



# TASK FORCE FOR ENERGY TRANSITIONS & CLIMATE FINANCE





# **G20 TASK FORCE FOR ENERGY TRANSITIONS & CLIMATE FINANCE**





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## 1. From the Task Force Co-Chairs

Energy transitions are central to the G20 agenda. In 2023, during India's presidency, the geopolitics and governance of energy have become immensely challenging, as the shift from fossil fuels to renewable energy, concerns about energy security and, in many cases, pressure on keeping financial commitments made related to tackling climate change have become complicated.

The International Energy Agency counts 20 million more people worldwide without electricity now compared to 2021. Predictably, the worst-affected are in sub-Saharan Africa, which is back to its lowest rate of electrification since 2013. In Europe, the number of people experiencing inadequate energy supply has risen to 80 million from 34 million in 2021. "Energy poverty" is global and widespread, impacting technology implementation, industry and sustainable development goals – all of which are also G20 goals.

This independent Task Force initiated by Gateway House in October 2022 seeks urgently to find ways to provide energy access, security and affordability. This requires resolving the conflicts between short- and long-term energy targets, addressing energy disruptions caused by the Ukraine-Russia conflict, and using creative financing to accelerate the development and adaptation of renewable technologies and new business models utilizing these technologies. The G20 has a key role to play in advancing solutions.

The Task Force's three working groups – addressing Energy Markets, Energy Transitions, and Climate Finance – have made a range of practical recommendations, not least the need for a cogent taxonomy. A summary of these important recommendations is at the end of this report. As co-chairs we would like to highlight three particularly significant recommendations, which can provide immediate runs on the board for India's G20 Presidency. They are:

The G20 should focus on providing financial support for those most in need as a cornerstone of climate action and energy transition in the United Nations Framework Convention on Climate Change Protocol and as reinforced and enshrined in the Paris Agreement and successive COPs. This is a natural role for the G20 to play given the involvement of leading economies in it and its convening power. While financial support to developing countries has been increasing, it is nowhere near what will be required for a successful transition. The G20 can galvanise pursuit of this agenda.

Public financing alone will not be enough for dealing with current energy challenges. Private finance is needed along with public finance. That means continued work to align global financial flows with the Paris Agreement goals. Innovative approaches to climate financing, such as blending finance with public and private capital so they work together, and key impediments like exchange rate risk for financing projects must be addressed. The G20 has a critical role to play in strengthening this global agenda, including by a continued step change on climate financing by the multilateral banks.

A possible game-changer could be the creation of a Global Climate Finance Agency to better integrate and drive this global agenda, including at very practical levels – for example, by expressly mandating it to lower hedging costs to mitigate a key risk faced by developers of green projects and to insure major clean energy projects from potential losses due to problems such as the failure of government utilities to meet supply and payment obligations – a persistent issue in developing countries, including India.

Finally, the G20 can harness the significant power of the public procurement system to accelerate energy transitions. There already is abundant evidence that, done well, this can be a major driver of change, for instance, by ensuring funding and adaptation at scale. At the same time, use of public procurement to drive such changes can help prevent the winner-takes-all effect that new technologies often create. Public procurement has a key role to play in accelerating the rollout of critical new technologies such as green hydrogen, electric vehicle transport systems connected to renewable power systems and small modular nuclear reactors, where the G20 can provide global impetus and inspiration.

Ultimately, these proposals will mean new business models and its new technologies for energy transitions– new tracks for new trains. Financial centres of the G20 countries and their significant business communities, like Mumbai, have a critical role to play in creating this new economy. The G20 should encourage cooperation and collaboration between these centres, including through green financing and economy taxonomies per the recommendations above, to accelerate climate transition and energy security for all.

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Former Australian Ambassador  
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## 2. Introduction to the Task Force

The past few years have seen major strides in adoption of renewable and green technologies globally. Renewable energy has shown the fastest growth among all energy sources in this period, more than doubling its share of total energy production from 2016 to 2021 to nearly 7 per cent. Several factors have driven this shift, including policies favoring green energy, easy availability of finance and technological advances.

