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ACCELERATING SUSTAINABLE ENERGY FOR ALL IN LANDLOCKED DEVELOPING COUNTRIES THROUGH INNOVATIVE PARTNERSHIPS

This publication contains both a summary report of the Senior Officials' Meeting on Accelerating Sustainable Energy for All in Landlocked Developing Countries through Innovative Partnerships held in Vienna, Austria on 24 and 25 October 2016 and the background report that was prepared for the Meeting.



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Solar Energy Field in Rwanda. USAID / Power Africa / Flickr

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**THE IMPLEMENTATION OF
IMPLEMENTED IN A COHERENT
FOR THE OPTIMAL BENEFIT
THAT NO ONE IS LEFT BEH**

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THE VPOA AND 2030 AGENDA NEED TO BE
 PRESENT MANNER TO FOSTER THE SYNERGIES
 OF THE LLDCs AND IN ORDER TO ENSURE
 SUSTAINABLE GROWTH AND EMPLOYMENT.



Photo: Ethiopia. Ollivier Girard/CIFOR, Flickr.

FOREWORD

The thirty two Landlocked Developing Countries (LLDCs) with a population of 480 million face unique challenges that require innovative and inclusive solutions: a disadvantaged geographical location which, combined with critical infrastructure deficiencies and poor trade facilitation, result in high transport and overall trade costs that erode their competitive edge and pose hurdles on their sustainable development pathway.

The High-Level Meeting on “Accelerating Sustainable Energy for All in Landlocked Developing Countries through Innovative Partnerships”, held from 24 to 25 October 2016 in Vienna, Austria, was a joint effort of the Government of Austria, the Office of the High Representative for LDCs, LLDCs and SIDS (UN-OHRLLS) and the United Nations Industrial Development Organization (UNIDO). Delegates discussed in detail potential strategies and important recommendations to address existing barriers for enhancing energy access and the deployment of renewable energy and energy efficiency in LLDCs.

The meeting was a major step towards the implementation of The Vienna Programme of Action for the LLDCs for the Decade 2014-2024 (VPoA). The VPoA underlines the critical role of energy to address the special challenges of the LLDCs, and contributes to the implementation of the 2030 Agenda for Sustainable Development and the Paris Climate Agreement. The 2030 Agenda makes specific reference to the LLDCs in SDG 7 which calls for access to affordable, reliable, sustainable and modern energy for all by 2030.

The multiplier effect of sustainable energy for the achievement of all other SDGs is commonly understood, and the cross-links between SDG 7 and other SDGs, such as SDG 13 on climate change mitigation and adaptation and SDG9 on inclusive and sustainable industrial development, require specific attention to positively enhance their achievement. LLDCs also play an important role in the achievement of the Paris Climate Agreement which aims at limiting the temperature increase to well below 2 degrees Celsius, while pursuing efforts to limit the increase to 1.5 degrees. Energy investment decisions in LLDCs matter for all of the most vulnerable countries, including Small Island Developing States (SIDS) which suffer from climate change impacts the most.

The meeting was another testimony for the importance of Vienna as an international hub for sustainable energy. Key recommendations on the way forward included to strengthen national frameworks for sustainable energy, mobilize financing at all levels and from all available sources, engage in innovative partnerships and enhance sub-regional cooperation to accelerate the uptake of renewable energy and energy efficiency markets, industries and innovation in LLDCs. In this context, regional organizations and international partners were encouraged to expand and consolidate the Global Network of Regional Sustainable Energy Centers, with its current hubs in Namibia, Uganda, Tonga, Barbados, Egypt and Cabo Verde.

This outcome report presents the main findings and recommendations from the High-Level Meeting together with a status report on persisting barriers and the progress made by LLDCs in moving towards sustainable energy for all.

We hope that this publication will prove to be a valuable and timely resource for decision-makers in governments, intergovernmental organizations, international and regional organizations, development partners, academia and the general public.



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SUMMARY

This report has two parts: a report of the Senior Official's Meeting on Accelerating Sustainable Energy for All in Landlocked Developing Countries (LLDCs) through Innovative Partnerships that was held in Vienna, Austria on 24 and 25 October 2016; and the background report that was prepared for the Senior Official's meeting. The meeting was jointly organized by the Government of Austria and the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLS), in collaboration with United Nations Industrial Development Organization (UNIDO), and Sustainable Energy for All (SE4ALL).

The meeting was organized as part of the follow-up and implementation of the Vienna Programme of Action (VPoA) and the 2030 Agenda for Sustainable Development. The VPoA stresses that energy infrastructure and access to affordable, reliable and renewable energy, and related technologies are critically important for improving trade facilitation and enhancing productive capacities to achieve sustained economic growth and structural transformation in LLDCs. Sustainable Development Goal 7 calls for ensuring access to affordable, reliable, sustainable, and modern energy for all by 2030. The LLDCs still have a significantly lower average level of access to electricity services when compared to developed countries, developing countries, and the world average. The average proportion of population with access to modern energy in the LLDCs is 55 per cent and more than 300 million people in the LLDCs still rely on traditional use of biomass for cooking. There are important cross-links to other SDGs, such as SDG-9 on infrastructure, innovation, and inclusive and sustainable industrial development, as well as SDG-13 which relates to the implementation of the Paris Climate Agreement.

The objectives of the meeting were: (i) to take stock of the progress made by the LLDCs in achieving sustainable energy for all; (ii) to identify existing drivers and remaining barriers for the scaling-up of renewable energy and energy efficiency markets, industries, and innovation; (iii) to review the effectiveness of the current regional and international support and partnership frameworks; and (iv) to suggest priority actions and practical solutions to strengthen implementation capacities of LLDCs. The background report aimed to: review the progress made by the LLDCs towards achieving sustainable energy for all at national level, identify existing barriers, and provide concrete recommendations on how to overcome these barriers.

Both the background document and discussions in the meeting highlighted the need to scale-up access to sustainable energy, close the rural-urban disparities, increase access to clean and modern cooking energy, and promote greater use of renewable energy sources and energy efficiency. To achieve this, LLDCs need to ensure that national sustainable energy policies and regulatory frameworks are strengthened to establish an enabling environment to encourage investment into the sector.

Strong national leadership is important. Strengthened partnerships between all stakeholders are necessary to provide technology, financial and capacity building support, and knowledge sharing of best practices and lessons learned. Regional partnerships are important for attracting investment to regional projects that can, in turn, create larger opportunities in energy trade for the benefit of the LLDCs. The meeting adopted important conclusions and recommendations that make a significant contribution to the implementation of the Vienna Programme of Action for LLDCs and the 2030 Agenda for Sustainable Development.

ACRONYMS AND ABBREVIATIONS

AA	Action Agenda	MENA	Middle East and North Africa
ADA	Austrian Developing Agency	NGO	Non-Governmental Organization
AEA	Austrian Energy Agency	ODA	Official Development Assistance
AFDB	African Development Bank	OFID	OPEC Fund for International Development
AIFC	Astana International Financial Center	OPEC	Organization of the Petroleum Exporting Countries
CFC	Common Fund for Commodities	PFAN	Private Financing Advisory Network
CTI	Climate Technology Initiative	PPAS	Power Purchase Agreements
ECOWAS	Economic Community Of West African States	PPP	Public-Private Partnership
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency	RE	Renewable Energy
ECOW-GEN	ECOWAS Programme on Gender Mainstreaming in Energy Access	RECPNET	Network for Resource Efficient and Cleaner Production
ECOWREX	ECOWAS Observatory for Renewable Energy and Energy Efficiency	REESAP	Renewable Energy and Energy Efficiency Strategy and Action Plan
EE	Energy efficiency	REN21	Renewable Energy Policy Network for the 21st Century
EEEP	ECOWAS Energy Efficiency Policy	RESCO s	Renewable Energy Service Companies
EREP	ECOWAS Renewable Energy Policy	SAARC	South Asian Association for Regional Cooperation
ESCOS	Energy Services Companies	SACREEE	SADC Centre for Renewable Energy and Energy Efficiency
EU	European Union	SADC	Southern African Development Community
GCF	Green Climate Fund	SDGs	Sustainable Development Goals
GEF	Global Environment Facility	SE4ALL	Sustainable Energy for All
GHG	Greenhouse Gas	SIDS	Small Island Developing States
HCREEE	Himalayan Centre for Renewable Energy and Energy Efficiency	SME s	Small and Medium Enterprises
ICIMOD	International Centre for Integrated Mountain Development	UNCTAD	United Nations Conference on Trade and Development
IEA	International Energy Agency	UN-DESA	United Nations Department of Economic and Social Affairs
IFC	International Finance Corporation	UNDP	United Nations Development Programme
IIASA	International Institute for Applied Systems Analysis	UN-ESCAP	Economic and Social Commission for Asia and the Pacific
INDCS	Intended Nationally Determined Contributions	UNECE	United Nations Economic Commission for Europe
IP	Investment Prospectus	UNFCCC	United Nations Framework Convention on Climate Change
IPPS	Independent Power Producers	UNIDO	United Nations Industrial Development Organization
IRENA	International Renewable Energy Agency	UN-OHRLLS	United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing
ISDB	Islamic Development Bank	UNSD	United Nations Statistics Division
ISO	International Organization for Standardization	VAT	Value-added Tax
LCOE	Levelised Cost of Energy	VEF	Vienna Energy Forum
LDCs	Least Developed Countries	VPOA	Vienna Programme of Action for the LLDCs for the Decade 2014- 2024
LLDCs	Landlocked Developing Countries		

PART 1

REPORT OF THE SENIOR OFFICIALS' MEETING ON ACCELERATING SUSTAINABLE ENERGY FOR ALL IN LANDLOCKED DEVELOPING COUNTRIES THROUGH INNOVATIVE PARTNERSHIPS HELD IN VIENNA, AUSTRIA ON 24 AND 25 OCTOBER 2016

SECTION 1: CONCLUSIONS AND RECOMMENDATIONS ADOPTED AT THE SENIOR OFFICIALS' MEETING ON ACCELERATING SUSTAINABLE ENERGY FOR ALL IN LANDLOCKED DEVELOPING COUNTRIES THROUGH INNOVATIVE PARTNERSHIPS

I. ASSESSMENT OF THE SITUATION

Geographical factors put the 32 Landlocked Developing Countries (LLDCs) at a distinct disadvantage in the development process. The level of development in the LLDCs is, on average, 20 per cent lower than what it would be if the countries were not landlocked. This ultimately affects their capability to structurally transform toward “green” circular economies and to achieve the Sustainable Development Goals (SDGs).

The Vienna Programme of Action for the LLDCs for the Decade 2014-2024 (VPoA) stresses that energy infrastructure and access to affordable, reliable, and renewable energy and related technologies are critically important for modernizing information and communications technology and transit systems, reducing delays, and enhancing productive capacity to achieve sustained economic growth and sustainable development. The 2030 Agenda for Sustainable Development acknowledges that the most vulnerable countries, including LLDCs, deserve special attention and indicates that the VPoA 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.

SDG 7 has a multiplier effect on the achievement of all the other SDGs. There are important cross-links to SDG 13 on climate change mitigation and resilience and SDG-9 on building resilient infrastructure, promoting inclusive and sustainable industrial development and innovation. SDG-17 also provides an important direction to enhance “North-South, South-South and triangular regional and international cooperation and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms.”

Despite the potential contribution of renewable energy and energy efficiency technologies and services to resolving some of the energy challenges in LLDCs, markets for these technologies and services remain largely underdeveloped. This is mainly due to an unfavorable market environment and bottlenecks faced by different stakeholders in the market. These bottlenecks include: inadequate project development and implementation expertise; lack of regional technical coordination, implementation, and harmonization capacities; lack of access to technologies; low grid stability due to lack of investments in the generation, transmission, and distribution networks; the biased subsidies to fossil fuels; existence of mechanisms such as the fuel surcharge that reduces the attractiveness of renewable energy projects to the utilities; and low electrification rates particularly in peri-urban and rural areas. Moreover, the energy sector workforce in most of the LLDCs, specifically for highly technical occupations, tends to be comprised of primarily males. There is need for women empowerment in energy planning and implementation.

A weakly developed domestic sustainable energy manufacturing and servicing industry has become a major bottleneck for the further uptake of sustainable energy markets and the implementation of the Intended Nationally Determined Contributions (INDCs) in LLDCs. In contrast to fossil fuel based solutions (e.g. diesel generators), the supply chains and logistics for sustainable energy solutions remain underdeveloped and products and services are either not available or they lack quality. Quality issues and the perception that solutions are not mature enough have been the backdrop for various renewable energy technologies in different parts of the world (e.g. solar thermal, PV). Moreover, the lack of a domestic industry has led to severe sustainability and maintenance issues of energy projects in various LLDCs (e.g. mini-grids).

Countries have introduced a number of policies and regulatory frameworks to promote sustainable energies. However, many do not sufficiently consider domestic value creation or how to strengthen industrial capacities in the sector. Therefore, the domestic and job creation effects along the value chain of sustainable energy investments (i.e., manufacturing and distribution, project planning and development, construction and installation, operation and maintenance, decommissioning and recycling) often remain very limited. Equipment and services continue to be imported, further catalyzed by export-driven donor programs, and lack of business and sustainability models.

The renewable energy and energy efficiency markets in many LLDCs are nascent or emerging and a range of support mechanisms are required to promote growth and investment within the market. There is little or no data to suggest how individual markets and the collective regional market can grow, highlighting the need for market definition and sustainability guidelines. Energy performance standards for new buildings, building renovations, appliances, lights, air conditioners, refrigerators, and vehicles, to name a few, are often weak or nonexistent. The result is that investments in new buildings are based on initial costs and fail to account for operating or life-cycle costs.

Some of the capacity gaps and barriers include: lack of technical capacity to formulate and enforce policies; limited existing local capacity in both the public and private sector to develop and sustain local renewable energy and energy efficiency technologies; brain drain; limited local educational and training programmes; and the distinct differences in the geographical, environmental, cultural, and social aspects amongst LLDC regions make it difficult to create a one-size-fits-all approach. Science and technology is a major catalyst for the creation of innovative products and services, yet most LLDCs are ranked very low on the Global Innovation Index.

In LLDCs, there are significant technology gaps, particularly in relation to the use of advanced energy technologies. Maintenance of equipment is another area for which assistance is required, as some countries lack experience in repairing and maintaining equipment. Additional gaps and barriers include: need for demonstration projects; need for technology and knowledge transfer; presence in the market of low quality equipment can lead to a negative uptake of renewable energy (RE) technologies; and lack of the infrastructure for integrating RE into the existing grids, thereby limiting grid readiness.

II. RECOMMENDATIONS

The implementation of the VPoA and 2030 Agenda need to be implemented in a coherent manner to foster the synergies for the optimal benefit of the LLDCs and in order to ensure

that no one is left behind. In view of the assessment, it is important to address the challenges and outstanding gaps. In this regard the following recommendations are proposed.

A: National strategies to achieve global goals on sustainable energy.

Strengthen synergies of the three goals of Sustainable Energy for All: access, energy efficiency and renewable energy in order to build linkages with other key SDGs such as health, food, water, gender, industry, and others. Renewable energy is not only a major source of energy access to those living in isolated rural areas but also a contributor to the much needed transformation of energy systems for addressing climate change, health and energy security. 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.

Accelerate policy processes to achieve SDG-7 and SDG-13 on energy access, renewable energy and energy efficiency and climate change mitigation and resilience:

LLDCs should develop and adopt national energy, energy efficiency and renewable energy policies and plans. LLDCs that have not yet done so should consider developing sustainable energy for all Action Agenda (AA) and respective investment prospectus (IP) to help guide on how the country could achieve the three goals of the SE4ALL. The AA should include national and subnational energy policies and action plans based on individual national circumstances and development aspirations. The policies should reflect an appropriate energy mix to meet developmental 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 AAs and IPs will be coordinated on sub-regional level by the regional organizations and communities and will be closely linked to the INDC process. In this context, the good practice established in ECOWAS through the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) will be replicated in partnership with the regional development banks and newly established regional sustainable energy centers under the umbrella of the Global Network of Regional Sustainable Energy Centers (GN-SEC)¹.

1 - For more information please visit www.se4allnetwork.org.

Build resilient sustainable energy infrastructure, promote inclusive industrial development and foster innovation in LLDCs (SDG-9):

Universal access to sustainable energy services requires scaling up and maintenance of centralized and decentralized energy infrastructure. In the case of rural and remote areas, where grid extension turns out to be no competitive option, alternative decentralized renewable energy (hybrid) solutions will be applied. However, a weakly developed domestic sustainable energy manufacturing and servicing industry has become a major bottleneck for the further uptake and sustainability of decentralized renewable energy markets in many LLDCs. It could be very helpful if the G20 Initiative on Supporting Industrialization in Africa and Least Developed Countries (LDCs) could be extended to all the LLDCs as this could strengthen the domestic sustainable energy manufacturing and servicing capacities of the LLDCs.

UNIDO is requested to increase its programmatic effort to support LLDCs in strengthening domestic energy entrepreneurs and innovation through targeted supplier side support complementary to demand-side stimulating activities. The areas of renewable energy (hybrid) mini-grids and cooking solutions were identified as key areas with high potential for domestic value creation. With this approach, UNIDO addresses a major growth barrier for sustainable energy markets, reduces negative environmental externalities (GHG, local pollution) and promotes value and job creation simultaneously. In this context, the Government of Austria, UNIDO and SE4ALL were encouraged to establish the Vienna Energy Forum as a north-south and south-south platform of promoting and matching sustainable energy entrepreneurs, start-ups and companies.

Enable country-specific, integrated national planning which guarantees national ownership, taking into consideration the plans and requirements of all energy sub-sectors and related sectors. This should take into account the existing and required infrastructure and should be based on a rigorous assessment of the sustainable energy sources available in the country. These plans need to set clear priorities in order to signal government commitment. Countries can draw upon the assistance of partners such as the regional sustainable energy centres in these efforts and can use SE4ALL Action Agendas as tools to achieve this task.

Engage in Public-Private Partnerships: Governments of LLDCs with the support of their development partners should engage in public and private partnerships in the energy sector in order to increase investments into renewable energy generation within the country, thereby reducing dependency on energy imports. LLDCs need to consider well the types of Public-Private Partnerships that are most appropriate for their specific context.

