IASS POLICY BRIEF 2/2019

Institute for Advanced Sustainability Studies (IASS)
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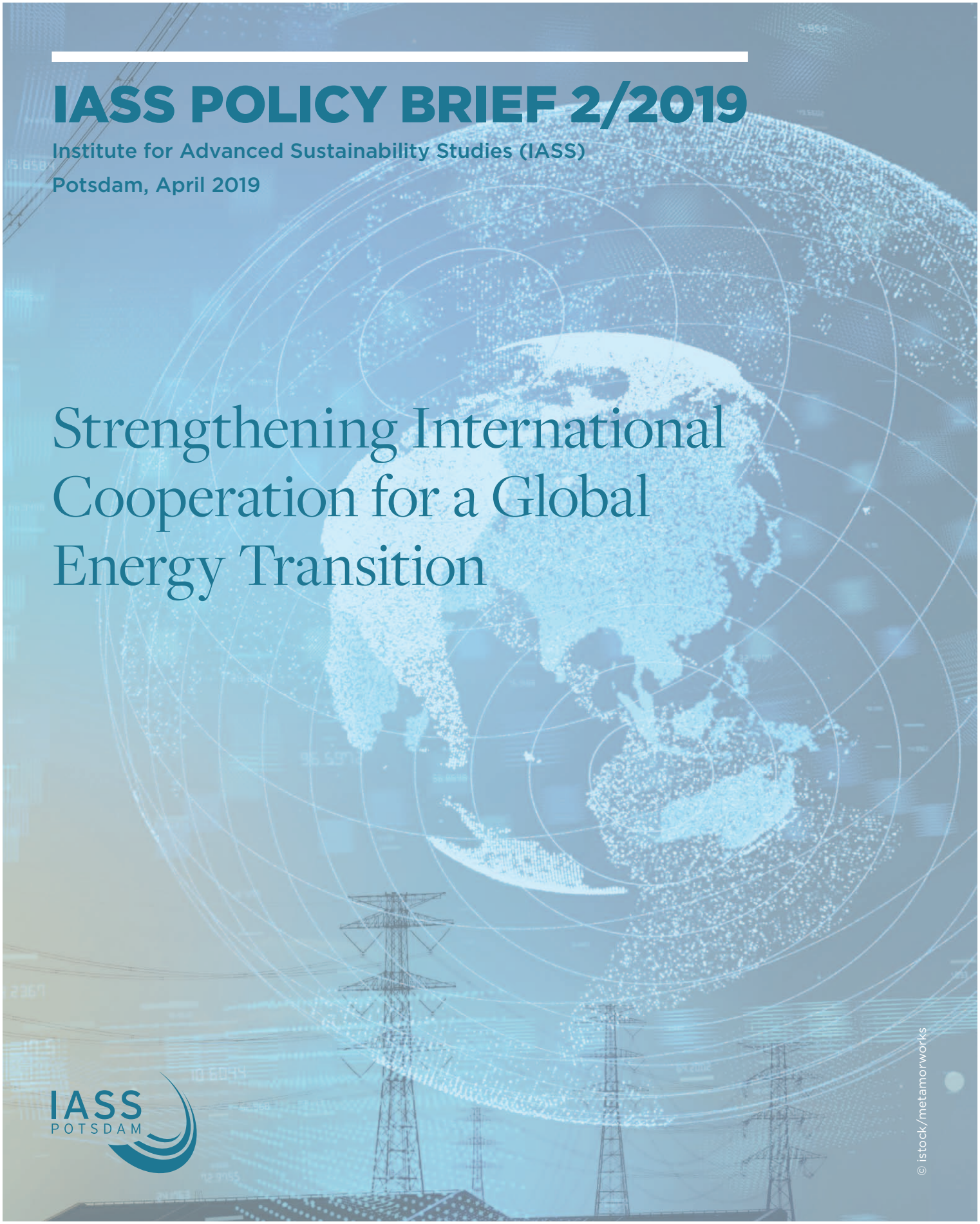
Strengthening International Cooperation for a Global Energy Transition



IASS POTSDAM

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International cooperation in support of a global energy transition is on the rise. Initiatives and fora for multilateral cooperation are complemented by growing bilateral engagement to foster international lesson-drawing and exchange. Official development assistance (ODA) in the energy sector is increasingly being directed to renewable energy sources.

