REGIONAL MEETING ON SUSTAINABLE ENERGY
FOR ASIA-PACIFIC LEAST DEVELOPED COUNTRIES
KATHMANDU, NEPAL | 22-23 MARCH 2017

Draft Background Paper for the Regional Meeting on Sustainable Energy
Prepared by UN-OHRLLS

I. Introduction

This background paper will inform the participants in the regional meeting on progress made in energy transition with a focus on the Asia-Pacific Least Developed Countries (LDCs) by providing the latest statistical data on the state of access to energy, energy efficiency, and renewable energy developments. The regional meeting will discuss the main challenges in accessing finance for accelerating energy transition, scaling-up current initiatives, and improving project preparation capacities in least developed countries.

LDCs are the most vulnerable countries in the world, facing severe risks and uncertainties in their development. They represent the poorest segment of the international community, accounting for less than 2 per cent of world GDP while at the same time comprising more than 954 million people (about 13 per cent of the world population). The population in LDCs is expected to double between 2015 and 2050 (UN-DESA 2015), entailing increasing challenges for the 48 least developed countries (including the 13 Asia-Pacific LDCs) that face severe gaps in socio-economic development, weak human and institutional capacities, low and unequally distributed income and scarce domestic financial resources. These countries often suffer from internal or external crises and high vulnerability to external shocks.

The acute energy gap faced by the least developed countries is a major impediment to their structural transformation. Being a key development multiplier, reliable and affordable access to energy is essential for private sector development, productive capacity building and expansion of trade. Energy access has strong linkages to climate action, health, education, water and food security, and women's empowerment.

The percentage of population having access to electricity in LDCs has increased slowly from 31.4 per cent in 2010 to 34.3 per cent in 2012 (UNSD SDG Indicators Global Database).[1] More than 95 per cent of the population without access to electricity live in Sub-Saharan Africa and developing Asia. While still far from complete, progress has been made in increasing access to electricity in the last two decades with electrification rates in urban areas outpacing those in rural areas.

The Istanbul Programme of Action (IPoA) for the Least Developed Countries for the Decade 2011-2020 charts out the international community's vision and strategy for the sustainable development of LDCs with a strong focus on developing their productive capacities. The overarching goal of the IPoA is to overcome the structural challenges faced by the LDCs in order to eradicate poverty and achieve

[1] The latest official data on energy access are from year 2012. Many LDCs have made significant progress since 2012 which is not reflected in the figures provided in this report. Updated official data on energy access will be published during the first half of 2017.

internationally agreed development goals and accelerate progress towards graduation from the LDC category. It specifically aims to enable half of the LDCs to meet the criteria for graduation.[2] Access to energy is one of the priority areas for action in the IPoA, which includes 3 goals and targets related to energy:

- Strive to increase total primary energy supply per capita to the same level as other developing countries
- Significantly increase the share of electricity generation through renewable energy sources by 2020
- Enhance capacities in energy production, trade and distribution with the aim of ensuring access to energy for all by 2030.

List of Asia Pacific LDCs

The category of LDCs was officially established in 1971 by the UN General Assembly with a view to attracting special international support for the most vulnerable and disadvantaged members of the UN family. The current list of LDCs includes 48 countries, among which 13 in the Asia-Pacific:

1. Afghanistan
2. Bangladesh
3. Bhutan
4. Cambodia
5. Kiribati
6. Lao People's Democratic Republic
7. Myanmar
8. Nepal
9. Solomon Islands
10. Timor-Leste
11. Tuvalu
12. Vanuatu
13. Yemen

The 2030 Agenda for Sustainable Development adopted in 2015 acknowledges that the most vulnerable countries deserve special attention. The 2030 Agenda calls for support towards the implementation of relevant strategies and programmes of action, including the IPoA and also indicates that the IPoA is integral to the new Agenda. Sustainable Development Goal 7 (SDG 7) calls for ensuring access to affordable, reliable, sustainable and modern energy for all by 2030 and has a multiplier effect on the achievement of all the other SDGs.

The Sustainable Energy for All (SE4ALL) initiative was launched in 2011 by the United Nations (UN) Secretary General as a multi-stakeholder partnership between governments, the private sector, and civil society to achieve three interlinked targets by 2030: (i) universal access to modern energy services; (ii) a twofold increase in the global rate of improvement in energy efficiency; and (iii) a doubling of the share of renewable energy in the global energy mix. Countries were encouraged to develop Country SE4ALL Action Agendas and respective investment prospectus(es) to help guide on how the country could achieve the three goals of the SE4ALL. Several LDCs have actively participated in the SE4All process. In total 7 out of 13 Asia-Pacific LDCs and Yemen have joined the initiative, and are looking at integrating strategies for energy transition in their national development agendas.

In addition, the United Nations General Assembly declared the period 2014-2024 as the Decade of Sustainable Energy for All. Pursuant to resolution A/RES/69/231, and the political declaration of the Comprehensive High-level Midterm Review of the Implementation of the Istanbul Programme of Action for the Least Developed Countries for the Decade 2011-2020, special attention should be given to the least developed countries throughout the United Nations Decade of Sustainable Energy for All (2014-2024).

[2] The identification of LDCs is currently based on three criteria: per capita gross national income (GNI), human assets and economic vulnerability to external shocks. The latter two are measured by two indices of structural impediments, namely the human assets index and the economic vulnerability index. To become eligible for graduation, a country must reach threshold levels for graduation for at least two of the aforementioned three criteria, or its GNI per capita must exceed at least twice the threshold level ($2,484 in the 2015 triennial review), and the likelihood that the level of GNI per capita is sustainable must be deemed high.

In December 2015, the Parties to the United Nations Framework Convention on Climate Change decided on the Paris Agreement, charting a fundamentally new course for global climate efforts. The Parties reaffirmed their commitment to limiting temperature increase to below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees. The agreement also established binding commitments by all parties to make "nationally determined contributions" and to pursue domestic measures aimed at achieving them. Renewable energy technologies were highlighted as a means to mitigate emissions and to adapt to the impacts of climate change.

Box 1. SDG 7 Targets and indicators

7.1: By 2030, ensure universal access to affordable, reliable and modern energy services Indicators: Proportion of population with access to electricity; and Proportion of population with primary reliance on clean fuels and technology

7.2: By 2030, increase substantially the share of renewable energy in the global energy mix Indicator: Renewable energy share in the total final energy consumption

7.3: By 2030, double the global rate of improvement in energy efficiency Indicator: Energy intensity measured in terms of primary energy and GDP

7.a: By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

7.b: By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

The Addis Ababa Action Agenda (AAAA) of the Third International Conference on Financing for Development adopted in 2015 provides a foundation for implementing the global sustainable development agenda. It highlights the need for additional investment both in energy and infrastructure sectors. It notes that insufficient investment is due in part to inadequate infrastructure plans and an insufficient number of well-prepared investable projects, along with private sector incentive structures that are not necessarily appropriate for investing in many long-term projects, and risk perceptions of investors. AAAA emphasizes the importance of promoting both public and private investment in energy infrastructure and clean energy technologies including carbon capture and storage technologies, and it further commits to enhance international cooperation to provide adequate support and facilitate access to clean energy research and technology, expand infrastructure and upgrade technology for supplying modern and sustainable energy services to all developing countries, in particular least developed countries and small island developing states.

All these agreements reinforce the notion that the upcoming years are crucial for identifying and evaluating pathways towards energy transition and a sustainable future. Effectively addressing the challenges of scaling-up energy access and advancing energy transition requires a unique mix of policies for each country as well as regional cooperation. A fundamental remaking of energy production, distribution and global consumption systems is needed in the coming decades. Policy-makers need to commit to removing barriers for the deployment of new technologies that provide cost-effective solutions to improve energy efficiency. Furthermore a multi-stakeholder approach is

needed for increased dialogue and coordinated decision making. Industrial leaders need to revive their commitments to contribute to a successful energy transition and improved energy efficiency.

