



**G20 Energy Transitions Working
Group Issue Note**



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Introduction

‘Energy’ emerged as a relevant G20 topic in the immediate aftermath of the 2008 global crisis that gave the group the prominence it has today. In different shapes and forms, and with varying perspectives, each G20 presidency has since kept ‘Energy’ high in the agenda.

Energy security has been a constant source of concern around the world long before G20 summits, and for legitimate reasons: when an event disrupts the availability of energy in a given country or region, the domino effect throughout the economy is nearly immediate and the ensuing crisis may generate political instability, stoke inflation, aggravate poverty, trigger outbreaks of violence and even war. Even with no specific disruptive event, many countries, especially developing ones, struggle to guarantee both energy security and energy access to their populations.

Notwithstanding the fact that energy security remains a challenge, climate change has brought about a new reality, and a sense of urgency that cannot be overstated. To avoid the direst consequences to life on the planet, we must transform at speed the way in which we produce and use energy, as energy is by far the major global contributor to climate change.

Today the urgent need for a global transition to low-carbon energy is beyond question. To meet our collective goal of the Paris Agreement to keep warming well below 2 degrees C, while pursuing efforts to limit warming to 1.5 degrees C, the energy transition must increase in pace and scale. G20 countries, as major producers and consumers of energy in the world, share a significant responsibility in this regard and for over the last years, G20 countries have been working together to address this challenge through the Energy Transitions Working Group (ETWG). During its G20 presidency, Brazil will be no less committed than previous presidencies in trying to bring about a collective sense of



direction to our endeavor towards a transition that is feasible, sustainable and works for all.

Under Brazil's presidency, we propose to dive deep into the meaning and effective implementation of a **just and inclusive** energy transition and into the role of G20 countries in providing international support to ensure that this process is a tool to fight current inequalities. This is no simple task. It will require a more in-depth assessment of the main constraints to pursuing the energy transition. There are numerous technological avenues to cleaner energy, and there is no one-size-fits-all pathway. Electrification may be a solution for several sectors and regions in the near future but for others not quite so. Low- emission hydrogen is a new frontier whose advances surprise us daily, but its widespread use remains a promise. Wind-powered and methanol cargo ships are in their early days but offer a glimpse of the future in a hard-to-abate sector. Biofuels have proven to be a formidable solution despite its limited application globally, but their wider use in sectors like aviation can offer a sustainable future for transport. The list is long. We understand that the energy transition comes in many shapes and forms – that is why we use the plural form to refer to it in this Working Group.

No matter how hard we try to identify the most adequate and less expensive options for decarbonizing energy production and consumption across the globe, energy transition will always come at a cost – which will be all the more challenging for developing countries. This is why a priority of the incoming Brazilian presidency is **Accelerating Financing for the Energy Transitions**. Financing tools as currently structured have not prioritized those who need resources most, despite amounting to most of humankind and of being further away from technological innovation. It is important to map out existing and new sources of financing, as well as a means to expand rapidly and fairly the access of poorer nations to financial and human resources to make their energy transitions viable.

Another priority is the **Social Dimension of Energy Transitions**. A just and inclusive transition goes certainly beyond the necessary retraining of workforce made redundant by the phasing down and phasing out of some industries. It is also about a large majority of countries having to adapt their path to development and energy access in new, more challenging circumstances where emissions are no longer an option. It is about ensuring



a fair share of opportunities for developing countries in this emerging low-carbon economy. A just and inclusive transition needs to be in line with Sustainable Development Goal 7 (‘Ensure access to affordable, reliable, sustainable and modern energy for all’) and consider pros and cons of transition options as well as how unevenly they impact local communities, women and ethnic groups.

Another of Brazil’s priorities is to discuss the **Innovative Perspectives on Sustainable Fuels**. Here we will invite countries to identify bottlenecks in their adoption and try to find solutions and recommendations to speed up their coming of age. This involves recognizing the different realities of different parts of the world, and where each new technology may work best. Among the issues to be addressed are also market design and the criteria to properly assess the lifecycle of fuels and their actual emissions.

