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# IASS POLICY BRIEF 8/2019

Institute for Advanced Sustainability Studies (IASS)

Potsdam, November 2019

## Countering the risk of an uneven low-carbon energy transition



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# Summary

**T**here are growing concerns of a globally uneven energy transition. Due to the uneven distribution of global technology and finance flows, developing countries have been particularly vocal about the importance of access to low-carbon technology as a precondition to sustainable development and the resolution of pressing energy access challenges. In contrast, OECD nations have stressed the importance of creating favourable business conditions to make low-carbon technologies an attractive investment; yet investments in renewable energy projects have remained concentrated in the OECD plus China, India, and Brazil, putting most developing countries at a disadvantage.

Consequently, the nationally determined contributions (NDCs) to the Paris Agreement of many developing countries make mitigation targets conditional on technology transfer and financial support exceeding the USD 100 billion to be mobilized annually under the Green Climate Fund. Countries are requested to update their NDCs by 2020 to close the gap in emission cuts needed in order to limit global warming to 1.5°C. Here, COP25 will need to send the right signals. An uneven transition entails risks for both the global community in that it increases their exposure to disastrous impacts of climate change; and for late-transitioning countries an enhanced exposure to economic instability, dwindling opportunity for trade, and conflicts.

## ■ Recommendation 1 Address the global dimension of just transitions

Policy debates on 'just transitions' focus on the implications of phasing out fossil fuels from national energy mixes. Yet there are distributional effects of a global energy transition especially for developing countries that lack financial and technological means to transition, creating structural risks. Acknowledging this global dimension of just transitions at the UNFCCC may help to create alliances for climate action.

## ■ Recommendation 2 Promote integrated low-carbon tech transfer mechanisms

Technology transfer initiatives can accelerate the diffusion of low-carbon energy technologies. Yet only a third of existing initiatives focus on transferring skills, expertise and technology simultaneously. To ensure the success of a global energy transition, tech transfer must be targeted and comprehensive.

## ■ Recommendation 3 Shift financial flows to increase ambition

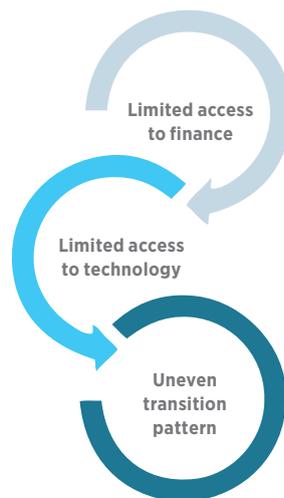
COP25 should coordinate a consistent strategy among financial actors to shift financial flows for energy transitions in the Global South. Common guidelines for long-term risk assessments and an exchange of best practices for capacity development could leverage ambition in the 2020 NDC updating processes.

# Background and context

The nationally determined contributions (NDCs) pledged by countries under the Paris Agreement currently fall short of the target of limiting global warming to 1.5°C by 2100. Of these pledges, 136 are conditional on states receiving assistance in the form of finance, technology, and capacity building (Pauw et al 2019). If these needs are not addressed, the global energy transition may happen quickly in some places and not at all in others, creating uneven transition patterns. These patterns will likely emerge along North-South lines due to structural inequalities that restrict access to finance and technology. An uneven transition bears risks both for the international community and for late decarbonizing countries. The COP25 negotiations offer a crucial opportunity to close this ambition gap. While the international community has taken first steps to acknowledge and address the tech and finance gap, it is important to appreciate its disproportionate impacts on developing countries.

## Why an uneven transition?

While the prices for clean electricity generation are dropping, this will not suffice to deliver the systemic changes that are urgently needed for the energy sector to achieve carbon-neutrality by 2050. Coal-fired power plants are still being planned and built, and world fossil fuel prices are predicted to deflate over the next decades (Agora Energiewende 2019). However, maintaining this course means that the eventual switch to clean economies will be even more costly, thanks to carbon lock-in (Unruh 2000). In order to break away from fossil fuel energy systems, countries need two key resources: finance and technology. IASS research shows that, with the exception of the BRICS states, developing countries are most likely to be excluded from these streams.