The fast evolution in the energy sector requires significant new investments in technology development, which LDCs, due to their limited financial capacity and under-developed capital markets, cannot provide on their own. Financing energy access thus remains a key challenge.

It is the responsibility of national governments to take necessary actions to shift funding priorities and design enabling policies to promote investments in the energy sector. International financial agencies, donor agencies, and the private sector will have to play a large role in providing the financial resources, mitigating risk and ensuring guarantees. To accelerate energy transition, additional sources of financing and tailored programmes for LDCs are needed.

Achieving sustainable energy for all by 2030 (universal energy access, doubling the share of renewable energy in the global energy mix, and doubling the rate of improvement in energy efficiency) will require innovation and increased investments in clean energy technology. Official development assistance and concessional financing are cornerstones of this effort, particularly for increasing energy access in least developed countries. The global need, however, far outstrips what public resources can provide. Global clean energy investments need to nearly triple from the current $400 billion a year, to more than $1 trillion a year. Therefore, public funds must be used to attract private sector funding and investments of all kinds. Ultimately, the private sector will be critical for achieving sustainable energy for all. .

For LDCs it will be essential to act fast in creating enabling environments for private sector investments and to promote attractive project pipelines. This will require capacity building and well-functioning institutions, transparent, efficient procedures and accountable and competent public and private sectors. Government leaders can and will need to undertake a number of policy and regulatory reforms to help build credibility with investors and effectively scale-up private investment and leverage public resources for country-level implementation. Recognition of the urgency of providing access to clean, affordable and reliable energy needs to be transformed into action.

II. Universal access to affordable, reliable and modern energy services of LDCs

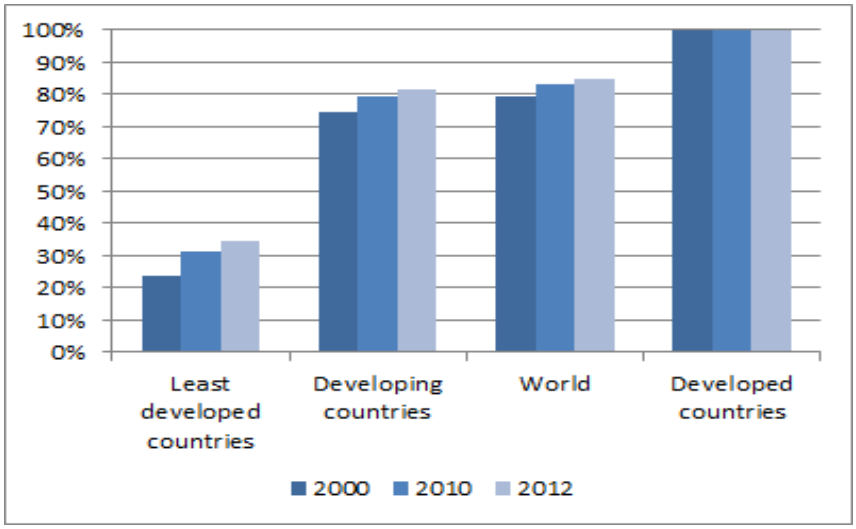
The lack of access to modern energy services constitutes a major challenge to our world today. In 2012 an estimated 66 per cent of the population in least developed countries did not have access to electricity. It represents only a modest improvement from 69% per cent in 2010. Compared to both, developing (81 per cent) and developed (100 per cent) countries, LDCs have a significantly lower average level of access to electricity, as shown in Figure 1. Even though great strides have been made, the large gap between LDCs and the rest of the world implies that there is an urgent need to intensify efforts in making energy available for all and addressing the huge gaps in electricity generation capacity, per capita electricity consumption, and household access to electricity.

In the Asia and the Pacific region overall, between 1990 and 2012 the electrification rate enhanced by 14 per cent, and 16 per cent of the population changed from using non-solid fuels to cleaner forms of energy (Se4All, 2016). In 2012, 455 million people in the Asia and the Pacific region lacked access to electricity and 2.06 billion people had to use solid fuels for cooking (Se4All, 2016). Whereas least developed countries are most affected by the lack of electricity access, wide disparities across regions also exist. Access to electricity in the 13 Asia-Pacific least developed countries increased slightly between 2010 and 2012. In 2012, 52.8 per cent of the population had access to electricity and in 56.2

per cent in 2012. From 2010 to 2012, energy access grew 3.2% annually on average in these countries.

Shortcomings in delivering reliable electricity stem from years of underspending on maintenance and expansion while leading to frequent power outages in the area. Also rapid population growth further exacerbates the problem of meeting demand, with an average population growth in Asia-Pacific LDC for 2010-2012 of 1.77 per cent.

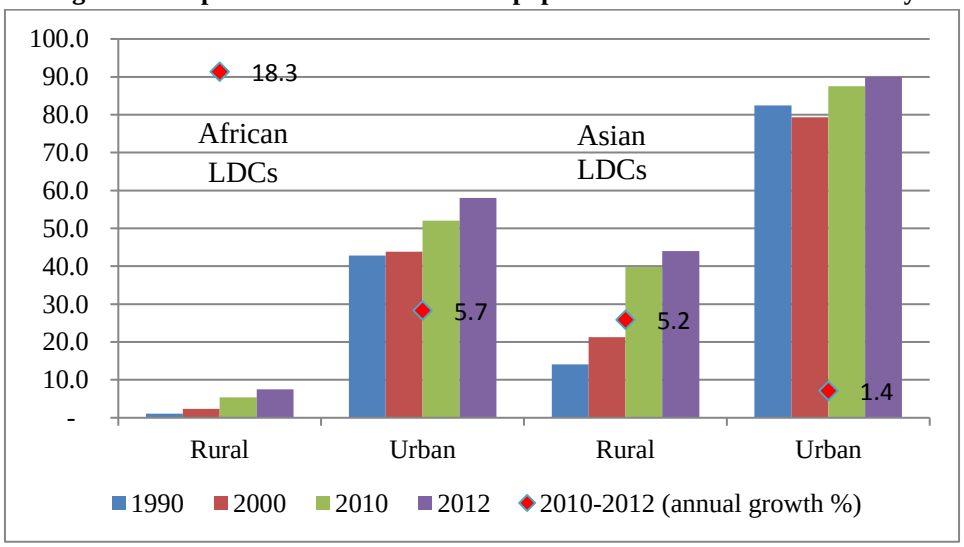
Figure 1: Proportion of population with access to electricity



Source: UNSD SDG Indicators Global Database.

As shown in Figure 2, Asia-Pacific LDCs have, in general, greater access to electricity, but the gap between urban and rural population is even more substantial: 90 per cent of the urban population and 44.0 per cent of the rural population have access to electricity. This represents a significant difference compared to African LDCs where 60 per cent of the urban population has access to electricity, only 13 per cent of the rural population can access it. Access to electricity among the Asia-Pacific rural population is growing at 5.2 per cent annually, compared to 1.4 per cent annual growth in the urban areas (between 2010-2012).

Figure 2: Proportion of rural and urban population with access to electricity



Source: OHRLLS calculations based on World Development Indicators, World Bank, 2017.

Globally, about 87 per cent of people with inadequate access lived in rural areas, and 88 per cent lived in Sub-Saharan Africa and South Asia. Electrification rates do also alter notably between the rural (74%) and urban areas (95%) in developing Asia (IEA 2014b).