LLDC Governments should recognize their role in **giving**

incentives for private sector investments. This requires a careful balancing of the public interests and needs to be based on a rigorous assessment of the impact that incentives may have on them. For example, in some cases special tariffs for the private sector may be recommendable, in other cases not.

Feasibility studies should include assessments of the social, economic, and environmental impact in the countries, including the consideration of shifts in economic dynamics, of required resettlements, rehabilitation and mitigation, of impacts on the job market, and whether they create capacity within the country and entail technology transfer. This should be based on specific timelines and take into account long-term effects.

Build capacity within the countries to assess investment agreements and contracts and guarantee the negotiation of agreements that are in the country's best interest.

Promote awareness of energy efficiency in the planning process and energy production and usage, and create the relevant policy, institutional and technical capacity.

Improve data collection and management in order to trace progress on achieving the country's targets, to provide the basis for good decision-making and to increase investor confidence.

The following **priority activities for the promotion of domestic sustainable energy servicing and manufacturing industries in LLDCs** were identified:

- (a) strengthening sustainable energy value creation and innovation policies, as well as institutional coordination,
- (b) promoting investments and partnerships with international companies, cluster-building and regional market access;
- (c) strengthening capacities and knowledge management;
- (d) use the sub-regional level as accelerator for creating business opportunities and spin-offs.

The establishment of technology clusters or industrial parks could be an interesting option in some LLDCs. By combining their knowledge, financial resources and contacts, they can improve their export potential and reduce costs and risks. Clusters may use the same suppliers of raw materials, cater to the same markets and clients, share the same territory, infrastructure and services, as well as face common challenges.

Cluster building is a tool to upgrade productive capacities,

increase access to international markets and generate innovation spin-offs. In this context, innovative multilateral, public-private partnerships such as the CTI Private Financing Advisory Network (PFAN) and GEF Clean Tech Programme to promote sustainable energy businesses and innovation should be strengthened. Given that informal and formal small and medium enterprises (SMEs) are the backbone of broad-based economic growth, it is crucial to ensure energy access for micro, small and medium enterprises. It is also important to create income-generating and entrepreneur opportunities in the energy sector; and applying innovative financial approaches, such as microfinance to energy services. There is need to increase the cleaner production capacities of domestic private sector.

LLDCs are encouraged to **create and support enabling environments** that facilitate public and private sector investment in relevant and needed cleaner energy technologies. LLDCs should improve coherence between energy, industrial, human resource, research, innovation and export policies and support instruments. Cross-sectoral approaches need to facilitate the mainstreaming of sustainable energy solutions into key industries (e.g. agro-business, tourism, fishery, construction, transport). National policy processes should take advantage of regional processes.

LLDC governments can also play an active role in developing energy access at every scale by undertaking **effective policies** such as providing tax breaks or subsidies to encourage energy generation and distribution.

LLDCs should facilitate finding new efficiencies in the commodity and energy sectors to enable businesses and households to switch away from traditional biomass fuels to sustainable energy production and use e.g. by upgrading to more efficient solid, liquid or gaseous fuels and electricity.

Sustainable cities and sub-national jurisdictions are emerging as key platforms for sustainable energy and climate action in LLDCs, but these will be fully successful only to the extent that they are strongly supported and linked to national strategies and policies. Sub-regional cooperation between cities on sustainable energy issues will be an important aspect of the way forward.

Sustainable energy for local value creation and employment: Without a considerable strengthening of the domestic sustainable energy manufacturing and servicing industry and innovation chain in LLDCs it will be difficult to achieve the envisaged transformational change in the energy sector. To ensure local value creation there is need for a critical mass of domestic energy entrepreneurs, companies and private sector groups. In many countries, the sustainable energy sector is considered as a future growth sector, which

offers business and employment opportunities, particularly for Small and Medium Sized Enterprises (SMEs). SMEs show great potential as instruments for economic growth and development through increased productivity, enterprise creation and employment rates.

The **nexus between energy, climate, transport, food, water, health and circular economy** is inseparable and essential contributor to social progress and human well-being. It needs to be approached in an integrated manner for adequate solutions. No longer can governments and policymakers afford to focus policies and resources on single issues or single-sector issues.

Improved sustainable energy use to promote trade facilitation: LLDCs and transit countries are encouraged to enhance the role of energy to facilitate trade in conjunction with harmonization of customs systems and documentation. Energy provision should be made reliable so as to eliminate any delays at the borders and in transit.

Promote the use of renewable energy as an alternative to the transportation and logistical challenges linked to delivering fuel to some LLDCs. This is particularly important for LLDCs that have unreliable overland trade corridors. Alternative and renewable energy sources can help address this logistical and supply chain issue while at the same time addressing climate change.

B: Enhancing regional cooperation.

Regional organizations and utility organizations (e.g. power pools) in partnership with regional development banks are encouraged to **scale-up investments into regional generation and transmission projects**. In addition, there is strong need to strengthen technical capacities of regional organizations to support Member States effectively in addressing the barriers for sustainable energy markets, industries and innovation.

Regional cooperation can play a potential role in providing foreign direct investment flows that contribute to the advancement of sustainable energy for all in LLDCs, as well as cooperation in the transfer of appropriate technology. In this context, to complement the financial activities of regional development banks in the sector, **the global network of regional sustainable energy centers will be further consolidated** by UNIDO in partnership with the respective regional organizations and international support. A network platform to allow exchange on common sustainable energy issues and programs between the centers will be created. The expansion of the network of centers to other LLDC regions, such as the Himalaya-Hindukush (HCREEE) and Central Asia is encouraged. The regional centers can play an important complementary role to the regional SE4ALL hubs,

located at the regional development banks, by addressing “soft barriers”.

There is need for regional policies to accelerate coherent policy development and implementation progress on national levels. Regional policies increase local ownership and provide an orientation for international support. To increase the effectiveness, the SE4ALL Action Agendas (AAs) and Investment Prospectuses (IPs) will be coordinated on sub-regional level by the regional organizations and will be closely linked to existing national and regional policy process (e.g. INDC process). In this context, the good practice established in ECOWAS in partnership with ECREEE, the regional development banks and other international partners will be replicated. An adapted regional policy process is considered by ICIMOD in the context of promoting rural energy policies targeting marginalized mountain populations. SACREEE has already started the development of a regional sustainable energy policy.

The development and implementation of sustainable energy policies and investments in LLDCs needs a considerable strengthening of domestic capacities to collect and manage reliable energy statistics, indicators, bankable investment data and reports at all levels – national, regional and global. In this context, the ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX) will be expanded to other LLDCs regions in Africa and beyond.

Regional centres can play an important role for standardisation and quality control of data. Moreover, the centres can strengthen national data collection and management capacities. ICIMOD intends to expand its existing information systems with regard to energy data. The domestic ownership in the regularly updated regional renewable energy and energy efficiency data reports will be increased and interlinked with regional/national capacity building activities on data collection and management.

Regional cooperation can be an important tool to up-scale domestic sustainable energy innovation, entrepreneurship, manufacturing and servicing capacities in LLDCs. The regional sustainable energy centres in partnership with regional development banks could develop tailored support mechanisms. There is need for economies of scales to attract investments and empower domestic “green energy” entrepreneurs to participate in regional and global manufacturing and servicing value chains.

It is important for LLDCs to implement energy efficiency measures in urban planning, buildings and transportation, and in the production of goods and services and the design of products and promote incentives in favor of, and removing disincentives to, energy efficiency. To increase the competitiveness and productivity of industries and SMEs in LLDCs

there is need to up-scale the use of energy management standards and systems (e.g. standard ISO 50001), as well as cleaner production practices. This is in line with the SE4ALL Industrial Energy Efficiency Accelerator and the international campaign of the Clean Energy Ministerial, which aim at 50,001 global certifications to International Organization for Standardization (ISO) 50001 by 2020. Sub-regional cooperation could play an important role in up-scaling the dissemination of such standards. LLDCs should aim to replace lighting with fluorescent and furthermore LED lights to increase energy efficiency and generate power savings. Regional sustainable energy centers could work closely with national standard organizations to ensure quality assurance and benchmarking. The regional level can play an important role in setting regional standards and certification of imported products.

There is need for targeted regional support to assist LLDCs in attracting and absorbing international climate finance (e.g. GEF and GCF) earmarked for the implementation of the INDCs. The increasing number of national and international-led programs and projects requires strong technical agenda-setting, coordination and coherence at sub-regional level. Apart from coordinating projects, the regional sustainable energy centres have also an important role to strengthen the national capacities to implement climate financing.

Sharing of experiences and best practices among countries at the regional level should be encouraged through innovative partnerships.

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 LLDCs. 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. For women to be key agents of sustainable energy, they need to be empowered and fully engaged at all levels of decision making processes. Therefore, SDG 5 on women’s empowerment and SDG 7 on sustainable energy must be tackled jointly through an integrated approach that promotes women’s transformational roles in providing innovative energy solutions.

Increased financing and policy action are required to accelerate gender mainstreaming of energy interventions, and women’s empowerment through sustainable energy solutions. There is need for supporting women as sustainable energy entrepreneurs. Availability of gender disaggregated indicators will be important for monitoring and evaluating

all sustainable energy initiatives. Sub-regional cooperation could play an important role in promoting gender mainstreaming. In this context, the ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN) will be expanded to other regions in Africa.

C: Financing sustainable energy transition in LLDCs

Support from Bilateral and multilateral development

partners: Bilateral and multilateral development partners are encouraged to increase their technical and financial assistance to support sustainable energy for all in LLDCs. They are encouraged to increase capital flows for the implementation of sustainable energy projects in LLDCs on renewable energy and energy efficiency and to support the Aid for Trade initiative, giving special consideration to the requirements of LLDCs. 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 LLDCs, as set out in the Addis Ababa Action Agenda and the Johannesburg Plan of Implementation, and highlight the importance of integrating sustainable energy needs of LLDCs in the Technology Facilitation Mechanism. Such support can include public research grants to universities or to establish national scientific and technological energy research centers in LLDCs that have ties with international research networks, as part of building sustainability-oriented innovations systems in the energy sector.

Domestic resources: Local banks should be supported and strengthened by the international financial institutions like IFC and others to provide them with capacity to lend to the local operators. Support to the local banks and in turn to the local operators should also add concessional lines especially in relation to energy efficiency or green finance.

LLDCs should improve tax collection, impose levies as appropriate and consider removing fossil fuel subsidies.

LLDCs should strengthen measures to incentivize the domestic private sector.

Energy is also linked to infrastructure and transport and as such it is important to have a holistic approach.

LLDCs need to give incentives to foreign investors to locally manufacture energy related equipment such as solar panels, such as for example bulk purchasing or land tenure security. LLDCs should also devise different investment models.

World Bank, IFC and others should provide technical assistance to help the LLDCs to negotiate complex contracts with the private sector and other international organizations.

Resource mobilization at a local level is a challenge. All sectors have to be brought in including energy. Banks in LLDCs are not interested in small operators and it is difficult for them to gather resources. There is need for partners to be more sensitized. Mobilization of resources for sustainable energy especially with respect to rural areas should be promoted and new mechanisms that can be used by the small operators in the rural areas are needed.

Official Development Assistance (ODA): Bilateral support should be used to leverage other resources including private resources. Many countries will need support from ODA to support unlocking of the local funding in private sectors.

Special facilities should be availed to LLDCs to transport products that are cheaper on the international arena but after transport they become more expensive; especially renewable energy and green technologies are very expensive.

Access to available international funds and facilities:

More needs to be done to show what is available and how they can be accessed, including experiences and this information needs to be shared with the LLDCs. There is also need for capacity building of the LLDCs to access the existing funds and facilities. It is important to exercise positive discrimination in order to encourage LLDCs to access funding and to raise awareness within the GCF on importance of energy for the LLDCs.

Regional approach to financing: Support towards regional projects is also very important. Sub regional or regional cooperation is important for building energy projects that benefit many countries in the region.

D: Building Innovative Partnerships

Organizations of the United Nations system, and other international organizations, the Regional Development Banks, and Regional Economic Communities,

are invited to provide more and better targeted technical assistance and technology transfer to support accelerated universal access, renewable energy and energy efficiency development in LLDCs including capacity building on optimal policy, regulatory and financial frameworks for energy service provision. International and regional organizations in particular UN-OHRLLS, UNIDO, UNCTAD, UNDP, SE4ALL and the International Think Tank for LLDCs, Regional Banks and others should provide LLDCs with technical assistance on how to enhance the role of energy to lower trading costs, boost trade, and stimulate structural transformation. They should also promote pooling of knowledge, sharing of best practices and advising on new technologies.

UN-OHRLLS should support the LLDCs with a mechanism for facilitating the sharing of experiences between LLDCs

on sustainable energy at the global level. OHRLLS should also conduct a study on the facilities and initiatives that the LLDCs can utilise on sustainable energy.

UN-OHRLLS, in cooperation with UNIDO, SE4All and UNDP should continue its efforts to promote sharing of experiences and best practices between LLDCs at national, regional and global levels. In this context, development partners are requested to provide necessary support, including financial assistance.

UNCTAD, CFC, UN-OHRLLS and OPEC Fund for International Development are encouraged to closely examine policies and strategies that facilitate access to affordable modern energy to boost productive capacities, enhance diversification of commodity value chains including value addition as a way towards sustainable transformation of LLDCs' economies.

UNIDO is encouraged to further consolidate and expand the global network of regional sustainable energy centres, the network for resource efficient and cleaner production in LLDCs and its support for energy management standards in industries and SMEs. UNIDO should continue to promote sustainable energy entrepreneurship, industrial development and innovation, as well as circular economy concepts in LLDCs. Based on previous achievements; the Vienna Energy Forum (VEF) will expand its function as north-south and south-south platform of exchange for innovative sustainable energy entrepreneurs, start-ups and manufacturing and service companies. In this context partnerships with important private sector events shall be sought (e.g. Pioneer Festival). The development of a UNIDO-REN21 report on renewable energy and energy efficiency in LLDCs is recommended.

Capacity building: Development partners are encouraged to strengthen capacity-building, including education and training, certification and in developing 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. To avoid duplication of efforts and efficient use of domestic and international resources, the sub-regional level will play an important role in defining the training needs and priority areas of intervention. The use of innovative regional train the trainer approaches is encouraged. Establishment of a network of experts to share experiences and best practices in implementation of energy efficiency and renewable energy legislation could also be considered.

There is the need for a stronger link between applied science and sustainable energy service and manufacturing companies. Innovation and entrepreneurial activities need a right mix of education and training, research and

development, applied science and technology, as well as financing. The promotion of sustainable energy markets requires training of many different stakeholders in different sectors on various skills (e.g. plumbers, architects, engineers, financiers, policy makers, farmers, consultants). Innovation happens in several entities like private sector industry, academia and universities, technology start-ups and research labs. However, collaboration and knowledge transfer between these entities is often rare, due to the different nature of drivers for each. There is need to build networks between SMEs, industrial clusters, national ministries, academia, industrial associations.

Partnerships for building capacity at the local levels:

International development partners should support capacity-building in particular at the local level. Training and information sharing are critical components of capacity building programmes. Training programmes to enhance local capacity, in particular of the workers and planners in the energy sector, on efficient and sustainable use of technology, use of sustainable materials, etc. should be developed. Strong certification of trained workers would then ensure quality assurance. Industry partners should support such training programmes towards becoming independent local and/or regional networks.

Access to information: Independent platforms should be set up with a view to provide access to information on sustainable energy guidelines, financing, training and technology at the national and local levels. The platforms should be set up with the help of international experts, but be independently run and governed.

Incorporating social elements in sustainable energy partnerships and projects – Partnerships and projects for technological innovations and solutions in energy efficiency and renewable energy need to take into account social and cultural aspects from the local and national level.

Partnerships need to be demand-driven.

Two-prong partnership approach to sustainable energy policies and solutions:

At the national level, partnerships between governments and NGOs provide a two-prong approach. While the Government carries the institutional power and authority, NGOs typically have a better grasp of the local needs and challenges. Sub-national entities at the communal and city levels should also be engaged. These kinds of partnerships in LLDCs can provide more effective results that take into account the energy concerns of the populations.

Engagement of the private sector at the local level:

The private sector at the local level should be engaged and supported in the development of sustainable energy

technologies and solutions. Partnerships between the public and private sectors at the local level should be promoted.

Ensuring coherence: In developing partnerships, it is critical to ensure coherence between different partnerships at the local, regional and global level.

Interactive thematic meetings on sustainable energy: The international community should support the organization of meetings on sustainable energy issues of importance to LLDCs that provide ample room for interaction and smaller group discussions to exchange and learn from each other experiences. Such meetings should have thematic, country, regional and/or project focus.

Experience sharing on sustainable energy: The lessons learned from landlocked developed countries, such as Austria, should be collected and presented for the LLDCs to learn from.

Data collection and analysis: Collection of energy resource data is critical and can provide results in a short period of time. Data collection needs to be followed up with mapping and analysis. Data needs to be made publicly available. Different international and national organizations collecting data should collaborate to ensure coherence in the data.

Exposure to end-user devices: Exposure to efficient biomass household end-user devices which have low or zero emissions, such as cookstoves and heating systems, is to be promoted.

Projection of LLDC issues at the global level: The issues of the LLDCs raised in this meeting should be adequately addressed at upcoming international meetings, including the 2017 Vienna Energy Forum to be held in May 2017 and the 2017 EXPO whose theme is Future Energy to be held in Astana, Kazakhstan to be held in 2017.

III. EXPRESSION OF GRATITUDE

The Meeting expressed profound appreciation to the Government of Austria for its financial contribution and hosting of the event.

Zambia was appreciated for its role as the Global Chair of the Group of LLDCs and Paraguay for its role as Coordinator for trade and development issues of the Group of LLDCs in Geneva.

The Meeting expressed gratitude to the substantive support and financial contribution of the Office of the High Representative for LDCs, LLDCs and SIDS (UN-OHRLLS) and UNIDO to the Meeting and to the substantive support of the SE4ALL to the meeting.

The Meeting also appreciated the active participation and substantive contributions of other development partners such as UN system organizations, other international and regional organizations, the private sector, the academia, civil society and other stakeholders.

The Meeting appreciated the Government of the Plurinational State of Bolivia for hosting the High-Level Meeting on Sustainable Transport of Landlocked Developing Countries in Santa Cruz – Bolivia on 13 and 14 October 2016.

