HIGH-LEVEL POLITICAL FORUM
ON SUSTAINABLE DEVELOPMENT

POLICY BRIEF #8

INTERLINKAGES AMONG ENERGY, POVERTY AND INEQUALITIES

Developed by:

UNDP, UNECA, UNESCAP, ACCESS 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

KEY MESSAGES

- SDG 7 is a condition for economic development, poverty alleviation (SDG 1) and reducing inequalities (SDG 10). Energy is an intermediate commodity, hence progress on SDG 7 must be seen not as an end in itself but rather as a means towards achieving other SDGs and the principle "Leave no one behind" (LNOB). Unequal access to energy and low human development are highly correlated (UNDP, 2007).
- The link between energy and poverty alleviation as well as reducing inequalities may manifest itself most obviously in the context of access to clean energy, but "fuel poverty" remains relevant. In situations where people have access to energy, it is often the poorest that end up paying disproportional shares of income for energy, not least because the higher upfront investments in energy efficient equipment are more difficult to bear for low income households. Equally important are the impact of costs of clean energy incentive schemes while born by all tax-payers but disproportionally by the poor and the unequal distribution of public money to national grid infrastructure versus small scale off-grid development.
- Rather than considering access to energy as a binary concept, more awareness is needed for different quality and higher tiers of energy access. A stronger emphasis is needed to bring about full Tier 5 energy access in order to sufficiently capture the potential for productive use of energy and reduce poverty and inequality.
- Private sector financing will be key to complement public sector finance in realising universal energy access in conjunction with renewable energy uptake, but this is often prevented by high financing costs as a result of a range of technical, regulatory, financial and informational barriers and their associated investment risks. PPP solutions may be able to contribute to avoiding selective private sector interest and energy solutions that are unaffordable for low income households.
- The distribution and quality of energy access is determined by several socio-technical and political economic drivers. These operate differently across scales: (sub-)national political economies often determine the energy sector configuration, whereas socio-technical factors largely shape energy access at regional and local scales.

Priority actions for the near future and towards 2030

- The policy discussion on energy access must move from a binary to a qualitative understanding of access to energy. The five tiers framework of energy access[1] can emphasize the relationship between the quality of energy access and poverty and inequality. Policy targets formulated for energy access must transcend a binary conception and institute timelines and milestones for percentages of population that can graduate to Tier 5 ("full") access to energy in order to sufficiently capture the potential for productive use of energy and reduce poverty and inequality.
- For private sector financing to contribute to clean energy access, policy makers should analyse the investment risks contributing to high financing costs and address the risks in a systemic and integrated manner. Policy derisking instruments geared towards renewable energy uptake should be prioritised, as these offer the most cost-effective future solutions,[2] while market transformation will usually require combining these with financial derisking instruments, supplemented by direct financial incentives as required.
- Policy makers can address the interlinkage between energy, poverty and inequality by combining Tier 5 ("full") energy access with the promotion of productive energy use, while acknowledging "fuel poverty" and supporting energy efficiency investments by low income households.
- Political economic inertia that often upholds inequalities in energy access (e.g., vote-bank politics, institutional bureaucracy) must be addressed. Socio-technical factors that affect the distribution and quality of energy access at regional and local scales must enter national level policy debates.

[1] http://www.se4all.org/sites/default/files/Beyond-Connections-Introducing-Multi-Tier-Framework-for-Tracking-Energy-Access.pdf

[2] IRENA. (2018) 'Renewable Power Generation Costs in 2017'. Accessed at: www.irena.org/publications/2018/Jan/Renewable-power-generation-costs-in-2017.

Interlinkages among energy, poverty and inequalities

Energy is an 'intermediate' commodity. It is valued not so much for its own sake as for the services it enables. It powers appliances, equipment, and machinery, and also has lighting and thermal applications. In relation to SDGs, one might say that SDG 7 is primarily useful in that it helps to achieve other SDGs. Thus, the success of SDG 7 is a complement to, if not a precondition for, the success of all other SDGs. However, for several SDGs such as SDG 1 (No Poverty) and SDG 10 (Reduced Inequality) there is especially a strong link with SDG 7. Due to its instrumental value for improving the living conditions and capabilities of households, access to energy is also a meant to achieve the principle "Leave no one behind" (LNOB).