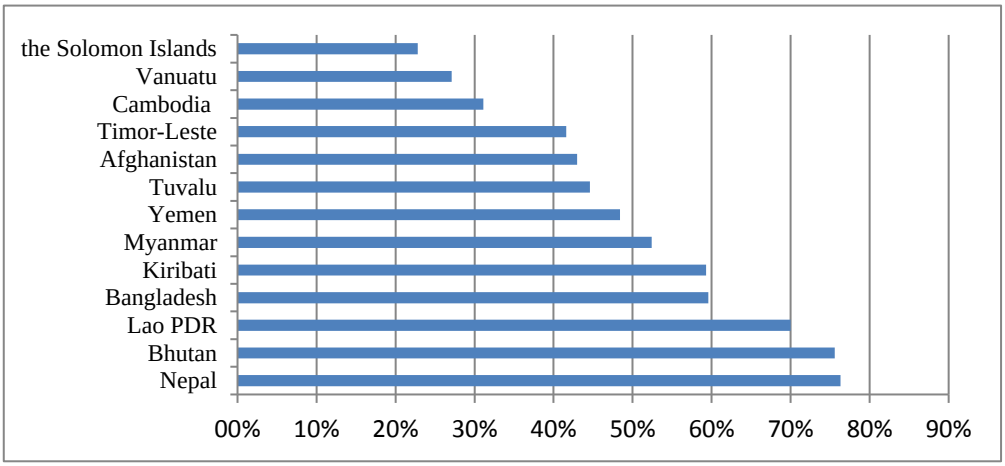
In many rural areas connections to central electric grids remain economically restrictive and may take a long time to realize. International Energy Agency (IEA) proposed that extending grids is the most appropriate option for all urban areas and for around 30 per cent of rural areas in the Asia and the Pacific region (Asian Development Bank, 2013). Governments in many developing countries are testing small-scale off-grid or micro-grid renewable energy projects to provide access to energy in rural areas benefitting of new technologies and more affordable prices. These technologies can efficiently be distributed in rural areas without investing in expensive infrastructure, making them fast to implement and cost-effective.

For example, the Lao PDR made remarkable steps towards success in rapid national electrification integrated within a broader strategy of national and rural development. More than two-thirds of Laotian households in 2013 had access-to-grid quality electricity, a large improvement from 1995 when only every six families was connected, and coverage is expected to reach 90% by 2020. This positive development is a result of the government making rural electrification a priority in the National Growth and Poverty Eradication Strategy for 2006-2010 and dedicating the required resources. The government also adjusted tariffs including cross-subsidization in pricing and offered subsides for the financial sustainability of the utility and for affordability for consumers (Asian Development Bank, 2013).

Bhutan and Nepal have also made remarkable steps towards access to energy for all. Bhutan has successfully tapped into its hydropower resources. The power sector has become the largest source of government revenue and the premier contributor to the country's gross domestic product. After meeting its domestic consumption needs, Bhutan exports around 70% of the total power it generates each year to India, making it South Asia's only energy exporter (World Energy Council , 2013). Hydropower development and exports have underpinned the economy's rapid growth and generated government resources for social and other investments. In 2008, Bhutan agreed to develop 10,000 MW of capacity for exports to India by 2020. Under the bilateral framework with India, three projects are under construction at Punatsangchhu-I (1,200 MW), Punatsangchhu-II (1,020 MW), and Mangdechhu (720 MW).

Nepal has implemented an integrated approach to energy sector development, with measures to improve efficiency in generation, transmission, and distribution of energy and guarantee sustainable use of its resources. The access to electricity among the rural population has increased from 17.4 per cent in 2000 to 71.6 per cent in 2012. However, Nepal's energy sector has faced some challenges and the construction of new plants, such as the 111 MW Rasuwagadi and the 456 MW Upper Tamakoshi, which endured serious setbacks due to damage from the April 2015 earthquake and its aftershocks. Nepal temporarily lost 150 MW of hydropower capability (about 30% of total), exacerbating an already serious electricity shortfall (REN21, 2016).

Figure 3: Proportion of population with access to electricity Asian LDCs, 2012

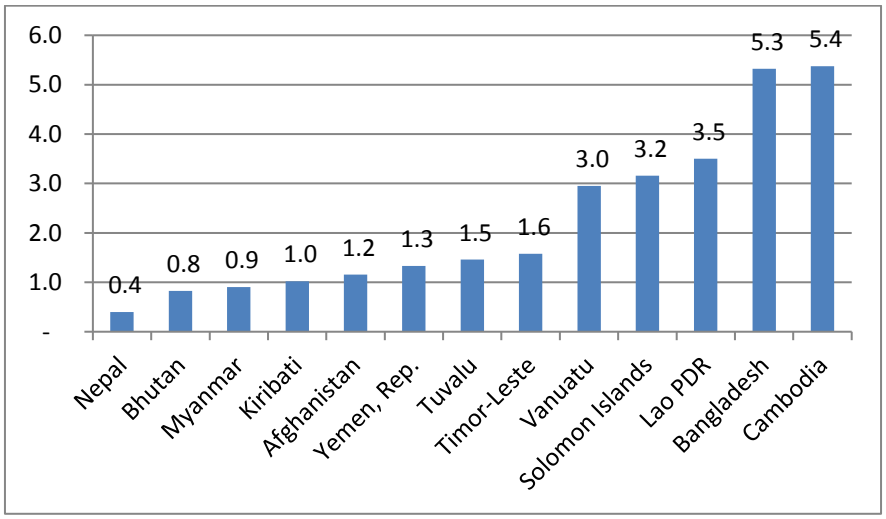


Source: World Development Indicators, World Bank, 2016.

High initial connection cost, poor reliability or unavailability of grid electricity, low revenues deriving from low tariffs, high leakage, non-payment of fees and lack of investment are among the root causes of access issues.

Figure 4 shows the annual growth rate between 2000 and 2012 for the thirteen Asia-Pacific LDCs. Despite great progress in some countries, challenges remain. In order to expand access to modern energy services, energy supply must be adequate in quantity, reliable and affordable. It must be accessible when needed, legal, healthy and safe. Regional cooperation is also an important tool to reach economies of scale to attract investments and empower domestic entrepreneurs to benefit from expanding sustainable energy markets. The LDCs also require higher quantities and quality of investment in infrastructure facilities to close the rural-urban gap, including a combination of off grid, mini-grid and decentralized grid-connected energy solutions.

Figure 4: Annual growth rate, per cent, in energy access, Asian LDC's, 2000-2012



Source: OHRLLS calculations based on World Development Indicators, World Bank, 2017.

The pace of development has especially been remarkable in Cambodia and Bangladesh, where energy access grew on average 5.4 and 5.3 per cent annually, respectively, from 2000 to 2012. In both countries, the energy sector is regarded as a source of economic growth. The Solar Home Systems (SHS) market in Bangladesh has grown at an average of 60% annually over the past decade, with

60,000 households being connected to the SHS market every month. In 2011, the Cambodian government established the Strategy and Plan for Development of Rural Electrification in order to achieve 52% household electrification by 2020 and 70% household electrification by 2030, mainly by expanding the country's grid infrastructure. As an example, Cambodia boosted its electricity supply with the 338 MW Russei Chrum River dam, financed and built by Chinese corporations (REN21, 2016).

Table 1: Electricity Prices across LDCs cities: US cent/kWh

Country	Electricity cost (US cent/kWh) - Major/Capital City
Afghanistan	16.8
Bangladesh	9.3
Bhutan	5.7
Cambodia	17.8
Kiribati	46.2
Lao People's Democratic Republic	11.3
Myanmar	9.8
Nepal	10.4
Solomon Islands	96
Timor-Leste	24
Vanuatu	33.8
Yemen	10.2

Source: World Bank Doing Business database

The least developed countries with the least resources often also pay considerably higher price for a kWh. Table 1 shows the array of commercial electricity rates (US cent/kWh) for the end-user across many major/capital cities of LDCs in the Asia-Pacific region. The average electricity rate across these cities stands at USD 22.4¢/kWh[3], compared to the rates of developed countries such as the U.S.A. (10.08¢/kWh, commercial 2016). The range of electricity rates across these countries extends from 5.7¢/kWh (Bhutan) to 96¢/kWh (Solomon Islands).

National energy policies need to take into consideration the energy demand profile of the poorest people and ensure access to affordable energy. The positive development impacts of sustainable energy can be broadest by targeting the poorest, the so called "bottom of the pyramid", who would normally not benefit from modern energy. Yet, focus should not be on promoting minimum access to households, but should also support productive uses and economic development and support gradual shift towards self-sustaining systems promoting economic development that is transformative and inclusive.