SECTION 2: SUMMARY OF PROCEEDINGS OF THE SENIOR OFFICIALS' MEETING ON ACCELERATING SUSTAINABLE ENERGY FOR ALL IN LANDLOCKED DEVELOPING COUNTRIES THROUGH INNOVATIVE PARTNERSHIPS

INTRODUCTION

The Government of Austria and the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) jointly organized a Senior Officials' Meeting: "Accelerating Sustainable Energy for All in Landlocked Developing Countries through Innovative Partnerships" together with the United Nations Industrial Development Organization (UNIDO), and Sustainable Energy for All (SE4ALL). The meeting was held on 24 and 25 October 2016 in Vienna International Centre, Vienna, Austria.

The meeting was organized as part of the follow-up and implementation of the Vienna Programme of Action. The objectives of the meeting were to: (i) take stock of the achievements made by the LLDCs in achieving sustainable energy for all; (ii) identify existing drivers and remaining barriers for scaling-up of renewable energy and energy efficiency markets, industries and innovation; (iii) review the effectiveness of the current regional and international support and partnership frameworks; and (iv) suggest priority actions and practical solutions to strengthen implementation capacities of LLDCs.

The meeting was attended by senior officials from: LLDCs; transit developing countries; development partners; UN and international organizations; international financial institutions, regional, and sub-regional organizations; power pools, regional renewable energy and energy efficiency associations; private sector; academia and NGOs.

OPENING SESSION

The meeting was officially opened by **Mr. Martin Ledolter**, Managing Director of Austrian Development Agency (ADA) of the Government of Austria. Opening statements were also made by H.E. Mr. Gyan Chandra Acharya, United Nations Under-Secretary-General and High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States; H.E. Ms. Mwaba Patricia Kasese-Bota, Permanent Representative of Zambia to the United Nations in New York and Global Chair of the Group of LLDCs; Mr. Taizo Nishikawa, Deputy Director General

of United Nations Industrial Development Organization (UNIDO); and Ms. Monika Weber-Fahr, Chief Operating Officer of Sustainable Energy for All (SE4All).

In his opening statement, Mr. Martin Ledolter shed light on three important topics to all stakeholders. The first was the Vienna Programme of Action and the challenges ahead. He noted that the issue of sustainable energy featured prominently in the VPoA and that many LLDCs have made substantial progress in reaching the goal of providing universal access to modern energy services. He nevertheless pointed out that the lack of finance still remained an important barrier for LLDCs. The second topic was Austria's role as advocate for LLDCs. He assured the meeting that Austria, as Co-Chair of the Group of Friends of LLDCs, would remain committed to supporting the priorities and actions of the VPoA through policy dialogue and concrete actions in the framework of their development cooperation. The third topic that Mr. Ledolter pointed out was the paramount importance of the private sector engagement. He indicated that the energy sector in particular requires both the private sector perspective and their participation. In that regard, he called for close cooperation and intensified partnership between governments and private sectors.

In his opening remarks, **Mr. Gyan Chandra Acharya** underscored the critical role of sustainable energy for LLDCs to achieve economic diversification, improve value addition and become more competitive in international markets. He reported the current status of energy access and renewable energy use in LLDCs and stressed the potential for the LLDC Group to reduce energy costs as well as to improve industrial productivity and energy security through improving energy efficiency. Furthermore, he highlighted the necessity of moving sustainable energy to the top of the list of investment priorities for LLDCs and underscored key elements that are required to achieve this goal, including: (i) a strong and multi-stakeholder national leadership and ownership to ensure a coherent policy and effective implementation mechanism and monitoring system; (ii) supportive policies and regulatory reforms; (iii) massive investments from private sector and the civil society and through public resources and regional integration; (iv) capacity building support and increased access to renewable and energy efficiency technologies; and (v) the need for greater partnerships between governments, the private sector, regional, international organizations, civil society, North-South and South-South cooperation.

H.E. Ms. Mwaba Patricia Kasese-Bota stated in her opening statement that access to electricity and clean energy technologies, as well as energy efficiency in LLDCs lag way behind when compared to other developing countries. Even though there is big potential for renewable energy production from hydropower, wind, sun and geothermal sources in LLDCs, low energy investment and inadequate infrastructure still remain big challenges for these countries to achieve universal access to clean energy, industrial growth and higher productive capacities. In that regard, she underscored the need for governments to work with all key stakeholders to create an enabling environment in order to promote investment in renewable energy, the need to revisit some of the long term development agreements to make them respond to the current geopolitical and development demands of the 2030 Agenda, the need for LLDCs to have enabling policy frameworks, as well as the need for technical and capacity-building support from development partners, international organizations and private sectors. She finally called upon all stakeholders to assess the special needs of LLDCs on energy and to come up with a package or initiative based on the assessment to address those needs.

In his opening address, **Mr. Taizo Nishikawa** pointed out that the progress towards SDG 7 on sustainable energy for all is of special interest to all LLDCs today. He indicated that UNIDO strongly believes in promoting sustainable energy solutions and accelerating climate action, which he considered as a key component in realizing all SDGs. He furthermore stressed the necessity of linking SDG 7 on sustainable energy for all with SDG 9 on sustainable and inclusive industrialization and SDG 13 on climate action in order to facilitate the transition to a sustainable future without stifling the ambitious targets for economic growth in LLDCs. He concluded by asking all participants two crucial questions: (i) how can we ensure sustainable transformation of current energy systems in LLDCs? and (ii) how can we enhance the cooperation around clean energy and innovative financing, and scale up private sector investments to achieve sustainable energy for all in LLDCs?

The final speaker of the opening session was **Ms. Monika Weber-Fahr**. In her statement, she emphasized the necessity of extraordinary leadership in achieving the specific goal of sustainable energy for all. In that regard, she urged all leaders to take action specifically in building partnerships and mobilizing financial resources. She further indicated that government should create specific investment frameworks for the energy sector and particularly set frameworks that allow cross-border trade for energy in LLDCs.

SESSION 1: ACHIEVING THE GLOBAL GOAL ON SUSTAINABLE ENERGY IN LLDCS: NATIONAL LEVEL STRATEGIES, BEST PRACTICES (POLICIES, TECHNOLOGIES), CHALLENGES AND OPPORTUNITIES

Sustainable energy is crucial for ending poverty and improving education and health outcomes. Despite the big potential for modern energy production, LLDCs have much lower level of modern energy access, renewable energy share, as well as energy efficiency compared to developed and developing countries, and the world average. Wide disparities also exist between rural and urban areas within these countries. Therefore, it is important for LLDCs to scale-up and speed-up their energy initiatives in order to facilitate transition to sustainable energy, to foster increased access and to close the rural urban energy gap.

This session reviewed national experiences of LLDCs in terms of their achievements, challenges, best practices (policies and technologies), lessons learnt, opportunities, as well as priority areas for action in achieving the three dimensions of sustainable energy for all. The moderator of this session was **Mr. Gyan Chandra Acharya**. Presentations were made by Ms. Christine Lins, Executive Secretary of Renewable Energy Policy Network for the 21st Century (REN21) and this was followed by presentations on national experiences from the following LLDCs: Afghanistan, Paraguay, Nepal, Botswana, Mongolia, Niger, Zimbabwe, and the Republic of Moldova.

Ms. Christine Lins, presented on the achievements and major challenges on sustainable energy for all at the global level. She reminded the meeting that 2015 was a record year for renewable energy with the largest annual increase of renewable power capacity of (147 GW) and the highest amount of investment (285.9 billion USD). She noted that it is encouraging to see, for the first time, more investment in renewable energy from emerging economies and developing countries. Ms. Lins further informed the meeting of the significant development in the power sector, solar PV, wind power, as well as job creation in the renewable energy industry. She stressed the need for more action in the fields of heating and cooling as well as transport, and on sector-coupling. She highlighted the need to further develop small-scale distributed renewables in addition to large connected projects in a smarter, more flexible system that accommodates both centralized as well as decentralized generations.

In his presentation, **Mr. Amanullah Ghalib**, Deputy Minister of Energy and Water of Afghanistan, informed the meeting of the significant progress that Afghanistan has made in developing power infrastructure, renewable energy and

energy efficiency, as well as in attracting private sector investment. He noted that Afghanistan has formulated a long-term power development plan which is both pragmatic and achievable. Based on this plan, the Ministry of Energy and Water has developed several energy projects and signed 4 major projects on sustainable energy with different investors. Mr. Ghalib stressed that Afghanistan has also concentrated on maintaining and upgrading the existing projects and has successfully rehabilitated some old dams and irrigation projects such as Kajaki Dam and Salma.

He indicated that his country had formulated and announced the National Energy Policy (NEP), which lays emphasis on development of power generation resources of medium to large size. He noted that the most optimal and effective solution for providing power to the rural population is development of renewable energy resources in particular solar and wind energy development. In this regard, government announced a National Renewable Energy Policy and demonstrated strong commitment for its implementation. The government has also announced solar, wind, mini hydro and bio-mass power projects aggregating to 100MW.

In terms of regional cooperation, he noted that Afghanistan played a crucial role in the CASA-1000 project in providing power transit from Central Asia to South Asia. Furthermore, he stressed that Afghanistan has come up with an energy self-sufficient plan for the next 5 years, indicating that Afghanistan is going to be self-sufficient by the end of 2020, increase the home power generation by 2,000 MW and change itself into transit country from import country of electricity. He finally urged the international community to support the LLDCs in energy infrastructure development.

Mr. Mauricio Bejarano, Vice Minister of Mines and Energy of Paraguay, presented Paraguay's long-term sustainable energy programme up to 2040. Mr. Mauricio Bejarano stressed that Paraguay has a peculiar energy diversification with 43% of biomass, 39% of hydrocarbon, and 18% of hydroelectric energy. He noted that the Government of Paraguay recently adopted the National Energy Policy up to 2040 to address the country's main challenges of using electricity more effectively and coping with deforestation. The main objective of the Policy is to enhance energy security, to provide quality energy access to the entire population, to position Paraguay as a major partner in regional energy integration, and to promote the understanding of sustainable use of energy. Based on this Policy, Paraguay has made efforts in containing the use of biomass and promoting solar energy use in houses, and is trying to close the 3% gap in the energy diversification matrix through clean and sustainable energy for all.

In his presentation, **Mr. Pralhad Prasad Sapkota**, Under Secretary, Ministry of Energy of Nepal, firstly pointed out the

huge hydropower capacity in Nepal as well as the measures that Nepal has implemented to harness the hydropower potential. He informed the meeting about the bilateral and regional agreements that Nepal is part of: the SAARC Energy Framework 2014 (regional), and the Electric Power Trade, Cross-Border Transmission Interconnection and Grid Connectivity Agreement 2014 (Nepal-India). Mr. Sapkota also introduced Nepal's recent energy policy and programme initiatives, such as the National Energy Crisis Mitigation Action Plan 2016 and the Nepal Energy Efficiency Programme from 2014 to 2017. He finally underlined the challenges and gaps facing Nepal in terms of energy development, including: inadequate power supply-load shedding, the lack of policy and dedicated institutions for energy efficiency, insufficient transmission infrastructures, high technical loss and electricity theft, as well as measures to address these challenges, including legal and policy reform, and administrative and structural development.

Mr. Freddie O. Motlathledi, Energy Advisor in the Department of Energy, Ministry of Mineral Resources, Green Technology and Energy Security of Botswana, shared Botswana's experience in developing the SE4All Action Agenda and respective investment prospectus. He firstly reminded the meeting of the four-step action process of developing the Agenda: (i) country opt in, (ii) stock-taking and gap analysis, (iii) development of national action agenda and investment prospectus, and (iv) implementation and monitoring. He noted that Botswana has finished the first two steps and is now in the process of the third step.

In terms of best practices, he indicated that Botswana is currently developing two strategies with assistance from the World Bank: Renewable Energy Strategy and Action Plan, and Energy Efficiency and Conservation Strategy and Action Plan. Besides, a draft National Energy Policy was tabled in Parliament to be adopted in the November 2016 Parliamentary sitting. He finally underscored the main challenges facing the country and the priority areas for action, including: (i) addressing lack of skilled manpower to implement projects, (ii) increasing access to modern energy services in rural areas, (iii) increasing affordability of energy services especially to low income groups, (iv) reducing the risk of exposure to excessive imports of energy especially electricity, (v) reducing vulnerability to supply disruptions of petroleum products, and (vi) promoting the use of locally available energy sources and achieving poverty eradication, sustainable development and environmental protection. Finally he also added the importance of regional cooperation through the SAPP as well as the newly established Southern African Centre for Renewable Energy and Energy Efficiency (SACREEE).

Mr. Bayarmagnai Myagmarsuren, Acting State Secretary of Ministry of Energy of Mongolia, highlighted that economic

diversification is one of the priority areas of Mongolia to achieve sustainable development and economic growth. He noted that Mongolia joined the SE4All initiative in 2012 and the Ministry of Energy concluded the rapid assessment of Mongolia for the initiative and collaboration with UNDP. He also noted that in 2015, the Government of Mongolia approved the national policy on energy sector up to 2030, which mainly focuses on safety, energy access and efficiency, and environment energy. Regarding regional cooperation, being endowed with rich primary energy resources and huge renewable energy potential and surrounded by world energy consuming countries such as China and Russia, Mongolia is playing an important role in the Gobitec and Asian Super Grid initiative by exporting energy to China and other high demanding Asian countries.

Mr. Nassourou Bello, Director of Renewable Energy and Domestic Energy of Niger, shared the experience, outlook, and challenges of his country in terms of achieving sustainable energy for all. He noted that Niger has worked on creating a favorable environmental framework by developing institutional and regulatory policies and strategies, as well as programmes and projects together with development partners and international organizations. In terms of the outlook, he noted that Niger is currently developing its energy policy, electricity access strategy, and an investment prospectus. He highlighted several elements that need close attention: mastery of negotiation tools for PPPs, completion of feasibility studies, and establishment of a renewable energy promotion fund. He finally underlined the main difficulties and challenges facing the country, including coordination of interventions, resource mobilization, population growth control, having energy as a priority sector, and guarantee of funds.

Mr. Kudakwashe Ndhlukula, Executive Director of SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) made an intervention on behalf of Mr. Benson Munyaradzi, Director Power Development, Ministry of Energy and Power Development of Zimbabwe. He noted that Zimbabwe has just concluded the SE4All Action Agenda which is building on existing plans, programmes and strategies through extensive discussions and following the guidelines of SE4All. He informed that Zimbabwe has already done the assessment and gap analysis in 2015 and has developed Zim Asset, the economic blue print for development for the country, the National Energy Policy of 2012 and other national agendas. He highlighted that all three focused areas of sustainable energy have been applied in the process.

In terms of energy access, he stressed that there is wide disparity of electricity access between urban and rural areas in Zimbabwe. In order to address the challenge, the rural energy fund was set up to cover aspects such as a revolving fund providing grant- and subsidy-funding for rural

households and communities, and pushing for mini grids, solar warming systems as well as capacity building. With regard to renewable energy, he indicated that Zimbabwe plans to expand renewable energy capacity to 3,200 MW by 2030, and that relevant policies such as the Renewable Energy Policy and Biofuels Policy are expected to be in place in 2017. In terms of energy efficiency, the target for 2030 is to decrease energy intensity by 17% for each year so that there will be a cumulative decrease by 43% by 2030. He indicated that in terms of solutions the country is banning incandescent lights, promoting use of solar water heaters and use of energy-efficient cooking stoves and alternative cooking fuels, applying geyser controls, and encouraging energy efficiency in industries and agricultural processes.

Mr. Denis Tumuruc, Head of Division Policies for Energy Efficiency and Capitalization of Renewable Energy Sources, Ministry of Economy of the Republic of Moldova, presented on the progress that Moldova has achieved in promoting energy efficiency and renewable energy. He indicated that the country had successfully reduced energy dependence from 96% to 88% and improved energy intensity by 27% during the last five years, and has increased the share of renewable energy in total final energy consumption from 4% in 2009 and targeted to increase to 13% for 2018. He underlined that this progress was attributed to several interrelated elements, including the proper legal framework and mobilization of financial resources. Besides, he also stressed the need for strong local capacities, which leads to better absorption of financial resources and the importance of public awareness to implement policies related to sustainable energy.

INTERACTIVE DISCUSSION

In the ensuing discussion, the meeting noted that there were countries that had achieved almost 100% electrification rate such as Bhutan. Participants noted that it is important to provide advice to such countries on how to make productive use of the electricity and take full advantage of the energy. The meeting also discussed how energy exporting countries like Paraguay are able to break even in terms of managing the power exports and ensuring the sufficient power supply in the country. The meeting was informed that Paraguay first meets its domestic demand and then export the surplus. Paraguay is projecting infrastructure development with the total amount of \$5,700 million to cover the 3% of population without electricity in the next ten years and is in the process of facilitating energy generation of small dams, thermal plants, solar and wind energy plants.

Participants discussed some of the reasons behind the growth in the renewable energy sector especially solar. One of the key reasons noted is ensuring policy stability and building confidence among investors. The meeting also discussed the issue of quality of the energy equipment and emphasized the need to put in place strategies for quality control for energy equipment destined for the LLDCs. Participants underscored the necessity of setting up testing centers to test imported products and ensure good quality. The meeting also noted that regional organizations such as the East, West and Southern African power pools play a crucial role in managing power export, and should facilitate fast and smooth power trading. Participants also underscored the importance of regional cooperation in enhancing energy access and in scaling up projects on renewable energy and energy efficiency.

Participants discussed the issue of resources and measures that can be taken to support LLDCs with lower capacities and financial resources and fewer opportunities. They noted the issue of low level of connections achieved at the end of the energy projects that are financed by development partners due to the high connection fees that are charged to consumers. The meeting emphasized that utilities that are financed by development partners should endeavor to have a cost free connection to poor consumers.

Finally, the meeting discussed the possible sources of resource mobilization to support the development of the energy sector. It was noted that LLDC governments are playing an important role in supporting the energy sector and should enhance their support. Participants underscored the important role of official development assistance, and financial support from multilateral and regional development banks and regional organizations. They stressed the important role of the private sector in supporting energy projects. They also highlighted the technical support provided by the UN and

other international, regional and national organizations. The meeting highlighted that national leadership and ownership, as well as international partnerships are critical to support energy transition in the LLDCs.