The interlinkages between energy, poverty and inequality have been acknowledged widely but are interpreted using different concepts. 'Energy poverty' is a concept used in interpretations varying from 'fuel poverty' in developed countries to 'lack of energy access' in the developing world.[3] In energy and development studies scholarship, energy poverty is commonly defined as: (a) lack of access to electricity networks; or (b) dependence on burning solid biomass, such as wood, straw, and dung, in inefficient and polluting stoves to meet household energy needs (Laldjebaev et al, 2016). In this policy brief, our discussion focusses on the interlinkages between energy, poverty and inequality from this latter developing world perspective, with the interpretation of 'energy poverty' mainly relating to the lack of energy access and factors driving it.

Despite the important role that sustainable energy plays in poverty reduction, about 1.2 billion people still lack access to electricity and nearly 40 percent of world's population still rely on solid fuels for cooking and heating (UNDP, 2017). Poor people also pay a high price - in cash or in labor - for the energy they use. Moreover, they spend a much greater share of their household income on energy than do wealthy people - not only because their incomes are so much smaller, but also because the fuels and equipment they use are so much less efficient than modern fuels and equipment. No country has managed to substantially reduce poverty without greatly increasing the use of energy. In the first edition of the Poor People's Energy Outlook in 2010, Practical Action framed lack of access to energy services as a "form," an "outcome," and a "cause of poverty." It is a form of poverty because it restricts human capabilities to meet their needs and realize their full potential. It is an outcome of poverty because low-income individuals are limited in their financial abilities to afford goods and services that their better-off fellow citizens enjoy, even if those goods and services are ultimately unsuitable or unsustainable. And it is a cause of poverty because it "reinforces constraints in income generation potential, because many product and service-based enterprises and public services either rely on energy or are substantially improved in their productivity, profitability, or efficiency by the introduction of improved forms of energy access." Taken together, a "vicious circle" is created whereby "a lack of energy access leads to limited income-earning capability, which reduces purchasing power, which in turn limits the access to energy that could improve incomes" (Practical Action, 2010).

Reducing the global disparity in energy is key to reducing income inequalities, gender inequalities and inequalities in other dimensions such as rural/urban income disparities. A lack of adequate, reliable and affordable supplies of modern energy disproportionally impacts women and children. It is also more severe in rural communities and it limits their productive opportunities, enterprise growth and employment, and exacerbates income inequality and persistent poverty. The use of alternative and unsafe energy sources often has severe consequences on health, which in return impacts poverty levels. In addition, some regions with the lowest energy consumption and greenhouse gas emissions, for example, countries in sub-Saharan Africa and South Asia, are the most vulnerable to climate change impacts and will suffer the most. Sustainable energy can help build resilience of these communities against climate change impacts and reduce inequality between and among nations.

Clean cooking & poverty alleviation[4]

- Clean energy access is critical for women's health, education and productive activities and therefore strongly related to reducing poverty and inequality for women - since in many parts of the world women spend more time than men cooking and collecting water and fuel.
- Improving energy access would reduce the drudgery of women's unpaid and care work, enable them to access education and employment options and enhance their livelihoods.
- According to a recent study by the McKinsey Global Institute, empowering women to participate in the global economy on an equal basis with men would add $12 trillion worldwide by 2025[5]. Women invest 90% of their income back into their families and their welfare—which has a positive knock-on effect, with lasting effects for generations to come.

[3] A COST Action on European Energy Poverty is seeking to bridge this gap: http://www.cost.eu/COST_Actions/ca/CA16232.

[4] The topic of access to clean cooking is mentioned here because of its importance for alleviating poverty and reducing inequality. Detailed discussion of clean cooking can be found in Policy Brief 2 and detailed discussion on gender inequality is addressed in Policy Brief 12.

[5] McKinsey Global Institute. 2015. 'The power of parity: How advancing women's equality can add $12 trillion to global growth'.

Less often discussed but equally important is the relation between public expenditures on clean energy development and the translation of these costs to the tax payer. While clean energy incentive schemes are usually born by all tax-payers it can disproportionally affect the poor if the policies are not sufficiently designed to cushion vulnerable households with social safety nets. Another crucial consideration for equal distribution of public expenditures is the far stronger focus on national grid infrastructure whereas small scale off-grid development is often neglected and not eligible for similar public funds allocation as compared to national infrastructure.