However, renewables are still a relatively small contributor to the overall energy mix, and further progress is likely to be hampered unless existing and emerging challenges are addressed. Shocks caused by the pandemic, geopolitical developments and market turmoil are likely to lead to greater use of traditional fuels such as oil and coal in the short term, as has already started to happen in some European countries. Simultaneously, slowing growth and higher inflation in the developed world will reduce the availability of finance for climate-change mitigation globally. Almost all developing countries also will see lower growth and higher inflation. The disruptions will reduce their ability to invest in new technologies and green infrastructure – despite increasing demands from international investors that they do so.

Despite these shocks, policy-makers have not recalibrated their goals for the transition to green and more sustainable energy sources. The Energy Ministers Communique issued during the Italian G20 Presidency (2021) announced the target of net-zero carbon emissions by mid-century. This goal was reiterated during Indonesia's 2022 Presidency. Both documents underlined the importance of limiting the rise in global temperatures to 1.5o C.

Resolving the conflict between the short-term need to deal with current energy disruptions and the urgency of addressing national energy security needs and climate change over the long term should be a priority for the G20. The G20 saw its role grow as a forum for the world's largest developed and emerging economies after the 2008 financial crisis. Today, another crisis requires the G20 to act again.

The Indonesian Presidency set three core priorities for the Energy Transitions Working Group to address: securing energy accessibility, scaling up smart and clean energy technologies, and advancing clean energy financing. The Gateway House G20 Energy Task Force acknowledges these goals and addresses these priorities through working groups focusing on:

- **Energy Markets** – policy measures to address energy poverty, which has intensified in the past few years.
- **Energy Transitions** – steps to encourage the use of green energy and sustainable technologies in a global economy with fewer resources to manage climate-change.
- **Climate Finance** – strategies to help generate the financial resources needed to nurture green technologies.

### 3. Members of the Task Force

#### CO-CHAIRS

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#### WORKING GROUP LEADS

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## 4. Executive Summary

The past decade has recorded significant progress in the adoption of green energy around the world. This has been made possible by a combination of technological advances, easier availability of capital and regulatory measures. However, further progress is likely to slow due to the economic shocks caused by the Covid-19 pandemic and the Russia-Ukraine crisis.

Energy shortages arising from these two shocks are leading to increased usage of fossil fuels, at least in the short term. Higher energy prices have pushed poorer consumers out of energy markets – and thus into energy poverty and deprivation. Slower global growth and higher inflation also will reduce financial resources available for green investments, especially in lower-income countries. The global challenge is to continue the green transition while ensuring that lower-income countries have access to affordable energy. Another important issue is taxonomy – a common definition for green, renewable and sustainable projects will facilitate financial flows towards these sectors. As a group that represents the world's largest economies, the G20 is well placed to act on these issues. India's G20 Presidency provides the opportunity to highlight the concerns of the developing world, the challenges of functioning democracies, and potential solutions.

This Task Force offers recommendations for the G20. Not all the members of the Task Force agree with all the findings and recommendations (See Appendix 2, Dissenting Note).

First, because volatility in energy supply and prices is counter-productive to green transitions, G20 should strive to achieve stable, accessible, and equitable energy markets by helping to expand the supply of affordable energy, including fossil fuels, and protecting against reduced energy supply and price fluctuations. The G20 can ensure adequate funding, including through philanthropy to make the benefits of green transition and clean technologies available to Least Developed Countries.

Second, public procurement can be used to favour technologies such as Small Modular Reactors and Green Hydrogen, which can reduce dependency on fossil fuels. Procurement norms that create a large number of players in these sectors will avoid the winner-takes-all effect often encountered in the development of new technologies. The G20 can set targets for green public procurement by 2030. Coordinated action can create cross-border carbon markets, which can steer industries towards low-carbon options. An international carbon market can generate resources for lower-income countries, where local funding is scarce.

Finally, the high costs of capital, especially debt, that most developing countries face can be eased by bringing down the cost of hedging foreign-exchange risks. Emerging markets also suffer from weak public utilities, which are the customers for green energy. Special multilateral financial institutions can provide guarantees to bring down borrowing costs. Seeding venture funds to invest in green projects in smaller and lower-income economies also can partly offset the vulnerability of these countries' financial markets.

## 5. Findings & Recommendations

### WORKING GROUP ON ENERGY MARKETS

Stringent regulations imposed on the emission of greenhouse gases, carbon-emission taxes, and ever-cheaper renewable energy over the past few years all point to a change in the energy status quo, as policymakers try to find meaningful solutions to the challenges of energy affordability, accessibility, and sustainability while meeting climate-change obligations and aspirations.