SESSION 2: ENHANCING REGIONAL COOPERATION AND IDENTIFYING FLAGSHIP PROJECTS FOR SUSTAINABLE ENERGY IN LLDCS

This session highlighted the potential contribution of sub-regional cooperation to address the barriers hindering the uptake of sustainable energy markets, industries and innovation in LLDCs. Regional cooperation is an important tool to reach the needed economies of scales to attract investments and empower domestic “green energy” entrepreneurs. There is need for targeted regional support to assist LLDCs in attracting and absorbing international climate finance earmarked for the implementation of the Intended Nationally Determined Contributions (INDCs). The session was particularly related to SDG-17 which aims at enhancing north-south, south-south and triangular regional and international cooperation.

Participants presented best practice examples on regional policy processes, information and data management and gender mainstreaming, and discussed the potential contribution of sub-regional cooperation, networks and centers to address the barriers hindering the uptake of sustainable energy markets, industries and innovation in LLDCs. The moderator of this session was Mr. Pradeep Monga, Director of the Energy Department of UNIDO. Distinguished panelists from regional renewable energy and energy efficiency associations discussed how these regional organizations and related centres can assist LLDCs with sustainable energy development.

In his introduction to this session, **Mr. Pradeep Monga** informed the meeting of UNIDO’s global network of regional centres on renewable energy and energy efficiency with the objectives to promote regional sustainable energy markets, government policies, and harmonization and alignment of energy projects through economies of scale, to strengthen regional and national capacities to meet sustainable targets and leverage climate finance, to promote south-south, triangular cooperation and public private partnership, and to address the “missing link” between international energy and climate commitments and implementation on national and local level. He also highlighted the contribution of the Austrian Government in supporting UNIDO’s 6 operational regional centres around the world.

Mr. Mahama Kappiah, Executive Director of ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE), gave a presentation on the achievements made by ECREEE so far. Mr. Kappiah firstly noted that the ECOWAS region faces challenges of low energy access, energy security, and climate change issues; meanwhile it has enormous potential for renewable energy resources such as solar, hydro and wind. He highlighted four particular barriers that need to be addressed to develop renewables in the region: policy development and formulation, capacity building, awareness, and business promotion and investment. He noted that ECOWAS regional policies are in place to set targets for renewable energy and energy efficiency and that all 15 countries have completed National Action Plans successfully and developed the SE4All Agenda. He also stressed that investment prospectus are currently being developed and will be available for all the countries by the middle of 2018. In this context he highlighted the importance that such centers can play in partnership with the power pools as well as development banks. In terms of capacity building, he mentioned that the ECREEE organized at least 4 or 5 short-term renewable energy capacity building programs per year and developed programs that get more women engaged and separate programs in rural communities.

Ms. Christine Lins, Executive Secretary of Renewable Energy Policy Network for the 21st Century made a presentation about the role of regional centre reports as decision making tools that help scale up investment and policies in the field of renewable energy. She mentioned that REN 21 is working with UNIDO and the regional centers on renewable energy. She noted that they have transferred the responsibility of the accuracy of the renewable energy data to regional centres and so far have produced status reports on MENA, ECOWAS, SADC, UNECE, and EAC regions. These reports are helping LLDCs and other Member States and other stakeholders on how to scale up renewable energy projects. She also highlighted the importance of creating local industries and regional markets and networks in attracting investment. She also noted that it is important for the LLDCs to prepare a report focused on their special needs so as to attract support.

Mr. Kudakwashe Ndhlukula, Executive Director of SADC Centre for Renewable Energy and Energy Efficiency (SACREEE) presented on how the SADC Centre contributes to addressing the challenges and harnessing the opportunities for the countries especially LLDCs in the region. He noted that regional collaboration in the SADC region is a long-standing objective of the integration paradigm and that extensive collaboration has been achieved in terms of energy infrastructure, powerlines and regulatory practices. He indicated that the SACREEE was established with the primary objective to promote; renewable energy and energy efficiency technologies and the development of markets, through the dissemination of information and best practices;

and the development of sound policy, regulatory, and legal frameworks, and capacity building within SADC member states for renewable energy and energy efficiency.

Mr. Ndhlukula informed the meeting that SADC has just developed a regional Renewable Energy and Energy Efficiency Strategy and Action Plan (REEESAP), which presents a SADC-wide long-term vision on achieving sufficient, reliable, least cost, sustainable, clean modern energy services for SADC by 2030 through acceleration of scaling up of renewable energy and energy efficiency uptake. SACREEE has been mandated by the Member States to coordinate the implementation of REEESAP. Amongst key activities and initiatives to coordinate at regional level include the INDCs and SE4ALL.

In collaboration with other SADC agencies, he noted that SACREEE will work to ensure enabling regulatory frameworks are developed and enforced by Regional Electricity Regulators Association of Southern Africa to develop the huge renewable energy resource in the region and use the SAPP grid to wheel this electricity to load centres through an interconnected grid. The LLDCs in SADC have huge renewable energy resources such as Botswana (solar), Lesotho (hydro and wind), Malawi (hydro and geothermal), Swaziland (biomass and hydro), Zambia (geothermal, hydro and solar) and Zimbabwe (solar and wind). The integration of the region through grid interconnection can be used to develop large scale renewable power as well as manage the intermittence of the resource.

In his presentation, **Mr. Basanta Shrestha**, Director of Strategic Cooperation at International Centre for Integrated Mountain Development (ICIMOD) underlined the challenges that Hindu Kush Himalayan region faces in terms of geographic impediments including inaccessibility, remoteness, and harsh climatic conditions. He indicated that ICIMOD brings together partnership of eight Himalayan countries namely - Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan. He noted that the region suffers from high incidence of poverty and energy poverty despite of immense renewable energy potentials - hydro, solar, winds. The energy access in the region is much below the world average statistics. In the context of SDGs, and Paris climate agreement he noted that the region needs increased investments, innovation and partnership to leapfrog from current situation.

He acknowledged the ICIMOD-UNIDO-ADA partnership to establish Himalayan centre for renewable energy and energy efficiency. With the key goal to promote energy access, efficiency and renewable energy for impoverished mountain communities. He indicated that such a center need to provide sustainable energy solutions for mountain specific situations while building upon the on-going national

efforts. Fostering regional cooperation among the member states will be the main agenda. He further stressed several key elements to push forward the main agenda of fostering regional cooperation, namely (i) research and innovation to provide knowledge and information for policy formulation and program practices; (ii) capacity development and networking; (iii) engagement of private sector and entrepreneurship; (v) regional platform for mutual learning and sharing opportunities and bringing together best practices; and (vi) global and innovative financing mechanisms.

In her presentation, **Ms. Cornelia Schenk**, Senior Scientific Officer of Center EU and International Projects at Austrian Energy Agency (AEA) shared the best practices and lessons learned from the implementation of EU Directives on renewable energy and energy efficiency. She stressed that strong regional policy frameworks combined with ambitious and achievable targets that are combined with support instruments and implementation mechanisms are important catalysts to spur the achievement of SDG7 and its sub-targets. She noted that regional organisations have a crucial role to play, not only in the development of regional policies and targets, but also in the design of regional processes – like the one that ECREEE plays in the development of national sustainable energy action plans in all Member States – the definition of common procedures and methodologies, that will facilitate greater policy coherence and promote the exploitation of synergies between energy efficiency, renewable energy and energy access, but also ensure a nexus approach between energy and related sectors. She indicated that individual countries may require support in the implementation of regional policies and legislation, which could be provided through structured dialogue and experience exchange processes.

She informed the meeting that the European Union has chosen the approach of Concerted Actions, which were launched as a joint initiative by the European Member States and the European Commission to assist Member States in the cost-effective implementation of European legislation in the areas of renewable energy, energy efficiency and energy performance of buildings, to develop common approaches and to coordinate solutions wherever beneficial. Concerted Actions are confidential fora in which representatives of implementing bodies can informally exchange and enhance their knowledge, share experiences and good practice examples and evaluate the most effective implementation options. Within this framework, participating countries can also informally and confidentially work with the European Commission. Discussions within the Concerted Actions and its Core Themes (working groups) are strictly confidential, which ensures open and in-depth discussions between implementing authorities.

Ms. Cornelia Schenk indicated that drawing on the example

of the Concerted Action on the Renewable Energy Sources Directive, which is coordinated by the Austrian Energy Agency, this mechanism has been shown to be an invaluable forum for sharing information, learning from experiences across EU Member States and for ensuring a thorough implementation of the directive. It has established and consolidated a strong network of experts, which serves as a point of departure for further discussions and cooperation. She noted that creating a platform for structured discussion and experience exchange could also be used as a mechanism for LLDCs to strengthen institutional capacities and facilitate the identification of common approaches and shared solutions.

INTERACTIVE DISCUSSION

In the ensuing discussion, participants wanted to know whether there are any overlaps in the many renewable energy and energy efficiency initiatives in Africa in particular between the Power Pools and the Centres for Renewable Energy and Energy Efficiency. The meeting was informed that the Centres for Renewable Energy and Energy Efficiency and Power Pools were complementary and support each other rather than overlap. The Power Pools are focusing on the extension of transmission lines as well as large-scale generation projects (which are often not based on renewable energy) which are of particular interest for the entire economy as well as urban areas. The regional centres focus exclusively on sustainable energy, which includes particularly decentralised solutions with high relevance for rural and remote areas.

During the discussion the promising cooperation between regional centres and development banks was highlighted, when it comes to the building up of sustainable energy project pipelines and working on enabling frameworks in parallel to bank investments (e.g. capacity building, policy and regulatory frameworks). The meeting noted that innovation and partnerships were very important. Innovation in terms of technologies, and financing mechanisms should be fully capitalized. Partnerships and networks should be strengthened among UN system, member states, regional commissions, private sector, civil society as well as north-south and south-south cooperation.

SESSION 3: INTERNATIONAL PARTNERSHIPS AND INNOVATIVE INITIATIVES TO SUPPORT SUSTAINABLE ENERGY FOR ALL IN THE LLDCS

For LLDCs to succeed in their efforts on sustainable energy for all, international cooperation and partnerships will be essential. This session reviewed the international initiatives and partnerships to support sustainable energy for all in LLDCs including Official Development Assistance, South-South Cooperation, Foreign Direct Investment, the International Financial Institutions, Philanthropy, the United Nations system and other international organizations. H.E. Ms. Mwaba Patricia Kasese-Bota, Permanent Representative of Zambia to the United Nations in New York and Global Chair of the Group of LLDCs moderated the session. Experts from international organizations shared experiences about support measures and initiatives that have been provided to assist LLDCs, identified existing constraints and gaps, and provided suggestions on how to enhance international partnerships.

In his presentation, **Mr. Robert Zeiner**, Head of Programmes and Projects International at Austria Development Agency (ADA) informed the meeting that Austria features a long tradition in the use and development of renewable energy sources such as small and large hydro power, solid biomass energy, biogas, solar thermal and photovoltaic energy and windmills. He presented details of an example of the Austrian Program to promote solarthermal solutions in Southern Africa. He noted that the ADA started in 2009 the program SOLTRAIN for capacity building for solar thermal energy in 6 selected Southern African countries. OFID joined the program in 2013. Since the inception of the programme in 2009: 1,124 policy makers have been informed about the potentials of solar thermal applications in 7 workshops; About 2,150 people (mainly installers) were trained in 80 training courses (planning, calculation, installation, monitoring and quality control of systems; 187 solar thermal systems ranging from 2 to 125 m² collector area per system have been installed benefitting about 7,000 people; The annual amount of electricity savings is 1.62 million kWh - 513 tons of cumulative CO₂ emission that are avoided per year; and a total of approximately Euro 14,000, of electricity costs are saved every year with the installed systems. Since beginning of 2016 SOLTRAIN is in its third phase with a combined funding of ADA and OFID (2,5 million Euro).

Mr. Zeiner highlighted that another Austrian technological leadership regards energy efficiency solutions in buildings, SMEs and industrial processes. He mentioned the efforts and successes of energy efficiency in Austrian buildings including

new buildings and retrofitting in the last 15 years. He noted that highly energy efficient passive house standards for public buildings were introduced as minimum level in some regions and recent development include surplus energy buildings which use integrated systems of solar thermal energy or photovoltaic within the building surface to work as decentralized energy producers. ADA supports the efforts on sharing experiences, lessons learned and best practices among countries at a regional level. Austria participates in the energy and environmental partnership in Southern and Eastern Africa since 2010 together with Finland and DFID. Since its inception in 2010; 179 projects have been contracted; 53,311 households or approximately 267,000 people are benefitting from improved RE / EE access; A total of 2,314 full-time jobs equivalents have been created; The absolute amount of energy savings stands at 26,804 mWh; and 26,056 tons of annual cumulative CO₂ emission reductions are achieved.

He emphasized that based on their experience, the promotion of sustainable energy needs a comprehensive and holistic approach combining elements of intervention that include: (i) policy, legal and regulatory support; (ii) capacity development and applied research; (iii) knowledge management and awareness-raising; and (iv) investment and business promotion. Mr. Robert Zeiner further reiterated the importance of innovation in achieving sustainable energy for all. He underlined that a flexible and country-oriented application is needed, that innovation and partnership have to be conceived as processes rather than static concepts, and that a global network of regional sustainable energy centres should facilitate knowledge sharing and exchange at the regional and global levels.

In his presentation, **Mr. Hans Olav Ibrek**, Policy Director in the Energy Section of Norwegian Ministry of Foreign Affairs highlighted several issues that are important in raising resources for sustainable energy for all. He stressed that partnerships are very important in mobilizing resources for efficient use towards sustainable energy. He highlighted important points for raising financial resources which include: (i) ensuring political leadership in both the donor countries and the receiving countries; (ii) facilitating domestic resource mobilization in line with Addis Ababa Action Agenda including enhancing tax collection, reviewing subsidies, creating an enabling environment, and fighting illicit flow of funds; (iii) improving energy security by developing renewable energy in LLDCs; and (iii) enhancing south-south learning and cooperation especially between countries.

He stressed that south-south cooperation is important for creating an enabling environment for energy investment. He also highlighted benchmarking initiatives that countries can use for establishing an enabling environment investment-framework such as Climate Scope by Bloomberg and RISE

– Readiness for Investments for Sustainable Energy. These tools will help countries on how to develop an enabling environment – in terms of the policies and regulations that the countries can improve. He also suggested that LLDCs should work closely with private sector entities, NGOs, UN agencies and other partners in developing renewable energy and energy efficiency initiatives. He suggested that large scale generation is an area for private sector and LLDCs should work with the private sector such as IFC, OFID, Multi-lateral development banks and development finance institutions; when it comes to off grid, and mini grids is an area where Governments, donors, small scale private sector and NGOs can work; transmission is a public good and governments should work on it and multi-lateral development banks to provide support; distribution – governments can work with donors, small scale entrepreneurs and NGOs; and on reforms and capacity building all partners are involved including the UN. He assured the meeting that Norway will continue to support the LLDCs on sustainable energy for all.

Mr. Faris Hasan, Director of Corporate Planning and Economic Services at OPEC Fund for International Development (OFID), presented on OFID's involvement with increasing sustainable energy access in LLDCs. He noted that in November 2007 at the Riyadh Summit, OPEC leaders established the eradication of energy poverty in the developing countries as an objective of OPEC aid institutions and called on these institutions to cooperate with the energy industry and other financial institutions to enhance this important endeavour. A few months later, in June 2008 at the Jeddah Energy Meeting, Saudi Arabia officially called for an initiative to help the poor have better access to modern energy. This call inspired the 'Energy for the Poor Initiative' which was supported by Energy Ministers in May 2009 and G20 Leaders at the Pittsburgh Global Summit. OFID was part of a UN global initiative on Sustainable Energy for All to mobilize action from all sectors of society in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix. He also indicated that OFID is presently a member of the Sustainable Energy for All (SE4ALL) Initiative's Advisory Board for the third year. He indicated that OFID has been working on energy poverty for some time together with UNIDO, Norway and Austria.

Mr. Hasan highlighted that it is difficult for OFID to work on its own so it sought partnerships including the private sector. He indicated that OFID works as a catalyst with the private sector. They have also chosen some partners who implement their energy grant of half a million and share the outcomes to improve energy access. He stressed three key elements for accelerating energy access which include: advocacy and knowledge, building alliances for financial mobilization, and projects on the ground. In terms of building alliances,

he mentioned that OFID changed from giving grants in an ad hoc way into choosing specific grant partners in order to develop scalable business models. He also informed the meeting of the featured projects in Azerbaijan, Paraguay and Armenia with the financial support of OFID. In terms of OFID's approach to energy access, Mr. Faris Hasan noted that being technology neutral, generating income and leveraging resources should be acted as catalytic elements. He further underlined that the value of energy sector commitments accounted for a very small proportion of the total value of OFID's commitments to LLDCs, which still needs more contribution. He indicated that in OFID the energy sector represents 25% of their total portfolio and for the LLDCs its only 11%. He indicated that it means OFID and LLDCs need to work harder to prioritize and develop more programmes on sustainable energy for all.

Mr. Hasan further noted that policymakers should grab the opportunity to build a conducive environment for private sector investments into the energy sector. They should nurture an enabling environment that can create the business model to attract the energy producers that have the appropriate technology to invest in the country. He highlighted that some of the issues that the policymakers could work on include tax breaks, long term security and stability in the country.

INTERACTIVE DISCUSSION

In the ensuing discussion, Ms. Mwaba Patricia Kasese-Bota posed some of the issues that have been raised in the meeting: How to balance the business model for energy between economic growth, social development and environmental protection? What best practices of partnerships, major constraints and gaps could be shared, And how can the LLDCs be best supported to enhance their access to climate and energy finance. The meeting was informed of country experiences including the case of Bhutan where the country had promoted access to affordable energy by subsidizing consumers in rural areas.

Participants debated on which business model works well for LLDCs. Some indicated that having the private sector to lead large scale power plants has a major drawback that they could factor the costs into the tariffs thereby affecting efforts to increase access to energy. They suggested the need to also involve the public sector in large scale energy plants. Other participants indicated that some countries such as Uganda the private sector experience in large scale energy production was rated high. The meeting also suggested the need for blended financing.

Participants underlined that the real challenge facing LLDCs is that private operators are not interested in prioritizing rural areas due to the low profit of doing so. The meeting appealed

to financial partners, banks and international organizations to come up with a mechanism so that the local population can take over the ownership of electricity and power generation in rural areas. The meeting was informed about one business model for mini grids based on the leftovers of agriculture that OFID initiated in four African countries. The models involve participation of the community but also has private sector participation. Participants also emphasized the importance of decentralized solutions and community based solutions to attract investment in rural areas. Other participants noted that the rural areas are very vibrant markets for small scale energy operators and that there are lots of promising business models available for scaling up private sector financing in these areas.