1 - Accelerating Financing for Energy Transitions, especially in Emerging Markets and Developing Economies

I. Why is it important?

There is a high degree of consensus that one of the main challenges for global energy transitions is to accelerate the deployment of clean energy, especially in emerging markets and developing economies (EMDEs). The pace of this multidecade transition will be different from country to country. But it is clear that there is no just, inclusive or affordable global energy transition without an enhanced financial availability to promote sustainable development for EMDEs. The International Energy Agency (IEA) considers that a crucial open question is how quickly clean energy investment can be scaled up in emerging and developing economies, where supportive strategies and policies will need to be accompanied by improved access to financeⁱ.

International organizations estimated that USD 150 billion were invested in 2020 in clean energy in EMDEs. In their view, this figure should be seven times higher by the end of the decade to put the world on track to reach net-zero emissions by 2050ⁱⁱ. Most probably, a large part of these resources will need to be private, but public funds and international concessional resources are necessary to catalyze the scaling up of financing energy



transitions in EMDEs, where the cost of capital can be several times higher than in advanced economiesⁱⁱⁱ.

The importance of this matter and the gap between needs and realities on the ground have been a constant subject of discussions and decisions by the Energy Transitions Working Group (ETWG) since its creation in 2013. During the Brazilian presidency of the G20, the focus will be on delivering actionable roadmaps for an accelerated deployment of financing tools for EMDEs. This is not intended to diminish the importance of fulfilling the decarbonization in the energy mix of advanced economies, bearing in mind the common but differentiated responsibilities in climate change, but rather to focus the discussion on what has been widely recognized as the biggest challenge for the current and future deployment of clean energy on the ground.

The 2023 G20 Leaders Declaration stressed as a top priority the implementation of “clean, sustainable, just, affordable and inclusive energy transitions”. To achieve this goal, leaders agreed that “recognizing that developing countries need to be supported in their transitions to low carbon emissions, we will work towards facilitating low-cost financing for them”. Following up on this commitment, the Brazilian presidency proposal is to respond to that call and promote strategies and actions to accelerate the financing of energy transitions in EMDEs.

II. Principles for action:

Energy transition pathways must consider the disproportionately high costs of finance for EMDEs, especially to low-income countries. G20 members and their partners should also consider the excessively high costs of an ‘unjust’ or disorderly energy transition for developing countries, which would risk perpetuating inequalities. Consequently, the modalities and terms of financing mechanisms should support mitigation efforts in a just and inclusive manner without undermining countries’ sustainable development needs and be in accordance with their respective capabilities.

To assure long-term sustainability of clean energy projects, financing in EMDEs should be accompanied by technology transfer and capacity building. In particular, solid public energy planning and policy institutional capacities and expertise is critical for addressing



consistently the energy transition challenge and foster a favorable environment for increasing a strong portfolio and accelerating financing.

Coordination between private, public and international financial institutions and national and regional level energy planning authorities is imperative to assure not only a lower cost of capital, but also adequate returns for investors and, whenever possible, little dependency on subsidies. Enabling policies should be part of a broader package of reforms, including dealing with significant debt burdens of some developing countries. For debt-stressed countries, it is also important to reduce reliance on debt instruments – loans and securities – to finance energy transition projects.^{iv}

Bearing in mind the specific situation of EMDEs, there is also a need to recognize the potential of sustainable financial products such as green bonds to increase access to low-cost resources. By responsibly promoting EMDEs issuance of green or sustainability bonds to finance their energy transitions, G20 members should discuss in more detail tools and enabling frameworks that reduce currency risks for EMDEs and international investors alike^v.

III. The main tasks at hand

Even though, over the past decade, several international initiatives and multilateral discussions were held under the ETWG umbrella on the urgency and importance of financing the energy transitions in EMDEs, the challenge remains essential and timely. The main tasks are to:

- Lower the cost of capital for clean energy projects in EMDEs, including de-risking and risk-sharing tools and policies
- Reduce the barriers for private investment
- Make more public investment and concessional resources available to act as catalyzers for deployment
- Improve governance and transparency in international concessional financing
- Promote coordination between development finance institutions
- Build institutional capacity on energy planning at national and regional level.



IV. Expected outcomes:

Cooperation at global level is crucial to financing the energy transition in EMDEs. Developed countries should fulfil their commitments to provide financial assistance and technical cooperation to the developing world. G20 members can also work to reduce technological barriers and assure markets for clean energy goods and services remain open and free. G20 members have a daunting challenge to increase cooperation and mutual trust while fragmentation forces and geopolitical instability are on the rise.