Countries that were utterly dependent on fossil fuels are moving gradually to achieve an energy mix with lower carbon emission levels (see Table 1 below). Policy measures ranging from taxing carbon to stringent control mechanisms are being developed globally to tackle the ubiquitous presence of carbon. Yet so far, these measures the world's dependency on fossil fuels drastically or significantly curb carbon emissions (see Tables 2, 3 and 4).

Table 1: Changing Renewables Consumption (relative change %): 2015 to 2021

	<b>Solar</b>	<b>Wind</b>	<b>Hydro</b>
<b>World</b>	+305%	+124%	+10%
<b>Africa</b>	+407%	+174%	+27%
<b>Asia</b>	+534%	+226%	+17%
<b>Europe</b>	+71%	+54%	+10%
<b>North America</b>	+330%	+93%	+2%
<b>South America</b>	+1,642%	+274%	-2%
<b>High-Income Countries</b>	+163%	+72%	+1%
<b>Upper Middle-Income Countries</b>	+702%	+239%	+14%
<b>Lower Middle-Income Countries</b>	+1,298%	+134%	+24%

Source: BP Statistical Review of World Energy, 2022<sup>iii</sup>

Table 2: Changing Coal Consumption (relative change%): 2015 to 2021

<b>World</b>	+1%
<b>Africa</b>	+4%
<b>Asia</b>	+10%
<b>Europe</b>	-30%
<b>North America</b>	-33%
<b>South America</b>	-9%
<b>High-Income Countries</b>	-26%
<b>Low-Income Countries</b>	+30%
<b>Upper Middle-Income Countries</b>	+5%
<b>Lower Middle -Income Countries</b>	+30%

Source: BP Statistical Review of World Energy, 2022<sup>iv</sup>

Table 3: Changing Oil Consumption (relative change %): 2015 to 2021

<b>World</b>	+1%
<b>Africa</b>	-1%
<b>Asia</b>	+8%
<b>Europe</b>	-4%
<b>North America</b>	-4%
<b>South America</b>	-13%
<b>High-Income Countries</b>	-5%
<b>Upper Middle-Income Countries</b>	+11%
<b>Lower Middle-Income Countries</b>	+5%

Source: BP Statistical Review of World Energy, 2022<sup>v</sup>

Table 4: Changing Gas Consumption (relative change %): 2015 to 2021

<b>World</b>	+16%
<b>Africa</b>	+24%
<b>Asia</b>	+25%
<b>Europe</b>	+13%
<b>North America</b>	+10%
<b>South America</b>	-8%
<b>High-Income Countries</b>	+10%
<b>Upper Middle-Income Countries</b>	+28%
<b>Lower Middle-Income Countries</b>	+18%

Source: BP Statistical Review of World Energy, 2022<sup>vi</sup>

Fossil fuel output grew briskly during the 2010s, spurred by stable coal, oil, and natural gas prices. Investments in the sector, aided by technological advancements, led to the development of new supplies, especially shale oil. However, this link seems to have broken down in the 2020s. Normally, the current high-price regime would encourage investments to increase supply, but policies hostile to fossil fuels have stifled fresh investment, raising the possibility of future supply shortages and further price and supply volatility.

Higher fossil fuel prices have been a factor promoting investments in renewable energy. But renewables are proving to be a paradox. While they disrupt existing energy markets, the spare capacity they require because of their intermittency is predominantly derived from fossil fuels. A mismatch in investments between renewables and spare load-balancing capacities will lead to supply disruptions, price spikes and extreme volatility.

G20 policymakers must ensure that enough spare fossil fuel-fired power capacity can be brought online quickly when renewables-based generation is interrupted. While fossil fuel prices will still fluctuate through normal market dynamics, this at least can protect against significant supply disruptions.

Predicting the potential impact of renewable energy on long-term fossil fuel prices and demand is complicated. This challenge has been exacerbated by recent black swan events like COVID-19 and the war in Europe, which have swayed public opinion and have generated policy blowbacks. Extreme weather events have exposed the lack of planning, decreased investments, and resultant reduced reliability in electricity grids. These extreme events could worsen with rising fossil fuel consumption.