SESSION 4: INNOVATIVE FINANCING FOR PROMOTING SUSTAINABLE ENERGY FOR ALL IN LLDCS

Innovative partnerships are crucial for developing energy infrastructure, accelerating energy access, enhancing efficiency and promoting renewable energy. It is essential for LLDCs to facilitate creation of enabling environments for private sector financing and to promote attractive project pipelines with the support of government. This session discussed the role of the private sector in promoting sustainable energy in LLDCs including its role in promoting energy access for industrial development and structural transformation. The moderator of this session was Ms. Monika Weber-Fahr. Four panelists from financial and energy institutions shared experiences and identified recommendations for enhancing private sector partnerships.

Ms. Francesca Chisangano, Director Planning and Information of Ministry of Energy and Water Development of Zambia shared her country's experience of creating an enabling environment for private sector investment. She noted that the government of Zambia has just finished the Seventh National Development Plan which called for subsidiary legislation to be revised. She indicated that the country had just opened up the energy sector for private sector participation. She indicated that the major challenge with regards to private sector participation is the tariff structure that would make costs for the consumers high. She highlighted the legal frameworks that are in place to drive the energy sector which include: 1. Energy Policy 2008; 2. Electricity and Energy Regulation laws; 3. Power Systems Development Master Plan; 4. Rural Electrification Master Plan (2008 - 2030); 5. Vision 2030 "Energy Chapter"; and 6.

Revised Sixth National Development Plan B.

Ms. Chisangano highlighted that the government initiatives that have been put in place include 1. The Government has zero rated and removed taxes on all renewable energy technologies in Zambia in order to encourage more investment in other alternative energy sources. 2. Cost reflective tariffs that the Government has agreed in principle to move towards a cost reflective tariff to encourage investment into the sector as well as diversification in the sector. 3. The Government banned the use of incandescent bulb as a new measure that will help relieve the pressure that's being experienced on the National Grid. The Migration path is towards the use of Led lights for industrial and household use. 4. Investment Incentives Government through the Zambia Development Agency offers tax holidays and tax breaks of up to 5 years to any investment in the energy sector with a minimum investment threshold of up to 500 million dollars.

Ms. Chisangano highlighted some of the challenges experienced that include: Low energy tariffs; Lack of investment in the energy sector; Lack of diversity in generation sources; Low Transmission Capacity to certain parts of the country; Low electricity access rates especially in the rural areas; and Heavy dependence on biomass as the major source of energy especially for households. She mentioned that the government has tried to give infrastructure support to remote areas in order to attract private sector investment. She also underlined the importance of optimizing tariff structure to make the energy sector competitive as well as the importance of off-grid network investment.

Mr. Günter Bramböck, Vice President for Regulatory Affairs of EVN Business Unit South East Europe, highlighted that they are a multi-utility company that provides energy services to 600 customers in Austria and also provide service to South Eastern Europe to 2 million customers since 2005. He highlighted the issues that the multi-utility face in terms of promoting energy access. One of the key issues is low affordability of energy services. As a result the company had to cut off services to those who could not afford. He also indicated that inefficient tariff structure was a problem. The other problem is need for cost to maintain the energy infrastructure grids as a result the private sector in the energy field urgently need investment. He further mentioned that grid is not always the cheapest solution to promote energy access and that micro grid might be challenging in terms of balancing load and capacity. In that regard, he suggested that some developed countries where micro grids are often used should think over whether it's cost-effective to maintain long range micro grids in regions with few consumers and low consumption in remote rural areas. Price development in photovoltaic and especially in storage might change in the next 3 years and there is need to take into account the

new opportunities. Finally, he underlined the importance of getting energy distributing companies engaged to deal with the problems of consumers. He indicated that from his experience there is no one solution for all countries instead there is need to design solutions that are specific to the situation.

Mr. Christian Grossmann, Director for Climate Change of International Finance Corporation (IFC), shared IFC's experience in doing climate finance. He noted that IFC is the private sector arm of the World Bank. He noted that since starting to track the climate-smart components of its investments and advisory services in 2005, IFC has invested about \$15.3 billion in long-term financing for renewable power, energy efficiency, sustainable agriculture, green buildings and private sector adaptation to climate change, in addition to \$10.1 of core mobilization (syndications and mobilization platforms). When it comes to climate finance, IFC's biggest impact is in its ability to mobilize external capital to climate sectors, as global financial institutions pledge to invest hundreds of billions of dollars in clean energy and other climate investments. IFC leverages its investment dollars through direct mobilization, co-financing from private commercial institutions, and influencing financial markets. In special circumstances IFC co-invests donor funds on concessional terms alongside its own commercial funds in high-impact climate projects that would not happen otherwise due to market barriers or high risks. Since FY10 IFC has deployed over \$380 million in donor funds to support 48 climate projects, leveraging \$1.3 billion of the IFC's own investment plus \$4 billion from other financiers – a leverage ratio of almost 14 times.

Mr. Grossmann indicated that IFC has supported climate-smart and energy investments in a number of landlocked countries since 2005, including: Armenia, Azerbaijan, Belarus, Bhutan, Bolivia, Burkina Faso, Ethiopia, Hungary, Kosovo, Kyrgyz Republic, Lao People's Democratic Republic, Macedonia, Malawi, Mali, Moldova, Mongolia, Nepal, Paraguay, Rwanda, Serbia, Tajikistan, Uganda, Uzbekistan, and Zambia. He indicated that their strategy of investments in these countries focuses on capitalizing on Renewable Energy Investments and supporting Energy Efficiency programs that would reduce energy costs in these countries. Since it started tracking its climate business, IFC has invested almost \$600 million of own account in landlocked countries and mobilized an additional \$350 million, for a total of almost \$1 billion in 41 climate-smart investments from their partners. IFC does not have a systematic program in landlocked countries, so investments are largely opportunistic. In most countries, IFC has executed only one climate project since 2005.

In terms of innovative financial development, he informed the meeting that IFC created an asset management company which is able to leverage resources to help mobilize capital

for the private sector. The company started up with some sovereign funds but are now tapping into pension funds. Furthermore, he mentioned that IFC has also started up the blended finance to use concessional funds to generate the platform for private sector investment and provide tariffs that are acceptable to the end users particularly in those countries like LLDCs where there is a lack of private sector financing. IFC has a special unit that helps innovative entrepreneurs to go global with new technologies.

In his presentation, **Mr. Camillo Stubenberg** from Kairos Impact Research and Development gGmbH underlined the challenge of transferring technologies – especially in countries like LLDCs. He indicated that technology is usually difficult to be fully and successfully transferred and there is need for support to ensure that technology is successfully transferred and utilized. He also underscored the importance of analyzing the interdependent relationship between society and technology and to develop innovative solutions for sustainable energy. He further suggested making high quality and lasting components for sustainable energy solutions on local markets which can then be enhanced and put together in off grid regions. Finally, he highlighted the core challenge of low quality, ready-made products flooding the market, which presents not only a potential environmental hazard, but also a threat to local value creation.

INTERACTIVE DISCUSSION

In the ensuing discussion, some participants pointed out that the real solution to the problem of private sector investment in the energy sector is to provide good pricing in addition to government subsidies. The meeting underscored the crucial need to come up with mechanisms and initiatives that are specifically designed to meet the needs of the LLDCs and to assist them to benefit from rural electrification. Participants also stressed that although rural electrification might not be cost effective in terms of money spent, in development sense it yields very high returns due to its social benefits linked to better health, education and job creation. They stressed the need for governments to subsidize rural electrification and be transparent towards renewable energy in rural areas. The meeting was informed that in Zambia the rural electrification agency needs about \$15 million per year to electrify all rural areas. It was emphasized that this is an investment for the government to attract more private sector involvement and boost the country's economy.

On the issue of incentivizing the private sector, the meeting was informed that the IFC has developed a strict methodology to make concessional funds time bound and specifically allocate them to different projects. It considers how much subsidy is needed and give a time bound period for use of the funds. The meeting hoped that the Green Climate Fund comes into operation soon so that projects can be

prepared to utilize the funding. The meeting underlined that supporting the poor people is the task for the state rather than for the companies serving electrification. However the state can work together with the private sector to ensure that the special needs of the rural communities are met.

SESSION 5: NEXUS SESSION: INTEGRATED SOLUTIONS FOR WATER, ENERGY, AND LAND

This session aimed to identify integrated approaches to energy, water, food, and ecosystem security in selected regions of the world as well as to address the particular case of LLDCs. The moderator of this session was Mr. Luis Gomez-Echeverri, Senior Research Scholar of International Institute for Applied Systems Analysis. Five panelists from diverse fields shared their experiences concerning the integration between water, energy, food security and ecosystem.

In his presentation, **Mr. Pradeep Monga** shed light on how the sustainable development goals can be linked up together to achieve energy sustainability as well as water, food and ecosystem security. He noted that UNIDO has worked on enabling green industry frameworks including greening existing industries and creating new green industries that are linked to more of renewables and efficient energy systems. He further stressed that energy and water efficiency as well as food security can also be enhanced through promoting sustainable agribusiness programs. Finally, he highlighted the importance of establishing a long-term, integrated system approach to equip all partners and Member States with decision making tools in dealing with sustainability issues.

Mr. Simon Langan, Program Director of Water at International Institute for Applied Systems Analysis emphasized that water underpins many of the SDGs and that greater attention has to be paid to water shortages. To deal with water scarcity, he stressed that in addition to increasing the supply through engineering solutions, there is also a need to reduce water demand by improving water use efficiency, such as producing more food per unit of water and increasing irrigation efficiency. He further underlined that Ministries of environment, food, and energy should think of new ways of doing business together to make the best use of water in different locations and at different points of time. Finally, he noted that IIASA will use stakeholder based scenarios at the global scale and two regional study areas in Asia and Africa to explore the interlinkages between water, food and energy.

Mr. Faris Hasan underlined the alarming issue of high water usage for primary sector in Africa due to the burning of biomass waste. He highlighted that the linkage between water, energy and food varies greatly by region and that water usage plans should be developed specifically for different countries and different regions within the country. He noted that in the Africa region water is used mostly for agriculture. He noted that in developing regions the amount of energy used for transporting food is much higher than in developed countries and stressed the need for improved efficiency in energy use in the transport of food. He also noted that increasing the efficiency of cooking facilities will lower the amount of energy used for food and improve the environment by lowering deforestation. To achieve the SDGs, he called upon the public and private sectors to work together to enhance new business models. Finally, he informed the meeting of the recently established oil and gas energy access platform where OFID rallies oil and gas companies around the world and especially in Africa to contribute to energy access.

In his presentation, **Mr. Chris Walzer**, Head of Conservation Medicine at University of Veterinary Medicine of Vienna, introduced the Alpine renewable energy program which aims at balancing Alpine renewable energy production and nature conservation. He noted that producing renewable energy in the Alpines has some impacts and challenges that need to be addressed. He highlighted the crucial role of biodiversity in forming habitats, maintaining biogeochemical cycles, enhancing productivity of ecosystems, and most importantly, protecting human health and well-being. He noted that the new renewable energy schemes (eg. Hydro power, wind mill power etc.) should restore the biodiversity of the ecosystem. He underlined the existing challenges for ecosystem services, such as the missing of policy and finance mechanisms for incorporating natural capital into land- and resource-use decisions as well as serious ethical implications. Finally, he emphasized that “green accounting” mechanisms are insufficient in addressing the global predicament that we face and hence there is a need to examine and redefine the prevalent economic concept of continuous growth and take the necessary institutional changes to secure the future of humanity.

Ms. Elfriede-Anna More, Director of International Environmental Affairs for the Austrian Ministry of Agriculture, Forestry, Environment and Water Management and Vice President of Global Forum of Sustainable Energy, presented on Austria’s experience of tackling the new paradigm of the integrated implementation of the SDGs and the Paris Agreement of Climate Change. She highlighted the similar challenges facing LLDCs that Austria as a landlocked and mountainous country also faces. She noted that mountainous countries face the impact of climate change which is affecting the mountain climate and ecosystem which impacts tourism

and jobs. She underlined the necessity of having an integrated energy and climate strategy for Austria and informed the meeting that four Austrian ministries in the areas of economy, social affairs, environment and transportation have started working together to lead the process. She noted that the four ministries have set up a green book for an integrated energy and climate strategy which was based on broad public consultations with stakeholders from various sectors. She noted that six working groups (which include: investments; research development and innovation; jobs and economy; governance; costs and financing; the future of the Austrian energy market) are currently elaborating on the actual integrated energy and climate strategy for 2030. This strategy will be ready in 2018 and the government will adopt it.

INTERACTIVE DISCUSSION

In the ensuing interactive discussion, participants stressed the importance of an integrated approach to addressing the nexus between energy, water and land. They highlighted the importance of undertaking environmental impact assessment to ensure preservation of the ecosystem in the future. Participants also underlined the issue of the lack of integration between financing framework, energy production and environmental impact.

The meeting underscored that the nexus approach should emphasize ecosystems and environmental aspects. The meeting noted that the global developments in 2015 including the 2030 Agenda and the Paris Agreement have resulted in a good legal framework that incorporates economic growth and the environment. They underscored the issue of economic and environmental tradeoffs of hard engineering solutions to sustainable energy, such as dam plants, which provide hydro power to the fishery industry but could also lead to ecosystem fragmentation and other environmental effects.

Details of the Vienna Energy Forum which is held once in every 2 years were shared in the meeting. It was noted that the Vienna Energy Forum started in 2009. The upcoming Vienna Energy Forum will be held on 9-12 May 2017 with the theme nexus and innovation and that there will perhaps be one plenary session for the LLDCs.

SESSION 6: ENHANCING ENABLING POLICIES FOR SUSTAINABLE ENERGY, TECHNOLOGY TRANSFER, DATA COLLECTION, MONITORING AND FOLLOW-UP IN LLDCS

Developing sustainable energy sectors requires strong political leadership, forward-looking long-term planning, enabling policy and regulatory framework, increased capacities to prepare and implement projects, and access to finance. This session focused on how to support capacity building for enabling policies, technology transfer and data collection, monitoring and follow-up on sustainable energy for all in LLDCs. The moderator of the session was Ms. Heidi Schroderus-Fox, Director of UN-OHRLLS. Ms. Schroderus-Fox stressed that enabling policies and regulatory frameworks at national level is a prerequisite to promoting access to modern energy, enhancing energy efficiency as well as facilitating public and private sector investment in the energy sector. In that regard, she underlined that LLDCs require capacity building assistance for formulating and implementing energy development policies, strategies and concrete plans. She also emphasized that technical assistance should be extended towards the preparation of sound and financially viable sustainable energy projects and that regular monitoring and reporting mechanisms should be in place to measure the progress, to assess the effectiveness of energy policies and to guide future energy policy decisions.

The first panelist, **Ms. Carolina Gonzalez** an industrial development officer spoke on behalf of Mr. Stephan Sicars, Director, Environment Department, RECPnet - The Network for Resource Efficient and Cleaner Production of the Environment, UNIDO. She presented RECPnet's experience of promoting knowledge sharing and information platform to enhance sustainable energy efforts. She noted that RECPnet is a well-established platform and south-south cooperation tool bringing together over 70 centres around the world to promote cleaner production and resource efficiency. These centres work closely with industries but are also involved in policy dialogue with the government to contribute to sustainable development and energy efficiency and to help the government create an enabling environment. In addition to the capacity building assistance that members receive from the network, there is also access to information and expertise from around the world. She also shared one of their most successful experiences with Moldova who has developed a unique tool for promoting resource efficiency called RECP Clubs with the support of UNIDO. Moldova RECP Clubs work in the urban areas but also in other municipal areas. She noted that the network is a useful south-south tool for sharing experiences on sustainable energy and energy efficiency.

In his presentation, **Mr. Mustapha Corr** from Energy and ICT Division of Infrastructure Department of Islamic Development Bank (IsDB) noted that the IsDB is a south-south Bank with a membership of fifty-seven (57) countries (including LLDCs) spread over four (4) continents (Africa, America, Asia and Europe) which was established in 1975. He highlighted some of the challenges that they have encountered in energy projects that include: the lack of technical knowledge – eg engineering, procurement and contract management leading to inferior infrastructure; the extended project implementation periods; and sustainability issues during the Operation phase of projects are left for governments to undertake and governments do not often follow through on these undertakings.

In order to strengthen sustainable energy projects with technical assistance, Mr. Corr recommended that the technical assistance should: (i) start at concept stage of the project design so as to improve quality at entry, accelerate the implementation of project and insulate the project from interference; (ii) extend technical assistance to the operation phase of projects to oversee the achievement of the sustainability measures designed into the projects; and (iii) technical assistance should be provided by institutions rather than individuals and the technical assistance should comprise mixed expertise. Furthermore, on the question of what type of technical assistance has proven most effective, he underlined that the technical assistance which is driven by the recipient where there is ownership by the country is a major factor. He noted that deep and exhaustive problem diagnosis is important to determine capacity development. He underscored that partnership between the provider and the recipient also proves to be most effective. Finally, regarding the issue of how can the LLDCs get more access to technical assistance on energy projects, he recommended that development partners and UN systems should help in mapping of providers and government of recipient countries should endeavor to have the policy of openness and allocate required counterpart funds.

Mr. Marcel Alers, Head of Sustainable Energy at UNDP presented on the initiatives and programs to support the capacities of LLDCs to collect sustainable energy statistics and to monitor progress. He noted that in order to implement the Paris Agreement, a lot of resources will be required from investors. The private sector ask for clarity and predictability in policies and regulatory framework. He stressed that capacity development is very important to ensure that the countries are able to establish supportive policies. He informed the meeting that UNDP has about 260 technical assistance projects ongoing so far, many of which focus on capacity building as well as data collection and analysis. Regarding the specific programs in supporting data collection and analysis, he noted that UNDP in collaboration with UN-DESA has recently supported three LLDCs: Bolivia,

Uganda and Kyrgyzstan. Government officials from statistics departments in these countries have been trained in using different types of modelling tools to analyze data on energy systems. He also noted that regional commissions such as UN-ESCAP are also active in this area – they have a portal of data where they collect data automatically from their member states and have a repository. Finally, he informed the meeting of the Global Tracking Framework co-led between the World Bank and the IEA to measure the progress of achieving the SE4All goal and produce a bi-annual report.