In this context, Brazil is proposing three main actionable goals for its ETWG presidency actions on financing (A, B and C), as well as four additional critical initiatives (D, E, F and G). The three main goals are:

- A. Establishment of a **Center for Policy Advice and Analysis on Clean Energy Investment and Finance for EMDEs**. In partnership with relevant international institutions, the Center would bring together data analysis, updated information and best practices on public and private financing of clean energy in EMDEs, aiming at closing the gap between them and the advanced economies. Mapping the investment flows will help identify barriers and solutions that can be adapted to different national and regional priorities. It can also constitute a reliable source of information and partnership for private investors and international institutions working to make clean energy a reality in EMDEs.

- B. Creation of a **Global Coalition for Energy Planning**, bringing together national and international institutions to promote cooperation and capacity building for EMDEs, with a special focus on low-income countries and regions. Partnering with national energy planning authorities^{vi}, and global and regional economic organizations^{vii}, the Coalition work would be focused on providing capacity building for civil servants in EMDEs on energy planning best practices aiming at the development of long-term energy transition policies according to their circumstances and needs. The Coalition would also help expand existing national economic planning support programs, by bringing additional energy transition expertise into them.



C. Commitment to a **Financing the Energy Transitions in EMDEs pledge**. Brazil believes the G20 is in a position to foster a global pledge for multiplying the financial resources destined to clean energy projects and technologies deployed in EMDEs in line with the global climate-change commitments. A special session of the ETWG would be convened to establish the appropriate data-based pledge, with support of partner institutions.

High-level event:

- A **High Level Meeting on de-risking investments in EMEDs Clean Energy Financing**. Emerging market green bonds are a growing and important source of financing for climate action. However, they are exposed to a number of risks. One of those is Currency risk, which can make it difficult for investors to assess the actual risks and returns of emerging market green bonds, and it can also deter investors from investing in these bonds. The high-level event would bring together experts from government, academia, and the private sector to share their perspectives and to discuss innovative approaches that can be used to mitigate currency risk and develop recommendations considering a range of factors, including lowering the burden for governments, engaging the private sector, and discussing a role for multilateral institutions. The workshop could be followed by a pilot project in a Latin American and Caribbean country with regional partners.

Finally, it is worth noting that financing the energy transition in EMDEs is critical for a number of other reasons not listed here. It is essential to address climate change, achieve global sustainable development goals, and build more resilient and equitable economies. It is a critical investment in the future. G20 members should be committed to achieving this goal.

2. Social Dimension of the energy transition

I. Why is it important?



Inequalities can persist in low-carbon energy systems, which may not be any more inclusive than conventional systems. When it comes to planning energy transitions, policy makers have to consider not only aspects related to lowering emissions from the energy sector, but also the economic and social opportunities that this process might create, such as quality of life improvements, job creation, education, and training. A people-centric vision is urgent to matters regarding energy transition, as technical-focused debates in large-scale processes, such as the G20 working groups, have considerable social impacts. As business-as-usual approaches are proven^{viii} not to be enough, the Brazilian G20 presidency aims to promote broad-based discussions that cover the social dimension of energy transition related to supply, demand, policies and financing.

EMDEs face immense challenges: besides the increasing energy demand that will be necessary to promote social and economic development and ensure universal access to energy, including industrialization/reindustrialization, they will be the ones to suffer the most with the effects of climate change. The G20 community must embrace a definition of just and inclusive energy transition that goes beyond what has so far been acknowledged. It must not only consider the necessary retraining of workforce made redundant by the phasing down and phasing out of some industries, but also recognize the impacts of the clean energy investments in local communities and ecosystems and the fairness in global trade and economic development. In this sense, EMDEs challenges to pursue energy transitions that are just and inclusive can vary from those of developed countries, and must be equally be addressed for the benefit of everyone.