Status of Implementation

Quality of energy access

Access to electricity used to be defined as whether or not a household had access to electricity or not. This, however, does not account for different levels of access to electricity provided to end-users. Electricity is only useful if it allows the desired energy services to be run adequately. Different energy services require different levels of electricity supply in terms of quantity, time of day, supply duration, quality, and affordability.

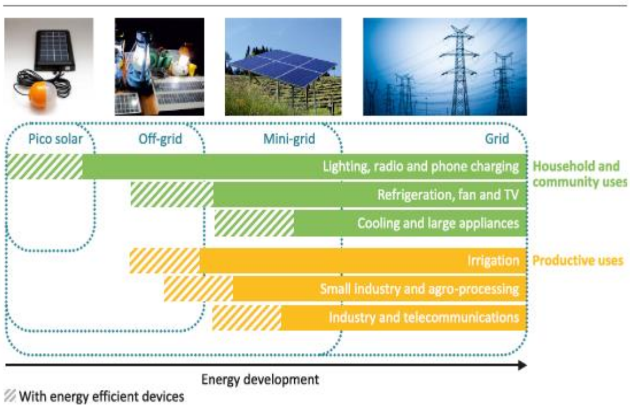


Figure 2: Electricity access and illustrative technology options (IEA, 2017).

Figure 2 illustrates how investments in various energy systems (ranging from the most basic pico solar system, to off grid and local mini grids to the most advanced system with access to an integrated electricity grid) results in incremental levels of access to electricity, and the possibility for end-users to utilize more advanced end-use technologies with increasing access levels.

More recently, a comprehensive framework was developed to measure levels of access to electricity provided to end-user, where successive thresholds of supply allow for increased use of end-use equipment (appliances) (ESMAP, 2015). This framework defines 6 levels for electricity access. Tier 0 represents the baseline situation with no access to electricity and consequently no access to energy services. Subsequently tier 1 represents the most basic level, tier 2 a more advanced level and ultimately tier 5 the most advanced level (see Figure 3).

Multi-tier Matrix for Measuring Access to Household Electricity Supply

ATTRIBUTES		TIER 0	TIER 1	TIER 2	TIER 3	TIER 4	TIER 5
1. Peak Capacity	Power capacity ratings[28] (in W or daily Wh)		Min 3 W	Min 50 W	Min 200 W	Min 800 W	Min 2 kW
			Min 12 Wh	Min 200 Wh	Min 1.0 kWh	Min 3.4 kWh	Min 8.2 kWh
	OR Services		Lighting of 1,000 lmhr/ day	Electrical lighting, air circulation, television, and phone charging are possible			
2. Availability (Duration)	Hours per day		Min 4 hrs	Min 4 hrs	Min 8 hrs	Min 16 hrs	Min 23 hrs
	Hours per evening		Min 1 hr	Min 2 hrs	Min 3 hrs	Min 4 hrs	Min 4 hrs
3. Reliability						Max 14 disruptions per week	Max 3 disruptions per week of total duration <2 hrs
4. Quality						Voltage problems do not affect the use of desired appliances	
5. Afford-ability					Cost of a standard consumption package of 365 kWh/year < 5% of household income		
6. Legality						Bill is paid to the utility, pre-paid card seller, or authorized representative	
7. Health & Safety						Absence of past accidents and perception of high risk in the future	

Figure 3 Multi-tier Matrix for Measuring Access to Household Electricity Supply (ESMAP, 2015)

Today, the tracking of progress on energy access is mainly based on a binary perception of access to energy. However, it is clear that lower tier levels of energy access may not contribute much to poverty alleviation, if at all. It is only from Tier 3 onwards that we may see growth in home businesses and new enterprises. For energy access to lead to poverty reduction and reduced inequality we therefore need to aim at Tier 5 or "full" energy access for all.

Barriers to energy access improvement and their associated investment risks

SDG7 provides opportunities to drive a transition towards clean energy access for all. However, sustainable energy in developing countries often faces technical, informational, financial and regulatory barriers that create associated investment risks, both real and perceived.

