

Report on First Consultative Science Platform

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

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This background note has received only limited review. Views or opinions expressed herein do not necessarily represent those of IIASA, ISC or other organizations supporting the work.

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Agenda

Context for consultation: The global lockdown due to COVID-19 has reduced industrial activities, construction, tourism, material demand, and mobility. This has impacted many sectors of the global economy including the energy sector which has witnessed movements both towards and away from sustainability. Key trends observed include a reduced demand for both energy and energy services, zero to negative oil prices, disruptions in the supply chain of energy technologies and materials – specially for renewable energy, and a decline in investments. This has led to welcome limited reductions in greenhouse gas emissions and air pollution, revealed opportunities for new and digitalized business models and responsible lifestyle choices, but all these will be short lived if we go back to business as usual.

As the world looks to recover from the economic and jobs related consequences of the pandemic, *all* stakeholders have a responsibility to ensure that we create a system of incentives to reward sustainable behavior while penalizing those actions that would take us back to the path of unsustainability. For the energy sector, this would translate not only to the choices that influence the supply of energy, including evaluating the balance of centralized and decentralized energy options, but also the choices that would impact the demand for energy itself! Re-examining these business models from the point of view of contributions to economic growth and jobs, while building on heightened awareness and a desire for green growth is the imperative.

The purpose of this consultation, with a gathering of some of the best experts in the field of energy, is to seek, explore and propose bold measures for policy and decision makers to ensure that we recover in a more sustainable manner, building on hard-earned insights into transformative change potential and opportunities for alternative development pathways from the COVID-19 responses. The following overarching questions would be the initial guides for the discussion and on which the participants can expand:

- How should COVID-19 and related recovery packages be directed to create the maximum impact on the transition to sustainable and resilient energy systems?
- How can a decarbonized, decentralized, and digitalized energy and related systems make our society more resilient?

Welcome of distinguished experts and introduction to consultation		
14:00-14:05	Welcome & opening remarks on IIASA-ISC Initiative	Leena Srivastava (IIASA)
14:05-14:08	Introduction and Objectives	Hans Olav Ibrekk
14:08-14:12	Presentation of the IIASA/ISC thematic team	Luis Gomez Echeverri (IIASA)
14:12-14:20	Overview of Background Paper	Luis Gomez Echeverri
Expert Discussion - Part 1: Impacts of COVID-19 and the transition to a more sustainable energy system – How can we build on the opportunities		
14:20-15:00	Tour de Table: Experts are invited to quickly introduce themselves (name and Institution) and highlight 1-2 key features of the energy system which were revealed by the COVID-19 and global lockdown and on which opportunities exist to build a more sustainable energy system	
15:00-15:30	Discussion and reflection of views expressed by the experts	
15:30-15:40	Virtual comfort break	
15:40-16:30	Break-out Groups The experts will be split into 2 breakout groups to discuss scientifically feasible: <ul style="list-style-type: none"> A. Transformations to reliable and affordable sustainable energy supply systems/energy services B. Transformations in energy demand – reduction and management with a view to prioritizing 1 – 2 key interventions/ systemic changes each that could lead to short term (1-2 years) and medium term (10 years) transformative changes	<ul style="list-style-type: none"> A. Moderator: David Victor (University of California, San Diego) Rapporteurs: Katsia Paulavets, Leonardo Barreto-Gomez (AEA) B. Moderator: Diana Urge-Vorsatz (Central European University, Hungary) Rapporteurs: Behnam Zakeri, Rana Ghoneim (UNIDO)
Expert Discussion - Part 2: Plenary discussion		Hans Olav Ibrekk
16:30-17:00	The moderators & rapporteurs of each group will provide a summary of the discussions, the main questions and proposals raised as a way forward. The discussion will focus on trying to identify 3 or 4 key proposals and questions on which the 2 future consultations could expand and develop proposals of new pathways toward a more sustainable energy system that would balance reliable energy supply with affordability and accessibility.	<ul style="list-style-type: none"> A. Moderator: David Victor Rapporteurs: Katsia Paulavets, Leonardo Barreto-Gomez B. Moderator: Diana Urge-Vorsatz Rapporteurs: Behnam Zakeri, Rana Ghoneim
17:00-17:15	Conclusions and recommended next steps	Hans Olav Ibrekk, Flavia Schlegel (ISC), Leena Srivastava

