design and use of the infrastructure and buildings. In the last few decades, urban infrastructure around the world has been allowed to deteriorate and many now lack modern technology to maintain safe, efficient, resilient, and flexible operations under emergency and/or new normal conditions. The COVID-19 crisis has revealed the serious implications of having a deteriorating infrastructure that has hampered the efforts to service the community equally when needed. Many lessons have been learned. This provides an opportunity to re-think their design and build back better. Renewed facilities should be more decentral and resilient, meeting modern standards for energy efficiency and air and water quality, and

[1] REN 21, 2019, *Renewables in Cities,* 2019 Global Status Report.
[2] Straface, Fernando, Redesigning cities on a human scale in a post-pandemic new normal, Inter-American Development Bank, July 14, 2020

minimizing long-term operational costs. This includes sponge city concepts[3], the integration of solar technologies into buildings, decentralized sanitation concepts, and facilities that can adapt to public health or emergency situations. Cities should adopt strong measures to make buildings more sustainable and less resources intensive. Modern sustainable building concepts such as the use of proper insulation, natural low-carbon building materials, proper use of natural light, and the use of renewable energy should be the norm; they are not only better for the environment but also cost saving. Strict laws are needed to make the material foundation of cities more sustainable.[4]

The ongoing COVID-19 pandemic has led to a steep decline in public transport ridership (buses, rail). People are understandably uncomfortable with large crowds and confined spaces. Studies show that private car travel and non-motorized options (cycling, walking) are picking up the slack in mobility where needed, outside of cases where the travel is avoided altogether (e.g., tele-working or a simple decision not to make a leisure-related trip).

As economies re-open, and strive to re-open safely, there will once again be a need for people to move around their cities en masse. Avoiding motorized trips should be a high priority, and this can be accomplished through a variety of policy measures. Firstly, by establishing zoning and land-use planning guidelines that foster the gradual redesign of urban spaces, communities can incentivize the development of more livable neighborhoods that incorporate a variety of mixed uses (residential, work, education, shopping, health care, i.e., urban village concepts) within a relatively small area reachable by foot or bicycle. Such processes take time of course, but sowing the seeds now could make sense, given that many people are exploring and becoming more familiar with their hyper-local communities now that they are spending so much time at home. Secondly, governments can actively discourage private car travel by making driving less convenient. This could include increased road and parking pricing as well as the removal of parking spaces at the intended destination or banning private cars from certain sections of town.

Not all trips are short distance, however. There will always be a need for motorized trips of several kilometers or more, for example those that connect different parts of the city or the city to the hinterland. This is where public transport has traditionally played an important role, including shared mobility options of both the traditional and modern variety. Numerous benefits derive from the higher occupancy rates of transit and shared mobility systems - to the extent those rates can be achieved - ranging from reduced congestion, improved transportation equity, and lower energy use and carbon and air pollutant emissions. Scenario studies make clear that absent some significant amount of shared mobility, in whatever form, going forward, it will be challenging for many countries to meet their longer-term climate goals, as growing vehicle activity levels could overwhelm gains made from energy efficiency and switching to low-carbon fuels. The post COVID-19 recovery should therefore make every effort to reverse the recent trend in declining transit and shared mobility ridership. While much of this comes down to consumers' individual decisions, there are certainly actions that governments can take. As above, making private car travel less convenient can help influence consumer decision-making. Then, to provide alternatives, governments can use recovery packages to double-down on public transit quality, frequency, ubiquity, cleanliness, and safety. Essentially, vehicles and stations need to be made ultra-modern and impeccably cared for so that travelers can utilize them without concern. With increased frequency and by more closely integrating point-to-point ride-sharing options into what could ultimately become a quasi-public, quasi-private form of mobility, overcrowding of these mobility systems can be avoided.