In pre-market conditions, as in many of the poorest countries and communities, these barriers to sustainable energy can act as immediate 'show-stoppers'. For example, investment is often impeded by a lack of access to affordable financing and capital scarcity due to lack of legal frameworks, underdeveloped economies and weak financial sectors. This presents a challenge for scaling up sustainable energy solutions, as higher returns are needed to compensate for the greater investment risks found in early-stage markets. Under these conditions, sustainable energy interventions become very sensitive to financing costs, making them less attractive and less cost-competitive than conventional solutions, as illustrated in Figure 4.

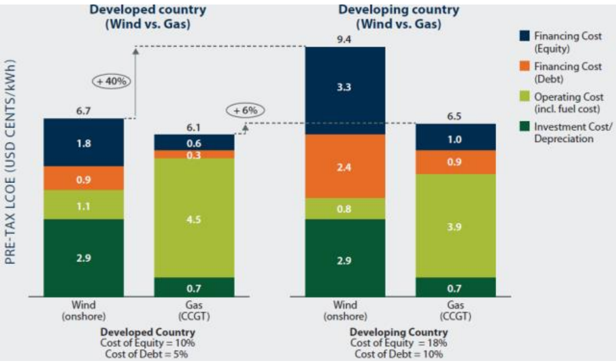


Figure 4: The impact of financing costs on wind and gas power generation costs (UNDP, 2015)

In those cases, a market transformation approach is needed that assists governments to implement combinations of public instruments that systematically target these barriers and investment risks, with the aim of cost-effectively achieving risk-return profiles that attract investment in sustainable energy at scale. An investment's risk-return profile can be improved through *reducing* risk, *transferring* risk or *compensating* for risk. Measures that reduce or transfer risk result in lower financing costs. Any residual risk may then be addressed by measures that compensate for risk. All public interventions to promote sustainable energy act in one or more of these three ways.

The public sector should be aware that there may be cases where private sector engagement can lead to increased consumer prices or where energy infrastructure is solely built in areas where returns are highest. In these cases, public-private partnerships may be able to contribute to solutions that avoid this risk.

Socio-technical and political economic drivers of equity and quality of energy access across scales

The nature of energy access is determined by a variety of processes at multiple scales. These are characterised by not only techno-economic factors, but also by path dependence, incumbency, inertia and resistance to change. At the global scale, the geopolitics of infrastructure (oil and gas trade links, multinational treaties) modulates energy transition pathways. At the national scale, energy remains a sensitive political issue, with public perceptions driving the commitment of governments alongside economic and technical concerns. At sub-national regional scales, population demographics and intersecting factors such as class and ethnic factors matter. At the local scale, norms along religious and gendered lines determine access within communities and households.

Recognition of the multi-scalar and intersectional nature of drivers of energy poverty is finally gaining ground. But it must be translated into affirmative action, the norming of transparency measures, and substantive public participation in decision-making on energy services. This is necessary in order to systemically reduce inequalities in energy access and address energy poverty. Such action requires policy measures that are responsive to the political economic and socio-technical realities of energy within multi-scalar administrative contexts (Sareen 2017). Otherwise we run the risk of actors with entrenched interests pushing for regressive courses of action in the energy sector at great public cost.[6]

Energy and poverty alleviation in light of fuel poverty and energy efficiency

The link between energy and poverty alleviation as well as reducing inequalities may manifest itself most obviously in the context of access to clean energy, but there are also cases of energy poverty where this relates to "fuel poverty". In situations where people have access to energy, it is often the poorest that end up paying disproportional shares of income to energy, not least because the higher upfront investments in energy efficient equipment are more difficult to bear for low income households (Simcock et al. 2017). Energy poverty widens this discussion to encompass built environment related factors, including reliable, safe and comfortable access.

Fuel poverty is mainly associated with developed countries where low income households have difficulty keeping their homes warm at reasonable cost. However, it also relates to low income households in developing countries since especially for those people who live in the poorest countries, the most inelastic segment of demand for energy is that for cooking and heating to ensure basic survival. Enhancing the poor's access to modern and cleaner forms of household energy is important due to its potential for increasing income levels for this group. Just as important, however, is the need to reduce the poor's expenditure on energy services. Previous analysis has shown that in most countries the poor spend a higher share of their income on energy than the non-poor, both for electricity as well as fuels (IISA, 2012).