Mr. Peterson Dlamini, Director of Energy from Ministry of Natural Resources and Energy of Swaziland presented on the issue of capacity building priorities for enabling energy policies in LLDCs and how they can be strengthened through partnerships. He underscored the importance of energy data in formulation of relevant policies. He noted that LLDCs can learn from his country's experience and endeavor to establish partnerships with developed countries, the UN and private sector to acquire appropriate data acquisition technology. He also stressed that all stakeholders including development partners, end users and other government departments should participate to draw up implementation plans of rolling out the energy policies. In terms of the area of energy efficiency, he urged the need to switch to other forms of energy in particular renewable energy. Finally, he highlighted the importance of raising awareness of capacity building to the end users and rethinking the way that government budgeting works to replace silo approach with an integrated approach.

WORKING GROUP DISCUSSIONS AND CONSULTATIONS ON THE WAY FORWARD

The working group discussions aimed to consult on the specific elements to be included in the Conclusions and Recommendations that were to be adopted in the closing session of the meeting. Four working groups were requested to prepare in writing specific action oriented recommendations and deliverables and present them during the consultations and way forward session.

The first working group with the theme “**National Strategies to Achieve Global Goals on Sustainable Energy**” was facilitated by SE4All. This group discussed and suggested recommendations to strengthen national energy policies and to ensure their effective implementation. The group also discussed recommendations to enhance the preparation of the national SE4All Action Agenda and the accompanying investment prospectus. The second working group with the theme “**Enhancing Regional Cooperation**” was facilitated by UNIDO. This group discussed how to enhance regional cooperation through regional policies and implementation mechanisms, financing operations, information systems

and other instruments and actions to support the LLDCs on sustainable energy.

The third working group, facilitated by IFC, focused on the issue of “**Financing Sustainable Energy Transition in LLDCs.**” This group discussed recommendations on how to improve financing including domestic resource mobilization, private sector engagement, blended finance, ODA and other financing resources at the national level in LLDCs.

The fourth working group with the theme “**Building Innovative Partnerships**” was facilitated by UNDP. The group discussed recommendations on how to improve different aspects of partnerships, including capacity building, data collection, policy development, experience sharing, technology transfer and others, to support the LLDCs in developing energy infrastructure, accelerating energy access, accessing technology, enhancing efficiency and promoting renewable energy. The recommendations from the group discussions were presented and reviewed during the consultation and way forward session that was moderated by **Mr. Sandagdorj Erdenebileg**, Chief of Policy Development, Coordination, and Reporting Service of UN-OHRLLS. Participants agreed on the Conclusions and Recommendations that are presented in the first section of this document.

PRESENTATION ON EXPO 2017 THEMED FUTURE ENERGY

Ms. Lyazzat Rysymbetova, Head of Division of the Secretariat of EXPO 2017 at Ministry of Foreign Affairs of Kazakhstan made a presentation on the International Specialized Exhibition EXPO 2017 themed “Future Energy” that will be held in the capital of Kazakhstan, Astana, from June 10 to September 10, 2017. She indicated that the Exhibition has three sub-themes: reduction of CO2 emissions, energy efficient lifestyle and energy for all. She indicated that the EXPO will present breakthrough innovational and promising projects in the sphere of alternative and renewable energy (hydro and geothermal energy, wind and solar power).

She also noted that over 100 states, 17 international organizations and 5 million visits to the Exhibition were expected. So far 11 LLDCs had officially confirmed their participation in the Exhibition. Furthermore, she informed the meeting that after completion of EXPO 2017, Kazakhstan will establish the Astana International Financial Center with a special status that will operate based on the British law following the example of the Dubai International Financial Centre. The AIFC is aimed at serving as the financial infrastructure heart of Kazakhstan and further on as a financial hub for the whole Central Asian region. Finally, she called upon all at the meeting to actively participate in the EXPO 2017 and AIFC.

CLOSING SESSION

In the closing session, the Chair of the LLDC Group, **Ms. Ency-la Tina Sinjela**, Ambassador of Zambia to Geneva, presented for consideration for adoption the Conclusions and Recommendations of the high level meeting. The participants adopted the Conclusions and Recommendations. In her closing remarks, Ms. Sinjela commended all participants for their contribution to the success of this meeting. She furthermore called upon development partners, the United Nations organizations and other regional and international organizations, and the private sector, to support the implementation of the recommendations that were adopted. Finally, she expressed her appreciation to the generous offer by the Government of Austria and UN-OHRLLS to co-organize the meeting in collaboration with UNIDO and SE4All.

In his closing remarks, **Mr. Gyan Chandra Acharya** highlighted the necessity of working together at all levels by combining the national leadership and capacity building, the regional and sub-regional cooperation as well as the global partnerships. He underscored that partnerships will be very active in carrying the agenda forward in terms of scaling up projects that are working in particular renewable energy sources. Working together at all levels, the LLDCs will be able to achieve SDG 7. He emphasized the necessity of building resilience by addressing the special vulnerabilities of LLDCs and the global vulnerabilities of climate change. He underscored the importance of implementing the Paris Agreement so that it translates to positive impact on the ground. He called upon all partners to support the LLDCs to access and utilize relevant financing sources available in order to scale up sustainable energy. He also indicated that the LLDCs also require technical support to build their capacity to negotiate contracts. Finally, he underlined the crucial role of domestic and international private sector in scaling-up the energy market and industry. He thanked the Austrian Government, UNIDO and SE4All for partnering in the organization of the meeting.

Mr. Martin Ledolter, in his closing statement, commended the participants for the recommendations that they adopted at the meeting indicating that they will make a significant contribution to the implementation of the Vienna Programme of Action for LLDCs and the 2030 Agenda for Sustainable Development. He assured the meeting that Austria will remain committed to advocating for the cause of LLDCs. He indicated that Austria had already quadrupled its funds for humanitarian relief operations and had committed to doubling its bilateral development cooperation budget until the year 2021. He noted that the meeting had identified capacity building in all dimensions as one of the key challenges to increase the share of sustainable energy in LLDCs. He also expressed his

commitment to continued to support the consolidation and expansion of the Global Network of Regional Sustainable Energy Centres. In this regard, the Austrian Development cooperation will continue to support partners from LLDC-countries especially in the field of capacity development. Finally, he expressed his gratitude to all participants at the meeting and invited them to come back to Vienna for the upcoming events such as the Vienna Energy Forum in May 2017 which is an important north-south and south-south platform of promoting and matching sustainable energy entrepreneurs, start-ups and companies. He wished participants safe travels back to their countries and closed the meeting.

PART 2

BACKGROUND PAPER FOR THE SENIOR OFFICIALS' MEETING

“ACCELERATING SUSTAINABLE ENERGY FOR ALL IN LANDLOCKED DEVELOPING COUNTRIES THROUGH INNOVATIVE PARTNERSHIPS”

A consolidated input by the co-organisers: Austria, UN-OHRLLS, UNIDO, SE4ALL

I. INTRODUCTION

The 32 landlocked developing countries (LLDCs) with a total population of about 480 million face development challenges owing to their geographical disadvantage of lacking direct territorial access to the sea and their remoteness and isolation from world markets. Additional border crossings coupled with cumbersome transit procedures and inadequate infrastructure, substantially increase the total expenses for transport and other transaction costs. The LLDCs pay about double the trade costs of the transit countries for imports and exports. These high transport and trade transaction costs, diminish export profits, inflate the prices of imported inputs for manufacturing and discourage investment thereby negatively affecting overall sustainable development in LLDCs. A 2013 study conducted by UN-OHRLLS found that because of landlockedness, the level of development in the LLDCs is, on average, 20% lower than what it would be if the countries were not landlocked. This ultimately affects their capability to structurally transform toward “green” circular economies and to achieve the sustainable development goals (SDGs).

Access to energy services, energy efficiency and renewable energy, the main pillars of SDG-7, are key development enablers for sustainable development. They are also important aspects of the circular economy concept, which aims at decoupling prosperity gains from negative externalities such as climate change, environmental pollution and resource scarcity. This policy concept assists LLDCs to reduce needs for resources through cleaner production, greener products, service-based business models, extended product lifetimes, increased recycling and minimized waste. Promote the use of energy to support productivity and competitiveness of the services sector since it is of strategic importance to overcome landlockedness through its potential contribution to trade and development. The multidimensional impact that rapid energy transition can have is all-encompassing; it is essential for alleviating poverty, improving human welfare, protecting health, empowering women and marginalized communities,

protecting the planet, raising living standards, building resilience, creating jobs and achieving rapid and sustainable economic growth. For LLDCs, reliable and sustainable energy is required to support faster customs clearance, border crossing, tracking of shipment that is in transit and other trade facilitation processes that are necessary to reduce delays in border and transit procedures and formalities, thereby resulting in reduced trade transaction costs, increased competitiveness of LLDCs and expansion of further international trade.

The LLDCs have limited productive capacities, are experiencing declining value addition in manufacturing and agriculture, and have heavy reliance on undiversified primary commodities. Energy is an important productive capacity that is necessary to support industrialization that can enable the LLDCs to achieve economic diversification, improve value addition and become more competitive in international markets for goods and services other than primary commodities. Renewable energy is also an alternative to the transportation and logistical challenges linked to delivering fuel to some LLDCs. In landlocked countries with unreliable overland trade corridors, the uninterrupted supply of fuel is critical. Alternative and renewable energy sources can help them to avoid this logistical and supply chain issue.

The Vienna Programme of Action for the LLDCs for the Decade 2014-2024 (VPoA) adopted at the Second United Nations Conference on LLDCs is a comprehensive and action-oriented development agenda to address the special needs and challenges of LLDCs in a more coherent manner. The VPoA stresses that energy infrastructure and access to affordable, reliable and renewable energy and related technologies are critically important for modernizing information and communications technology and transit systems, reducing delays and enhancing productive capacity to achieve sustained economic growth and sustainable development.

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



Photo: Kyrgyzstan. Matthias Buehler/Flickr

The 2030 Agenda for Sustainable Development adopted in 2015 as the overarching global development framework for the next 15 years acknowledges that the most vulnerable countries, including LLDCs deserve special attention. The 2030 Agenda calls for support towards the implementation of relevant strategies and programmes of action, including the VPoA and also indicates that the VPoA 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. SDG 7 has a multiplier effect on the achievement of all the other SDGs.

There are important cross-links to SDG 13 on climate change mitigation and resilience and SDG-9 on building resilient infrastructure, promoting inclusive and sustainable industrial development and innovation. SDG-17 gives also an important direction to enhance “North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism.”

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/are encouraged to develop Country SE4ALL Action Agenda and respective investment prospectus (es) to help guide on how the country could achieve the three goals of the SE4ALL.

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.

This background paper provides highlights on the progress that has been made towards achieving sustainable energy

for all at national level in the LLDCs including in improving energy access, efficiency and renewable energy. It highlights the progress using the global indicators for SDG 7. The paper identifies the key barriers and priority areas for action and highlights the implications for partnerships. Finally, it gives concrete recommendations on how to overcome barriers to be validated during the two-days high level seminar.

II. UNIVERSAL ACCESS TO AFFORDABLE, RELIABLE AND MODERN ENERGY SERVICES IN LLDCS

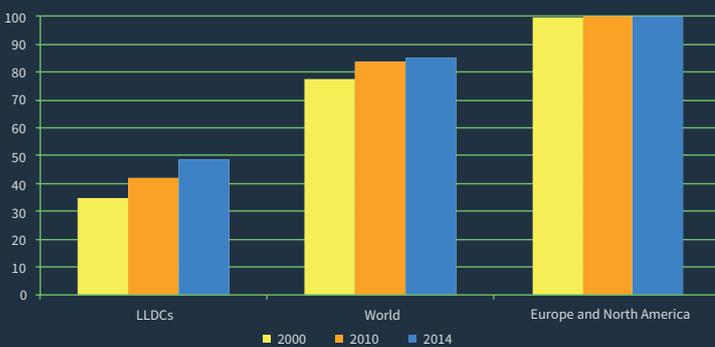
Despite the potential that modern energy has for the development of the LLDCs, the average proportion of population having access to modern energy in the LLDCs was 48.5% in 2014. LLDCs have a significantly lower average level of access to electricity when compared to both developed, and developing countries and the world average as shown in Figure 1. The proportion of the population with electricity in LLDCs increased by only 10% since 2000 and there is need to intensify efforts so as to improve access to all.

Furthermore there are wide disparities between countries; with 9 countries having reached universal access, while 8 countries are trailing behind others with an access rate lower than 20% (see Annex 1) and the remaining 15 LLDCs lie in between.

There are also wide disparities between urban and rural areas with urban areas having access rates that are much higher than the rural areas as shown in Figure 2. It is important that access to modern energy is enhanced to specifically target the rural areas. In this regard it is important to scale up renewable energy which represents one of the most cost-effective solutions for off-grid areas and has a cost advantage over diesel-fired power generation. The LLDCs also require higher quantity and quality of investment in infrastructure facilities to close the rural-urban gap and to achieve universal access in sustainable energy including involving a combination of off-grid, mini-grid and decentralized grid-connected energy solutions.

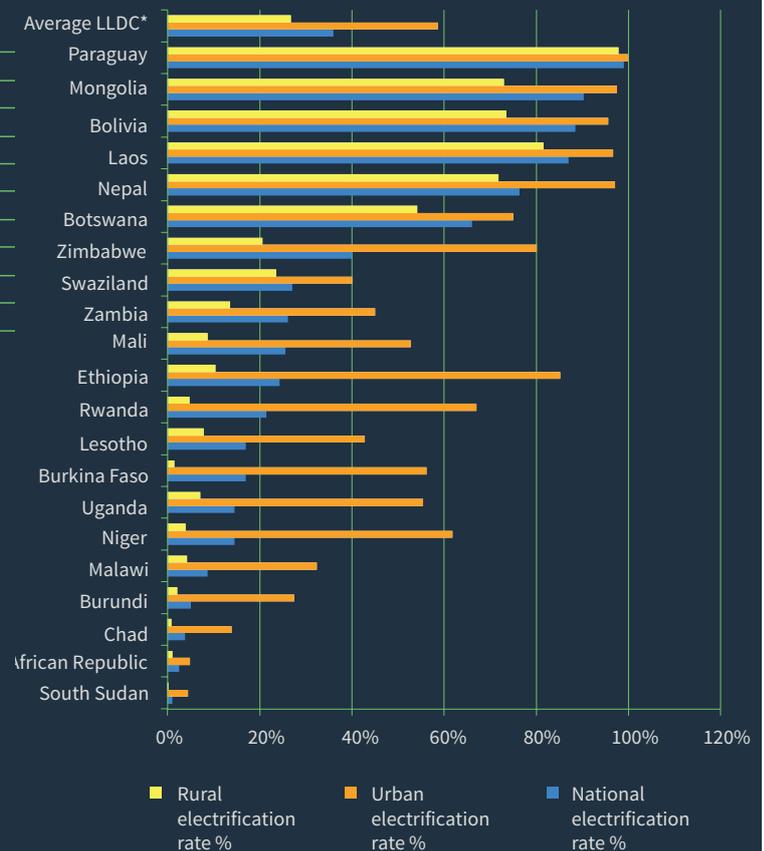
Furthermore there are wide disparities between countries; with 9 countries having reached universal access, while 9 countries are trailing behind others with an access rate lower than 20% (see Annex 1) and the remaining 14 LLDCs lie in between. There are also wide disparities between urban and rural areas with urban areas having access rates that are much higher than the rural areas as shown in Figure 2. It is important that access to modern energy is enhanced to specifically target the rural areas. In this regard it is important to scale up renewable energy which represents one of the most cost-effective solutions for off-grid areas and has a cost advantage over diesel-fired power generation. The LLDCs also require higher quantity and quality of investment in infrastructure facilities to close the rural-urban gap and to achieve univer-

FIGURE 1. Proportion of population with access to electricity



Source: UNSD SDG Indicators Global Database.

FIGURE 2. Electricity access in selected LLDCs in 2013



Source: IEA, World Energy Outlook 2015.

sal access in sustainable energy including involving a combination of off-grid, mini-grid and decentralized grid-connected energy solutions.

According to the recent data by the International Energy Agency, about 300 million people in the LLDCs or two thirds of their total population rely on traditional use of biomass for cooking (see table 1). The indoor pollution resulting from biomass use kills more people, especially young children and women, than malaria and tuberculosis and HIV-AIDS combined, underscoring the urgent need for improved access to clean and modern cooking energy.

With regard to the second SDG indicator on access to energy, the proportion of the LLDCs' population with access to clean fuels and technologies for cooking, such as gas and electricity is only 25.6% in 2014 – less than half the rate of the world average and about a quarter of the developed regions' average. Growth in access to clean fuels and technologies for cooking has been slow growing only from 24.8% in 2005 to 25.6% in 2014 particularly in African LLDCs (see Figure 3 and Annex 2). The 2016 SDG report stresses that the growth in

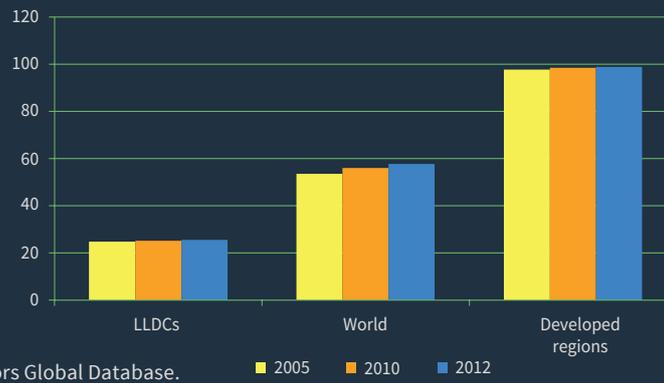
access to clean fuels and technologies for cooking is almost exclusively confined to urban areas.

The LLDCs have been undertaking efforts to improve access to clean fuel and energy technologies including for example through rural electrification, biogas and improved cook stoves (see Annex 7 for some examples). Over the period 2012–2014, the World Bank supported a project Africa Clean Cooking Energy Solutions Sub-Saharan Africa that was an enterprise-based platform to promote clean fuels and technologies (Uganda was one of the pilot countries). In East Asia between 2012 and 2015 the World Bank supported Mongolia, and Lao PDR in capacity building, policy development, knowledge sharing and institutional strengthening on clean stoves. The large-scale adoption and sustained use of clean cookstoves is constrained by financing in terms of a lack of investment and working capital for producers, and lack of information, awareness, and cultural barriers for consumers. This underscores the importance of awareness raising; markets and preferences; technologies and standards; and innovative financing.