III. Energy efficiency in LDCs

Energy efficiency represents the opportunity to deliver more services for the same energy input, or the same amount of services for less energy input (REN21, 2016). Greater energy efficiency frees up resources to expand energy access and lowers energy cost for consumers. The indicator to measure energy efficiency – energy intensity – is calculated by dividing the total primary energy supply by

[3] Excluding Tuvalu - missing data. Assumed commercial electricity rate from Doing Business database.

GDP, thus measuring the amount of energy used (megajoules) per unit of economic output (2011 Dollars).

The role of energy efficiency is crucial on the path towards increased use of sustainable energy. Investments in energy efficiency are a promising way to address climate change and thus need to be an important component in every energy and climate change policy. Innovations in energy efficiency create win-win situations by reducing emissions while at the same time securing productivity and incomes in developing countries. Progress in energy efficiency in Asia-Pacific LDCs has remained slow, with only 0.2 per cent average change per year from 2010 to 2012. This rate of change is slightly lower when compared to African LDCs, 0.4 per cent; however, energy efficiency in Asia-Pacific LDCs is on average 5 times higher than African LDCs (UNSD SDG Indicators Global Database).

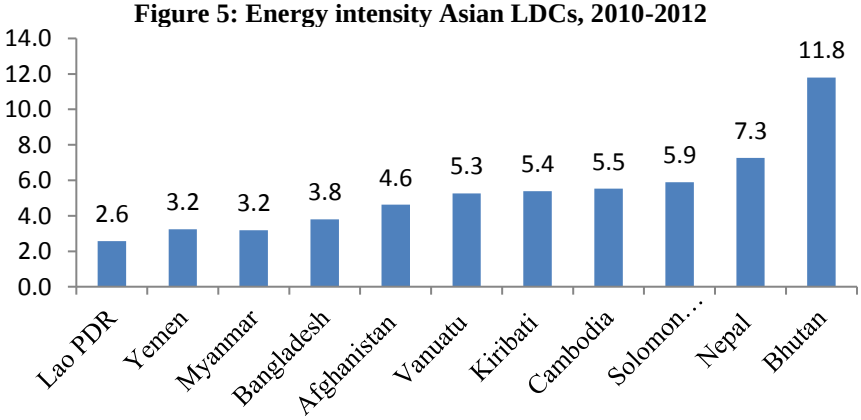
In spite of global progress, energy intensity of LDCs is still higher than the world average or the average of the developing regions. Efficiency improvements need to be achieved during extraction, generation, transmission, distribution and end-use in order to free resources for expanding access, guaranteeing lower consumer prices of energy, and creating surplus. Figure 5 shows the energy intensity level of primary energy for the top 11 energy consumers (see Annex 4 for all countries) among Asia-Pacific LDCs. Despite this progress, challenges in optimizing energy efficiency remain. Access to technology and financial resources as well as stable and transparent institutional and legal frameworks are of high importance in reaching the energy efficiency potential in least developed countries.

Cambodia, the Lao PDR and Myanmar are all anticipating a doubling or tripling (or more) of energy consumption over the next 15 to 20 years. To meet the increase in demand, it will be important for these countries to enhance their energy efficiency. In Lao PDR in 2012, households accounted for 51% of the total final energy consumption. The high share accounted for by households shows their dependence on biomass, which has low efficiency (UNESCAP , 2014).

Tuvalu's Master Plan for Renewable Energy and Energy Efficiency (TMPREEE), 2012-2020, plans the way forward to produce electricity from renewable energy and to establish an energy efficiency programme. Tuvalu aims to generate electricity with 100% renewable energy by 2020 and to enhance energy efficiency on Funafuti by 30 per cent. It is predicted that the use of the diesel generator plant will diminish by up to 95 per cent by 2020 (Government of Tuvalu , 2015).

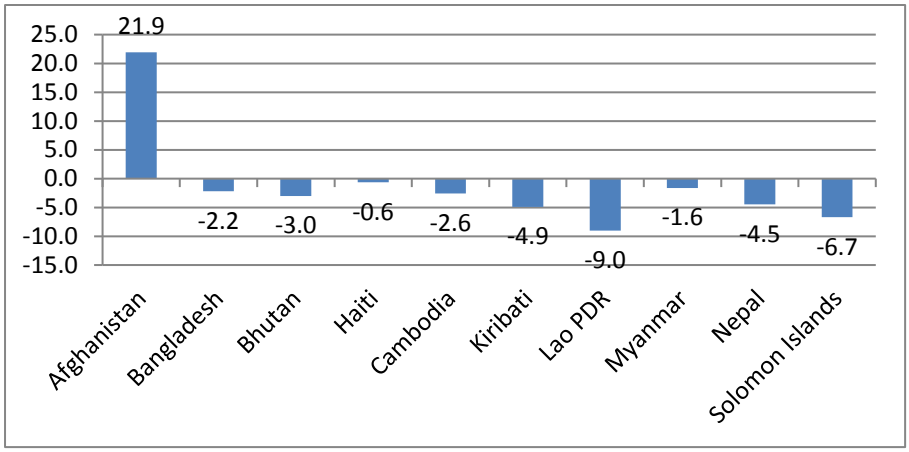
According to Figure 5, Bhutan has the highest energy intensity and therefore it would appear that there are opportunities to improve efficiency of energy use. Accordingly, the Bhutan 2040 Strategic Vision included some key considerations related to energy efficiency – including incentives for fuel efficient buses and taxis, introduction of training in transport management and logistics at technical institutes and introduces vehicle standards and testing (UNDP, Ministry of Economic Affairs, & Royal Government of Bhutan, 2012).

Figure 5: Energy intensity Asian LDCs, 2010-2012



*Tuvalu and Timor-Leste data missing
Source: UNSD SDG Indicators Global Database.

Figure 6: Annual growth rate (per cent) in energy intensity Asian LDCs, 2010-2012



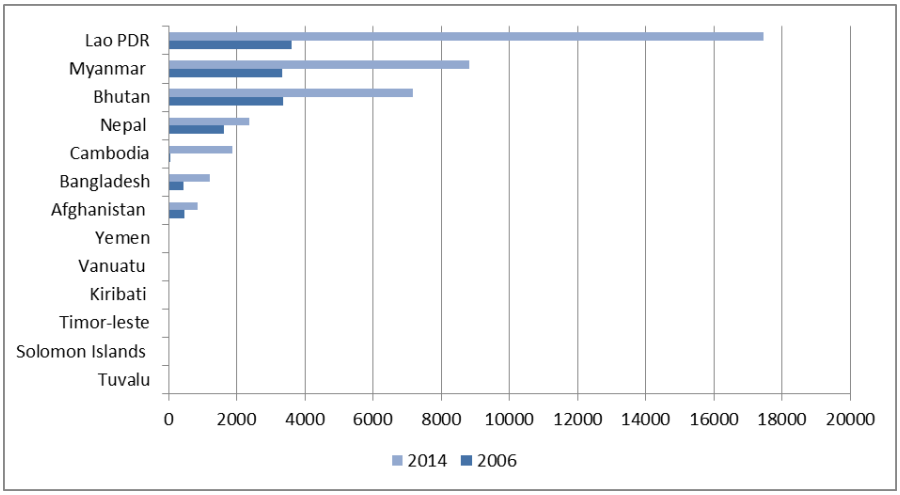
*Tuvalu and Timor-Leste data missing

Source: OHRLLS calculations based on World Development Indicators, World Bank, 2017.

IV. Renewable energy usage in LDCs

Renewable energy strategies are essential for unleashing and accelerating energy transition in Asia-Pacific LDCs. Offering a large potential for the promotion and use of renewable energies, least developed countries play a particularly important role in the transition towards a sustainable future. In 2015, renewable energies have seen the largest worldwide capacity additions to date, making 2015 an exceptional year for renewable energy. Despite lower fossil fuel prices, renewable power expanded at its fastest-ever rate in 2015, thanks to supportive government policies and sharp cost reductions. Renewables accounted for more than half of the world's additional electricity capacity in 2015. Led by wind and solar, renewables represented more than half the additional electricity capacity around the world, reaching a record 153 Gigawatt (GW), 15% more than the previous year. Most of these gains were driven by record-level wind additions of 66 GW and solar photovoltaic (PV) additions of 49 GW (IEA 2016a). The increases in renewable energy production in LDCs are depicted in Figure 7, showing the total renewable energy production by LDCs for the years 2006 and 2014.