**Figure 1:**  
Pathways of an uneven transition

**Source:**  
IASS/the authors

**Finance gap:** The scope of the financial resources needed to decarbonize the energy sector is massive: IRENA (2019) predicts that total investment in the energy system would need to reach USD 110 trillion by 2050 (15 trillion of which would go to renewable energy). Access to international finance is one of the most decisive factors for a successful energy transition in a developing country, as highlighted by a recent IASS elite survey among energy industry and energy finance experts worldwide (IASS 2019a). Yet despite having some of the highest mitigation needs (Tempest and Lazarus 2014), developing countries (excluding China, India and Brazil) only received 11.7 per cent of the total investment volumes of USD 280 billion in 2017 (Frankfurt School-UNEP Centre/BNEF 2018). Private investment flows are likely to remain low due to risk levels, insufficient returns on

investment and overall low demand due to high levels of energy and general poverty. If current patterns persist, developing countries will continue to see relatively low investments in clean energy compared to conventional energy. There are, after all, abundant sources of non-renewable finance: While the Green Climate Fund (GCF) struggles to raise funds, a recent summit in Sochi focused on Russian-African deals

including oil and gas (Farand for Climate Change News, October 2019). And even as China cuts back on coal investment at home, it continues to finance thermal power plants abroad through vehicles such as the Asian Infrastructure Investment Bank (Inskip & Westerman 2019). Providing long-term public funding for clean energy is therefore of particular importance to developing countries.

Investment in USD billions, 2018

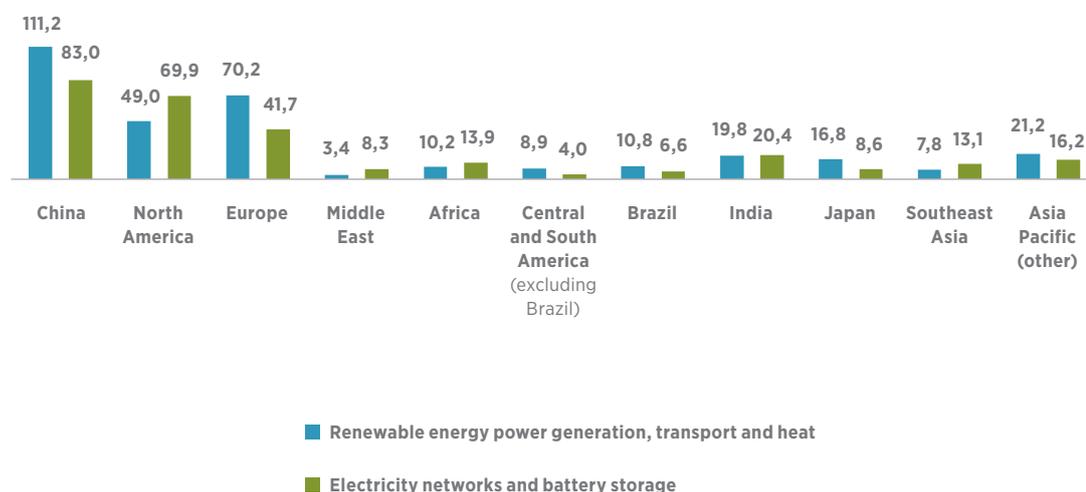


Table 1: Investments in renewable energy systems, including hydropower

Source: Data from IEA World Energy Investment 2019

**Tech gap:** While the technologies to generate low-carbon energy are already widely available, their development and manufacturing takes place to a large extent in the USA, the EU, China, and Japan. Their technology diffusion is driven primarily by large-scale investments in energy manufacturing and generation projects. However, not all of the countries that need these technologies offer a favourable environment for investment. In addition, the IASS elite survey ranks skills and knowledge in renewable energy among the five most important factors for investment decisions in renewable energy sources in a developing coun-