The turmoil in energy markets in 2022 saw developed nations prioritize their energy and food security, but this has sent vulnerable populations in developing and least-developed countries, which need cheap energy and food to survive, into greater poverty. The massive increase in energy prices and increased supply risk has already seen high-income countries in Europe start to burn increasing biomass and resort to restarting coal-fired power plants to meet their energy needs since gas supply is constrained by heating and electricity loads. These ominous signs indicate that the world could easily slip back into the pre-Paris Agreement of 2015 era, negating all the progress in generating multilateral consensus on climate-change mitigation. Europe's demand for biomass and coal – and for Liquefied Natural Gas (LNG) – show how the rich nations easily skew energy markets, raising global energy prices and fueling inflation worldwide. For instance, inflation in energy prices has caused fertilizer prices to raise exponentially, a development that has caused food prices to spike.

Circumstances dictate a move toward a prudent mix of renewables and fossil fuel energy to ensure a manageable transition to a sustainable energy future, even if not wholly insulated from unforeseen events. This should allow renewable energy to balance the accessibility, dependency and economics of fossil fuel for the use of all of society.

#### **RECOMMENDATIONS:**

The G20 can focus on this in two ways:

1. Support the expansion of affordable energy while maintaining the flow of fossil fuels to ensure reduced supply and volatility risks to energy markets. This will require the G20 to put on its agenda the goal of achieving affordable, accessible, sustainable and diverse energy sources. A representative body like the G20 must recognize this as a common good, especially as the actions of the developed world have once again led to severe challenges for the developing countries. Unless addressed, the vulnerability of the developing and least developed economies to energy shocks and resultant volatility will be detrimental to the G20's overall goals.
2. Energy transitions must be a collective effort across the entire community of nations. Policies should seek equal access to clean and sustainable technologies and prevent them from becoming battlegrounds over potentially lucrative future markets. Countries are in the race to dominate futuristic industries and new energy technologies. The transition to a cleaner future should not exacerbate energy poverty and skew accessibility. The G20 should support the development of innovative financial mechanisms and curate the multiple philanthropic efforts being carried out globally to bring the benefits of energy transition technologies, including energy-conservation technologies, to Least Developed Countries (LDCs) so they can progress on the path to sustainability.

## WORKING GROUP ON ENERGY TRANSITIONS

Energy Transitions have been a focus area of the G20 for several years. The communiqués issued after the Energy Ministers meetings for Indonesia (2022), Italy (2021) and Japan (2019) all cite energy transition as a key requirement in their opening statements. The attention is justified as carbon dioxide emissions from conventional energy – coal, oil and natural gas, which are largely used for electricity and transport – are the biggest contributors to anthropogenic climate change (See Tables 5&6).

Table 5: Carbon Dioxide emissions by sector (2019)

Sector	Share
Energy Systems	34%
Industry	24%
Agriculture	22%
Transport	15%
Buildings	6%
<b>Total</b>	<b>100%</b>

Source: IPCC <sup>vii</sup>

Table 6: Energy Related Carbon Dioxide Emissions

Sector	Share
Power (Coal)	29%
Power (Gas)	9%
Power (Oil)	2%
Transport	23%
Industry	23%
Buildings	10%
Others	5%
<b>Total</b>	<b>100%</b>

Source: International Energy Agency <sup>viii</sup>

The current turmoil in energy markets and the world economy adds to challenges threatening the transition to renewable energy and the shift to green technologies in several ways. First, slower growth and higher inflation deplete the financial resources available for such a transition. Second, new technologies necessitate replacing existing supply chains geared to older fossil-fuel based technologies, further adding to costs. Third, higher prices lead to increases in the production of commodities such as coal, oil and natural gas, working against the goal of reducing carbon emissions.

Finally, the economic crisis has demonstrated a major shortcoming of existing renewable technologies such as solar and wind energy when put to real-time use: their inability to deliver energy reliably at all times, even when the sun doesn't shine and wind doesn't blow. Unless addressed, this intermittency poses an insurmountable barrier to climate mitigation.

The extent to which green technologies can be substituted for coal, oil and natural gas are exposed. Fuels like oil and natural gas have non-energy applications – in production of fertilizer, for example – that cannot be directly met by renewable energy. Nuclear power is the only 24/7/365 zero-carbon energy alternative currently available, but it has problems of its own: large reactors face substantial cost and time overruns, sometimes as much as a decade.

