



POLICY BRIEF #24

ENERGY SECTOR TRANSFORMATION: DECENTRALISED RENEWABLE ENERGY FOR UNIVERSAL ENERGY ACCESS

Developed by:

Germany, The Netherlands, IRENA and World Bank

In collaboration with:

Kenya, Nepal, HIVOS, SNV, Schneider, SELCO and University of Bergen

12TH FEBRUARY 2018

DRAFT FOR PUBLIC CONSULTATION

This document is a part of a series of Policy Briefs being developed to support SDG7 review at the UN High-Level Political Forum to be held in July 2018. The objective is to inform intergovernmental discussions by providing substantive inputs on SDG7 and its interlinkages with other SDGs prepared through inclusive multi-stakeholder consultation processes. The development of these Policy Briefs is coordinated under the auspices of the Ad Hoc Informal Multi-stakeholder Technical Group of Advisors on SDG7.

If you want to provide comments on this Policy Brief, please visit:

<https://sustainabledevelopment.un.org/EnergyConference/documentation>

PREFACE

We acknowledge the inputs done in Policy Brief 1 on ensuring universal access to electricity. This policy brief discusses universal access to electricity in the context of the disruptive transformation of the energy sector fueled by the deployment of decentralised renewable energy. The brief focusses on the regulatory framework necessary for the roll out of renewable energy. We furthermore would like to emphasize that this policy brief primarily focuses on the electricity sector. We recognize other energy forms such as clean cooking, heating and cooling. However, we see the electricity sector as the key towards an energy sector transformation within the NDC framework of the Paris agreement. Finally, in this policy brief decentralised renewable energy is understood as renewable energy (solar, wind, small hydro) distributed, both, in centralised form through the grid as well as in decentralised manner through mini-grids and off-grid installations.

KEY MESSAGES

Status of the energy sector transformation and progress towards achieving SDG 7.1.1

- The deployment of decentralised renewable energy is fuelling the disruptive transformation of the energy sector. The rapid growth of decentralised renewable energy technologies changes the structure of the energy sector towards a multi-actors set-up in which large utilities interact with self-consumers and mini-utilities.
- The accelerating dissemination of decentralised renewable energy will drive energy solutions that are more in line with people's needs, in particular those of the energy poor, who will prioritize energy services with major development co-benefits in the field of security, resilience, access to Information and Communication Technologies (ICT), agricultural production, etc. The focus of providing energy access is therefore not just about wires and poles, but about the quality supply that supports local economic activities. Productive use on the other hand is central to the upscale and sustainability of the Renewable Energy sector as it can attract more private financing and developers.
- The provision of electricity access is increasingly driven by decentralised renewable energy, in particular solar systems. Renewable energy distributed in centralised form through the grid as well as in decentralised ways through mini-grids and off-grid installations have provided power to 30% of the people who have gained access since 2000. To achieve universal energy access by 2030, this share will need to increase significantly. For over 70% of those who gain access in rural areas, decentralised systems based on renewable energy will be the most cost-effective solution (IEA, 2017).
- This, in turn, will drive a deeper systematic transformation of the energy sector. Business as usual governance of the energy sector will not be able to mobilize the full potential of renewable energy for electricity access. To the contrary, administrative, legislative and financial frameworks need to accommodate for a decentralised and proactive citizen-oriented organisation of the energy sector with high shares of renewable energy (RISE – World Bank 2017).