In response to these challenges, what is being proposed is a combination of four interlocking strategies:

[3] Chris Zevenbergen, Dafang Fu and Assela Pathirana, *Sponge Cities, Emerging Approaches,* Journal Water, October 2018. (A **Sponge City** is a **city** that has the capacity to mainstream urban water management into the urban planning policies and designs.)
[4] World Economic Forum, 8 steps towards a sustainable economic recovery: How to build a bright new future for all, 29 June 2020, The World Economic Forum COVIS-19 Platform

- Re-design cities into connected *urban villages* based on three normative perspectives: space for sustainable living, working, mobility, and leisure[5]. This includes introducing zoning and land use planning guidelines that promote the development of urban villages that incorporate a variety of mixed uses (residential, work, leisure, etc.) to lower the need for travel.
- Re-define the material foundation of buildings to make them less resource and carbon intensive using bio-based traditional and modern low-carbon materials (including retrofitting to make them more energy efficient). And retrofit buildings to meet zero energy goals, a measure that not only addresses sustainable energy goals but also provides high labor benefits.
- Re-invent the design and use of infrastructure using modern technology to make it safer, more efficient, resilient, and flexible.
- Reverse the trend in declining public and shared transport to prevent replacement and/or increase of private vehicle use through measures that encourage public and shared mobility and discourage use of private vehicle traffic in cities with total avoidance in some parts of the cities.

2. Re-imagining Decentralized Services: Beyond Energy Systems

The COVID-19 lockdown and restriction in mobility and international trade revealed some of the vulnerabilities and weaknesses of centralized systems, including governance systems. It became evident that a multi-scalar governance system is necessary and more effective for meeting crisis situations and for managing the energy transition more equitably. The uncertainty of fossil fuel prices and disruptions in inter-continental energy trade has increased the importance of relying on local distributed solutions, such as decentralized, renewable-based energy services. The challenge posed to the renewable energy sector to fill in the gap likely to be created by a reduction in demand for fossil fuels is that most of the supplies of the products for one of the most important renewable energy solutions -solar panels - and some green technologies in general are dependent on a few suppliers and vulnerable to trade disruptions.

The creation of local value chains requires education and training of the local workforce on both technical and managerial skills. It also requires industrial development policies that foster the emergence of industrial ecosystems that promote renewable energy by setting national targets for renewable energy together with measures to attract private sector investment. Incubators can provide business development services, capacity building and technical and investment support for micro, small and medium local renewable and energy efficiency companies. It is of particular importance to involve women and youth in local renewable value chains through education, training and support to entrepreneurship to create jobs and generate income opportunities. The development of small and medium size industries should be a focus of stimulus/ recovery packages. These packages may include fiscal measures such as tax breaks, reduction of interest rates and restructuring of credit, guarantee funds and credit facilities for SMEs as well as enabling frameworks to increase private sector involvement in renewable energy, energy efficiency and energy access businesses.

The strengthening of the resilience of rural and local communities is important, including support for rural economies, such as agriculture, forestry, traditional manufacturing, and green tourism. Renewable energy communities offer the opportunity to utilize energy for productive uses such as irrigation, refrigeration and drying. Farmers no longer need to sell their vegetables and fruits at low prices immediately after harvesting but can achieve better prices for their processed and refrigerated products. Policies are also needed to support community-based business models. These may include development of legal frameworks that enable citizens to take part in renewable energy communities, capacity building and vocational training for the community, local authorities and community project developers, advisory services to communities, financial support

[5] Creutzig, et al, *Fair Street Space Allocation: Ethical Principles and Empirical Insights,* Transport Reviews, DOI: 10.1080/01441647.2020.1762795, 18 May 2020.

mechanisms such as soft loans, guarantee funds and investors matchmaking services and simplification of project permitting procedures.