Despite these promising developments, it is widely acknowledged that investment towards achieving Sustainable Development Goal 7 on clean and affordable energy is insufficient. A recent report by SE4ALL estimates annual investments in support of SDG7 at USD 30 billion. This is well below the USD 52 billion that are needed (SE4ALL and Climate Policy Initiative, 2018). Moreover, investment in clean energy remains heavily concentrated in a small number of frontrunner countries.

In terms of technologies, investments in clean energy still overwhelmingly target grid-connected electricity generation. Despite their proven ability to provide rapid and affordable access to clean energy in many country contexts, off-grid technologies account for only 1.3 per cent of investments (SE4ALL and Climate Policy Initiative, 2018). Worryingly, a significant share of international public sector financing, most notably by export-credit agencies, is still allocated to coal and other fossil-based technologies.

Against this background, this policy brief makes three recommendations for strengthening international cooperation in support of a global energy transition.

Recommendation 1

Promote investment in clean energy and end support for coal-based energy infrastructure.

To this end, donor countries from the OECD and G20 should lead the way by discontinuing all public investment support for new coal-based energy infrastructure and establish clear guidelines for support to other fossil-based investments.

Recommendation 2

Tackle the socio-economic dimension of the global energy transition.

In order to accelerate and expand the geographic scope of the global energy transition, international cooperation should play an active role in mobilising the socio-economic benefits of clean energy and address potential risks by supporting analysis and policy dialogue at both the country and global levels.

Recommendation 3

Provide early market support to promote challenge-based energy innovation.

SE4ALL or Mission Innovation should create multi-stakeholder, challenge-based initiatives to promote energy innovation in developing and emerging economies and foster early market demand for related products or services.

The role of international cooperation to promote a global energy transition

International cooperation to support a global energy transition is on the rise. The international institutional architecture has developed significantly over the past decade. The International Renewable Energy Agency (IRENA) provides an institutionalised and internationally recognised forum for global knowledge development and exchange on renewable energy. The UN Initiative Sustainable Energy for All (SE4ALL) provides a framework for activities in support of implementing Sustainable Development Goal 7 for affordable and clean energy. The International Energy Agency (IEA) now also engages actively to support a transition to clean energy with initiatives like its Clean Energy Transitions Programme. Other important initiatives include the Clean Energy Ministerial, the G20 Energy Transitions Working Group, the International Partnership for Energy Efficiency, and the Berlin Energy Transition Dialogue.

Initiatives and fora for multilateral cooperation are complemented by growing bilateral engagement to foster international lesson-drawing and exchange. Germany, for instance, has forged energy partnerships and dialogues with over 20 countries with the aim of promoting renewables and energy efficiency (Quitzow et al. 2019). China and the US collaborate in the context of the US-China Clean Energy Research Center and the US-China Renewable Energy Partnership with the aim of accelerating the development and deployment of clean energy technologies.

Official development assistance (ODA) in the energy sector is also increasingly being directed to renewable energy sources. Data provided by the OECD on ODA reveals that support to renewable energy projects has increased substantially over the past decade. It grew from slightly over USD 1.5 billion in 2008 to close to USD 6 billion in 2017. In 2017, support for renewables made up 41 per cent of total energy ODA (see figure 1 for details).