Figure 7: Total renewable energy generation (GWh), 2006-2014



Source: The International Renewable Energy Agency, IRENA 2016.

There has been a remarkable improvement in the competitiveness of renewable power generation technologies. Renewables have gained from a virtuous cycle of increased deployment, leading to greater economies of scale and manufacturing improvements, increased competition, technology improvements and falling costs (REN21, 2016).

Solar PV, for instance, has went through remarkable cost reductions. Between 2010 and 2015, the global weighted average LCOE (levelized cost of energy) of utility-scale (>1 MW) solar PV fell by almost 60%. Solar PV is now competing, with no financial support, even in areas with plentiful fossil fuels. Projects such as Scaling Solar – a World Bank group designed programme to facilitate the procurement of solar power for governments – has cleared the way for the implementation of sustainable, solar energy in countries such as Zambia, where solar-powered electricity will be provided by Neoen/First Solar and Enel for as low as 6.02 cents per kWh. Additionally, the 6-cent Zambia tariff is fixed for 25 years, and will not rise with inflation (IFC, 2016) .

Costs for mature renewable power generation technologies, such as biomass for power and hydropower, have been rather stable since 2010. These technologies can offer some of the cheapest electricity of any source (REN21, 2016). The increase of competitiveness in renewable energy technologies is not only essential to meeting countries' energy needs, but also likely to be a commodity for cross-border trade. Increasingly, these opportunities are forming regional energy strategies. Countries of South East Asia are embracing this approach through the ASEAN Power grid, but more could be implemented to influence abundant renewable resources in the region (IRENA , 2014).

The Asia-Pacific LDCs have experienced a variety of trends in their renewable energy production levels (Annex 6**)** in the past years. While some have experienced slight declines, many have maintained or positively increased their renewable energy production levels. A couple of notable examples include Bangladesh, whose energy output from solar energy increased from 51 to 212 GWh between 2010 and 2014, as well as Cambodia which increased their hydroelectric output from 32 to 1,852 GWh, also between 2010 and 2014. Noticeably large increases of renewable energy production have also been achieved in Laos and Myanmar where total renewable energy production more than doubled between 2006 and 2014. Other Asian LDCs ranking highest in their increases of renewable energy generation include Afghanistan, Bhutan and Nepal.

Lao PDR's and Myanmar's main source of renewable energy is hydropower. Hydropower investments in Lao PDR have increased remarkably in recent years, making valuable contributions to economic development. The Mekong river sub-basins in Lao PDR have an estimated 20,000 MW of technically viable hydropower potential. Besides tapping into hydropower, Myanmar's national electrification plan also provides assistance to mini-grid and solar home systems solutions to communities and households in remote areas, located far beyond the existing national grid.

The Solomon Islands' reliance on diesel generation has led to high electricity costs, which restrains economic growth, especially in the commercial and tourism sectors. Last year, the Asian Development Bank (ADB) agreed to finance the Government of Solomon Islands and Solomon Power to convert electricity networks in five provinces almost completely to solar power, making electricity more affordable and accessible. Furthermore, the solar power plants will have a modular structure in order to allow for structural expansions and additions, all in the interest of being capable to meet any future energy demands. (Asian Development Bank, 2016). Furthermore, the Government of the Solomon Islands aims to source 50 per cent of its energy generation from renewable sources by 2020 (Climate Investment Funds).

The major sources of renewable energy in Bangladesh are solar and wind energy. Solar PV systems are implemented throughout the country with more than 2.9 million household-level installations having a capacity of 122.2 MW in April 2014. The coastal areas in Bangladesh provide good opportunities for wind-powered pumping and electricity generation. In Afghanistan, in addition to solar and wind, hydropower and biomass also have potential. Hydropower potential alone is estimated at 23 GW. Measured in 2014, ADB stated that there are about 2,600 micro and mini hydropower plants that could be further developed.

A dramatic decline in global fossil fuel prices, announcements regarding price decreases in renewable power long-term contracts, new technical innovations including in the area of energy storage, and the historic climate agreement in Paris have shaped last year's developments. With increased cost-competitiveness of renewable technologies, improved access to financial resources, increased environmental awareness and demand for energy security in developing and emerging nations the use of renewable energy around the globe increased with rapid growth rates observed particularly in the power sector. New markets for renewable energy are emerging around the world and net investments leading to renewable power capacity additions outpaced fossil fuel net investments in the sixth consecutive year. Particularly private investors, large banks and international investment firms, increased their commitments during 2015, scaling up loan size and introducing new investment vehicles, such as green bonds, and crowdfunding. Developing and emerging markets started embedding mainstream financing structures and guarantees as companies (especially solar PV) and investors took higher risk in order to receive higher yields.

Even with ongoing fossil fuels subsidies and diminishing prices in 2015, renewable energy continued its fast growth in both capacities added and energy produced. Solar PV and wind were the most dynamic markets, and hydropower remains to provide the majority of renewable power capacity and generation. Bioenergy remained the leader by far in the heat (buildings and industry) and transport sectors (REN21, 2016).

2015 was not only a year of growth in markets and investments but also of continued progress in renewable energy technologies, improvements in energy efficiency, increases in the use of smart grid technologies and important advances in hardware and software to facilitate the integration of renewable energy. Further progress has been made in the development of energy storage and commercialization. LDC decision-makers have to find a way how to tap into these developments and to ensure that today's decisions will not lock their countries into unsustainable paths of development.

The transition to renewable energies has wide-ranging positive effects on the global society. Affordable, reliable and sustainable energy services are the main drivers for ending extreme poverty, the creation of decent employment opportunities, business development and improved access to health and education, thus contributing to the achievement of all SDGs. The transition toward sustainable use of energy requires a unique mix of policies for each country. Stakeholders, governments, civil society, energy suppliers and consumers need to collaborate in working towards energy transition.

V. Conclusions

Sustainable growth, advancing development, and improving livelihoods can only be achieved with efficient use and distribution of energy. Access to affordable, reliable, and renewable energy and related technologies should be made a priority and will be critically important on the path towards sustainable development and ending extreme poverty. Each country's transition to a sustainable energy sector involves a unique mix of resource opportunities and challenges and national plans and policies should be designed to meet the unique needs and resources of each country with the necessary mix of grid, mini-grid and off-grid solutions.

The following key considerations will accelerate the transition in the least developed countries in an integrated and holistic manner:

1. Access to sustainable energy is the key priority for LDCs. Without access to modern and affordable energy, the prospect of development will remain a distant dream for LDCs. Increased access to renewable and clean energy will have a direct impact on the livelihoods of people and be a strong entry point for enhancing sustainable development in an integrated manner. Access to sustainable energy for all can be achieved without increasing emissions of greenhouse gases. Given their low-carbon profile and rich natural capital and cultural assets, LDCs are also well positioned in the transition to a green economy via a sustainable energy mix.

2. Renewable energy is not only a major source of energy access to those living in isolated rural areas and SIDS, but also a contributor to the much needed transformation of energy systems for **addressing climate change, health and energy security**.

3. LDC governments need to create **enabling and supporting policy and regulatory frameworks** to promote commercial investments, involve with a broad range of stakeholders, including reaching out to the poorest and supporting bottom-up approaches. Governments should share experiences and learn from successful initiatives.

4. National policies should reflect an appropriate energy mix to meet development needs, including through increased use of renewable energy sources and other low-emission technologies, the more efficient use of energy and greater reliance on advanced energy technologies, including cleaner fossil fuel technologies, and the sustainable use of traditional energy resources. To increase the effectiveness and assure local ownership, the development and implementation of energy investment plans should be coordinated at the sub-regional level by regional organizations and be closely linked to the Intended Nationally Determined Contributions (INDC) process.