Priority actions over the next four years and toward 2030

- Countries with a large energy access deficit will, next to centralised on-grid capacity, need to introduce decentralised grid-connected and off-grid renewables in national electrification plans to enable a decentralised organisation of the energy sector with clear energy access development targets. Similarly, it is important for these countries to address outstanding shortcomings in the regulatory frameworks for renewables, in particular for mini-grid and off-grid renewables. Regulatory framework must respond rapidly to changes in evolving energy sectors as new challenges and opportunities arise linked with smart and flexible grids, and increased ways of user participation in generation, decision-making and information sharing through blockchain, internet-of-things (IOT), and ICTs. In addition, these countries should develop enabling market strategies to address existing market failures, including risk mitigation instruments to facilitate accelerated investments.
- The financial landscape needs to shift towards unlocking local and community driven financing available from the private sector to generate, distribute and sell decentralised renewable energy, in particular mini-grid and off-grid solutions in remote areas. For governments, this translates into changing their role from a direct provider of energy access to a facilitator of energy access, focused on a clear investment framework with licensing and regulatory guidelines tailored to different renewable solutions, differentiated tariffs between central and decentral grid and dedicated funding facilities.
- The international community will need to refine the instruments for multi-stakeholder participatory planning and monitoring of SDG7. The focus of energy planning and monitoring will move from least-cost energy supply, to value maximization approach, where energy services address people's needs and unlock the co-benefits in policy areas such as health, education, economic development and social advancement. Only with inclusive planning and monitoring processes, high quality data, adequate legal and judicial frameworks led by effective, accountable and

transparent institutions, countries will set the right path for a deeper transformation towards low carbon resilient development pathways. To ensure political and economic traction, a coherent, transparent and robust framework to plan and monitor SDG7 is needed.

- Without the proper human resources, it will be impossible to achieve a transformative change in energy access — one that is efficient, effective, equitable, empowering, and long lasting. The right skills and competencies are needed for the design, uptake, and sustainable management of technologies, business models, and the policy framework. At the same time, the introduction and adoption of new or improved energy technologies require new skills for installation, maintenance, and service. Going forward, it will be critical to strengthen the role of people throughout the entire energy supply chain — from production to users — capacity building and training activities will become essential components of any successful project aimed at enhancing energy access. (SEAR - World Bank 2017)

Current Status of Energy Sector Transformation

The energy sector is undergoing a disruptive transformation fuelled by decentralised renewable electricity generation. Since 2012, new generating capacity driven by renewables has exceeded the one by non-renewables by a widening margin (IRENA, 2017a). Similarly, renewable energies have had a positive impact on the provision of electricity access. Out of the people who have gained access since 2000, 27% have achieved so through centralised on-grid and 3% through decentralised grid and off-grid renewables (IEA, 2017). Governments are accommodating and contributing to this transformation through targeted policy instruments and regulatory measures.

The positive contribution of renewables to electricity access reflects the change in the energy sector. Public programmes and community level initiatives have traditionally been the key actors in this sector. Philanthropic social financing and business models have also played a key role in the uptake of decentralised renewables. More recently, private sector actors have emerged to provide electricity access by associating renewables with end-user services, ranging from solar irrigation pumps to off-grid renewable energy solutions. More than 100 international companies are now providing stand-alone solar lanterns and solar home system kits targeted at those without modern electricity access. Governments have been instrumental in the engagement of the private sector by implementing dedicated policy and regulatory frameworks to support renewable energies.

The international community has been similarly instrumental in putting renewables on the international agenda not least through the dedicated role of renewables energies within SDG7. Instruments for the monitoring for SDG7 have been refined to allow for the tracking of renewable sources for electricity access. For example, the Multi-Tier Framework (MTF) redefines the measurement of access to energy acknowledging the incremental energy access benefits provided by both the grid and off-grid energy technologies (Bhatia, Angelou, 2015, see Policy Brief #8 on energy-poverty-inequalities interlinkages).

Energy sector transformation – what role can decentralised renewables play for universal energy access?

Business as usual governance of the energy sector will not be able to achieve universal energy access, in particular with regards to renewable energy. As large scale on-grid energy production is less cost effective for providing access in rural

Box 1: Interlinkages with other SDGs

The implementation of the Agenda 2030 and its SDGs requires comprehensive national sustainable development strategies that factor in all the SDGs and their interlinkages. The range of relevant interlinkages with SDG7 should be broadened, such as is the case of Energy, Poverty and Inequalities (SDG 1, 10); Food, Water and Energy (SDG 2, 6) (Nexus-Approaches), Energy and Education (SDG 4) and PB 14 on sustainable cities (SDG 11).