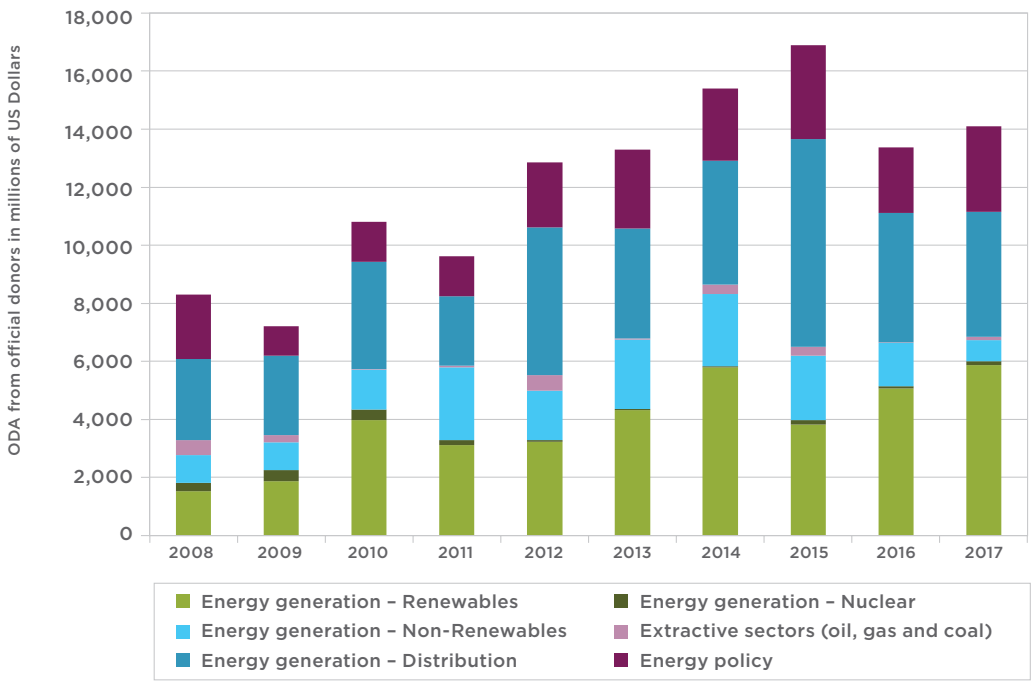

Figure 1: Overseas development assistance from official donors in the energy sector

Source: Authors, based on data available from the OECD's Creditor Reporting System

Gaps and remaining challenges for international energy cooperation

Despite the dynamic and positive development towards more international cooperation for a global energy transition, it is widely acknowledged that investment towards achieving Sustainable Development Goal 7 on clean and affordable energy is insufficient. A recent report by SE4ALL estimates the total annual investments (from private and public sources) in support of SDG7 at USD 30 billion. This is well below the USD 52 billion that are needed (SE4ALL and Climate Policy Initiative, 2018).

Investment concentrated in frontrunner countries

Moreover, investment in clean energy remains heavily concentrated in a small number of frontrunner countries. China, the US and Europe accounted for three quarters of total global investment in renewable energy in 2017 (see figure 2 below). Among developing countries, India and Brazil represent the largest recipients, capturing 6 per cent of the total. A mere USD 33 billion, representing 11 per cent of the total, found their way to the remaining developing countries (Frankfurt School-UNEP and BNEF, 2018). Employment creation and value added in clean energy manufacturing also remain highly concentrated in a small number of frontrunners: China, Japan, Germany and the US. Brazil, India and a number of Asian economies represent important regional hubs in the wind energy and solar photovoltaics supply chains (CEMAC, 2017).

In terms of technologies, investments still primarily target grid-connected electricity generation. Despite their proven ability to provide rapid and affordable access to clean energy in many country contexts, off-grid technologies account for only 1.3 per cent of investments. Worryingly, a large share of investments is still allocated to fossil-based technologies. In the 20 high-impact countries covered by SE4All's investment tracking, about half of the investment in electricity generation still goes to fossil-based infrastructure (SE4ALL and Climate Policy Initiative, 2018).