## RECOMMENDATIONS

### **Technology**

This working group proffered two solutions:

1. **Small modular reactors (SMRs)** – nuclear reactors of up to 300 megawatts capacity – can be one answer. They can be prefabricated and transported as single units, offering significant savings in cost and time compared to larger facilities. Use of SMRs does not require major changes to the existing transmission infrastructure.
2. **Green hydrogen** – hydrogen produced from water using renewable electricity – is another solution, a means to store much more energy than the lithium batteries currently in vogue and available in sufficient quantity. Hydrogen also can be used as a feedstock for fertilizer plants reducing a significant need for natural gas. At present, pilot-scale green hydrogen plants are operational in the EU, U.S., Japan and China, suggesting the technology can be brought to scale reasonably soon.

### **Policy**

Speeding up the adoption of these (and similar) technologies can advance the transition to green energy. However, amassing resources for such a push is still a challenge. The G20 can suggest the use of public procurement and the creation of carbon markets to address this:

1. Public procurement policies can favour technologies that replace traditional fuels (SMRs) or otherwise reduce the need for other materials (green hydrogen), or even existing renewable technologies. Green public procurement norms and benchmarks can be tailored to create space for a large number of players in developing countries – including micro, small and medium enterprises (MSME). Lessons from India's successful PLI (Production Linked Incentives) schemes can be used to aid new partnerships between MSMEs and others. This will guard against winner-take-all effects, which usually benefit large companies. The G20 can agree on a target for green public procurement by 2030.

2. Creating a global carbon market and setting a price for carbon that will lead to reduced emissions can steer industries towards low-carbon options. A worldwide market for carbon will generate resources for building green infrastructure in emerging markets, where local funding is scarce. This will be helpful for industries such as cement and steel, which are large job creators and, as substantial consumers of energy, want to shift to cleaner options. MSMEs, which currently cannot participate in such a market due to their small size, should not be locked out of global and local markets.

## WORKING GROUP ON CLIMATE FINANCE

A major obstacle to green transitions is availability of finance. Climate-related financing is not a macroeconomic issue – the developed world has enough funding. Developing countries are short on capital for climate finance, but their estimated annual requirement of \$4-5 trillion can be met since annual global savings total \$20 trillion and global GDP amounts to \$80 trillion.

Encouraging sustainable development requires greater capital flows from developed to developing countries. Three issues stand in the way:

- **High cost of debt:** Clean-energy technologies inherently have higher upfront costs, but significantly lower operating costs than conventional technologies. As a result, capital has a direct bearing on the overall cost of clean energy or energy services. Clean technology projects also have long payback periods, necessitating patient, long-term funding solutions.
- **Need for hedging that reflects actual costs, to eliminate foreign-exchange risk:** Revenues generated from clean technology projects in developing countries are in local currency, but the investment they require usually is in the form of foreign currency. The hedging market for currency-hedging swaps in developing countries is not deep enough, especially for investments with maturities beyond three years. This translates to high overall capital costs, even when foreign-currency loans are priced low. For example, the annual interest on rupee-dollar hedging is around 6 per cent, which is significantly higher than the long-term annual rupee depreciation rate of 3.5 per cent. Moreover, the hedging market is non-existent for loans with average maturity of more than 10 years, leaving projects exposed to medium and long-term currency risk. The problem is exacerbated when money is borrowed in currencies other than the US dollar or Euro since this requires two-pronged hedging, which means higher hedging costs. For example, if a loan is extended in yen for a project in India, hedging is required first between the yen and the Indian rupee and then between the rupee and US dollar.
- **Weak financial position of public utilities:** The purchasers for energy from clean technology projects are largely public utilities, including state distribution companies, state transport corporations and municipalities. In developing countries, most of these entities are in weak financial health. Because of their high upfront investment and lower operating costs, the future prices of energy produced with clean technology can be much more attractive than current prices. Therefore, new contracts look far more competitive than those signed five years earlier. Because of this differential, utilities have often reneged on their commitment to make payments on old contracts that have come to look too expensive. This has increased the risk – and hence the cost – of financing clean technology projects that supply energy to public utilities.