Poverty reduction (SDG1)

No country has gone from poverty to prosperity without providing energy in line with needs. Sustainable energy available in the right amount, at the right time, and at the right place and affordable for all segments of society can offer social and economic perspectives. Renewables have the potential to supply electricity directly in line with end-user demand, ranging from solar irrigation pumps to off-grid renewable energy solutions for healthcare facilities. With the development of local skills, the deployment of decentralised energy can create employment in assembling, distributing, installing and maintaining equipment. Electricity is also essential for economic sectors – agriculture, tourism, commerce, and industry – to thrive and create income-generating opportunities. (IRENA, 2017a).

Climate Action (SDG13)

The framework conditions for delivering universal access to energy are defined by the Paris Agreement seeking to promote low-emission, resilient development pathways that limit the temperature rise to well below 2°C, ideally a 1.5°C. Renewable energy systems contribute to climate change mitigation by replacing or avoiding fossil fuel based energy services. About 70% of Nationally Determined Contributions (NDCs) to the Paris agreement therefore mention the need to expand or strengthen renewables in their country's energy mix (Stephan et al., 2016; REN21, 2016).

Peace and justice, strong institutions (SDG 16)

To “ensure universal access to affordable, reliable and modern energy services” (SDG 7.1) through the promotion of renewable energies, requires conducive political and legal framework conditions for the energy sector, including effective, accountable and transparent institutions at all levels (SDG 16.6), rule of law and access to justice (SDG 16.3) and responsive, inclusive and participatory decision-making (SDG 16.7).

areas, decentralised renewable energy systems are essential for achieving universal access by 2030. Since most of the people who will gain access live in rural areas, the share of decentralised renewable energy (38%) needs to be higher than the on-grid share (23%).

Barriers to a deeper and systematic energy sector transformation

The move towards a decentralised organisation of the energy supply with a high share of renewables challenges the structure of the existing energy sector. A range of barriers are still in place that impede a deeper and systematic energy sector transformation in line with universal energy access by 2030.

Regulatory Indicators for Sustainable Energy (RISE) show that all energy access deficit countries have developed some kind of regulatory provisions for renewables. Taking a closer look at regulations, however, it seems as if these countries are still some steps away from a coherent and integrated energy access development scenario through renewables. For example, very few of these countries have regulations that clarify interconnection procedures for the main electricity grid reaching a mini-grid - a very important investment consideration for mini-grids (RISE - World Bank 2017).

In addition, out of the ten highest access deficit countries, only three countries (e.g. Bangladesh, India and Tanzania) have developed comprehensive frameworks for mini-grids. A quarter of the RISE access deficit data shows that countries mainly in Sub-Saharan Africa are lagging behind in the provision of enabling policies for off-grid solutions: neither they provide confidence for private investors, nor they

champion public sector solar uptake. Only a third of these countries also have financing facilities available for mini-grid and/or standalone home systems.

Over the last years, finance commitments for decentralised electricity projects have still been minimal compared to grid-connected investments. Over 2013-14, finance commitments for electricity in the 20 countries representing 80% of the global energy access deficit were at least USD 19.4 billion a year on average. Almost all finance commitments were dedicated to on-grid solutions including 2/3 from renewables and 1/3 based on fossil fuels (SEforALL, 2017). This implies a continuing bias toward funding large-scale infrastructure projects and a need for more targeted and refined strategies to address structural issues related to the organisation of the energy sector.

Policy Implications/Recommendations

Energy access deficit countries –Integrated and holistic planning to a deep transformation

Countries with a high energy access deficit will need to focus on enabling a deep transformation of the energy sector to maximize the potential of renewables for universal energy access. As a first step, this would mean to introduce centralised on-grid as well as decentralised grid-connected and off-grid renewables in their national electrification plans. These energy access development scenarios should focus on satisfying the current needs of various population groups and establish a pathway for growing consumption and demand over time. This implies a dynamic planning context, in which stand-alone renewable solutions may be a starting point, and gradually evolving into mini-grids or absorbed by the grid extension. The planning should be the result of regular consultation of the various stakeholders, including local private sector and Civil Society Organisations (CSOs).