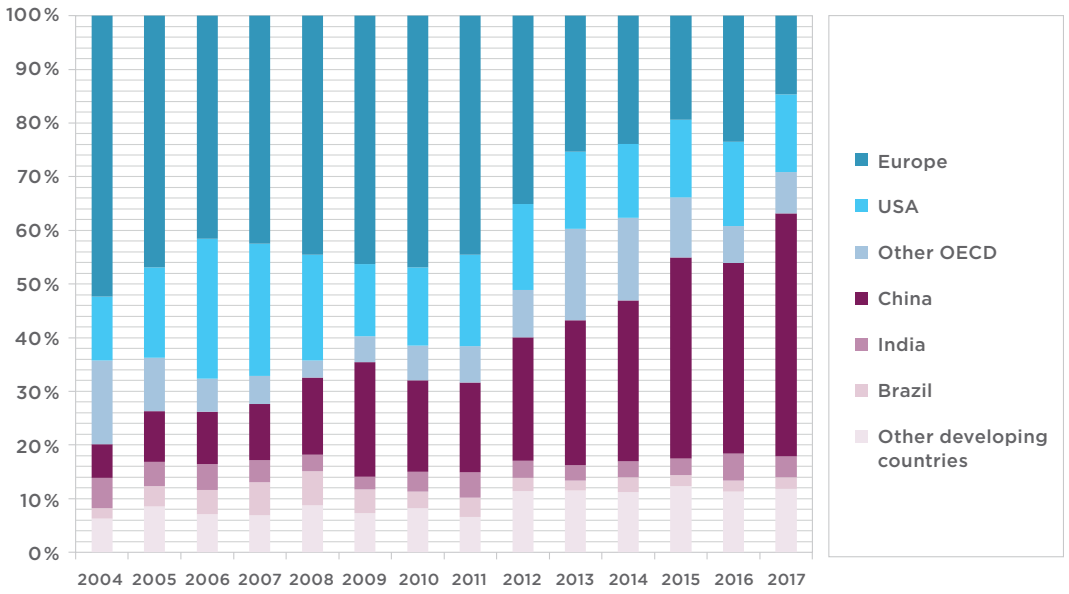

Figure 2:
Share of investment in renewable energy by country/group of countries

Source:
Authors, based on Frankfurt School-UNEP and BNEF (2018)

Focus on existing solutions

These investment trends are largely mirrored in the current landscape of international cooperation. Overall, international cooperation is strongly focused on the promotion of existing technologies and solutions. A recent review of Germany's energy partnerships conducted by the IASS shows that its bilateral cooperation primarily focuses on disseminating the lessons and technical know-how from Germany's energy transition to its partner countries. Accordingly, a major focus is on the deployment of grid-connected renewable energy technologies and related regulatory issues and challenges of system integration. Only in a few instances do the partnerships explicitly target the promotion of innovation and technology development (Quitzow et al., 2019). International initiatives that do target innovation primarily focus on cooperation among energy transition leaders. Mission Innovation, a multilateral initiative in support of clean energy innovation, primarily engages existing frontrunners. Little attention is paid to the forging of innovation partnerships aimed at developing new solutions for less developed markets.

Investing for a low-carbon future?

Official ODA funding for fossil-based infrastructure shows a downward trend, with commitments in 2017 dropping below USD 1 billion. However, funding from public export-credit agencies remains strongly oriented towards fossil-based energy generation, including coal. Despite an agreement among OECD countries to reduce coal-related financing (OECD, 2015), a number of banks continue to pursue investments in the coal sector. The Japanese Bank for International Cooperation and the Export-Import Bank of Korea have been found to be particularly active in launching new coal-based projects (DeAngelis, 2018). But Germany's export-credit agency, Euler Hermes, also continues to provide guarantees to fossil-based projects on a significant scale (see figure 3 below).

Over the last two decades, China Development Bank and China Export-Import Bank have emerged as major sources of funding for coal- and other fossil-based energy projects around the world. Between 2005 and 2017, the two Chinese policy banks dedicated over 40 per cent of their power sector funding to coal-based energy generation. Their energy sector financing amounted to about USD 200 billion in the period from 2007 to 2016, almost twice as much as the World Bank provides to projects in the energy sector (Gallagher et al., 2018).

Against this background, this policy brief makes three recommendations to further strengthen international cooperation in support of a global energy transition.