Emerging technologies and new business models need to be encouraged. Because power generation is the largest source of carbon emissions, global attention has focused on renewable energy. But with the growing role of renewable energy, energy storage is becoming crucial. Financial support also is required to mainstream other nascent sectors such as electric mobility, green hydrogen and carbon capture to meet climate goals. Another issue that needs to be looked at is taxonomy – what is green, what is renewable and what is sustainable. Directing global financial flows towards desirable outcomes will require common definitions.

## RECOMMENDATIONS:

This Working Group recommends the creation of a Global Climate Finance Agency managed by a reputed existing multilateral agency. Some portion of the support promised by developed countries can be used to capitalize this entity. Foundations and philanthropies can provide additional funds in the form of grants; in return they can receive Certified Emission Reductions (CER) benefits to use either as green credentials or for trading.

The Global Climate Finance Agency can perform the following functions:

- 1. Hedging:** A cost-effective hedging mechanism similar to insurance can cover private-sector green projects when additional financial protection is needed over what is available through long-term currency-depreciation rates. Developers of green projects can pay a hedging cost marginally above annual currency depreciation, and the Global Climate Finance Agency can cover hedging costs exceeding that threshold. Hedging costs can be lowered by introducing a secondary, or reinsurance, market. When combined with some blended finance instruments, this can make the insurance premium for projects more affordable than existing alternatives. Another key aspect will be the duration of the cover, which should be in line with the loan tenors.
- 2. First Loss Facility:** The agency can provide a first loss facility to protect clean-energy projects from losses that might arise from a failure of government utilities in developing countries to fulfil their energy-purchase agreements. In the absence of such a payment security mechanism, the perception of project risk increases, resulting in higher energy and energy service costs. A first loss facility for clean technology projects reduces risks related to customers and can accelerate adoption of green technologies and increase the flow of funds to them.
- 3. Venture capital and new business models for emerging technologies:** Today, most countries depend heavily on imported capital equipment for their solar and battery sectors. This restricts the creation of local ecosystems for new technologies. Emerging economies must reduce import dependence before scaling up adoption of hydrogen, battery storage and electric mobility. Business models must evolve to reflect the operational nature of these emerging technologies. Venture capital and new business models for emerging technologies will make energy transitions more democratic. The Global Climate Finance Agency of the previous recommendation can seed or create venture-capital or private equity funds in smaller economies, so an ecosystem can flourish. The WTO's existing safeguards and scope for technologies and investments in the national interest should be fully utilized to boost such business models compatible with global trade rules.

## 6. Conclusion

The world today faces economic headwinds ranging from energy price shocks to slower economic growth. These can push vulnerable populations into energy poverty and slow the transition to green energy. At the level of households, pandemic effects on health and economic burdens make it imperative that household and small business energy security be an essential component for any future energy transition. Getting energy transitions on track requires encouraging promising technologies and addressing energy deprivation in lower-income countries. The challenges are global in nature and require a global response, making G20 the appropriate forum to address them.

Specifically, the G20 can take steps to:

1. Stabilize energy markets to ensure adequate energy access.
2. Ensure that the benefits of green transition reach least developed countries.
3. Promote promising technologies via policy support measures such as public procurement.
4. Create a global carbon market to ensure availability of finance for green projects.
5. Reduce costs for green projects in developing countries by bringing down foreign-exchange hedging costs.
6. Improve viability of energy projects by providing a first loss facility in developing economies.
7. Seed an ecosystem for venture capital focussing on green infrastructure in smaller and lower-income economies.

The world faces an economic crisis more serious than those of the past – one that can undo progress on green transitions. The G20 is the forum to lead on this collective challenge. The words “One Earth: One Family: One Future” on India’s G20 logo adequately capture the scope of this shared task, as well as the need for all countries to work together.

## Appendix 1: Principles for a Just transition

By Ambassador Pedro Villagra Delgado

*Argentina's Sherpa for the G-20, 2018*

Transitions to renewable and cleaner energy sources are essential for reducing carbon emissions and contributing to a fairer world with sustainable development and wellbeing for all. The binding commitment to common but differentiated responsibilities embodied in international energy agreements since 1992 should not be eroded or considered just a slogan. It should produce concrete actions, effective policies and provision of resources to help developing countries achieve these energy transitions to stop global warming and build a sustainable economy for all.