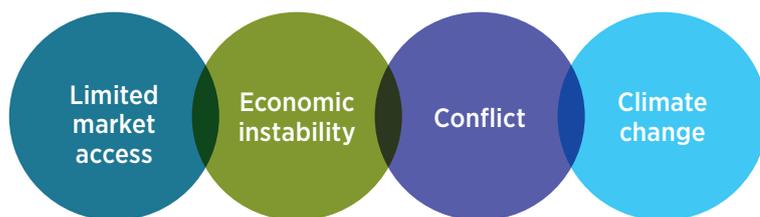
try; this is perhaps why experts see BRICS countries as potential transition ‘winners’ (IASS 2019a). Yet national technological innovation systems are generally lacking in developing countries and creating them requires time, money, and institutional capacities (Ockwell and Byrne 2015). In this case, a negative feedback loop could develop in which countries with already relatively low technological capacities are unable to attract investments that could help them develop further, widening the gap between transition leaders and technology recipients.

What is more, technology diffusion may result in clean energy technologies moving from advanced to less advanced economies, but it does not necessarily ensure the creation of local economic value in the receiving country. This problem can be addressed through targeted technology transfer, which includes not only the ‘hardware’ (such as solar panels) but also ‘software’, that is, the knowledge and skills necessary to reproduce and improve a technology to fit local needs. Such comprehensive tech transfer in turn increases resilience and creates opportunities for new products and indigenous industry. In order for technology transfers to be successful, local capacities for the use and modification of technologies must exist. However, a systematic IASS stocktaking of globally existing technology transfer initiatives found that of those in non-OECD countries in early 2019, less than half included measures to transfer skills and build local innovative capacity (IASS 2019b). This is troubling as currently almost 80 per cent of least-developed countries make their NDCs conditional on technology transfer (Pauw et al. 2019).

While the international community has acknowledged that a finance and technology gap exists, the needs of developing countries are far from being met. Altogether, the financial requests within conditional NDCs exceed the proposed target of mobilizing USD 100 billion annually for the GCF from 2020 onwards. In addition, the GCF is already struggling to meet its funding goals: The latest replenishment session, held in October 2019, was only able to raise USD 9.8 billion from 27 countries, whereas 300 projects worth USD 15 billion are currently waiting for GCF funding (Yeo for Nature 2019). In total, the GCF estimates yearly investment needs of up to USD 7 trillion.

### Risks of an uneven transition

Taken together, these finance and technology transfer deficits mean that a set of countries will be unable to decarbonize, increasing the gap between transition leaders and laggards. This uneven transition entails risks for both the global community and late-transitioning countries.



**Figure 2:**  
Transition risks

**Source:**  
IASS/the authors

The first risk lies in developing countries not being able to green their energy systems, resulting in increasing global CO<sub>2</sub> emissions. Due to growing populations and economies, non-OECD countries are expected to make up 70 per cent of global future energy demand by 2040 (IEA 2018). Even if these countries still have relatively low emissions today, a lack of funds and technology for clean energy will mean higher future emissions. While it is key to reduce emissions for current emissions 'heavyweights' (including China, India and Brazil), underestimating the impacts of countries with fast-growing populations is crucial to achieving the 1.5°C target.

The second risk is for export-dependent countries that are unable to quickly decarbonize their energy systems. In a decarbonizing global economy, the carbon content of products will become an important factor to determine market access. Cases in point are measures such as the border carbon adjustments under discussion at the new EU Commission (Wolff for Bruegel 2019). If large economies were to impose such levies, it could result in countries that are locked into fossil fuel systems becoming shut out of prime import markets. While the emerging BRICS economies have a choice when it comes to designing their energy systems going forward, many developing nations arguably have not; their transition risks being hampered by the lack of investment that would bring the necessary low-carbon technology. Short of the latter, however, they will be at a disadvantage in global markets.