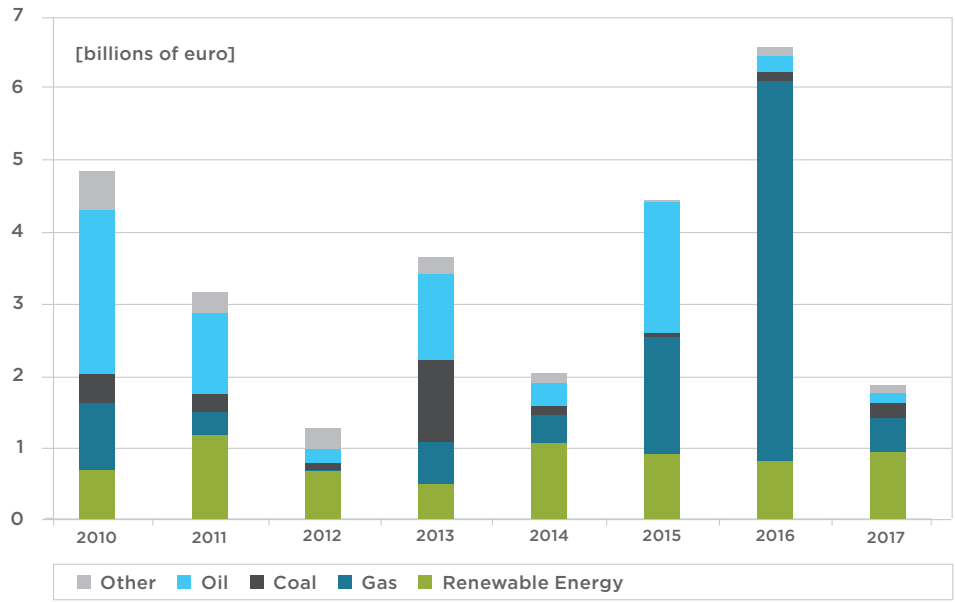

Figure 3:
German Euler-Hermes export credit guarantees for energy projects by energy source

Source:
Authors, based on data available at https://www.agaportal.de/exportkreditgarantien/grundlagen/energiesektor

Promote investment in clean energy and end support for coal-based energy infrastructure

International cooperation should focus on creating a conducive environment for investment in renewable energy, while discouraging investment in fossil fuels. To this end, donor countries from the OECD and G20 should lead the way by discontinuing all public financial support for new coal-based energy infrastructure and adopting guidelines for investment in other fossil-based energy infrastructure. Coal-fired power plants are not only a threat to globally agreed climate targets; by creating new lock-ins in high carbon infrastructure, they also increase the economic and financial risk of stranded assets. Moreover, cost-competitive clean energy alternatives make the economic case for investments in coal-fired power plants obsolete.

The OECD *Sector Understanding on Export Credits for Coal-fired Electricity Generation Projects* offers an important starting point for developing an agreement among all donor countries to discontinue all public financial support for coal-based energy infrastructure. It includes, for instance, provisions to ensure that eligible projects are in line with the host country's climate mitigation strategy and that less carbon-intensive alternatives are not viable (OECD, 2015). The G20 energy work stream could offer an appropriate forum not only for extending the agreement to all G20 donor countries, but also for broadening its scope to cover all new coal-fired power plants. In its 2016 Voluntary Action Plan on Renewable Energy, the G20 agreed in principle on the need to reduce coal consumption. What is missing, however, is a clear commitment by the G20 members to cease public financing for new coal-fired power plants overseas.

Furthermore, the G20 should call on all multilateral development banks (MDBs) to adopt policies banning investments in coal-based energy generation. While the World Bank and a number of other MDBs have done so, this should be extended to include the remaining MDBs. In order to track the implementation of such commitments, a process for the development and communication of corresponding policies should be established. The discontinuation of financial support for coal-based power plants would not only ensure that MDBs avoid the creation of new lock-ins in high carbon infrastructure, but also set an important precedent and framework for national development finance institutions (DFIs) to follow.

In parallel, the G20 energy and climate work streams should develop more general guidelines for the provision of public financial support to other fossil-based infrastructure. This should be based on a lifecycle assessment of climate impacts and climate asset risks. Such a framework should build on experiences with shadow carbon pricing as a method for assessing carbon asset risk, as introduced by a number of MDBs (Larsen et al., 2018). Again, the development of such a framework for use by G20 donor countries and MDBs is not only important in its own right. It can provide guidance and the political motivation for other DFIs to adopt corresponding approaches.

Tackle the socio-economic dimension of the global energy transition

The global energy transition presents important social and economic development opportunities (see figure 4). Worldwide, more than 10 million people are already employed in the renewable energy sector (IRENA, 2018). In India, clean energy targets are expected to create over 300,000 jobs in the next five years (CEEW and NRDC, 2017). A recent report on South Africa shows that by pursuing ambitious renewable energy scenarios, gross employment in the power sector could be more than doubled by 2030 (IASS and CSIR, 2019). Germany's Energiewende is fostering societal ownership in the energy system, with more than 1,700 citizen-led energy cooperatives across the country generating direct revenue for citizens and local communities (Helgenberger et al., 2019).