The dynamic nature of the energy access planning needs to be acknowledged and frameworks developed allowing co-existence and integration of different technologies and system-sizes over time (Sareen 2017). Renewable energy solutions need to be introduced as early as possible in regional and national electrification planning processes. This will provide guidance to the public and private sector, as well as development banks and donors, to collaborate, mobilise and direct resources to off-grid and grid-based electrification options (IRENA, 2017b). Such holistic electrification plan will not only avoid duplication of efforts (from both off-grid and on-grid sectors) but also mitigate the risk of stranded assets of off-grid systems (if and when the grid arrives). Such plans should also clarify how people in rural areas can move beyond a basic level of consumption, maximise their benefits and improve livelihoods from the provision of reliable and affordable energy.

POLICY BRIEF #24: Energy Sector Transformation: Decentralised renewable Energy for universal energy access

Tailoring regulatory frameworks to accelerate deployment

Equally important, countries with high energy access deficit will need to address outstanding shortcomings in the regulatory frameworks for renewable energy. This includes developing comprehensive support frameworks for decentralised grid-connected and off-grid renewables. Streamlined regulatory requirements can reduce development costs, which will allow striking a balance between reliability and affordability for the actors participating in the market. A common approach to facilitate various regulatory requirements is to establish a single-window clearance facility hosted at a rural electrification agency or similar body (IRENA, 2016c). A tailored approach to tariff regulation has a strong influence on the viability and sustainability of mini-grids, in addition to effective participation of private sector. This is crucial, as countries will also need to attempt to move towards market-based mechanisms for renewables support. For many governments this may imply a shift from being a direct financier of energy access (e.g. through state-owned utilities) to be an energy access facilitator, creating incentives and level-playing field for a number of technologies and service providers to co-exist and serve different segments of the grid and off-grid market.

Flourishing investment in renewables – The key for a deeper sector transformation

The continuing bias towards funding large-scale infrastructure projects will not achieve the necessary financing amounts to contribute to universal energy access. Instead, the focus needs to shift towards attracting funding for small-scale infrastructure projects by the private sector. For this, certainty and clarity within the legal framework and legal enforcement through rule of law are important issues for investors to be addressed. Clear licensing and regulatory guidelines tailored to different renewable solutions should be in place. The traditional approach of uniform national tariffs needs to give way for differentiation between central and decentral grid to allow for cost recovery. Industrial bulk consumption, self-consumption and the application of distributed storage can yield benefits for both end-users and the power system as a whole. Therefore, regulation should actively promote self-consumption by adopting a cost-reflective design for retail tariffs. Finally, governments can also take concrete financing measures by i) cooperating with regional and global funding facilities to attract early-stage capital, ii) using tools, such as guarantees, to encourage commercial bank lending, and iii) developing dedicated funding facilities for specific needs, and iv) creating favourable fiscal regimes (e.g. eliminating custom duty barriers for renewables). Integrating renewable energy targets, as concrete as possible, in a country's NDC will give policy certainty, enhance the predictability of investors and support a transformation funded among others by commercial banks.

International community – Guiding the way for a deep transformation

The analysis of the current status of access topography at the multilateral level together with identification of gaps will ensure a more timely and effective process for reaching energy transformation goals. Common methodologies and tools are also needed to assess the energy sector and develop roadmaps for a transformation maximizing the potential of the sector to meet climate and development goals. Similarly, the monitoring of SDG7 will need to integrate the characteristics of central on-grid as well as decentralised grid and off-grid renewable energies to track the dynamics and integrated nature of energy access development going forward. There is a need for a multilateral supported approach paving the way for an energy sector transformation and maximizing the potential of renewable energy deployment to achieve at the same time development goals such as energy access and the NDCs. Only with inclusive planning and monitoring processes, high quality data, adequate legal and judicial frameworks and effective, accountable and transparent institutions countries will set the right course for a deep transformation to meet the “leave no one behind” principle of the agenda 2030.