The Brazilian presidency recalls the efforts regarding aspects of the social dimension of energy transition of the G20 Indian Presidency in its outcome document and ETWG discussions. It also takes into consideration recent G20-related documents such as: the [“Decade of Actions: Bali Energy Transitions Roadmap”](#) by the Indonesian Presidency in 2022; the Energy Poverty Executive Note of the Italian Presidency of 2021; Saudi Arabia’s Presidency “Initiative on Clean Cooking and Energy Access” in 2020; the “A Collaborative Endeavor Templates for the G20 Karuizawa Innovation Action Plan on Energy Transitions and Global Environment for Sustainable Growth” document by the



Japan Presidency in 2019; the "Energy Access and Affordability Voluntary Action Plan for Latin America and the Caribbean" put forward by Argentina's G20 Presidency in 2018, amongst other valuable and relevant decisions and reports made in this forum. In this context, the Brazilian presidency proposes to continue these debates and build upon the progress made.

The Brazilian presidency seeks to advance discussions and cooperation on the social dimension of energy transition even further, recalling that Sustainable Development Goal (SDG) 7 aims to “ensure access to affordable, reliable, sustainable, and modern energy for all by 2030”. It will also emphasize that a social dimension approach to energy transition has the potential to promote solutions and maximize the results of other SDGs, such as SDG 1 (No Poverty – End poverty in all its forms everywhere), SDG 3 (Good Health and Well-Being – Ensure healthy lives and promote well-being for all at all ages), SDG 4 (Quality Education – Ensure inclusive and equitable education and promote lifelong learning opportunities for all), SDG 5 (Gender Equality – Achieve gender equality and empower all women and girls), SDG 8 (Decent work and Economic Growth – Promote sustained, inclusive and Sustainable Economic Growth, full and productive employment and decent work for all), SDG 10 (Reduced Inequalities – reduce inequalities within and among countries), SDG 12 (Responsible Consumption and Production – ensure sustainable consumption and production patterns), and SDG 13 (Climate Action – Take urgent action to combat climate change and its impacts).

II. The main tasks at hand:

- **Energy access and affordability to low-income populations, especially in developing countries – related to financing priority number 1**

From EMDE’s perspective, energy access and affordability are not minor or side aspects of the energy transition process, but pivotal issues that should be addressed with a sense of urgency. G20 member countries must acknowledge the different needs of developed and developing countries while addressing the energy transition challenges and



opportunities. Around 675 million people do not have access to energy^{ix}, mostly in developing countries. The lack of energy access has immense cost of opportunity effects related to economic activities, loss of efficiency, access to education, access to communication and digital services, quality of health services, safety, availability of cold chains, cooking, heating, and cooling solutions for millions of people around the world. Under current conditions, 660 million people are projected to still be without access to electricity in 2030^x. Globally, over 200 million children go to primary schools without electricity access and an estimated 1 billion people rely on health facilities without electricity^{xi}. Lack of energy often causes cold-chain breaks in emerging economies, which results in an estimated 20% of food loss^{xii}.

In many cases, integration to national or regional grids could be the most suitable option for improved access. However, in remote areas, individual or community solar, hydropower, hybrid mini-grids, storage, biomass and biofuels need to be taken into consideration to provide sustainable, affordable, scalable, modern, and non-traditional options. In some cases, fossil fuels may still be needed for energy security and reliability of supply in the near term. The productive use of waste may be an option for many communities, but there is a challenge on how to turn waste-to-energy into employment opportunities and create a viable market^{xiii}.

It's important to acknowledge the nexus between provision of energy services to people and poverty eradication, by stimulating the economic activities of households. Studies^{xiv} show that access to electricity can boost household income as a whole and, therefore, promote an economically viable demand for electricity supply and distribution businesses, fostering a dynamic energy ecosystem. The resulting increased incomes could help communities fund their own electricity provisions and promote new business. In this sense, universal and improved energy access must be addressed as a critical and urgent aspect of the energy transition.

Providing people with electricity supply is not sufficient to yield productive results. Millions of people have limited or precarious electricity supply, having to deal with



recurrent outages. There are also discrepancies regarding rural and urban electrification rates, which demand different approaches. It is urgent to provide energy access to isolated and remote populations, but also to improve energy access to low-income populations in big urban settings, like slums, notably in LMICs. Voltage fluctuations and interruptions in power supply have negative impacts on income-generating uses. Also, low income communities may have to pay more for electricity due to the use of inefficient appliances and equipment^{xv}. Also to be noted, buildings account for about one-third of the world’s final energy use^{xvi}. Thus, the energy transition is also deeply linked to housing and urban development policies. Improving efficiency and upgrading grid infrastructure in low-income areas would also help set a just and inclusive energy transition.