Another related risk is specific to resource-rich countries that rely on fossil fuel rents as a major source of income. Unless they rapidly diversify their economies, such countries may see their fossil assets becoming less valuable as the transition progresses, resulting in the spectre of domestic economic crises and recession (Mercure et al. 2018). Dwindling fossil fuel revenues may also break the social contract and bring about political instability. IASS expert interviews confirm that many actors in the finance and energy sectors are already aware of these risks, implying that the window of opportunity for course corrections may be far smaller than domestic policy-makers assume.

Finally, an uneven global energy transition could potentially disrupt international cooperation. If the gap between early and late decarbonizing countries deepens, so too might the potential for disagreements at the United Nations, further slowing the transition. It is therefore imperative that structural inequalities be mitigated by actions taken at COP25. Providing the financial and technical means to realize the conditional NDC targets would help to build trust for a global alliance for more ambitious action. The following three policy recommendations address the risks of an uneven transition.

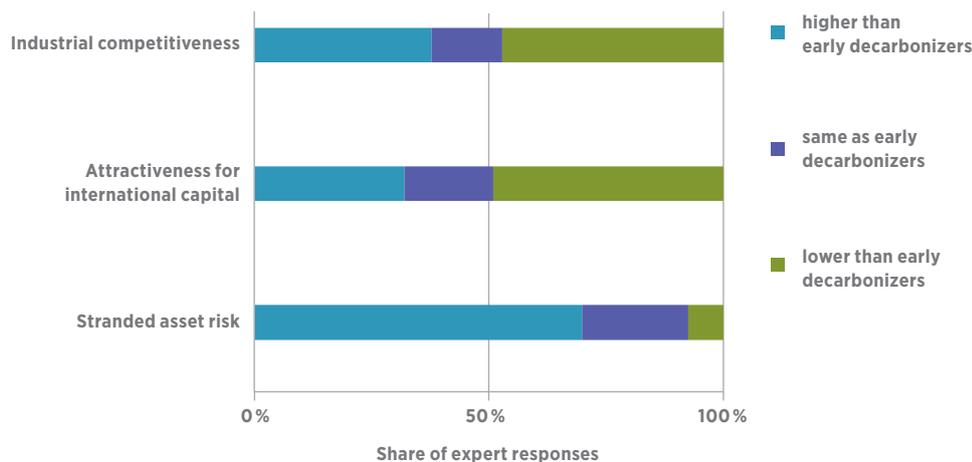
### **Box 1: Uneven transition: the case of Algeria**

Algeria is a country that was rated as high-risk by the experts in the IASS survey. In 2018, it had under 1 GW of installed renewable energy capacity and was highly dependent on fossil fuels for economic stability. Algeria may also be excluded from international finance flows, as it ranks low for ease of doing business (157<sup>th</sup> out of 190 countries according to the World Bank's 2020 Doing Business Report). Tech transfer assistance is therefore a key step in reducing the country's transition risks.

# Address the global dimension of just transitions

Policy debates on ‘just transitions’ tend to narrowly focus on the socio-economic implications of phasing out coal or other fossil fuels from national energy mixes. While the French *gilets jaunes* drove home the point that carbon policies need to be socially acceptable, such a national definition of ‘justice’ neglects the distributional effects of a global energy transition across countries. The implications of climate change will be unevenly distributed and will hit many developing countries faster and harder than OECD

countries. Facilitating a globally just transition therefore means enabling each and every country to be part of this transition by ensuring they are able to access the necessary financial and technological resources. The IASS elite survey suggests that late decarbonizing countries will face significantly higher risk levels when it comes to economic stability, attractiveness for investments, industrial competitiveness and exclusion from global markets.