Effective institutions and administrations at all levels facilitate the development and implementation of policies on renewables and improve citizen-oriented energy supply as part of public service delivery. To increase the availability and the use of data for planning, statistical systems need to be strengthened through possible training of its members who are in a position to influence, introduce or modify policies that will positively impact national energy access.

Civil society- Voicing the interest of people and communities

To increase the uptake of decentralised renewable energy, including for the last mile, CSOs can support national governments and the international community first and foremost by voicing the interest of people and communities, with a focus on household energy consumption as well as productive use of energy. Next, CSOs can support policy makers with concrete suggestions for finance, energy and nexus policies and regulations, making sure policy and implementation is connected to the needs of communities. Finally, CSOs are able to lead by example, by developing inspiring and daring new solutions, using a multi stakeholder communication approach.

Integrating productive use of electricity in the project life cycle

The inclusion and adequate integration of productive use in project planning and implementation is pivotal for greater economic growth, productivity, and employment. Productive use cannot be an afterthought and should be an integral part of the energy access strategy. Several renewable energy technologies have emerged as economically viable and environmentally friendly options, which if suitably adopted,

POLICY BRIEF #24: Energy Sector Transformation: Decentralised renewable Energy for universal energy access

can meet growing energy needs of industry, and particularly of small and medium-sized enterprises (SMEs).