Access to energy will not alleviate poverty if it is not affordable for the lowest income households. In some cases tariff systems with progressive fee structure (cross subsidies) have been introduced as part of finding solutions to this challenge. However, such solutions may also create counterproductive signals to clean energy development for low income households as it may lead to clean energy such as solar systems to be of interest to households with higher fee structures only, thereby also creating distortions in the business model of the utility that may lose its higher paying customers. Careful consideration of energy price policies is needed while alternative policies to cushion vulnerable households with social safety nets are preferred.

Electricity access and clean cooking are therefore only part of the desired policy objectives to reduce poverty but equally important is access to energy efficient and low-cost end-use

[6] See the Mapping Power project for a comparative study of 15 Indian states along these lines: http://www.cprindia.org/projects/mapping-power.

options and devices used by the poor in agro-processing, small scale value-addition processes, water pumping, housing and transportation.

Policy recommendations

Quality of energy access

The policy discussion on energy access must move from a binary to a qualitative understanding of access to energy. The five tiers framework of energy access can provide a graded picture to attune action to context and emphasize the relation between quality of energy access and poverty and inequality (ESMAP, 2015). Policy targets formulated for energy access should move beyond the binary concept and set timelines and milestones for percentages of population with Tier 5 ("full") access to energy.

Barriers to energy access improvement and their associated investment risks

In order to allow private sector financing to contribute to access to energy, thereby reducing poverty and inequality, policy makers should analyse the investment risks contributing to high financing costs and address the risks in a systemic and integrated manner. Policy derisking instruments geared towards renewable energy uptake should be the first choice for action as these offer the most cost-effective and sustainable future solutions, while market transformation will usually require a mix of policy and financial derisking instruments, supplemented by direct financial incentives as required.

Socio-technical and political economic drivers of equity and quality of energy access across scales

Policy makers must act on the emerging consensus that energy poverty and inequitable access persist (a) due to political economic factors that can be dealt with through more participatory decision-making and instituting transparency measures in the energy sector; and (b) due to the misrecognition of socio-technical factors that modulate energy access at different scales and must be taken into account in national and regional energy policies. As cities, regions and countries undertake energy transitions, we must utilise the opportunity to democratise this sector into one that is responsive to public interest. Regulators, administrators, and utilities alike must be held accountable for provision of quality access to clean energy in an equitable, inclusive manner.

Energy and poverty alleviation in light of fuel poverty and energy efficiency

The interlinkage between energy, poverty and inequality can be addressed by policy makers in combining Tier 5 ("full") energy access with promotion of productive use of energy but also by acknowledging the concepts of "fuel poverty" and support for energy efficiency investments by low income households.

References

ESMAP (2015) Beyond Connections. Redefining Energy Access. The International Bank for Reconstruction and Development / The World Bank Group

IEA (2017) WEO Energy Access Outlook 2017 Methodology for Energy Access Analysis. OECD/IEA 2017

IISA (2012), Energy, Poverty and Development, Karekezi, S., S. McDade, B. Boardman and J. Kimani, GEA Chapter 2, weblink: http://www.iiasa.ac.at/web/home/research/Flagship-Projects/Global-Energy-Assessment/GEA_Chapter2_development_hires.pdf

Laldjebaev K., B. K. Sovacool, K. S. Kassam (2016), Energy security, poverty and sovereignity – Complex interlinkages and compelling implications, in: International Energy and Poverty – the emerging contours, chapter 7, Routledge