Report of the first Sustainable Energy Theme consultation

Impacts of COVID-19 on the energy systems and opportunities it provides

The global lockdown due to COVID-19 has affected most sectors of the global economy and the energy sector is not an exception. A reduced demand for both energy and energy services, zero to negative oil prices, disruptions in the supply chain of energy technologies and materials – specially for renewable energy, and a decline in investments are among key developments that took place in the energy sector in the last few months. This has led to limited reductions in greenhouse gas emissions and air pollution, revealed opportunities for new and digitalized business models and responsible lifestyle choices, but all these will be short-lived if we go back to business as usual.

Recovery packages in response to the economic recession caused by the COVID-19 crisis should include policies, measures and initiatives that steer a profound transformation of the global energy system towards a cleaner, affordable and more resilient path, while boosting employment and economic prosperity. Measures should also address the vulnerabilities of the global energy system exposed and aggravated by the crisis, while alleviating economic recession. Designing and implementing those measures requires a careful interplay between science, technology, policy and business.

Renewables together with energy efficiency combined with digitalisation can be at the centre of a green recovery strategy in end-use energy sectors such as buildings, mobility and industry. Energy efficiency and renewable energy offer competitive solutions in terms of economic development and job creation while also reducing emissions and progressing towards SDGs implementation.

Opportunities in the buildings sector

The impact of the COVID-19 crisis on energy demand has been substantial. In the long run, demand for energy in buildings will increase, due to growing use of air conditioning and household appliances. This trend could be intensified by a potential shift to working from home. These developments provide an opportunity to introduce energy efficiency and renewables in the buildings sector, through Minimum Energy Performance Standards (MEPS) and accompanying measures, such as awareness raising of different stakeholders and training of the workforce. Besides reducing energy bills, energy efficient renovation of existing buildings and efficient new buildings offer a great potential for job creation (local construction jobs, manufacturing jobs due to increased demand for building materials and equipment).

Opportunities in the transport sector

During the pandemic, mobility has been substantially constrained due to the lockdown. The crisis brought a substantial reduction in private cars use at the global level and some positive changes such as an increased use of bicycles and expansion of bike lanes. The reduction was not long lasting. As the lockdowns have eased, the use of private cars is increasing again and will continue to do so, at least in the short-term, as people seek to minimise the risk of contagion. Given the inefficiency and the negative externalities for health, environment, productivity and welfare of this mode of transport, many governments are supporting the public transport sector to ensure the continuity of its services. Innovative multi-modal mobility services and e-mobility provides an opportunity to transform passenger transport while also improving its resilience and sustainability. For instance, e-mobility has significant potential to solve a number of environmental issues and decarbonise the sector. However, lack of charging infrastructure, long charging times, high costs as well as lack of integration into electricity grids, among other factors, have hindered progress. Advancing electrification of the transport sector will require policies that stimulate investments in e-mobility vehicles and infrastructure as well as the implementation of innovative business models such as smartphone-based transportation network companies. In this context, regulations and/or funding for e-mobility solutions targeted to low-income drivers would be a green, pro-justice alternative that could leverage the private sector in useful ways.

Opportunities in industry

Energy demand in the industrial sector declined substantially during the pandemic. Manufacturing industries stopped production and small and medium size enterprises (SMEs) are the most affected. Energy efficiency offers a great opportunity for cost reduction. There is a particular need to support capacity building for energy efficiency in SMEs, which are job engines in many economies. Industrial energy efficiency can be crucial in the public infrastructure investment packages used to rebuild national economies after the COVID-19 crisis.