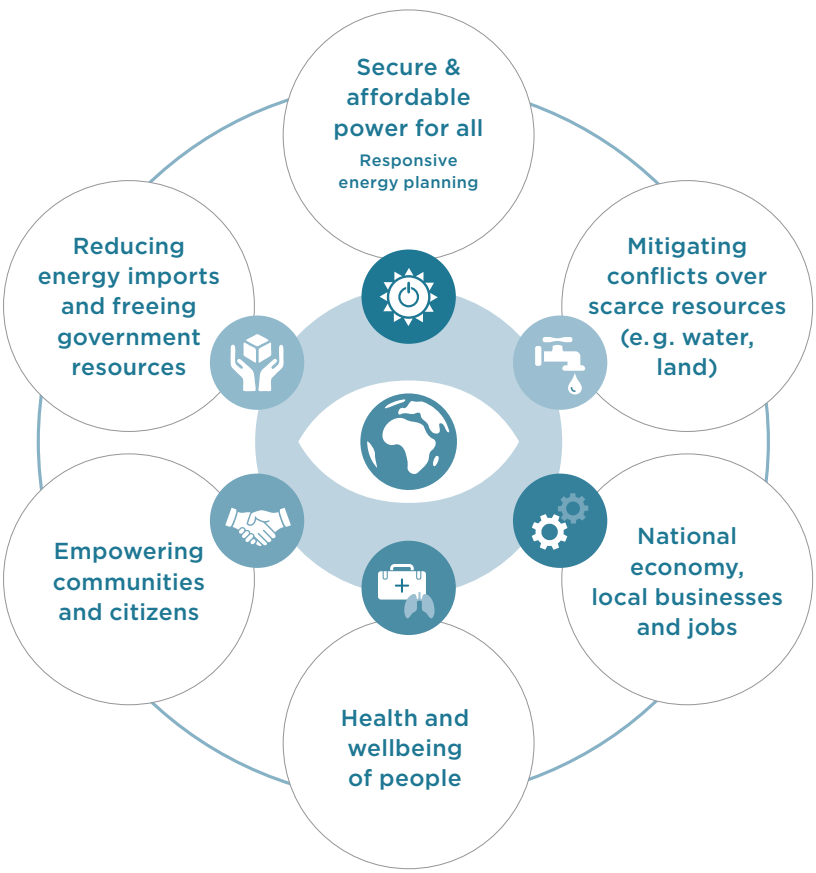

Figure 4:
Social and economic co-benefits driving the global energy transition

Source:
Helgenberger and Jänicke (2017)

In order to accelerate and expand the geographic scope of the global energy transition, international cooperation should play an active role in mobilising the socio-economic benefits of a global energy transition by supporting policy dialogue and robust analysis of socio-economic benefits at both the country and global levels. At the country level, the COBENEFITS project, led by the IASS in the framework of Germany's International Climate Initiative (IKI), offers in-depth assessments in a number of countries. Similar analyses are needed to underpin investment strategies in developing and emerging countries and should therefore be expanded. In a first step, this might be done for the high-impact countries within SE4ALL. Such analysis can provide the basis for cross-country assessments of best practice and processes of mutual learning on the national-level benefits of renewables. Formats for bi- or multilateral South-South policy alignment, such as the International Solar Alliance, will also be important. China, but also India and Brazil, are the key players in low-carbon development outside the OECD and should take the lead in creating such exchanges.

At the global level, socio-economic analyses conducted by IRENA, such as the annual reviews of employment in the renewable energy sector (IRENA, 2018), offer an important starting point. In addition, efforts should be made to systematically cover developments in clean energy manufacturing. The Clean Energy Manufacturing Center, launched by the US Department of Energy, represents an important effort to generate data on clean energy manufacturing for stakeholders in the US. These data are required for a robust assessment of the factors, including policies, regulations and standards, that are shaping the localisation of industrial production within the emerging clean energy sector. Such analysis is urgently needed to address the needs of developing and emerging economies. The OECD's Policy Dialogue on Global Value Chains, Production Transformation and Development could offer a forum for developing such a data collection initiative.

Finally, it is equally important to consider the potentially adverse effects that might accompany a global energy transition. This includes, but is not limited to, the financial risks related to existing and new investments in fossil-based power generation (carbon risk). To date, there is little systematic analysis of the broader socio-economic risks of a global energy transition and the related exposure of individual countries and stakeholder groups. Developing an evidence base on these questions is crucial for the development of appropriate mitigation strategies. This, in turn, is key to garnering the support of affected stakeholders and countries and should accompany policy dialogue and analysis on the socio-economic benefits of a transition to clean energy.