While all countries should strive to combat climate change and advance energy transitions, those have polluted most and for the longest time – becoming more developed and amassing more financial resources in the process – must make a larger contribution to removing this global cause of climate change. Without investment, financial assistance and new technologies, energy transitions may not happen in many developing countries and the gap between rich and poor may widen globally.

Enabling developing countries to develop, deploy and gain access to new energy sources like photovoltaics, wind, seawater, geothermal and hydrogen at reasonable cost should be a goal for all. It is not only a matter of fairness but of self-protection for all. The goal of mobilising \$100 billion per year to help developing countries take climate-change adaptation and mitigation measures, albeit insufficient, should be fulfilled. This will help developing countries achieve their National Determined Contributions under the Paris Agreement to decarbonize globally by 2050.

To make reduction of emissions and decarbonization a global common good, advanced renewable-energy technologies should be made available to developing countries at reasonable cost based on their respective capabilities and national circumstances. This will require capital to allow the development and deployment of new sources of energy (lithium, hydrogen and others).

Investment, research and development to guarantee energy transitions should be seen not only as a means for the most advanced countries to make money through new technologies, but also as a means to achieve a cleaner planet for the benefit of all people. This should not be a zero-sum game but rather a process in which all win through decarbonizing the planet and overcoming energy deprivation affecting billions of people, particularly in the developing world.

Certain other facts and principles need to be kept in mind as we proceed:

- Nuclear power is a formidable baseload source of energy with no carbon emissions. Its potential contribution to energy transitions should be recognized.
- Unilateral actions that contradict international rules such as those of the World Trade Organization on the imposition of barriers to trade affect the international rules-based order and may run counter to energy transition goals, which require broad consensus and common actions to be achieved.

- The war in Ukraine has led to a significant increase in the prices of energy, including fossil fuels. This has affected all countries, but developing countries have been hardest hit. The G20 should identify practical measures to enable those countries to overcome those difficulties and continue making the transition to renewable energy and achieving decarbonization.
- Research and development of technologies to store renewable energy from sources such as wind and solar at reasonable costs should be promoted since they could stimulate transitions toward these sources.

The fight against climate change should be a common global goal and thus decided by all. This requires that all countries, developed and developing, agree on fair criteria for action. Common ground amongst all countries, developed and developing, should be found. Current tensions and conflicts make the G20 a more useful platform than ever for finding global solutions that benefit all. We should strengthen this mechanism.

## Appendix 2: Dissenting Note

### The G20 as a trailblazer for climate action and the role of renewable energy sources in overcoming the energy crisis

By Diana-Paula Gherasim, Research Fellow, IFRI

Russia's reductions in gas supplies via pipelines to Europe starting in 2021 and 2022 have pushed European buyers to ramp up LNG imports from spot markets, sending energy import bills for Europeans and inflation in energy prices in other markets soaring globally. This happened in the absence of any sanction on natural gas, and in spite of long-term contract supply obligations. The EU's structural response was to double down on the energy transition agenda of the Green Deal and Fit for 55 package through its RE Power EU Plan. Although, the reactivation of some coal plants in Europe was made possible for energy security purposes, a first analysis by Ember shows that the increase in coal use for power generation was marginal thanks to an increase in wind and solar generation and energy savings. An ambitious reform of the EU carbon market in 2022 will further strengthen the decarbonization signal.

The G20 must focus on accelerating the energy transition. A Bloomberg NEF analysis estimates that, for the first time, global spending on clean energy technologies was equal to the amount spent on fossil fuels, yet this is not enough given our climate targets. Pushing forward with the deployment of clean energy sources and energy efficiency is urgently required to stay on track with the Paris Agreement. Multilateral cooperation is required within G20 to find actionable solutions for massively deploying clean energy supplies and energy efficiency programs, decarbonizing energy intensive industries, upskilling for the green economy and building a strong basis for international green trade.

Renewable Energy Sources (RES) have been delivering in times of crisis. The IEA notes that while CO2 emissions from fossil fuels combustion were expected to grow by 300 million tonnes in 2022 (to 33.8 tonnes), they would have more than tripled *"were it not for the major deployments of renewable energy technologies and electric vehicles around the world."* This shows how RES rose to the challenge of the energy crunch in 2022, as *"the relatively small increase in coal emissions has been considerably outweighed by the expansion of renewables"*, with the largest annual rise of RES generation on record. The more RES we bring into the global energy system, the more we need to maintain the balance of power supply and demand by using a variety of flexibility technologies, including battery storage, smart electricity grids, active management of the energy system, consumer participation in the market renewable H2, and virtual power lines.