When it comes to financing, even though the world needs new technologies to reach carbon neutrality in the medium and long-term, there must be a balance between existing and emerging solutions. Besides broad financing-focused policies, G20 countries should recommend that international financial institutions grant attention to already available “drop-in” and low-cost solutions in emerging markets, as some less costly solutions are not being properly funded. In energy markets, frequently, “silver bullet” options whose results are not completely proven may receive more attention than solutions with immediate effects. Although it is important to make sure industry and non-residential consumers^{xvii} receive proper funding, it is also important to consider that millions of individuals remain without proper reliable access to energy.

Most people would choose cleaner technology options, but do not have the income to afford them^{xviii}. Adopting low-carbon options should not result in debt traps for people to be able to get a new form of technology. Similarly, efficiency regulations (can) disproportionately affect the poor through, for example, pushing expenditures on new home appliances or house renovations. As such, governments need to seriously consider financing solutions that (can include) tax reductions, carbon credits and facilitated loans and cross-subsidies with higher income households, but also strategies of payment that could enable access to technologies in an immediate manner (as in pay-as-you-go or [installment plans](#))^{xix}. Similarly, energy transition policies must avoid



regressive approaches, when tax incentives, cross-subsidies, carbon credits and other incentives benefit higher-income populations more than lower-income ones. A just and inclusive energy transition must be designed in tandem with policies to combat inequalities.

Approaching energy transitions from the social dimension should also address financing and affordability of cooling and heating, especially due to extreme weather events occurring worldwide. Heat waves kill 356,000 people annually.

- **Accelerating the clean cooking transition**

Around 2.3 billion people do not have access to clean cooking^{xx}, with devastating health effects, as the use of polluting cooking methods are estimated to cause 3.7 millions of premature deaths each year^{xxi}. Estimations indicate that around USD 8 billion is required to achieve universal access to cooking by 2030^{xxii}, but so far only 30% of this amount has been invested^{xxiii}. In many countries in sub-Saharan Africa, these figures are even lower. Multilateral development banks committed only 1 per cent of their total energy financing into clean cooking solutions in 2017^{xxiv}. Moreover, there are additional costs for related infrastructure, distribution or fuel that should be considered. Despite the cost of the transition in clean cooking, calculations show that the negative impact related to lack of modern cooking equipment is even costlier and amounts to USD 2,4 trillion per year, due to impacts on health (USD 1,4 trillion), climate (USD 0,2 trillion) and other areas^{xxv}. Approximately one gigaton of carbon dioxide is emitted every year from burning inefficient biomass, equating to about 2% of global CO² emissions^{xxvi}.

When proposing solutions, it is important to consider local and heterogenous realities. Solutions need an integrated approach with aspects regarding challenges to indigenous peoples and local communities, women, youth, children, migrants and persons with disabilities, persons living in poverty and other vulnerable situations. In this context, only the availability of clean cook stoves is not enough, as there are issues related to fuel



access, technical support and time constraints (such as stability of the fire, time that it takes to work).

There is immense potential impact in freeing up time of the population that dedicates time to labor-intensive activities like collecting fuel material and cooking, since people, especially women, can spend more than twenty hours a week in these activities^{xxvii}. That time could be used in activities aimed at achieving better conditions, such as to study, work, and access internet services (which can result in better access to employment opportunities and banking services, i.e). There are also many health-related benefits to solving the clean cooking problem, since once populations have access to clean cooking, it will no longer be necessary to transport heavy loads of inefficient/polluting biomass.

There is an overlap between electrification and clean cooking solutions, however, the gap between people without access to electricity (675 million people) and people without access to clean cooking (2.3 billion people) means that access to electricity does not solve the matter of clean cooking by itself..