Energy security and sustainable, resilient energy systems are indispensable and renewable energy offers competitive solutions in terms of economic development and job creation while also reducing emissions and fostering technology innovation. These innovations could include more decentralized solutions in the supply mix. Such options could be examined in the context not only of enhancing energy independence but also for their contribution to economic recovery and job creation. COVID-19 has revealed some important weaknesses as was the case for example in the significantly strained healthcare infrastructure and a number of healthcare facilities in developing countries which do not have reliable electricity supply and other requirements. Distributed renewable energy can offer cost-effective and rapidly deployable modular solutions. Electrification plans should give priority to health facilities and other essential energy services using distributed energy solutions.

Energy efficiency needs to be at the center: There is a major concern that the effects in the economy and possible long-term recessions might tighten public expenditures in climate-friendly solutions and clean energy investments in general in different countries around the globe. If economic downtime persists after the lockdown period, energy prices will continue to be lower than forecasted. This reduction in final energy prices may put policies for clean energy and for improving energy efficiency and its role in achieving SDG7 at risk. Energy efficiency offers multiple benefits including job creation, increased industrial productivity and self-sufficiency, reduction of impacts of volatile energy prices, poverty alleviation, and energy security. Energy efficiency policies with significant impact include minimum energy performance standards for new buildings and buildings that undergo renovation, minimum standards for vehicle efficiency, efficiency standards for clean cooking solutions, industrial energy management systems and energy systems optimization in industry, standards and labelling for appliances, efficiency standards for power generation and cogeneration as well as resource efficiency approaches covering energy, water, materials and management of waste streams. Energy efficiency policies should also be linked to energy access policies to enable the best use of available energy and financial resources.
In response to these challenges and opportunities, what is being proposed is a combination of four interlocking strategies:

- Develop local value chains for renewable energy and energy efficiency technologies to create jobs, support economic recovery and invest heavily in innovation and technology by creating an enabling environment for this to thrive (create local capacities of local actors for production, installation, operation, and technology maintenance).
- Develop special recovery packages for small and medium enterprises providing decentralized energy services in developing countries (energy SMEs) as well as enabling frameworks to increase social innovation and private sector involvement in these decentralized renewable energy businesses.
- Strengthen the resilience of rural and local communities by supporting the development of community-based governance and business models and finance schemes, in particular smaller projects that generate wider community benefits with impact on economic equity, resilience, inclusivity, and strengthening energy-health nexus
- Assign top priority to energy efficiency in policy making, planning and investment in stimulus and recovery packages as a way to substantially contribute to economic recovery, emissions reduction, as well as resource conservation.

3. Re-imagining Energy Consumption: Responsibility and Sustainability

Due to the global lockdown and restriction measures for containing COVID-19, mobility and travelling has been reduced to an unprecedented level. During the lockdown, road transport fell between 50% and 75% compared to the corresponding period in 2019 in many regions, with global average road transport dropping by 50%.

Not to mention the effects on global travel affecting severely the tourism and other travel but which have revealed opportunities for more sustainable practices. Educational institutions have reached a record number of their courses being delivered online. Offices and non-customer businesses have implemented work-from-home policies increasingly, improving their ability to maintain efficiency and productivity in this mode of operation. Conferences and workshops with fairly large number of participants have shifted to the use of online platforms across the globe. The widespread efforts on financial inclusion and e-banking, e-finance transactions have facilitated e-commerce at an unprecedented level. These lifestyle and behavioral changes have caused a significant reduction in energy consumption. A large share of the demand reduction is linked to an overall decrease in economic activity with the long-term impacts still to be seen.

The key learning that COVID-19 has provided us is that businesses and people can be adept to change. However, well-designed policies are needed to move from the current temporary-fix solutions to more customized and efficient solutions for the longer-term sustainability of consumption.

The access to modern energy services is important during and after the COVID-19 pandemic to minimize inequalities in the way population groups are impacted by COVID-19 and related containment measures. Access to electricity is crucial for having access to information, option for social interaction, remote working, home-schooling, and operating of health facilities. Access to digital technologies that rely on electricity are needed for remote working and home-schooling, for example.