Table 1. Traditional use of biomass for cooking in selected LLDCs – 2013

REGION	Population relying on traditional use of biomass millions	Percentage of population relying on traditional use of biomass %
Botswana	1	37%
Burkina Faso	16	95%
Burundi	10	98%
Central African Republic	5	97%
Chad	12	95%
Ethiopia	89	95%
Lesotho	1	62%
Malawi	16	97%
Mali	15	98%
Niger	17	97%
Rwanda	12	98%
South Sudan	11	98%
Swaziland	1	98%
Uganda	37	98%
Zambia	12	82%
Zimbabwe	10	71%
Laos	4	65%
Mongolia	2	63%
Nepal	22	80%
Bolivia	2	23%
Paraguay	3	42%
TOTAL	297	79%

Source: IEA, World Energy Outlook 2015.

FIGURE 3. Proportion of population with primary reliance on clean fuels and technology in LLDCs

Source: UNSD SDG Indicators Global Database.

III. ENERGY EFFICIENCY IN LLDCs

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 efficiency improvements during extraction, generation, transmission, distribution and end-use in lighting, appliances, buildings, mechanical work, transport and industry contexts frees up resources to expand access, lowers the cost of energy for consumers, and creates a surplus that allows more energy to be used for productive undertakings.

The SDG indicator to measure energy efficiency - energy intensity - calculated by dividing total primary energy supply by GDP reveals how much energy is used to produce one unit of economic output. Energy intensity in LLDCs improved from 2000 to 2012, falling from 14 megajoules per unit of GDP (2011 US dollars PPP) in 2000 to 8.8 in 2012. However the energy intensity of the LLDCs is still much higher than the world average or the average of the developing regions indicating that there is still need for more work to enhance energy efficiency (see Figure 4).

Among end-use sectors at the global level, the 2016 UN SDG reports that industry was the largest contributor to reduced energy intensity, followed closely by transportation. To increase the competitiveness and productivity of industries and SMEs in LLDCs there is need to up-scale the use of energy management standards and systems (e.g. standard ISO 50001), as well as cleaner production practices. Over the past 30 years, best practices and lessons learned from UNIDO's industrial energy efficiency program and the Network for Resource Efficient and Cleaner Production Centers (RECPnet) have demonstrated the productivity gains and viability of such measures.

For example, a Moldovan Lactis dairy products company achieved through the implementation of energy management standards an annual reduction in electricity and natural gas consumption of 4% and 22%, respectively, achieved at not cost or low cost, while maintaining the same production level.

Energy efficiency in LLDCs has not yet reached its potential. Some of the challenges to optimizing efficiency potential involve lack of access to technologies, capacity-building and financial resources, as well as market related and institu-

FIGURE 4. Energy intensity level of primary energy (millijoules (MJ) per constant 2011 PPP GDP

Source: UNSD SDG Indicators Global Database.

tional issues. According to REN21, 2016 in some countries, legal frameworks are not considered stable and transparent enough to trigger large-scale private investment. Subsidies for fossil fuels also continue to put renewable energy and energy efficiency projects at an economic disadvantage.

IV. RENEWABLE ENERGY USAGE IN LLDCs

New and renewable sources of energy have become accepted not only as feasible and important energy supply options, but also as key resources for addressing global challenges, including universal energy access, energy security, climate change, and ultimately poverty eradication and sustainable development. According to the UNSD data on SDG 7, the share of renewable energy derived from hydropower, solid and liquid biofuels, the wind, sun, biogas, geothermal and marine sources, and waste in the LLDCs' total final energy consumption decreased, from 44.3% in 2000 to 29.2% in 2012. There has been a general decrease in the proportion of renewable energy consumption in 23 LLDCs over the period 2000-2012. Globally the share of renewable energy in total final energy consumption increased from 17.4 per cent in 2000 to 18.1 per cent in 2012. Globally, the technologies making the largest contribution have been hydropower, wind and solar energy; together they account for 73 per cent of the total increase in modern renewable energy between 2010 and 2012. Total renewable energy production has been on the increase in some LLDCs as shown in Figure 5, with 7 countries producing more than 10 000 Gwh in 2014.

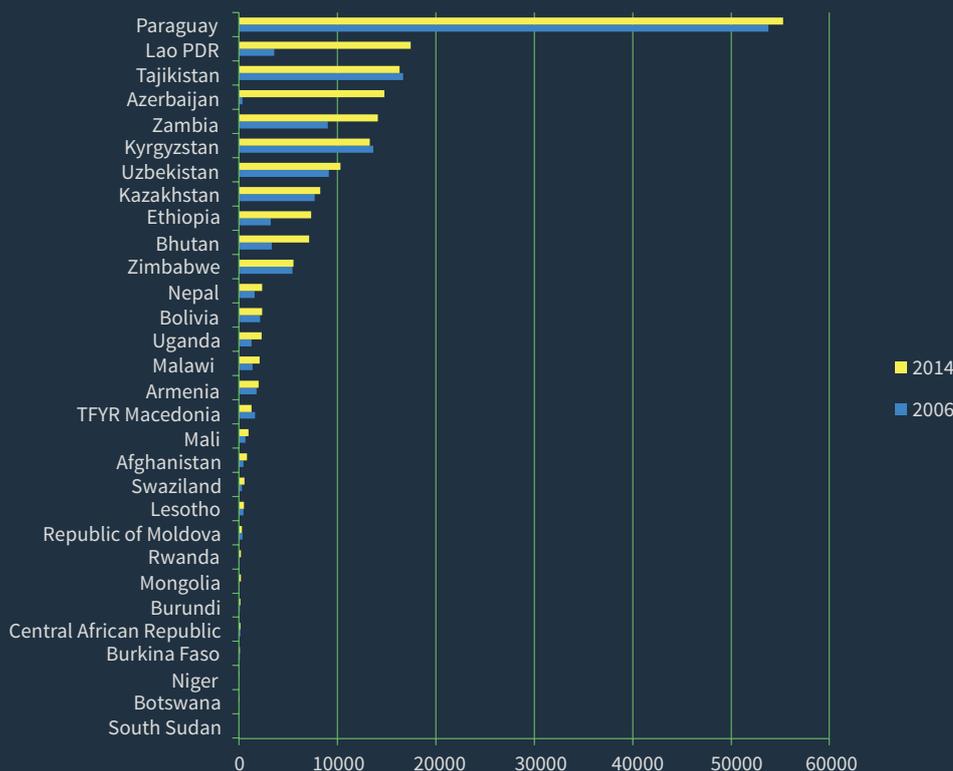
The major source of renewable energy in LLDCs is hydropower followed by bio-energy, solar and wind energy as detailed in annex 6. Some LLDCs have rich hydropower potential in-

cluding: large hydroelectric dams, run-of-the-river systems, and small hydro stations. Some LLDCs like Paraguay and Bhutan are producing electricity for export using hydropower. LLDCs have great potential for solar energy production because of length of daytime, weather, climate condition, and geographical location. While some efforts have been made to utilize solar energy, much more can be done.

Wind energy is relatively underdeveloped compared to other energy sources globally and LLDCs have relatively few installations of wind power plants. Ethiopia and Mongolia produce higher level of wind energy when compared to the other LLDCs (see annex 6). Ethiopia is one of the largest wind energy producers among LLDCs. In May 2015, the Adama Wind Farm II which was implemented by Chinese companies opened, and its 153 MW capacity made it the largest wind farm in sub-Saharan Africa, and the latest of three giant wind farms (Eaglestone Securities, 2015). Mongolia also has high potential to produce wind energy. All regions of Mongolia are influenced by the westerly jet stream, a high-speed ribbon of air several kilometers above sea level (Elliott, 2001). The LLDCs also have potential to produce geothermal energy. Some LLDCs such as Zambia, Malawi, Uganda, Ethiopia, and Macedonia are located in the hottest known geothermal region where volcanic and seismic activities occur frequently, and they have high potential to produce geothermal energy. Currently only Ethiopia is producing geothermal energy.

The bioenergy share in total global primary energy consumption has remained steady since before the year 2000, at around 10% (REN21, 2015). Most of this energy is used for lighting, cooking, or heating in household in developing countries. The LLDCs producing larger amounts of bio-en-

FIGURE 5. Total Renewable Energy Production by LLDCs (gigawatt hours Gwh)



Source: IRENA, 2016.

ergy include Swaziland, Uganda, Azerbaijan, Zimbabwe and Bolivia. The Economic Community of West African States (ECOWAS) developed a plan to get bioenergy from appropriate crops such as sweet sorghum, jatropha, cassava, or cashew which flourish in a specific climate. For example, jatropha is well cultivated in tropical and subtropical regions, and Mali and Burkina Faso are focus areas to generate bioenergy using jatropha crop. Jatropha has a high oil content which is versatile in use, but it needs optimal condition to grow (ECREEE, 2012).

The trends in renewable energy technology costs have been falling in particular solar and wind power, have made projects viable in resource-rich developing countries. The global weighted average levelised cost of electricity (LCOE) of projects commissioned in 2015 was around USD 0.06/kWh for biomass, USD 0.08/kWh for geothermal, USD 0.05/kWh for hydro and USD 0.06/kWh for onshore wind and that these technologies compete head-to-head with fossil fuels, which have costs of between USD 0.045/kWh and USD 0.14/kWh (REN21, 2016). Solar photovoltaic has also experienced significant cost reductions. Between 2010 and 2015, the global weighted average LCOE of utility-scale (>1 MW) solar photo-

voltaic fell by almost 60%, driven primarily by reductions in module costs of around three quarters during this period. In 2015, the most competitive utility scale solar PV projects were regularly delivering electricity for just USD 0.08/kWh, without financial support, compared to a range of USD 0.045/kWh to USD 0.14/kWh for new fossil fuel power (excluding health and carbon emission costs) (REN21, 2016).

In the lead up to the 2015 UNFCCC 21st Conference of the Parties (COP21) countries outlined their own concrete post-2020 mitigation commitments under Intended Nationally Determined Contributions (INDCs). Some LLDCs indicated national intentions to increase renewable energy technology and set targets as shown in Table 2.

On the policy front, the LLDCs have made some progress to support renewable energy and energy efficiency. As shown in Table 3, more than half of the LLDCs have strategies outlining their priorities in renewable energy technology, and have adopted renewable energy targets. Since renewable energy strategies and targets are vital for unleashing the full potential of energy for development, it is important for countries that have not yet done so to develop national renewable en-

Table 2. Targets for Renewable Power installed Capacity and/or Generation

COUNTRY	Technology and Target
Armenia	Hydropower (small-scale) 377 MW by 2020; 397 MW by 2025 Geothermal power 50 MW by 2020; 100 MW by 2025 Solar PV 40 MW by 2020; 80 MW by 2025 Wind power 50 MW
Azerbaijan	Electricity 1 GW by 2020
Bhutan	Electricity 20 MW by 2025 Bio-power from solid biomass 5 MW by 2025 Solar PV 5 MW by 2025 Wind power 5 MW by 2025
Bolivia	Electricity 160 MW renewable energy
Burundi	Bio-power from solid biomass 4 MW Hydropower 212 MW Solar PV 40 MW Wind power 10 MW
Ethiopia	Bio-power from bagasse 103.5 MW (no date) Geothermal power 75 MW by 2015; 450 MW by 2018; 1 GW by 2030 Hydropower 10.6 GW (>90% large-scale) by 2015; 22 GW by 2030
Kazakhstan	Electricity 1.04 GWh by 2020
Lesotho	Electricity 260 MW by 2030
Macedonia	Bio-power from solid biomass 50 GWh by 2020 Bio-power from biogas 20 GWh by 2020 Hydropower (small-scale) 216 GWh by 2020 Solar PV 14 GWh by 2020 Wind power 300 GWh by 2020
Malawi	Hydropower 346.5 MW by 2014
Rwanda	Biogas power 300 MW by 2017 Geothermal power 310 MW by 2017 Hydropower 340 MW by 2017 Hydropower (small-scale) 42 MW by 2015 Electricity (off-grid) 5 MW by 2017
Tajikistan	Hydropower (small-scale) 100 MW by 2020
Uganda	Bio-power from organic MSW 30 MW by 2017 Geothermal power 45 MW by 2017 Hydropower (large-scale) 1.2 GW by 2017 Hydropower (mini- and micro-scale) 85 MW by 2017 Solar PV (solar home systems) 700 kW by 2017

Source: REN 21 2016.

ergy strategies that support the development of the necessary infrastructure, institutions and regulatory framework. Most regulatory support policies in the LLDCs exist in the power sector, where feed-in tariffs are the most commonly used, followed by tendering. The forms of fiscal incentives and public financing that the LLDCs utilize most are the reductions in sales, energy, VAT or other taxes and the public investment, loans or grants.

is considerably high. Countries are faced with the challenge of finding ways of addressing the energy for development and climate change in a balanced manner whilst as they strive to achieve SDG7. Some LLDCs have experienced capacity constraints in policy formulation and of regulatory institutions. Adequate data and information is also important to support the development and effective implementation, monitoring and evaluation of supportive policies.

One of the major challenges to production of renewable electricity generation is lack of adequate financial resources. The initial construction cost for energy infrastructure and plants

Table 3. Renewable Energy Support Policies in LLDCs

COUNTRY	Renewable energy targets	REGULATORY POLICIES				FISCAL INCENTIVES AND PUBLIC FINANCING			
		Feed-in tariff/premium payment	Transport obligation/mandate	Tradable REC	Tendering	Capital subsidy grant, or rebate	Investment or production tax credits	Reductions in sales, energy, VAT or other taxes	Public investment, loans or grants
Afghanistan	∅								
Armenia	◇	◇							
Azerbaijan	◇								◇
Bhutan	∅								
Bolivia	∅								
Botswana	◇					◇		◇	
Burkina Faso					◇		◇	◇	
Burundi	∅								
Central African Rep.	∅								
Chad	∅								
Ethiopia	◇		◇					◇	◇
Kazakhstan	◇	◇		◇		◇			
Kyrgyzstan						◇		◇	
Lao PDR	∅								
Lesotho	R				◇	◇	◇		◇
Malawi	R		◇					◇	◇
Mali	◇		◇					◇	◇
Mongolia	R	◇			◇			*	
Nepal	◇	◇		◇	◇	◇	◇	◇	◇
Niger	R							◇	
Paraguay	*		◇					◇	
Republic of Moldova	◇	◇							◇
Rwanda	◇	◇			◇		◇	◇	◇
South Sudan	∅								
Swaziland	∅								
Tajikistan	◇	◇						◇	◇
TFYR Macedonia	◇	◇							
Turkmenistan	∅								
Uganda	R	◇			◇	◇		◇	◇
Uzbekistan					◇				
Zambia						◇		◇	◇
Zimbabwe	◇		◇					◇	◇

Source: REN 21, 2016.

Notes: RPS: Renewable Portfolio Standards REC: Renewable Energy Certificate

◇: Existing national (could also include subnational) *: New (one or more policies of this type)

R: Revised (one or more policies of this type) ∅: Data are not available

MANY LLDCS HAVE INTRODUCED TARGETS TO SCALE UP RENEWABLE ENERGY AND ENERGY EFFICIENCY MARKETS AND CLIMATE MITIGATION THROUGHOUT THE NEXT DECADES.

V. EXISTING BARRIERS FOR SUSTAINABLE ENERGY IN LLDCS

As already mentioned, many LLDCs have introduced targets to scale up renewable energy and energy efficiency markets and climate mitigation throughout the next decades. However, the implementation of these commitments is hindered by a bundle of interrelated barriers, which need to be addressed (e.g. policy and regulatory, technical, financial, human and institutional capacity, knowledge, awareness, investment and business). During the High Level Seminar potential strategies to overcome these barriers in LLDCs will be discussed.

GENERAL BARRIERS

Despite the potential contribution of renewable energy and energy efficiency technologies and services to resolving some of the energy challenges in LLDCs, markets for these technologies and services remain largely underdeveloped. This is mainly due to unfavorable market environment and bottlenecks that are faced by the different market players.

- 1. Inadequate project development and implementation expertise:** Within LLDCs, several energy projects have failed/stalled on account of a range of issues relating to environmental, social, technical, and/or financial factors. For example, assistance (human resource, technical, legal, financial, administrative) in developing RE/EE solicitations understanding and evaluating RE and EE proposals is required so that the best proposals are chosen to meet the specific needs of the individual country and/or region.
- 2. Lack of regional technical coordination, implementation and harmonization capacities:** The institutional capacities on regional level need an urgent strengthening. The current situation tends to support donor driven approaches and agenda setting. There is a need for a stronger use of local implementing systems (e.g. procurement) and experts (e.g. consultants, companies).
- 3. There is a need for regional coordination:** This could have a range of applications ranging from knowledge transfer between countries to electricity transfer between countries to promote regional energy security. In addition, timely implementation of RE and EE initiatives could be supported by coordinating best practice approaches and highlighting scope for rapid implementation, where such opportunities exist. That is, established frameworks focusing on electricity generation, transmission and distribution need to be established at the regional level so that individual countries can take advantage of combined opportunities for exploiting RE/EE potentials and improving economies of scale.
- 4. Low grid stability:** The reliability of some power systems in LLDCs is low due to lack of investments in the generation, transmission and distribution networks. Adding intermittent sources of energy, as is the case of the majority of RE sources such as solar and wind, could contribute to further interruptions in the grid when the power plants are not able to meet the demand.

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5. **Subsidies to fossil fuels:** One of the key constraints to investments in renewable energy and energy efficiency is the biased subsidies to fossil fuels. The existence of mechanisms such as the fuel surcharge also reduces the attractiveness of RE projects to the utilities.
 6. **Low electrification rates:** Efforts to electrify peri-urban and rural areas need to be significantly scaled-up in order to tackle low electrification rates. Besides availability of finance, the lack of regulatory framework to allow private businesses such as RE services companies to operate in this market is also seen as a barrier. It is also important to link these mechanisms with other access-to-energy programmes (e.g. rural electrification and efficient cooking stoves).