5. The main constraints for LDCs in accessing financing include **low project preparation capacities** and skills to deploy financing models that encourage blended finance to attract more funds. Development partners are encouraged to **strengthen capacity building**, including education and training as well as certification. Furthermore there is a need to develop national and local capacities to implement and monitor the results of energy access policies and programmes. This includes the strengthening of the institutional capacities of regional organizations and communities.

6. All stakeholders including bilateral donors, international organisations, development finance institutions, private sector and civil society need to join their efforts to make sure that the most vulnerable countries will enter the path of transition to sustainable energy. The international community must provide the necessary **support to leverage financial resources and help LDCs' actions to build capacity** in order to seize the opportunity for transformative change that will scale up poverty eradication and sustainable development in these countries. Public-private partnerships are an important way to overcome practical challenges and meet financing gaps, also leveraging impact of ODA and MDBs investment play key role for achieving the energy goals.

7. Governments of developed countries are encouraged to take further action to mobilize the provision of **technology transfer** on concessional and preferential terms and the diffusion of new and existing environmentally sound technologies to developing countries including LDCs, as set out in the Addis

Ababa Action Agenda and the Johannesburg Plan of Implementation. The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States is supporting the establishment of the Technology Bank for LDCs which will build capacities in Science, Technology and Innovation in LDCs including in the renewable energy sector. The resolution establishing the **Technology Bank for LDCs** was adopted by the United Nations General Assembly in December 2016.

8. A greater effort is needed to **strengthen synergies of the three goals of Sustainable Energy for All: access, energy efficiency and renewable energy**. A fragmented approach to the three key sub-goals of SDG 7 and SE4All is an obstacle to building linkages to other key SDGs such as health, food, water, gender, industry. A well performing and efficient energy system strengthens the opportunity to provide energy access to those now deprived of affordable and reliable energy. Provision of modern energy access, including electricity and clean cooking fuels, will also inter alia: increase productive capacity and economic growth; provide better health outcomes through reductions in both indoor and outdoor air pollution, and greater provision and access to health services; raise education standards, and help mitigate the impacts of climate change. In fact, there are very few areas in the sustainable development agenda where sustainable energy will not play a significant role

9. Regional cooperation is an important tool to reach the needed economies of scale to attract investments and empower domestic "green energy" entrepreneurs to participate in regional and global manufacturing and servicing value chains. There is need for targeted regional support to assist LDCs in attracting and absorbing international climate finance (e.g. GEF and GCF) earmarked for the implementation of the INDCs. **Regional organizations and utility organizations** (e.g. power pools) encouraged to strengthen sub-regional and regional energy infrastructure development projects and overall coordination and coherence. There is a strong need for enhancing the technical capacities of regional organizations to support Member States effectively in addressing the barriers for sustainable energy markets, industries and innovation.

10. The Pacific **SIDS** are highly dependent on imported fossil fuels for their energy needs. The deployment of renewable energy technologies and efficient use of energy can have a transformational impact on the economic, environmental and social development of these countries. Therefore, promoting renewable energy has to be an integral part of their sustainable development, climate mitigation and resilience efforts.

11. Sustainable energy and women's empowerment are mutually reinforcing goals. The empowerment of women to become agents of sustainable energy will be key to achieving truly inclusive and sustainable development in LDCs. Energy poverty impacts women disproportionately especially due to domestic dependence on biofuels, traditional gender roles, and the related health problems. In addition to addressing such energy poverty challenges, evidence shows that access to sustainable energy can provide opportunities for women's economic empowerment and advance gender equality.

~

VI. List of Annexes:

Annex 1: Proportion of LDC population with access to electricity, 1990-2012
Annex 2: Proportion of population with primary reliance on clean fuels, 2005-2014
Annex 3: Renewable energy share in the total final energy consumption, 2000-2012
Annex 4: Energy intensity level of primary energy, millijoules (MJ) per constant 2011 PPP GDP, 2000-2012
Annex 5: Electric generation capacity (GW) per 1,000,000 people, 2000-2012
Annex 6: Renewable Electricity generation (GWh), 2010-2014

VII. Annexes

Annex 1: Proportion of LDC population with access to electricity, 1990-2012

Country	1990	2000	2010	2012
Afghanistan	35	37	41	43
Angola	28	31	35	37
Bangladesh	22	32	55	60
Benin	22	25	28	38
Bhutan	66	68	72	76
Burkina Faso	6	7	13	13
Burundi	0	4	5	7
Cambodia	19	17	31	31
Central African Republic	3	6	10	11
Chad	0	2	4	6
Comoros	42	45	52	69
Congo, Dem. Rep.	6	7	15	16
Djibouti	43	46	50	53
Equatorial Guinea	57	61	65	66
Eritrea	23	32	33	36
Ethiopia	10	13	23	27
Gambia, The	18	34	31	35
Guinea	14	16	20	26
Guinea-Bissau	51	54	57	61
Haiti	31	31	34	38
Kiribati	49	53	56	59
Lao PDR	52	46	66	70
Lesotho	6	5	17	21
Liberia	0	1	4	10
Madagascar	9	11	14	15
Malawi	3	5	9	10
Mali	12	17	17	26
Mauritania	12	15	18	22
Mozambique	6	7	15	20
Myanmar	43	47	49	52
Nepal	70	73	76	76
Niger	6	7	9	14
Rwanda	2	6	11	18
Sao Tome and Principe	50	53	57	60
Senegal	26	37	57	57
Sierra Leone	6	9	12	14
Solomon Islands	13	16	19	23
Somalia	22	26	29	33
South Sudan			2	5
Sudan	23	25	29	33
Tanzania	7	9	15	15
Timor-Leste	32	34	38	42
Togo	10	17	28	31
Tuvalu	35	37	41	45
Uganda	7	9	15	18
Vanuatu	18	19	24	27
Yemen, Rep.	38	41	45	48
Zambia	13	17	19	22

Source: UNSD SDG Indicators Global Database.

Annex 2: Proportion of population with primary reliance on clean fuels, 2005-2014

Country	2005	2010	2012	2014
Afghanistan	21%	19%	18%	17%
Angola	29%	39%	44%	48%
Burundi	<5%	<5%	<5%	<5%
Benin	<5%	5%	6%	7%
Burkina Faso	<5%	6%	7%	7%
Bangladesh	11%	10%	10%	10%
Bhutan	49%	60%	64%	68%
Central African Republic	<5%	<5%	<5%	<5%
Democratic Republic of the Congo	<5%	<5%	5%	6%
Comoros	<5%	<5%	6%	7%
Djibouti	<5%	7%	9%	10%
Eritrea	8%	11%	12%	14%
Ethiopia	<5%	<5%	<5%	<5%
Guinea	<5%	<5%	5%	6%
Gambia	<5%	<5%	<5%	<5%
Guinea-Bissau	<5%	<5%	<5%	<5%
Equatorial Guinea	17%	19%	21%	22%
Haiti	7%	8%	8%	9%
Cambodia	8%	11%	12%	13%
Kiribati	5%	<5%	<5%	<5%
Lao People's Democratic Republic	<5%	<5%	<5%	<5%
Liberia	<5%	<5%	<5%	<5%
Lesotho	24%	28%	30%	32%
Madagascar	<5%	<5%	<5%	<5%
Mali	<5%	<5%	<5%	<5%
Myanmar	6%	8%	9%	9%
Mozambique	<5%	<5%	<5%	<5%
Mauritania	36%	41%	43%	45%
Malawi	<5%	<5%	<5%	<5%
Niger	<5%	<5%	<5%	<5%
Nepal	14%	21%	23%	26%
Rwanda	<5%	<5%	<5%	<5%
Sudan	12%	18%	21%	23%
Senegal	38%	37%	36%	36%
Solomon Islands	8%	8%	9%	9%
Sierra Leone	<5%	<5%	<5%	<5%
Somalia	<5%	6%	8%	9%
South Sudan	<5%	<5%	<5%	<5%
Sao Tome and Principe	22%	27%	29%	30%
Chad	<5%	<5%	<5%	<5%
Togo	<5%	<5%	5%	6%
Timor-Leste	<5%	<5%	<5%	<5%
Tuvalu	25%	28%	29%	30%
United Republic of Tanzania	<5%	<5%	<5%	<5%
Uganda	<5%	<5%	<5%	<5%
Vanuatu	14%	15%	16%	16%
Yemen	62%	62%	62%	62%
Zambia	14%	15%	16%	16%

Source: UNSD SDG Indicators Global Database.