### Appendix 3: Acronyms

BP statistical Review	The British Petroleum Statistical Review
IMF	International Monetary Fund
G20	Group of Twenty
IPCC	Intergovernmental Panel on Climate Change
SMR	Small Modular Reactors
EU	European Union
US	United States
MSME	Micro, Small and Medium Enterprises
CER	Certified Emission Reductions
LDC	Least Developed Countries
SDG	Sustainable Development Goals
LNG	Liquified Natural Gas

### Appendix 4: List of Tables

Table 1: Changing Renewables Consumption (Relative change %): 2015 to 2021
Table 2: Changing Coal Consumption (Relative Change %): 2015-2021
Table 3: Changing Oil Consumption (Relative Change %): 2015-2021
Table 4: Changing Gas Consumption (Relative Change %): 2015-2021
Table 5: Carbon Dioxide emissions by sector (2019)
Table 6: Energy Related Carbon Dioxide Emissions

## Glossary

### Blended Finance <sup>xi</sup>

The Strategic use of development finance for the mobilization of additional finance towards sustainable development in developing countries.

### Decarbonization <sup>xii</sup>

The process by which countries, individuals or other entities aim to achieve zero fossil carbon existence. Typically refers to a reduction of the carbon emissions associated with electricity, industry and transport.

### Net Zero Carbon Emissions <sup>xiii</sup>

Net zero carbon dioxide (CO<sub>2</sub>) emissions are achieved when anthropogenic CO<sub>2</sub> emissions are balanced globally by anthropogenic CO<sub>2</sub> removals over a specified period. Also referred to as carbon neutrality.

### Technological Leapfrogging <sup>xiv</sup>

When a nation bypasses traditional stages of development to either jump directly to the latest technologies (stage-skipping) or explore an alternative path of technological development involving emerging technologies with new benefits and new opportunities (path-creating).

### Small Modular Reactors <sup>xv</sup>

Advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit, which is about one-third of the generating capacity of traditional nuclear power reactors, which harness nuclear fission to generate heat to produce energy. They are physically a fraction of the size of conventional nuclear power reactors, making it possible for systems and components to be factory-assembled and transported as a unit to a location for installation.

### Energy Mix <sup>xvi</sup>

To meet its energy needs, each country uses fossil fuels (oil, natural gas and coal), nuclear energy, waste and the many types of renewable energy (biomass, wind, geothermal, water and solar) in different proportions. While energy mix varies significantly from one country to another, fossil fuels account for over 80% of the overall global energy mix.

### Carbon Tax <sup>xvii</sup>

Deterring the burning of fossil fuels is crucial to reducing the accumulation of heat-trapping greenhouse gases in the earth's atmosphere. A carbon tax could discourage the use of fossil fuels and encourage a shift to less-polluting fuels, thereby limiting the carbon dioxide (CO<sub>2</sub>) emissions that are by far the most prevalent greenhouse gas. Carbon taxes, levied on coal, oil products, and natural gas in proportion to their carbon content, can be collected from fuel suppliers.

### Least Developed countries

Low-income countries confronting severe structural impediments to sustainable development. They are highly vulnerable to economic and environmental shocks and have low levels of human assets. There are currently 46 countries on the list of LDCs, which is reviewed every three years by the committee for Development (CDP).

### Foreign Exchange Risk

Foreign exchange trade is the simultaneous buying of one currency and selling of another. A company can be affected by the variation in the exchange rate between its local currency, and the currency used in transactions with a foreign country.

### Certified Emission Reduction (CER)

A certificate issued and generated under the clean Development Mechanism (CDM), for each unit of reduction in the greenhouse gas emission from the atmosphere. One CER is equal to one metric ton of CO<sub>2</sub>. It can be traded in a voluntary carbon market and used by developed countries to meet emission reduction commitments.

### Carbon Capture Storage

Carbon Capture and Storage (CCS) and carbon capture, utilization, and storage (CCUS) are processes designed to collect or “capture” carbon dioxide generated by high-emitting activities like coal-fired or gas-fired power production or plastics manufacturing. Those captured emissions are then transported to sites where they are used for industrial processes or stored underground.

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