**Figure 3:** Low-carbon transition: Implications for late decarbonizers (N = 53 experts)

Source: IASS 2019a

Putting the risk of an uneven transition on the agenda could help debates at the UN on climate action move past issues of historical responsibility and the distribution of climate change impacts.

could help avoid the emergence of antagonistic blocs comprising the early and late decarbonizing countries, and break the deadlock between developing nations and advanced economies in the UNFCCC.

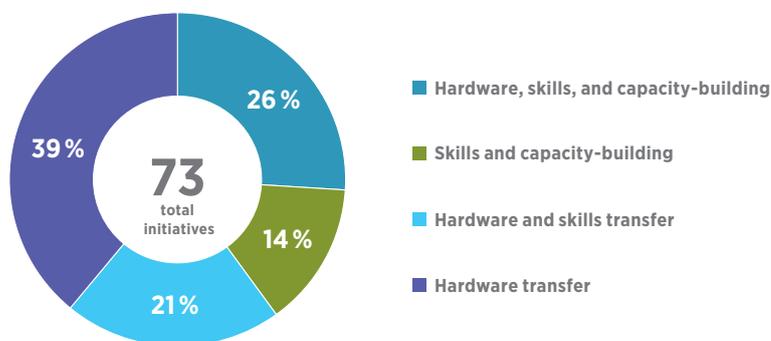
The onus is on Annex-I countries in particular to send a strong signal in this regard, which would encourage more ambitious NDC revisions in 2020. Likewise, those BRICS countries that have expanded their engagement in international energy investment would need to align these activities more closely with the goals of the Paris Agreement, e.g. by only investing in renewable energy sources. This would not only speed up action and help climate change mitigation; by acknowledging the global dimension of just transitions at the next COP, the international community

However, the imperative of ensuring a global just transition cannot be limited to the UN if sustained international action is to take place. Other fora such as the G7 should use their platforms and resources to advance related agendas. In addition, EU transitions platforms such as the *European Platform for Coal Regions in Transition* should broaden their scope to consider impacts. It is only through comprehensive efforts by all relevant global bodies in climate and energy policy that the risks of an uneven transition can be addressed.

# Promote integrated low-carbon tech transfer mechanisms

Ensuring access to technology for countries in the Global South should be a top priority for policymakers. While the diffusion of low-carbon energy technology is crucial for the energy transition, it depends to a large extent on investment, which risks leaving many developing countries behind. In addition, the mere diffusion of hardware like solar panels is not enough to build innovation capacity and create local economic value. Technology transfer must include the transfer of skills and expertise, so that users are able to modify and use tech according to local needs.

There is a crucial second dimension to this, in that heightened innovative capacities help to attract international financing for clean energy projects. Technology transfer should therefore be understood as an integrated process that includes the transfer of skills and expertise. However, the IASS assessment of initiatives aiming to transfer low-carbon energy technology found that innovative capacity building was severely neglected. Around 40 per cent of existing initiatives only transferred hardware; another 20 per cent focused on hardware with some skills transfer. Just over 26 per cent of initiatives transferred both hardware and skills and worked to build local innovative capacity.



**Figure 4:**  
Technology transfer initiatives by type

**Source:**  
IASS 2019b

IASS research suggests that actors and institutions that aim to promote technology transfer must expand the scope of their activities to support capacity building. Such a targeted and comprehensive tech transfer strategy can reduce the risk of an uneven global energy transition. One body with such a strategy is the Climate Technology Centre and Network (CTCN), which is tasked by the UN Technology Executive Committee to help countries achieve their NDCs.

For example, an initiative it promoted in Algeria with cooperation from the US National Renewable Energy Laboratory helped to establish a domestic certification body for solar technology including lab setup, training and materials. However, the CTCN and similar organizations work at a relatively small scale and depend on international finance to implement projects.