References

- Bhatia, M.; Angelou, N (2015), Beyond Connections: Energy Access Redefined. ESMAP Technical Report; 008/15, World Bank, Washington, DC License: CC BY 3.0 IGO
<https://openknowledge.worldbank.org/handle/10986/24368>
- Bloomberg New Energy Finance (2017), Q1 Off-Grid and Mini-Grid Market Outlook, 30 Jan 2018
<https://about.bnef.com/blog/off-grid-mini-grid-q1-2017-market-outlook/>
- Bruckner, T. et al. (2014), Chapter 7 - Energy Systems, Intergovernmental Panel On Climate Change (IPCC) Working Group III (2014), Climate Change 2014 – Mitigation of Climate Change, New York.
- Climate Analytics, Ecofys, New Climate Institute (2016), Climate Action Tracker - The ten most important short term steps to limit warming to 1.5°C,
http://climateactiontracker.org/assets/publications/publications/CAT_10_Steps_for_1o5.pdf, 30 Jan 2018
- Climatescope (2017), 4Q 2017 Off-Grid and Mini-Grid Market Outlook, 30 Jan 2018 <http://global-climatescope.org/en/off-grid-quarterly/q4-2017/>
- ECDPM (European Centre for Development Policy Management), Grosse-Puppenthal, S., Bilal, S., Karaki, K. 2017. The EU's financial instruments for access to energy in sub-Saharan Africa. (Discussion Paper 218). Maastricht: ECDPM, 30 Jan 2018 <http://ecdpm.org/wp-content/uploads/DP218-EU-Financial-Instruments-for-Access-to-Energy-ECDPM.pdf>
- IEA (International Energy Agency) (2016c), World Energy Outlook 2016
- IEA (International Energy Agency) (2017), Energy Access Outlook 2017
- IIASA (International Institute for Applied Systems Analysis) (2015), IAMC AR5 Scenario Database, 30 Jan 2018.
www.secure.iiasa.ac.at/webapps/ene/AR5DB/dsd?Action=htmlpage&page=about
- IIED (International Institute for Environment and Development), Rai, N, Best, S and Soanes, M (2016) Unlocking climate finance for decentralised energy access. IIED, London, , 30 Jan 2018
https://www.hivos.org/sites/default/files/unlocking_climate_finance_for_decentralised_energy_access.pdf
- IRENA (International Renewable Energy Agency) (2012), Renewable Energy Jobs & Access, Abu Dhabi
- IRENA (2015), Accelerating Off-grid Renewable Energy: Key Findings and Recommendations from IOREC 2014, Abu Dhabi
- IRENA (2016a), Renewable Energy Benefits: Decentralised Solutions in Agriculture, Abu Dhabi
- IRENA (2016b), Solar Pumping for Irrigation: Improving Livelihoods and Sustainability, Abu Dhabi
- IRENA (2016c), Policies and regulations for private sector renewable energy mini-grids, Abu Dhabi
- IRENA (2017a), Rethinking energy: Accelerating the energy transition, Abu Dhabi
- IRENA (2017b), Accelerating Off-grid Renewable Energy: Key Findings and Recommendations from IOREC 2016, Abu Dhabi
- IRENA (2017c), Renewable energy statistics 2017, International Renewable Energy Agency, Abu Dhabi
- IRENA (2017d), Adapting market design to the growing shares of variable renewable energy, Abu Dhabi
- IRENA, CPI (Climate Policy Initiative) (2018), Global Landscape of Renewable Energy Finance, Abu Dhabi
- Lay and Prediger (2016), Interlinkages within the 2030 Agenda: Implications for development cooperation
- McCollum et al. (2017), Connecting the Sustainable Development Goals by their energy interlinkages, 30 Jan 2018. <http://pure.iiasa.ac.at/14567/1/WP-17-006.pdf>
- REN21 (Renewable Energy Policy Network for the 21st Century) (2016), Renewables 2016 Global Status Report, , 30 Jan 2018
www.ren21.net/wpcontent/uploads/2016/06/GSR_2016_Full_Report_REN21.pdf
- Sareen, S., (2017), Energy distribution trajectories in two Western Indian states: Comparative politics and sectoral dynamics. Energy Research & Social Science.
- SEforALL (2017), Energizing Finance – Scaling and Refining Finance in Countries with Large Energy Access Gaps, 2017, Washington DC
- Stephan, B., et al. (2016), What Place for Renewables in the INDCs?, 30 Jan 2018. www.worldfuturecouncil.org/inc/uploads/2016/03/WFC_2016_What_Place_for_Renewables_in_the_INDCs.pdf
- The Guardian (2017), BoI expands renewable energy funding with N1b solar fund, 23 Jan 2018.
<https://guardian.ng/business-services/boi-expands-renewable-energy-funding-with-n1b-solar-fund/>
- The Lab (Global Innovation Lab for Climate Finance) (2016), Germany to Provide €30 Million to TCX for Currency Hedging Instruments, 30 Jan 2018.

POLICY BRIEF #24: Energy Sector Transformation: Decentralised renewable Energy for universal energy access

<https://www.climatefinancelab.org/news/germany-to-provide-e30mn-to-tcx-for-currency-hedging-instruments/>

UNIDO, Energy access for productive uses, 30 Jan 2018.

<https://www.unido.org/our-focus/safeguarding-environment/energy-access-productive-uses>

World Bank, 2017, State of Electricity Access Report,

<https://esmap.org/sear/>

World Bank, 2017 Regulatory indicators for sustainable energy: a global scorecard for policy makers,

<http://rise.esmap.org>, Washington, D.C.: World Bank Group.