Annex 3: Renewable energy share in the total final energy consumption, 2000-2012

Country	2000	2005	2010	2012
Afghanistan	60%	40%	15%	
Angola	76%	73%	57%	57%
Burundi	93%	97%	97%	
Benin	70%	59%	52%	51%
Burkina Faso	86%	87%	84%	
Bangladesh	59%	51%	41%	38%
Bhutan	95%	92%	91%	
Central African Republic	86%	86%	80%	
Democratic Republic of the Congo	98%	97%	97%	96%
Comoros	54%	52%	50%	
Djibouti	34%	33%	34%	
Eritrea	77%	75%	81%	80%
Ethiopia	96%	95%	94%	93%
Guinea	90%	89%	77%	
Gambia	50%	46%	45%	
Guinea-Bissau	92%	89%	89%	
Equatorial Guinea	53%	35%	31%	
Haiti	76%	77%	79%	83%
Cambodia	81%	76%	73%	73%
Kiribati	11%	1%	3%	
Lao PDR	91%	90%	87%	
Liberia	98%	107%	108%	
Lesotho	100%	5%	4%	
Madagascar	78%	80%	82%	
Mali	86%	86%	84%	
Myanmar	80%	80%	85%	79%
Mozambique	92%	93%	90%	88%
Mauritania	44%	39%	34%	
Malawi	77%	83%	79%	
Niger	94%	91%	80%	
Nepal	88%	90%	87%	85%
Rwanda	89%	89%	91%	
Sudan	80%	72%	61%	64%
Senegal	48%	41%	51%	51%
Solomon Islands	87%	80%	67%	
Sierra Leone	89%	87%	84%	
Somalia	93%	93%	94%	
Sao Tome and Principe	55%	48%	44%	
Chad	98%	92%	91%	
Togo	77%	77%	66%	73%
Timor-Leste		47%	38%	
United Republic of Tanzania	94%	91%	90%	88%
Uganda	95%	93%	91%	
Vanuatu	69%	68%	39%	
Yemen	1%	1%	1%	1%
Zambia	90%	89%	92%	88%

Source: UNSD SDG Indicators Global Database.

Annex 4: Energy intensity level of primary energy, millijoules (MJ) per constant 2011 PPP GDP, 2000-2012

Country	2000	2005	2010	2012
Afghanistan		1.43	3.12	4.63
Angola	6.66	4.95	4.12	3.97
Burundi	11.73	15.47	13.54	12.99
Benin	7.84	8.09	9.85	9.67
Burkina Faso	6.82	7.66	7.36	7.02
Bangladesh	4.17	3.99	3.97	3.8
Bhutan	21.9	16.24	12.55	11.8
Central African Republic	9.09	8.03	7.22	7.16
Democratic Republic of the Congo	23.43	23.29	21.17	19.13
Comoros	5.08	5.32	5.76	6.14
Djibouti	6.44	6.53	6.12	3.48
Eritrea	5.2	4.94	5.01	4.61
Ethiopia	29.97	25.57	18.63	17.04
Guinea	13.34	11.81	12.34	11.91
Gambia	5.82	5.77	5.67	5.53
Guinea-Bissau	15.56	15.95	15.18	15.1
Equatorial Guinea	1.99	5.01	5.26	5.77
Haiti	5.66	9.86	10.58	10.45
Cambodia	8.54	5.5	5.83	5.53
Kiribati	3.77	5.99	5.95	5.39
Lao People's Democratic Republic	5.65	4.55	3.11	2.57
Liberia	39.79	45.2	30.55	27.52
Lesotho	7.2	11.04	11.6	10.96
Madagascar	6.8	6.07	6.32	6.42
Mali	4.71	3.72	3.24	3.29
Myanmar	9.42	5.93	3.3	3.19
Mozambique	29.99	23.26	19.55	17.91
Mauritania	5.59	5.61	4.76	7.81
Malawi	13.76	13.31	10.45	10.16
Niger	11.57	8.12	6.23	6.31
Nepal	9.29	8.85	7.97	7.27
Rwanda	8.59	8.84	7.32	5.61
Sudan	6.76	5.58	4.61	5.29
Senegal	5.31	4.92	5.82	5.79
Solomon Islands	8.27	8.15	6.76	5.89
Sierra Leone	15.35	11.26	9.21	7.98
Somalia	50.99	54.62	55.28	54.69
Sao Tome and Principe	6.39	6.73	5.84	5.68
Chad	8.04	4.25	3.73	3.56
Togo	13.92	14.8	16.6	14.98
United Republic of Tanzania	16.37	14.84	12.55	12.08
Uganda	15.68	12.63	9.67	9.14
Vanuatu	4.18	3.38	4.22	5.26
Yemen	2.82	3.19	3.39	3.23
Zambia	12.3	11.33	9.43	9.03

Source: UNSD SDG Indicators Global Database.

Annex 5: Electric generation capacity (GW, first column) and renewable generation capacity (GW, second column) per 1,000,000 people, 2000-2012

Country	2000	2005	2010	2012	2000	2005	2010	2012
Afghanistan	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01
Angola	0.04	0.05	0.05	0.07	0.02	0.03	0.02	0.03
Bangladesh	0.03	0.03	0.04	0.06	0.00	0.00	0.00	0.00
Benin	0.01	0.01	0.01	0.02	0.00	0.00	0.00	0.00
Bhutan	0.75	0.74	2.09	2.02	0.73	0.72	2.07	2.00
Burkina Faso	0.01	0.02	0.02	0.01	0.00	0.00	0.00	0.00
Burundi	0.01	0.00	0.01	0.01	0.01	0.00	0.01	0.01
Cambodia	0.01	0.02	0.03	0.04	0.00	0.00	0.00	0.02
Central African Republic	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01
Chad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Comoros	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.00
Congo, Dem. Rep.	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.04
Djibouti	0.15	0.15	0.16	0.15	0.00	0.00	0.00	0.00
Equatorial Guinea	0.02	0.04	0.05	0.21	0.00	0.00	0.00	0.16
Eritrea	0.02	0.04	0.03		0.00	0.00	0.00	
Ethiopia	0.01	0.01	0.02	0.03	0.01	0.01	0.02	0.02
Gambia, The	0.02	0.03	0.04	0.03	0.00	0.00	0.00	0.00
Guinea	0.04	0.03	0.04	0.03	0.02	0.01	0.01	0.01
Guinea-Bissau	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00
Haiti	0.03	0.03	0.03	0.03	0.01	0.01	0.01	0.01
Kiribati	0.05	0.03	0.05	0.05	0.00	0.00	0.00	0.00
Lao PDR	0.12	0.13	0.30	0.47	0.12	0.12	0.29	0.46
Lesotho	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Liberia	0.07	0.06	0.05	0.01	0.00	0.00	0.00	0.00
Madagascar	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Malawi	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Mali	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Mauritania	0.05	0.08	0.07	0.08	0.03	0.03	0.03	0.03
Mozambique	0.13	0.11	0.10	0.09	0.12	0.10	0.09	0.08
Myanmar	0.02	0.03	0.03	0.07	0.01	0.01	0.02	0.05
Nepal	0.02	0.02	0.03	0.03	0.01	0.02	0.02	0.03
Niger	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
Rwanda	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01
Sao Tome and Principe	0.10	0.09	0.08	0.09	0.05	0.04	0.04	0.02
Senegal	0.03	0.05	0.05	0.05	0.00	0.00	0.00	0.00
Sierra Leone	0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.01
Solomon Islands	0.03	0.08	0.07	0.07	0.00	0.00	0.00	0.00
Somalia	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00
South Sudan	...	...	...	...	...	...	...	...
Sudan	0.03	0.03	0.06	0.08	0.01	0.01	0.04	0.06
Tanzania	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01
Timor-Leste	...	...	...	...	...	...	...	...
Togo	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Tuvalu	...	...	...	...	...	...	...	...
Uganda	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.02
Vanuatu	0.09	0.10	0.12	0.11	0.00	0.00	0.01	0.01
Yemen, Rep.	0.05	0.05	0.06	0.06	0.00	0.00	0.00	0.00
Zambia	0.16	0.14	0.12	0.13	0.16	0.14	0.12	0.13

Source: World Development Indicators and Sustainable Energy For All, World Bank 2016.