- **Women´s participation in clean energy policies and businesses, including jobs and capacity building opportunities**

There is a great opportunity for social inclusion through clean energy jobs in EMDEs. In particular, renewable energy jobs are expected to increase to 43 million in 2050^{xxviii}. However, currently, most clean energy-based economic opportunities are created in higher income countries^{xxix} that develop clean energy technologies and export such technologies and expert services to third countries. Pursuing a truly just and inclusive energy transition will require requires that G20 countries foster much more innovation, capacity building and professional training in EMDEs, otherwise there is a risk that energy transitions can cause a mere shift of inequalities, instead of eliminating them. Such approach not only creates the opportunity to bring developed and developing countries closer together in collaboration, but also could contribute to addresses the significant gender gap that still persists in our societies.



In this context, G20 Ministers of Energy agreed to support and encourage a stronger focus on women empowerment and gender equality in energy transitions at all levels^{xxx}. Despite making up 39% of the global labor force, women only currently account for 16% of the traditional energy sector^{xxxi}. The absence of diversity in the energy sector labour market influences business and political decisions over how technologies are developed. Thus, a just and inclusive transition should adopt a broader perspective that includes reskilling fossil fuel laborers and also inclusion of women in the energy sector, with particular attention to developing countries.

Another aspect in which the G20 can further promote capacity building is regarding capacity building for long-term planning in developing countries, especially LMICs^{xxxiii[42]}, with special attention to the informal economy, which represents more than half of the working population and 90% of the micro and small companies around the world, which will face challenges regarding the transition^{xxxiii}. G20 governments should focus on approaches that strengthen the energy transition capabilities of these small businesses.

The three aspects briefly described above offer just some examples of aspects regarding a truly just and inclusive energy transition. A global guiding definition, however, must encompass also issues related to global trade and protectionism, access to technology, accelerated access to concessional financing, fair compensation for the impacts of clean energy deployment and mining for the energy transition, etc.

III . Suggested questions for discussion:

- Thoughts and lessons from documents and initiatives of previous G20 presidencies
- How can we build upon the definition of just and inclusive energy transition in order to to encourage more effective efforts?
- Should the ETWG look to promote exchanges with G20's infrastructure and development working groups?



- Which are the existing technological and financial policies to empower people and promote energy accessibility and affordability that are successful and replicable, both locally and countrywide scale?
- How has the "G20 Initiative on Clean Cooking and Energy Access" of the Saudi Arabia presidency as well as national voluntary plans for energy access fared so far? What are the lessons that we can take from it?
- What are some already successful solutions in clean cooking that could be promoted through voluntary cooperation, taking note of triangular cooperation (North-South-South) potential?
- How can G20 countries cooperate with developing countries to encourage capacity building and facilitate transfer of technologies in order to promote renewable energy skills?

IV . Expected outcomes:

- Assessment of definitions of just and inclusive energy transition and what gaps may these definitions have (and how to address them);
- Pledge from G20 countries to fund universal and improved access to clean cooking in partnership with an International Organization tbc;

High Level dialogue:

- A. A **Multistakeholder Dialogue on Principles for Promoting a Just and Inclusive Energy Transition in EMDEs that would include** representatives from civil society and academia from G20 countries to discuss how community and local perspectives can be successfully incorporated into energy planning for a just and inclusive energy transition. This would be a valuable opportunity to bring together governments, international organizations, the private sector, and civil society to discuss and agree on a set of principles for promoting a just energy transition in EMDEs. This event, organized under Brazil's G20 presidency, would also aim to raise awareness of the importance of a just and inclusive energy



transition and to mobilize financial resources to support it, providing advice for consideration by the ETWG;

3. Innovative perspectives on sustainable fuels

I. Why is it important?

There is consensus on the need to urgently increase production and deployment of sustainable fuels (low-emission fuels), particularly in end-use sectors such as industry and transport. The most recent assessments of the International Energy Agency (IEA)^{xxxiv} and the International Renewable Energy Agency (IRENA)^{xxxv} recognize that energy transition pathways consistent with increasing global energy demand and in line with climate goals will require a diverse portfolio of technologies, including large quantities of low-emission fuels, such as liquid biofuels, e-fuels and low-emission gases (hydrogen and biogas) and green ammonia. As summarized by the Intergovernmental Panel on Climate Change (IPCC) in its Synthesis Report of the 6th Assessment Report, rapid and deep reductions in global greenhouse gases emissions will require major energy systems transitions. Net zero energy systems will require a wide range of technologies and mitigation options, including widespread electrification combined with alternative energy carriers in applications less amenable to electrification^{xxxvi}.