Practical Action (2010), Poor People's Energy Outlook

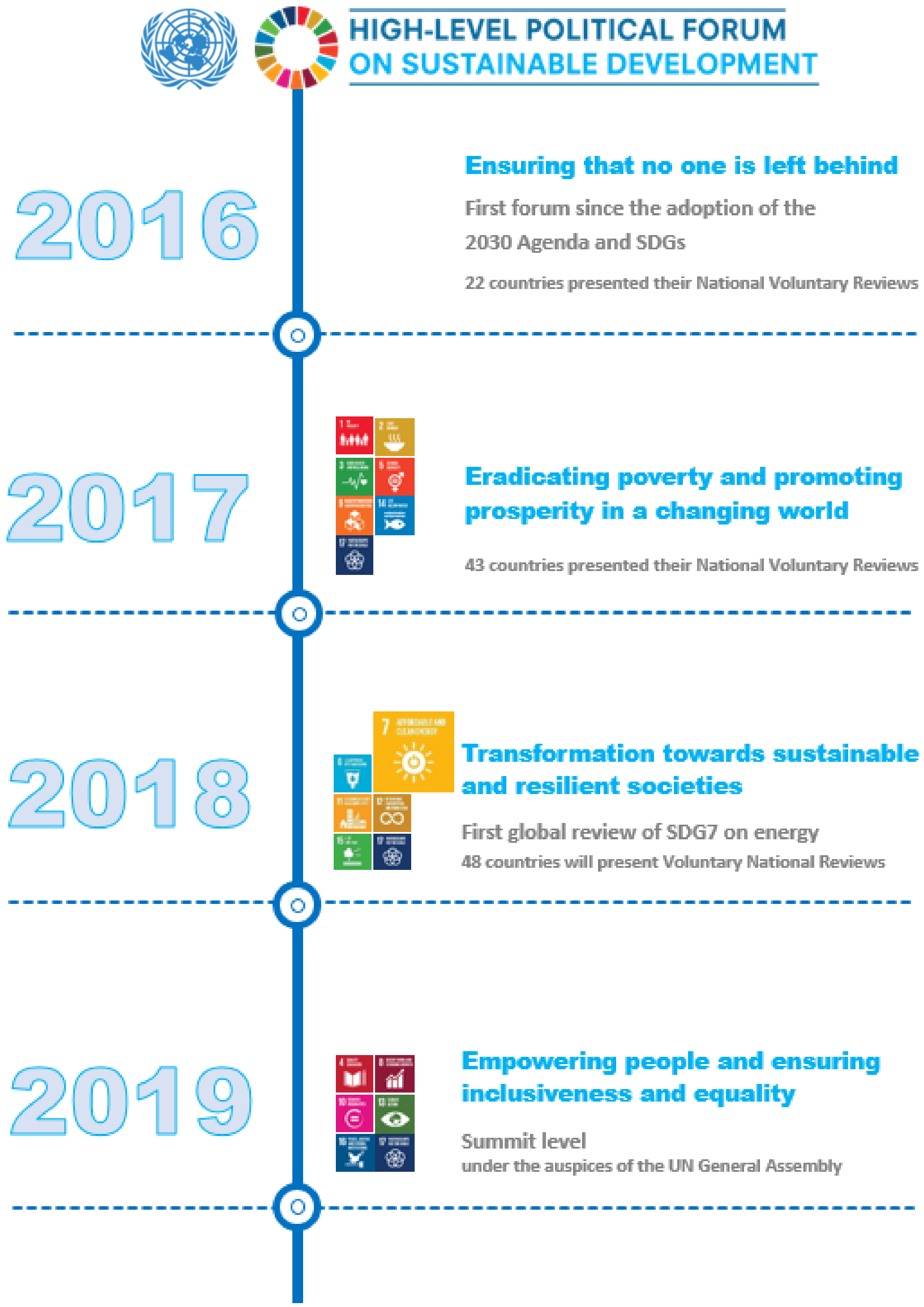
Sareen, S. (2017). Energy distribution trajectories in two Western Indian states: Comparative politics and sectoral dynamics. Energy Research & Social Science.

Simcock, N., Thomson, H., Petrova, S., & Bouzarovski, S. (Eds.) (2017). Energy Poverty and Vulnerability: A Global Perspective. Routledge Explorations in Energy Studies.

UNDP (2007), Human Development Report: Fighting Climate Change – Human Solidarity in a Divided World, New York

UNDP (2015), Derisking Renewable Energy Investment, New York: http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/derisking-renewable-energy-investment.html

UNDP (2017), Delivering Sustainable Energy in an Changing Climate – Strategy Note on Sustainable Energy 2017-2021, New York, accessible online: http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/undp-s-energy-strategy-.html



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