# Shift financial flows to increase ambition

Climate finance will continue to be a hotly debated topic at COP25. Getting climate finance right would forge alliances that could be leveraged as the NDCs are updated with a view to closing the ambition gap. Achieving this will require the alignment of additional sources of funding by development banks and private investment funds with the Paris Agreement. In addition, climate finance must be consistent with the goals of the Paris Agreement – both within and across public and private funding institutions. Many of these target renewable energy projects while continuing to fund carbon-intensive energy projects, undermining the ambition of low-carbon development pathways (Dunlop et al., 2019). Accordingly, countries are still getting locked into emission-intensive energy infrastructure, with higher exposure to the risks of economic instability and exclusion from trade. Therefore, a clear commitment by financial actors to a common, consistent strategy is crucial to ensuring the success of a global energy transition. Three elements are key in this regard:

**Innovative mechanisms** are needed in order to extend and enhance access to financial flows. De-risking investments in renewable energy and low-carbon projects in countries of the Global South is an important element in this and can be pursued with a variety of instruments, including loan guarantees, insurances, public equity co-investments or public-private partnerships. Here, global best practice will prove highly valuable. Furthermore, the new market mechanisms under Art.6 of the Paris Agreement that are expected to be finalized at COP25 need to be accompanied by support mechanisms to specifically target developing countries other than BRICS. These could build on best practices e.g. under the “NDC Support Cluster” of the International Climate Initiative (IKI). Among other activities, the cluster aims at capacity building to develop bankable projects early-on in the project preparation phase that is prior to funding applications.

**Consistency with the Paris Agreement targets** can be increased across financial institutions by enhancing the international coordination of public and private funding guidelines and practices for the evaluation of SDG compliance. The Coalition of Finance Ministers for Climate Action, which held a first technical meeting in 2019, or the UN Principles of Sustainable Banking, launched in 2019 and signed by 130 banks holding assets totalling USD 47 trillion, are important entry points here. However, these initiatives would need to be lifted up to the next level, COP25 being a first opportunity to commit to common mandatory guidelines that then could be implemented coherently within public financial institutions across all countries.

**Transparency frameworks** are necessary to ensure accountability and uphold a common strategy across financial institutions. As the design of market mechanisms under Art.6 is expected to be finalized at COP25, transparency regulations and reporting obligations need to be incorporated into the Paris rulebook in order to ensure that this finance mechanism targets additional emission reduction projects beyond NDC obligations in order to avoid ambition gaming in the 2020 updating process.

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# Conclusion and outlook

Providing the technological and financial prerequisites for a global energy transition will be key to reducing the risks associated with an uneven transition and enabling all countries to enjoy the numerous co-benefits of an energy transition. Consistent strategies are needed to deliver a just global energy transition, limit global warming to 1.5°C and enable countries to decarbonize their economies. Access to climate finance and low-carbon technologies is also critical for efforts to build a global alliance for raising ambition under the UNFCCC. The Meetings of the Marrakech Partnership for Global Climate Action, involving multi-level governments and private businesses

and investors working against climate change, might open further space for these discussions at COP25. Furthermore, international platforms, bilateral programmes, and private actors can all play an important role. Initiatives like the NDC Partnership showcase the potential for aligning the activities of multiple actors within specific country contexts. Steps must also be taken to coordinate the principles and practices of financial actors across all countries. COP25 in Madrid could serve as a stepping stone in the development of consistent strategies that will be crucial for developing nations as they update their NDCs in 2020 and for efforts to close the ambitions gap. ■

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## Institute for Advanced Sustainability Studies (IASS) e. V.

The Institute for Advanced Sustainability Studies (IASS) conducts research with the goal of identifying, advancing, and guiding transformation processes towards sustainable societies in Germany and abroad. Its research practice is transdisciplinary, transformative, and co-creative. The institute cooperates with partners in academia, political institutions, administrations, civil society, and the business community to understand sustainability challenges and generate potential solutions. A strong network of national and international partners supports the work of the institute. Among its central research topics are the energy transition, emerging technologies, climate change, air quality, systemic risks, governance and participation, and cultures of transformation. The IASS is funded by the research ministries of the Federal Government of Germany and the State of Brandenburg.

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