2017 International Council for Science (ICSU), 'A Guide to SDG Interactions' (particularly pp. 127-169 on SDG7), Nilsson

et al. (2016) <https://www.icsu.org/cms/2017/05/SDGs-Guide-to-Interactions.pdf>

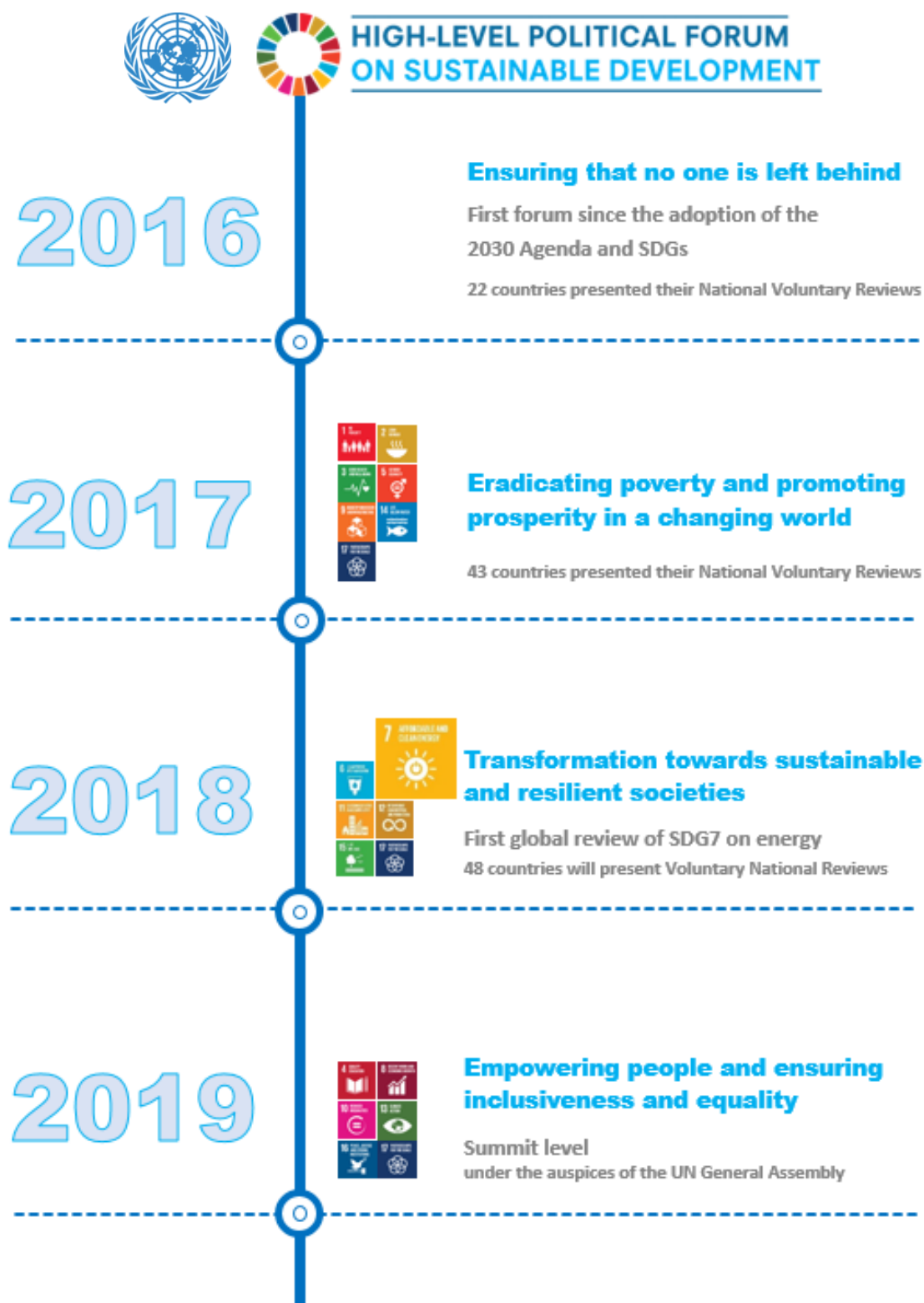
International Institute for Applied Systems Analysis (IIASA),

Connecting the Sustainable Development Goals by their energy interlinkages, McCollum et al. (2017) (see pp. 10-13)

<http://pure.iiasa.ac.at/14567/1/WP-17-006.pdf>

European Expert Network. Interlinkages within the 2030

Agenda: Implications for development cooperation, Lay and Prediger (2016)



For further information, please contact:
Division for Sustainable Development
Department of Economic and Social Affairs
United Nations
<https://sustainabledevelopment.un.org/>