It is therefore essential to find ways to overcome the main obstacles hindering the pace of adoption of sustainable fuels: a) availability and sustainability of feedstocks, including biomass feedstocks; b) implementation; c) harmonized basic sustainability criteria; d) consensual carbon accounting and energy-efficiency assessment; d) trade; e) market regulation; f) legal frameworks; and g) certification of major clean energy sources beyond wind and solar, such as hydrogen, liquid biofuels and solid biomass. G20 members recently recognized the importance of exploring, diversifying, adopting, and advancing sustainable fuels^{xxxvii}. Building on this consensus, we propose to take this important discussion forward as sustainable fuels are the “fuels for future” and one of the pillars of energy transitions.



II. Areas for discussion:

Sustainable fuels are an integral part of the diverse mix of technologies and solutions available to countries to implement their energy transitions and meet their climate goals. They must be scaled up in parallel with a substantial increase in energy efficiency, with electrification of transport, and with the deployment of other clean and/or renewable energy technologies^{xxxviii}. Sustainable fuels will be critical in a wide range of applications and sectors, including industry and transport (in particular heavy freight, shipping and aviation).

To increase competition and accelerate cost reductions, national strategies, as well as policy and regulatory frameworks, should consider different technologies, feedstocks and conversion processes; at the same time, they should ensure energy and environmental efficiency, including through appropriate sustainability criteria. This may also contribute to fuel supply diversification and energy security.

Reducing industry greenhouse gas emissions (GHG) will require consistent and coordinated efforts throughout value chains, promoting all available mitigation options, including fuel switching to low- and zero-GHG emitting fuels. In the transport sector, sustainable biofuels, low-emission hydrogen and hydrogen derivatives (including ammonia and synthetic fuels) can support mitigation of CO₂ emissions from shipping, aviation, and land transport.

Sustainable fuels can also play an important role in the energy transitions of the power sector. Since many countries currently rely heavily on fossil fuel-based power generation, the conversion of existing thermal power plants can greatly benefit from sustainable fuels, including solid biomass, as potentially cost-effective options.

Besides contributing to the delivery of climate goals, sustainable fuels can also provide wider environmental, social and economic benefits, by fostering technology and innovation, creating “green” jobs, and promoting sustainable development at large, in line with the 2030 Agenda and its goals and targets.

An array of different technologies and conversion pathways are currently available or under development, at different levels of readiness, across countries and regions. Modern,



sustainable bioenergy is widely commercialized and can be adequately sourced and deployed through the combination of different policies and approaches. Second generation technologies for biofuels have already achieved large-scale demonstration or early commercialization, already including operational industrial scale plants. Initiatives such as the Biofuture Platform and the Global Biofuels Alliance are important fora where the exchange of experiences and discussion about sustainable production and use of bioenergy takes place.

Far more investment is necessary to scale up production and use. Many of these technologies will require additional incentives to achieve full commercial operation, closing major price gaps and addressing issues of cost-effectiveness. Adequate policy support is key to ensure the uptake of novel technologies, bringing them to industrial scale.

III. The main tasks at hand:

The challenges to scaling up production and deployment of sustainable low-carbon fuels are many, and they may differ depending on the fuel, country or policy framework in place. Obstacles may include high production costs, unfavorable policies, limited availability of sustainably sourced feedstocks, including due to lack of harmonization of basic sustainability criteria across countries. Fuels at lower technology-readiness levels may also face technical and economic challenges, as well as outstanding issues regarding compatibility with existing infrastructure. These challenges shed light on the need for an enabling environment, as well as adequate technology-push and market-pull instruments, to create the conditions for scaling up production and deployment of sustainable fuels.

Global dialogue and cooperation can be powerful tools to help identify implementation barriers to market development, commercialization and use of sustainable fuels, especially through the exchange of good practices and lessons learned.

Sustainable expansion of biomass and appropriately managed landscape systems supported by adequate governance mechanisms allow for efficient and sustainable resource use. The full realization of this potential will require significant innovation and increased investment, as well as cooperation and collective action, building on evidence-based approaches and taking into account local contexts and domestic circumstances.