The long-term effect of the pandemic on energy demand may not be as positive as the short run. The way businesses and offices will function after the pandemic, with possible increased in digitalization and remote working will possibly lead to lower commuting and business travels. The international tourism, travelling, and trade as mentioned above may experience a longer recession compared to other sectors. This may trigger new structural shifts in the economy and rethinking of some activities and services with implications for the energy sector. This can create an opportunity for some cities for reshaping the spaces and extending the bike lanes and more pedestrian zones. But these would need to be encouraged. Governments should promote campaigns that address behavior and consumption patterns. A coordinated approach to sustainable consumption between different policy areas is necessary, ranging from research, innovation, energy and industrial policies to education, health, welfare and trade, to allow consumers to adopt more sustainable lifestyles and make products and materials longer-lasting and less environmentally damaging. Sustainable consumption measures should engage product manufacturers, retailers, public authorities, and consumers and pay greater attention to low-income households, in order to make sustainable products and services affordable to all, reduce poverty and improve equity.

Policies to achieve sustainable consumption include awareness raising campaigns and education to influence attitudes and practices, fair and green public procurement, circular economy approaches that lead to a better use of materials and reduce waste and emissions, minimum performance standards and labelling for products and taxation. Product manufacturers and retailers should be engaged to green upstream supply chains and reduce downstream impact of products, for instance through public-private partnerships and industry standards.

The sharing economy can promote sustainable consumption while shifting consumer choices from ownership to demand-fulfilment. However, it requires improved governance between public authorities, entrepreneurs, owners and users to make sure that the most pro-social and environmentally compatible business models are implemented as well as adapted regulatory frameworks to address social and other shortcomings.

To address these concerns, what is being proposed is a combination of three interlocking strategies:

- Enhance the regulation and develop the potential for a sharing economy for reducing demand for materials and increasing the efficiency of the system for the energy system transformation in general (e.g. through

shared mobility, shared office spaces, etc.) and implementing regulatory frameworks that enhance opportunities and reduce social and other risks.

- Advance digitalization of the economy supported by entrepreneurial initiatives to reduce material intensity of demand for services and energy. This should be done through policies that examine not only the impact of digitalization as an enabler of new and more sustainable business models, but also the potential socio-economic impacts of digital technologies to ensure that equity is not compromised.
- Transform the concept of consumption to one based on responsible, sustainable and sufficient demand for services facilitated or enhanced by new available technologies, and stimulated by policies that encourage behavior and life style changes leading to a lower resource demand, a new concept of "sufficient consumption" that would be characterized by high efficiency of resource use, digital convergence, and increasing importance of the sharing economy.

4. Re-emphasizing equity and justice in energy transitions

Addressing prevailing vulnerabilities and inequities that have been exacerbated by the Covid-19 pandemic is imperative for building resilience and overcoming long-standing gaps in existing policies and efforts towards equitable and just energy transitions. The COVID-19 crisis has revealed the weakness, and in some cases the absence, of safety nets for the less privileged. Work from home has a very different meaning for the poor who have lost their livelihood, trapped in debt and unable to pay these debts, lack of reliable internet or ability to pay for it affecting and exacerbating an already deepening divide among youth/children who are unable to participate in the new digital COVID-19 phase.
An explicit focus on equity and justice in immediate recovery efforts and medium and longer-term transition policies is essential to reduce growing disparities and inequities, increase resilience of disadvantaged and vulnerable groups, and give them a voice in energy and climate governance. The message is that socio-economic aspects may prove as important as the technology-oriented solutions of the energy transition and on how society embraces, encourages, and supports transition to low-carbon. Efforts to do so need to build on existing policies and development objectives but accelerate efforts and be more flexible to respond to emerging challenges.