Opportunities provided by digitalisation

The crisis forced people to work remotely, when possible, and accelerated the introduction of digital solutions, for instance online shopping. A more widespread use of working from home would lead to a decrease in demand for mobility, related emissions, and congestion in cities. Working from home would also have implications for demand in other sectors. However, in many developing and developed countries many jobs cannot be done from home and even if they could, there is no appropriate infrastructure to enable people working from home. To develop these possibilities, public policies together with changes in the organizational culture towards remote working are needed.

Digital technologies and innovation are forming new economies as well as creating new platforms for connectivity and collaboration. Digitalisation can increase energy efficiency and better integrate renewable energy into the energy system as well as enable new business models. But to become inclusive and reliable, digital economy needs to be adequately supported by entrepreneurial initiatives and human capacities. Public and private sector efforts are needed to include specific population segments in the expansion of the digital

economy, including women, youth, refugees, micro-, small- and medium-sized enterprises, and rural inhabitants. The science-policy dialogue can help identifying the key constraints hindering the development of an inclusive digital economy, while helping setting the right priorities for public and private sector stakeholders. Digitalisation has also significant implications on the education sector and is changing the ways knowledge is transferred. However, the existing digital divide can create another layer of inequality. Closing this divide is therefore key to ensure that individuals from all social backgrounds are granted access to information, advance their education and increase their employability. Providing access to business ideas and innovation will enhance countries' capabilities to adsorb energy efficiency and low-carbon technologies.

Opportunities provided by citizens engagement and a sharing economy

Recovery packages should aim to make communities, business and economies more resilient under the overarching objective of protecting livelihoods. With their collective power to demand and effect change, citizens, local communities and authorities should be at the centre of the energy transition. An important aspect are ways to influence the technologies by understanding where the consumers are willing to spend their money in during the coming months and years. In this context, we should focus on the sectors where the money will be spent by consumers and not only the government. It will be important to encourage consumer spending towards more energy efficient technologies and sustainable, low-carbon consumption patterns in addition to encouraging green procurement and investments in green infrastructure and technologies by national, regional and local governments.

The sharing economy – with shared mobility services, workspaces, online delivery systems, and sharing of demand-side energy technologies - can empower citizens and local communities as prosumers to participate in energy and mobility markets. Empowering citizens and local communities as prosumers not only helps to speed up the transition towards clean energy systems but also generates benefits for the communities themselves. In its turn, empowering local and regional authorities helps overcoming shortcomings and delays in the implementation of clean energy policies and programmes at the national level. Regions, cities and towns can act in a more agile manner if they are given the autonomy to make decisions, to determine the use of financial resources and build the necessary capacity. Communities that are able to produce, share, sell and store renewable energy can play a significant role in the development of a decentralised, digitalised and decarbonised energy system but this requires substantial cooperation between local authorities and communities.

Ensuring a fair and equitable energy transition

A transition towards a more sustainable energy system cannot be achieved without social justice. Without it, the political and public support for the transition can be eroded. In this respect, identifying ways of reducing energy poverty and increasing access to affordable and clean energy services is essential. Given that the pandemic has affected very differently various segments of the societies, it is important to provide differentiated policy recommendations and pay careful attention to the needs of the most vulnerable communities. The provision of energy safety nets for the poor and vulnerable population and energy service providers at risk of bankruptcy will also be important. Identifying measures that would help oil, coal or gas-exporting countries to

reduce the macroeconomic impact of revenue losses and steer long-term transformation towards more sustainable economic activities will be critical. Retraining people working in incumbent industries that are at risk of losing their jobs should be one of the key priorities.