Enhanced collaboration can also contribute to promote harmonization of basic sustainability criteria, contributing to spur market development and integration.

Increased harmonization and integration of markets and value chains can also contribute to scaling up investment in sustainable low-carbon fuel projects and programmes across different regions, boosting sustainable sourcing of feedstocks, production and deployment. Wider deployment of these technologies across the world, particularly in developing countries, will be key to ensure their uptake as cost-effective options, benefiting from economies of scale.

Reducing the current geographical concentration of many of the recent developments in clean energy technologies and supply chains may also contribute to reducing risks of disruption, increasing the overall resilience of economies. The development of new markets for sustainable fuels and their supply chains will create significant opportunities in many countries and sectors.

IV. Questions for discussion:

- How can new sustainable fuels complement and be integrated to electrification pathways?
- How to unlock the potential of biogenic carbon to deliver low-emission fuels?
- How to promote harmonization of basic sustainability criteria to amplify and integrate markets for sustainable fuels?
- What are the best policy approaches to boost sustainable fuels production and use? Technology-push and market-pull through smart policy and regulatory frameworks.
- What is the role of other stakeholders, in particular industry and the research community, in promoting positive change and supporting governments in their efforts to scale-up production and deployment of sustainable fuels?
- How to unlock the potential of sustainable fuels in developing countries? Dialogue and collaboration to promote science, technology and innovation; lessons learned, exchange of good practices and capacity building through North-South, Triangular and South-South cooperation.



V. Expected outcomes:

- Roadmap with policy guidelines for accelerating market development for new sustainable fuels, including hydrogen and its derivatives as well as sustainable bioenergy (liquid biofuels and solid biomass).
- Policy blueprint on good practices for sustainable sourcing: quantification and sustainability governance. A set of approaches, based on lessons learned and good practices, that can ensure sustainable sourcing, taking into account national circumstances and capabilities and local contexts;
- Policy paper: “Ethanol’s role in the Net-Zero scenario: present and future”
- Launch of updated version (in 4 languages) of the “Green Ethanol Book” (CGEE + BNDES) as a Global Biofuels Alliance deliverable

High Level Event:

High level debate: Seeking consensus on performance-based sustainability assessments and frameworks: how can G20 countries move towards adopting transparent, practical and evidence-based life cycle assessment methods to ensure domestic reduction of GHG emissions, improve production efficiency and facilitate trade?

Time and venue of ETWG Meetings:

ETWG I (Initial Meeting - virtual) – 18th and 19st February 2024

ETWG II - April, 15 to 16th (Brasília)

ETWG III - May, 26th to 29th (Belo Horizonte)

ETWG IV - September 24 and 25th (Foz do Iguaçu)



Clean Energy Ministerial - September 24th to 26th (Foz do Iguaçu)

ETMM - September 27th (Foz do Iguaçu)



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- xxxiv IEA (2023). Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach. (2023 Update).
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- xxxvi IPCC, 2023. Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. C.3.2.
- xxxvii “We recognize the importance of exploring, diversifying, adopting, and advancing sustainable biofuels and hydrogen produced from zero and low emission technologies, and its derivatives such as ammonia, for contributing towards the energy transitions, enhancing energy security, and addressing GHG emissions. We underscore the importance of supporting national policies that stimulate further advancements and deployments of various technologies, ensure sustainable feedstock sourcing, enhance productivity, and accelerate market development. We acknowledge the need to strengthen collaborative research, facilitate voluntary and mutually agreed technology transfer/co-development and financing needs for advancing the adoption of sustainable fuels for future, encouraging knowledge sharing on sustainable practices and in this regard, note the work of multilateral initiatives” (G20 Energy Ministers' Meeting, Outcome Document and Chair’s Summary, 2023, par. 16).
- xxxviii IEA. Net Zero Roadmap A Global Pathway to Keep the 1.5 °C Goal in Reach. (2023 Update).: Today much of the momentum is in small, modular clean energy technologies like solar PV and batteries, but these alone are not sufficient to deliver net zero emissions. It will also require: large new, smarter and repurposed infrastructure networks; large quantities of low- emissions fuels; technologies to capture CO2 from smokestacks and the atmosphere; more nuclear power; and large land areas for renewables.