The Covid-19 pandemic has caused an unprecedented reduction in economic activity and unforeseen unemployment, affecting the poor and vulnerable sections of society disproportionately. Emergency response measures to the pandemic have also affected unemployed youth, women, the elderly, informal/insecure labor, and migrant labor significantly, deepening existing inequalities. As several nations consider recovery measures and stimulus packages now, there is an opportunity to redress these inequities, but this requires analyzing and assessing the distributional implications of such measures. Recognizing how these plans and measures differentially impact disparate segments of society and designing these to ensure a fair and equitable energy transition can help create new jobs and new economic activities and greater job and income security for vulnerable populations in the future. An explicit focus on fairness is required in all policies, plans and initiatives.

This means, assistance efforts and measures need to be targeted towards those most at risk and that have experienced the worst of the economic fallout of the crises. These also implies that more effort is needed to integrate gender concerns in energy transition policies, both by involving women in the design and implementation of these, but also ensuring that they benefit equally by them. Improved labor standards and expanded and inclusive social safety nets and security, as well as public employment programs specifically in sectors with higher unemployment rates and with large concentrations of low-income workers can also work to reduce inequities.

Populations living in slums and low-income housing and those without permanent or with inadequate, poor quality shelter have been particularly impacted by the ongoing pandemic and are at higher risk of contracting the virus. Access to adequate shelter, and a comfortable and clean indoor environment are goals that

governments have been pursuing in the past too. Recovery and stimulus packages provide additional opportunity to accelerate these efforts. In the short-term, measures that provide rental assistance and eviction prevention assistance, a moratorium on evictions and foreclosures, and emergency funds for the homeless may be needed. Stimulus packages and longer-term efforts, however, need to target the provision of affordable housing infrastructure. New construction and refurbishment projects that aim to provide affordable and low-carbon housing infrastructure can also provide jobs and employment. Prioritizing policies and efforts to help those with limited resources, low-incomes and that are more vulnerable to shocks, is needed.

Emerging evidence that exposure to air pollution increases vulnerability to experiencing the most severe Covid-19 outcomes[6] adds to the urgency to provide access to clean cooking and heating in homes. While some nations, e.g. Spain, have put in place unemployment benefits and social measures to help low-income families pay their utility bills, early evidence shows these have not always been adequate to avoid defaults and consequently fuel and energy poverty. In low and middle-income nations, policies and programs to provide universal access to clean cooking and heating have been impacted by the crisis as well. Leveraging social assistance mechanisms to help poor families afford clean cooking and heating services and thermal comfort in the home can drive efforts towards enhancing universal access and achieving SDG 7 (SEforALL 2019 energy safety nets). An intersectional approach to recovery plans can accelerate access to clean cooking, heating and thermal comfort in homes and reap additional benefits for health and equity[7].

To address these equity and justice issues, what is being proposed is a combination of four interlocking strategies:

- Explicitly consider and assess the distributional implications of proposed stimulus/recovery efforts and energy transition policies to understand their impacts on different population groups and stakeholders to promote an inclusive and equitable process of recovery.
- Accelerate access to modern and renewable energy for essential community services and commodities especially in remote rural regions and among the poorest communities to enhance their resilience; and develop policies and measures to support long term finance for rural enterprises.
- Accelerate access to electrical and digital technologies and services for disadvantaged communities to make work and education from home more of a possibility.
- Improve access to decent living space, sustainable housing, and shelter and access to clean cooking and heating for low-income groups to avoid in-door pollution which is seriously exacerbating health inequalities.

[6] Harvard.EDU Covid-19 PM 2.5 A national study on long-term exposure to air pollution and COVID-19 mortality in the United states

[7] S Batchelor & E Brown (2020) Cooking Health Energy Environment and Gender (CHEEG) - guiding Covid recovery plans. Working Paper 19/June/2020 V1.1 . (https://mecs.org.uk/wp-content/uploads/2020/07/CHEEG-Covid-recovery-strategies-Final.pdf).

Participants of the online consultations

- Chair: **Hans Olav Ibrekk** – Policy Director Section for Energy and Climate, Norwegian Ministry of Foreign Affairs; Co-Facilitator, Technical Advisory Group, SDG 7
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