Provide early market support to promote challenge-based energy innovation

Support for the spread of clean energy technologies to new markets is crucial for advancing the global energy transition. These efforts should not be limited to the transfer of existing clean energy solutions, however. Depending on existing infrastructure or the particular climatic or societal context, existing technologies may not always be the most appropriate. Energy efficient building designs, for instance, must take into account both local climatic conditions and social practices (Pocock et al., 2016). Moreover, innovation aimed at the needs of emerging and developing markets offers important opportunities for value creation. Estimates show that approximately two thirds of middle-class consumption is likely to be located in emerging and developing economies by 2030 (Kharas, 2017). Accordingly, these markets represent important growth markets for energy-related infrastructure and services. Moreover, in the absence of clean energy solutions tailored to these growth markets, there is a high risk of new high-carbon infrastructure lock-ins.

Creating innovation ecosystems

At the same time, developing and emerging economies frequently lack the institutional infrastructure necessary to support clean energy innovation. This requires innovation ecosystems that span infrastructure and human resources for research and development, financing for innovation and entrepreneurship as well as networks of innovative firms. In addition, clean energy innovation typically requires some form of support for early market demand for innovative products or services.

While the international community cannot provide a shortcut to the development of such institutions, it could support international multi-stakeholder initiatives to jointly tackle selected energy innovation challenges. Under the umbrella of SE4All or Mission Innovation, this could provide a forum for bringing together cutting-edge international expertise with domestic knowledge and capacities to meet selected innovation challenges. The aim should be to concentrate a critical mass of resources on a clearly defined innovation challenge in order to catalyse progress towards the chosen goal.

Supporting innovation by fostering early market demand

Efforts to foster early market demand for the resulting products or services should take centre stage. While feed-in tariffs or reverse auctions play this role in stimulating markets for traditional, grid-connected renewable energy technologies, additional instruments are needed to stimulate and aggregate demand in other areas of application. Market support programmes for off-grid solar energy technologies and clean cooking devices are examples of such approaches. Challenge-based innovation initiatives should prepare the ground for the roll-out of market support programmes for innovative applications in new end-user markets.

Innovation-oriented procurement by the public sector offers one entry point for stimulating such early market demand. This has been successfully used to stimulate technologies such as the Global Position-

ing System in the US or fuel cell electric buses in Japan. In developing countries, there are examples in the health sector. So-called advanced market commitments have been used to stimulate the development of vaccines in high-impact areas. These legally-binding agreements provide funding to subsidise the purchase, at a pre-determined maximum price, of an as yet unavailable vaccine, thereby accelerating its development and availability.

Finally, the focus of innovation challenges should be developed in participatory processes. This would create opportunities for raising awareness and generating debate on energy innovation within the respective countries, while identifying challenges that reflect domestic priorities and needs. Here it will be crucial to engage both private sector and civil society stakeholders. The latter have been shown to be underrepresented in donor-supported energy initiatives (Quitzow et al., 2016).

Solar collectors in Cambodia: An important potential for clean energy innovation in end-user markets in the developing world remains largely untapped.

Conclusion

Rapid declines in the costs of renewable energy technologies have unleashed an irreversible process of transformation in the energy sector. Even the most conservative forecasts now project a rapid expansion of renewable energy around the world. Nonetheless, policy decisions remain crucial for determining the speed of a global transition to clean energy. Cooperation among leading countries can play a key role in setting the pace in this regard. However, international energy cooperation needs to go beyond the solutions and strategies being pioneered in these countries. It will be equally important to address the unique challenges of developing and emerging countries in order to avoid the risk of new lock-ins in high-carbon growth paths.

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Funded by the ministries of research of the Federal Republic of Germany and the State of Brandenburg, the Institute for Advanced Sustainability Studies (IASS) aims to identify and promote development pathways for a global transformation towards a sustainable society. The IASS employs a transdisciplinary approach that encourages dialogue to understand sustainability issues and generate potential solutions in cooperation with partners from academia, civil society, policymaking, and the business sector. A strong network of national and international partners supports the work of the institute. Its central research topics include the energy transition, emerging technologies, climate change, air quality, systemic risks, governance and participation, and cultures of transformation.

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