Annex 6: Renewable Electricity generation (GWh), 2010-2014

Country/area	Technology	2010	2011	2012	2013	2014
Afghanistan	Total renewable energy	693	548	647	747	838
	Hydropower	693	548	647	746	836
	Wind					
	Solar				1	1
Bangladesh	Total renewable energy	1 347	1 311	1 237	1 252	1 208
	Hydropower	1 293	1 226	1 126	1 066	993
	Wind	4	4	4	4	4
	Solar	51	81	108	182	212
Bhutan	Total renewable energy	7 328	7 068	6 827	7 550	7 148
	Hydropower	7 328	7 067	6 827	7 550	7 147
	Wind					
	Solar	0	0	0	0	0
Cambodia	Total renewable energy	42	68	533	1 026	1 873
	Hydropower	32	52	517	1 016	1 852
	Wind	1	1	1	1	1
	Solar	3	3	3	3	3
Lao PDR	Total renewable energy	13 470	13 503	15 642	15 665	17 440
	Hydropower	13 470	13 503	15 642	15 659	17 434
	Wind					
	Solar			0	0	0
Myanmar	Total renewable energy	6 189	7 518	7 766	8 823	8 829
	Hydropower	6 189	7 518	7 766	8 823	8 829
	Wind					
	Solar					
Nepal	Total renewable energy	2 169	2 186	2 431	2 329	2 369
	Hydropower	2 152	2 163	2 401	2 292	2 321
	Wind					
	Solar	17	23	30	38	48
Timor Leste	Total renewable energy	2	2	2	2	2
	Hydropower	2	2	2	2	2
	Wind					
	Solar					
Kiribati	Total renewable energy	3	3	2	2	2
	Hydropower					
	Wind					
	Solar	3	3	2	2	2
Solomon Is	Total renewable energy	1	2	2	2	2
	Hydropower	1	1	1	1	1
	Wind					
	Solar	0	1	1	1	2
Tuvalu	Total renewable energy	0	0	0	0	0
	Hydropower					
	Wind					
	Solar	0	0	0	0	0
Vanuatu	Total renewable energy	12	10	13	13	13
	Hydropower	7	6	7	7	8
	Wind	5	4	5	5	5
	Solar		0	0	0	0

Source: IRENA (2016), Renewable Energy Statistics 2016

Bibliography

Asian Development Bank . (2016). *Going Beyond the Meter: Inclusive Energy Solutions in South Asia, Conference Report* . Jaipur .

Asian Development Bank. (2013). *Energy Access and Energy Security in Asia and the Pacific.* Manila .

Asian Development Bank. (2015). *Energy efficiency developments and potential energy savings in the greater mekong subregion.* Manila .

Asian Development Bank. (2016). *ADB Approves $15.2 Million Solar Project for Solomon Islands*. Retrieved from Asian Development Bank Website.

Castalia Strategic Advisors . (2014). *Myanmar National Electrification Program (NEP) Roadmap and Investment Prospectus.* SE4ALL .

Climate Investment Funds. (n.d.). *Solomon Islands*. Retrieved from Climate Investment Funds: https://www-cif.climateinvestmentfunds.org/country/solomon-islands

E8. (2009). *The Tuvalu Solar Power Project.* Retrieved from Global Sustainable Electricity Partnership.

ESMAP. (2011). *Fighting Poverty through Decentralized Renewable Energy.* Phnom Penh: World Bank Group.

ESMAP. (2014). *Annual report 2014* .

Export.gov. (2017). *Export.gov*. Retrieved from Export.got: https://www.export.gov/article?id=Ethiopia-Energy

Government of Tuvalu . (2015). *Intended Nationally Determined, Contributions Communicated to the UNFCCC on 27 November2015.* UNFCCC.

IEA. (2016). *Medium-Term Renewable Energy Market Report*. Retrieved from International Energy Agency: https://www.iea.org/bookshop/734-Medium-Term_Renewable_Energy_Market_Report_2016

IEA. (2017). *OECD - IEA Net Electrical Capacity*. Retrieved from OECD iLibrary: http://www.oecd-ilibrary.org/energy/data/iea-electricity-information-statistics/oecd-net-electrical-capacity_data-00460-en

IFC. (2016). *Scaling Solar Delivers Low-cost Clean Energy for Zambia*. Retrieved from IFC: http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/scaling+solar+delivers+low+cost+clean+energy+for+zambia

IFC. (2016). *SCALING SOLAR DELIVERS LOW-COST CLEAN ENERGY FOR ZAMBIA*. Retrieved from IFC: World Bank Group: http://www.ifc.org/wps/wcm/connect/news_ext_content/ifc_external_corporate_site/news+and+events/news/scaling+solar+delivers+low+cost+clean+energy+for+zambia

IMF. (2015). *Macroeconomic Developments and Prospects in Low-Income Developing countries: 2015.* Washington DC: IMF.

IRENA . (2014). *Work Programme and Budget for 2014-2015, Report of the Director-General.* Abu Dhabi: IRENA.

REN21. (2016). *Renewables 2016 Global Status Report* .

SE4ALL . (2012). *Rapid assessment, gap analysis, Bhutan* .

SE4ALL . (2013). *Rapid assessment, gap analysis, Nepal* .

Se4All. (2016). *Contributions to the 2030 Agenda for Sustainable Development.* New York : Sustainable Development Goals.

UNCTAD. (2015). *The Least Developed Countries Report 2015.* New York and Geneva: UNCTAD.

UN-DESA. (2015). *World Population Projected to Reach 9.7 billion by 2050*. Retrieved from UN-DESA: http://www.un.org/en/development/desa/news/population/2015-report.html

UNDESA. (2016). *SDG Indicators Global Database*. Retrieved from UNDESA Statistics Divison: https://unstats.un.org/sdgs/indicators/database/

UNDP, Ministry of Economic Affairs, & Royal Government of Bhutan. (2012). *Bhutan Energy Efficiency Baseline Study*.

UNEP. (2016). *An Ethiopian Environmental Success Story*. Retrieved from UNEP: http://web.unep.org/africa/news/ethiopian-environmental-success-story

UNESCAP . (2014). *Enabling Environment and Technology Innovation Ecosystem for Affordable Sustainable Energy Options* .

World Bank. (2016). *Africa Far from Sustainable Energy for All, But Showing Signs of Progress*. Retrieved from World Bank: http://www.worldbank.org/en/news/feature/2016/02/17/africa-far-from-sustainable-energy-for-all-but-showing-signs-of-progress

World Bank. (2016). *World Development Indicators*. Retrieved from World Bank: http://data.worldbank.org/data-catalog/world-development-indicators

World Bank. (2017). *Making Power Affordable for Africa and Viable for its Utilities*. Retrieved from World Bank: http://www.worldbank.org/en/topic/energy/publication/making-power-work-for-africa

World Bank. (2017). *Projects & Operations*. Retrieved from World Bank Website: http://projects.worldbank.org/P144573?lang=en

World Bank Group . (2015). *Electricity Connections and Firm Performance in 183 Countries.* Washington: World Bank Group .

World Energy Council . (2013). *World energy resouces, 2013 survey* . London: World energy council .