Critical role of science and international collaboration

Science has a major role to play in understanding the differentiated effects of the pandemic on energy systems and social behaviour and informing policy makers about the measures that can lead the energy system towards a sustainable path in the long run. Science can also guide decision makers as to *what not to do* and *where not to invest*. That is, which policies and investments are not conducive to the effective achievement of multiple economic, energy, sustainability, and climate-change goals. Promoting international cooperation in science, science-policy dialogue and knowledge transfer is necessary to materialize the potential of energy transition. Knowledge transfer can support the strengthening of the clean technology adsorption capacity in developing countries and emerging economies and can be conducted among others through digital platforms.

International cooperation based on multi-stakeholder and transdisciplinary approaches is necessary to understand the short-term and long-term impacts of the pandemic and the transformational impact of measures in terms of economic growth, poverty alleviation and job creation, leverage of private investments, climate change and environmental benefits, and speed of delivery. International cooperation would lead to synergistic gains and a more cost-effective and quicker recovery.

Understanding interactions, synergies and trade-offs among policy objectives is essential. Positive opportunities brought by the COVID-19 crisis, contributing to the transition towards sustainable energy systems, as well as negative impacts should be identified, carefully scrutinized and lessons drawn. The resulting insights should find their way into policy design and implementation. Experience and good-practice exchange through international collaboration enables valuable cross-learning, rebuilds trust and facilitates joint initiatives.

Suggestions for IIASA-ISC priority actions

Given the IIASA-ISC project is in a very crowded space, there was a common agreement that its output needs to be distinctive, very focused and accurate, with a strong emphasis on How rather than on What. Identifying clear recommendations on how to fast-forward energy transitions from the short-term to the longer-term should be the primary goal of the IIASA-ISC energy initiative. Recognising the advanced systems analysis and interdisciplinary capacities of involved institutions, the group of experts put forward the following suggestions for priority actions:

- Reflecting on where we want to be and articulating what the endpoints might look like and, with modelling support, proposing measures that could help to reach multiple economic, environmental and social goals. Scrutinizing the transformative potential of the stimulus packages will be necessary, including through the lens of justice and inclusiveness: Where should the energy system be once the stimulus recovery packages end? How do we achieve a fair and equitable transition and enable access to affordable clean energy services? Articulating how short-term recovery actions could trigger long-term energy transformations could also be a

valuable contribution. Political economy considerations will be key to ensuring the implementation of policies that achieve a transition to a low-carbon, affordable and climate resilient energy system.

- Identifying mechanisms for unleashing private investment in energy transition. Although investments in clean energy have been relatively resilient during the crisis, they are still affected by supply and demand shocks and the general economic recession. Investments will remain well below the levels that are required for the sustainable energy transition, if policy packages do not provide a change of direction. Therefore, increasing the role of private sector in the recovery is essential to reach the large levels of investments that the clean energy transition requires. Recovery packages need to leverage private investments and promote public-private partnerships, by lowering risk associated with private sector investment. Policy signals should be given to stimulate a reallocation of investments towards clean energy projects and a solid bankable project pipeline for energy efficiency and renewable energy investments needs to be built. Science can play a role in guiding decision makers as to what not to do and where not to invest.
- Understanding behavioural changes and consumer choices and feeding the resulting insights into energy policies and measures. Behavioural science has a very important role to play in understanding the behaviour of energy consumers, their motivations, biases and choices. It can also support the design of policies and measures to guide consumers to make lifestyle changes towards more energy and resource efficient and low-carbon consumption patterns.
- Identifying concrete actions for international collaboration in the field of energy. While the importance of international collaboration is generally recognized, international cooperation at the institutional level is currently eroding. Therefore, it is important to identify concrete actions for international cooperation in the domain of energy. For instance, it could be cooperation in science – e.g. hydrogen project or digitalization; or provision of sustainable energy to refugees' camps, etc. It could also be the setting up of a science-industry-policy dialogue on sustainable recovery in the energy sector. Concrete initiatives seeking to increase international cooperation would help rebuilding trust and foster experience exchange across countries and regions as well as encourage the development of joint approaches to tackle common problems.

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