KNOWLEDGE AND AWARENESS BARRIERS

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1. **Stakeholders/General public sometimes do not possess sufficient RE&EE knowledge** and awareness to make informed decisions. As such, there is a definite need for advocacy, awareness raising, information dissemination and stakeholder engagement efforts.
 2. **Incomplete and decentralized regional data collection, compilation and analysis:** Within a number of LLDCs there are a few entities, which collect energy sector data. However, such data collection efforts are decentralised and in some cases pertinent data is yet to be collected on a consistent basis and disaggregated by sex. These efforts need to be coordinated at a regional level so that relevant comparisons, possible collaborative ventures and assistance support between and among countries can be identified and implemented. That is, there is a need for energy information compilation, energy statistics and analysis to facilitate strategic planning and effective decision-making at the country, sub-regional and regional levels.
 3. **There is also a lack of institutionalized memory on sustainable energy projects and issues.** Many activities are implemented on a project basis and after closure of the project the knowledge and lessons learned are lost. There is a need for a regional information hub which keeps record of the lessons learned and knowledge.
 4. **Lack of feasibility studies for RE and EE assessments:** There is sometimes a greater focus on political matters, instead of technical issues, and this, in some cases, leads to the requisite studies not being (properly) conducted. In some instances, data is not communicated or disseminated widely to key stakeholders, regular regional policy and project manager staff meetings are not held, all of which can negatively impact RE/EE project development.

POLICY BARRIERS

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1. **Absence of an enabling framework:** While there are existing draft or final energy policies, there is a noticeable deficiency as it relates to clear sustainable energy action plans/road maps and supporting policies/legislation that would be expected to provide the enabling environment for development of RE and EE projects. For example, the lack of policies or guidelines and the revision of electrical codes and legislation pertaining to RE interconnection, wheeling, net-billing, net-metering and appropriate incentive structures have stymied RE and EE development in several countries.
 2. **Inadequately defined policy targets:** In some cases, it is felt that some policy goals and targets were set without proper and complete analysis, consultation and collaboration with key stakeholders. Some of these policies may need to be refined to ensure that the defined targets are achievable and actionable. Moreover, policies are mostly not gender sensitive. In some cases, additional studies, grid impact and stability studies may be required to ensure that policy targets and action plans are attainable and sustainable.

MARKET BARRIERS

The RE/EE market in many LLDCs is nascent or emerging and a range of support mechanisms are required to promote growth and investment within the market. The specific needs of individual countries as it pertains to the development of a RE/EE market/industry are summarized as follows:

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1. **RE/EE Market structure not (fully) defined:** For many countries, the scope/potential of the RE/EE market has not been properly defined. There is little or no data to suggest how the individual markets and the collective regional market can grow. As such, there is a need for market definition and sustainability guidelines. For example, it is necessary to understand the scope for the development of local facilities/institutions to manufacture, assemble, recycle and repair RE&EE equipment.
 2. **Inadequate support mechanisms for increasing the market share of renewable energy and energy efficiency:** In some countries, RE and EE potentials remain largely unexploited and untapped. This is on account of several reasons relating to location of the resources, investment costs, lack of technical expertise etc. However, in many instances it is on account of the fact that market drivers are lacking. For example, tariffs for RE projects are sometimes too low,

discouraging market growth. In other instances there are caps on RE addition to the grid, even in the absence of grid dynamic impact studies.

3. **There are weak or no minimum energy performance standards** for new buildings, building renovations, appliances, lights, air conditioning and refrigeration, vehicles, etc. This leads to the construction of building where investments are based on initial costs, not operating or life-cycle costs.
4. **Local companies and industry are currently not taking sufficiently advantage** of the growing sustainable energy market and job opportunities. There is a need for strengthening the capacities of the local private sector and to promote entrepreneurship. Women stay underrepresented in the energy sector.
5. **Limited data is available for linkage industries/sectors**, such as agriculture, transport, food storage, etc. which tend to be large energy users. Limited baseline studies have been carried out in most energy using industry sectors within the region. Some organisations and government departments have conducted some research; however, a lot of the data has not been collated, updated or acted upon.
6. **Metering:** There was a good understanding of the different forms of metering, but only a few countries seemed to be addressing/ implementing any such activities to date.

FINANCE BARRIERS

Financing is a critical issue in LLDCs, as governments typically do not have the financial resources to develop and implement RE/EE projects. Therefore, private sector interests/ external investors are expected to drive RE/EE initiatives. Several RE/EE projects to date have been stalled/postponed on account of a lack of available financing. The specific needs of the individual countries as it relates to financing were outlined as:

1. **Inadequate low-interest and innovative financing programs:** Business loans for the development of RE/EE projects sometimes have high interest charges, which tend to be viewed as prohibitive for small, medium sized businesses. There is a definite need for low-interest financing mechanisms, “Pay as you Save Programs” and other innovative financial mechanisms and incentives for small and large enterprises operating/seeking to develop RE/EE projects. Specific barriers for women entrepreneurs to access credit will also need to be taken into account and addressed by new financing mechanisms.

2. **Inadequate financial policies:** Policy and regulation needs to be developed to provide financial incentives for RE and EE initiatives. This will help to stimulate growth and investment within the industry.

3. **Apprehension in making new investments:** The economic slowdown and the increase in frequency of extreme climate events (e.g. hurricanes and floods), have led to some business owners/backers holding back on potential RE&EE investments.

CAPACITY BARRIERS

Regional capacity, particularly as it relates to development of RE/EE projects is sometimes limited. As such, external capacity, in the form of imported labour, is usually brought on to support project implementation. One of the concerns with this type of arrangement is that knowledge transfer is typically very limited and so local capacity is not enhanced or developed. The capacity gaps/barriers can be outlined as:

1. **Lack of technical capacity to formulate and enforce policies:** The technical capacity in some LLDCs is confined to the staff of the electric utilities. In some instances, governments and regulators lack the resources to formulate consistent sustainable energy policies and regulations in line with the local environment and social aspects. This is frequently due to the limited number of persons in these institutions but also because of their technical skills.
2. **Limited existing local capacity in both the public and private sector to develop and sustain local RE and EE technologies:** In many cases, personnel needs to be trained/retrained in order to effectively implement projects. There is a need for continuous training and development to upgrade staff skills and capabilities.
3. **Brain drain:** Local trained human resources may migrate (outside the region) to seek better opportunities. There is a need for programmes focused on succession planning that minimizes attrition rates and engender capacity retention.
4. **Limited local educational/training programmes:** Although the number of industry-relevant and industry-specific certification and degree programmes has increased in recent years, there is still a need to improve/expand such programmes in keeping with industry feedback.
5. **The distinct differences in the geographical, environmental, cultural and social aspects** in LLDC regions make it difficult to create a one-size-fits-all approach.

TECHNOLOGY BARRIERS

In LLDCs, there are significant technology gaps, particularly as it relates to the use of advanced energy technologies. Maintenance of equipment is another area for which assistance is required, as some countries do not have a good history of repair and maintaining equipment. Additional gaps/barriers include:

- 1. Need for demonstration projects:** Demonstration projects are needed to highlight the benefits of EE & RE technologies not yet being used on a large scale. This is to be supported by capacity development. There is need for adapted solutions reflecting the reality of the respective LLDC.
- 2. Need for technology and knowledge transfer:** Technical knowledge and capacity transfer within and between countries is necessary so that individuals embarking on new RE/EE initiatives can learn from those who have already successfully implemented such projects. That is, south-south and north-south technology and knowledge transfer is required to spur growth and development.
- 3. Presence in the market of low quality equipment** can lead to a negative uptake of RE technologies, and interviews in some countries confirm that this is the case. Consumers need to be educated regarding the options when purchasing equipment. It is also urgent to address waste management issues of the equipment when they reach the end of their life. There is a lack of certification of equipment.
- 4. Grid Readiness:** The infrastructure for integrating RE into the existing grids is seen as an area of need. This would include having an updated map of all connections, substations, capacity levels, evacuations of electricity levels at said subs stations. And, a grid that can feed back information to the grid operator and at the same time be adaptable. The readiness of the grid would also support the uptake of electric vehicles, where it was seen in most countries as a desirable need.



Photo: Hydropower Plant in Tajikistan. ADB/Flickr



Photo: Construction of Intumak Dam on the Nura River, Kazakhstan. Shynar Jetpissova, World Bank/Flickr



Photo: Itaipu Dam, Paraguay. Deni Williams/Flickr



Photo: Macedonia's ELEM plant. Tomislav Georgiev, World Bank/Flickr

GENDER PARTICIPATION GAP

The energy sector in most of the LLDCs, specifically for highly technical occupations, tends to be comprised of primarily males. This is a reflection of enrolment rates within applicable educational programmes at universities and other training institutions. In terms of gender participation gaps, there is a real need for initiatives that target females and that help to remove the perception that the energy-sector jobs are primarily for males. Moreover, with a growing demand for sustainable energy, it is expected that there will be a need for trained labour to fulfil the demand for experienced and skilled technicians at various levels, capable of designing, developing, installing, operating, and maintaining, and managing RE&EE projects. This represents an opportunity to foster the participation of women in this nascent sector by entering the labour force and by helping them become entrepreneurs/creating new businesses.

CAPACITY REQUIREMENTS OF VARIOUS STAKEHOLDER GROUPS

Table 4 presents capacity requirements of various stakeholder groups based on the foregoing discussion. In order to ensure the success of sustainable energy in LLDCs, it is important to address these capacity needs.

Table 4. Capacity Requirements of Various Stakeholder Groups

STAKEHOLDER GROUP	CAPACITY NEEDS
Policy makers in the renewable energy and energy efficiency sectors and the energy sector in general.	<ul style="list-style-type: none"> • Developing and operationalizing coherent, comprehensive and evidence-based policies, laws and regulations that create a level playing field for RE&EE technologies • Implementing rural energy planning • Negotiating power purchase agreement (PPAs) with independent power producers (IPPs) and setting viable feed-in tariffs • Integrating environmental and social strategies in the formulation of country action plans • Strengthen the capacities to appraise sustainable projects and establish standard approval procedures which particularly consider potential negative social and environmental impacts of projects (e.g. environmental impact assessments, standards for hydro power planning)
Policy makers from non-energy sectors like agriculture, health, water, private sector, transport sectors etc.	<ul style="list-style-type: none"> • Basic design of renewable energy systems • Integrating gender sensitive renewable energy components and EE measures into their sectors
Entrepreneurs, project developers, equipment manufacturers, consultants and industry support bodies	<ul style="list-style-type: none"> • Development of vocational and higher education courses adapted to the RE&EE requirements and languages of the region • Certification for conducting energy audits • Identifying, developing and packaging a pipeline of potential RE&EE investment projects • Negotiating viable power purchase agreement with investors • Preparing quality business plans that are consistent with existing financing mechanisms • Mobilizing and structuring investments in RE&EE projects • Adoption of a climate change-based resilience approaching the development and implementation of energy sector plans and projects
Utilities	<ul style="list-style-type: none"> • Ability to tender RE&EE projects • Negotiate power purchase agreements (PPAs) • Integrate RE generation in the grid
Recipients/buyers of energy services and technologies	<ul style="list-style-type: none"> • Willingness and ability to pay for the services or technologies • Ability to assess the energy implications or costs in daily choices and decisions such as selecting electric equipment

VI. SUSTAINABLE ENERGY INDUSTRIAL VALUE CREATION AND INNOVATION IN LLDCS (SDG 9)

A weakly developed domestic sustainable energy manufacturing and servicing industry has become a major bottleneck for the further uptake of sustainable energy markets and the implementation of the INDCs in LLDCs. In contrast to fossil fuel based solutions (e.g. diesel generators), the supply and logistical chains for sustainable energy solutions remain underdeveloped and products and services are either not available or lack of quality. Quality issues and the perception that solutions are not mature have been a backdrop for various renewable energy technologies in different parts of the world (e.g. solar thermal, PV). Moreover, the lack of a domestic industry has led to severe sustainability and maintenance issues in various LLDCs (e.g. mini-grids).

Countries have introduced a number of policies and regulatory frameworks to promote sustainable energy. However, many of those do not consider sufficiently domestic value creation and the strengthening of industrial capacities in the sector. Therefore, the domestic value and job creation effects along the value chain of sustainable energy investments (manufacturing and distribution, project planning and development, construction and installation, operation and maintenance, decommissioning and recycling) remains often very limited. Equipment and services continue to be imported. This is further catalyzed by export-driven donor programs, with lack of business and sustainability models.

According to UNIDO, there is need to better interlink sustainable energy demand-side with supplier-side support mechanisms and incentive schemes to maximize local benefits along the sustainable energy value chain. Existing governmental sustainable energy promotion programs need a parallel supplier-side oriented support stream. To create an enabling business environment for sustainable energy companies and start-ups (e.g. Energy service companies (ESCOs), Renewable Energy Service Companies (RESCOs), manufacturing, planning, installation and operation) there is also need for improved coherence between energy, industrial, human resource, research, innovation and export policies and support instruments. Cross-sectoral approaches need to facilitate the mainstreaming of sustainable energy solutions into key industries (e.g. agro-business, tourism, fishery, construction, transport).

Innovation and entrepreneurship in the sustainable energy sector are grounded in the application of scientific research. Science and technology is a major catalyst for the creation of innovative products and services. Most LLDCs are ranked very low on the Global Innovation Index. More has to be done to create the enabling environment necessary to support the commercialisation of adapted innovations and the subse-

quent growth in entrepreneurship and micro, small and medium-sized enterprises.

There is the need for a stronger link between applied science and sustainable energy service and manufacturing companies. Innovation and entrepreneurial activities need a right mix of education and training, research and development, applied science and technology, as well as financing. The promotion of sustainable energy markets requires training of many different stakeholders in different sectors on various skills (e.g. plumbers, architects, engineers, financiers, policy makers, farmers, consultants). Innovation happens in several entities like private sector industry, academia and universities, technology start-ups and research labs. However, collaboration and knowledge transfer between these entities is often rare, due to the different nature of drivers for each. There is need to build networks between SMEs, industrial clusters, national ministries, academia, industrial associations.

Without a considerable strengthening of the domestic sustainable energy manufacturing and servicing industry and innovation chain in LLDCs it will be difficult to achieve the envisaged transformational change in the energy sector. To ensure local value creation there is need for a critical mass of domestic energy entrepreneurs, companies and private sector groups. In many countries, the sustainable energy sector is considered as a future growth sector, which offers business and employment opportunities particularly for Small and Medium Sized Enterprises (SMEs). SMEs create jobs and are essential for the overall development of the economy, accounting for 99% of the number of businesses worldwide. They show great potential as instruments for economic growth and development through increased productivity, enterprise creation and employment rates.

VII. CONCLUSION AND SUGGESTED RECOMMENDATIONS FOR ACHIEVING SUSTAINABLE ENERGY FOR ALL IN LLDCS

LLDCs have disadvantages related to their geography which make them incur high trade costs thereby restricting their competitiveness and trade activity on the international markets. They also have structural constraints related to their limited ability to trade that include high trading costs, limited productive capacities, declining value addition in manufacturing and agriculture, and heavy reliance on undiversified primary commodities.

Sustainable energy can act as a multiplier for economic growth in LLDCs by improving trade facilitation, making supply chains more efficient, financial transactions faster, accelerating the flow of goods and services across national borders, and boosting productivity in all sectors resulting

in higher output, diversified economic base and structural transformation. Affordable, reliable and sustainable energy services are critical for ending extreme poverty, creation of decent jobs, development of businesses and improved access to health and education. Each country's transition to a sustainable energy sector involves a unique mix of resource opportunities and challenges and should be designed to meet its unique needs.

Sustainable energy is also an important aspect of the circular economy concept. The policy concept assists LLDCs to reduce needs for resources through cleaner production, greener products, service-based business models, extended product lifetimes, increased recycling and minimized waste.

DETAILED RECOMMENDATIONS FOR THE OUTCOME MATRIX

The implementation of the VPoA and 2030 Agenda need to be implemented in a coherent manner to foster the synergies for the optimal benefit of the LLDCs and in order to ensure that no one is left behind. The following recommendations will be validated and expanded during the High Level seminar to support sustainable energy for all in the LLDCs and address existing barriers.

1. 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, and others. A well performing and efficient energy system strengthens the opportunity to provide energy access to those now deprived of affordable and reliable energy. Renewable energy is not only a major source of energy access to those living in isolated rural areas but also a contributor to the much needed transformation of energy systems for addressing climate change, health and energy security. 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.

2. Enhance sub-regional, south-south and triangular cooperation (SDG-17)

Regional organizations and utility organizations (e.g. power pools) are encouraged to strengthen sub-regional and regional energy infrastructure development projects and overall coordination and coherence. There is 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. Regional cooperation is an important tool to reach the needed economies of scales 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 LLDCs in attracting and absorbing international climate finance (e.g. GEF and GCF) earmarked for the implementation of the INDCs. The increasing number of national and international-led programs and projects requires strong technical agenda-setting, coordination and coherence on sub-regional level. Triangular cooperation can play a potential role in providing foreign direct investment flows that contribute to the advancement of sustainable energy for all in LLDCs, as well as cooperation in the transfer of appropriate technology. In this context, to complement the financial activities of regional development banks in the sector, the global network of regional sustainable energy centers will be further consolidated by UNIDO in partnership with the respective regional organizations and international support³. A network platform to allow exchange on common sustainable energy issues and programs between the centers will be created. The expansion of the network of centers to other LLDC regions, such as the Himalaya-Hindukush or Central Asia is encouraged. This is in line with SDG-17 which aims at enhancing "North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms."

3. Accelerate policy processes to achieve SDG-7 and SDG-13 on energy access, renewable energy and energy efficiency and climate change mitigation and resilience

LLDCs that have not yet done so should consider developing sustainable energy for all Action Agenda (AA) and respective investment prospectus (IP) to help guide on how the country could achieve the three goals of the SE4ALL.

3 - Global Network of Regional Sustainable Energy Centers (GN-SEC), <http://www.se4allnetwork.org>.

The AA should include national and subnational energy policies and action plans based on individual national circumstances and development aspirations. The policies should reflect an appropriate energy mix to meet developmental 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 AAs and IPs will be coordinated on sub-regional level by the regional organizations and communities and will be closely linked to the INDC process. In this context, the good practice established in ECOWAS⁴ will be replicated in partnership with the regional development banks and regional sustainable energy centers. The regional centers can play an important complementary role to the regional SE4ALL hubs, located at the regional development banks, by addressing “soft barriers.”⁵

4. Build resilient sustainable energy infrastructure, promote inclusive industrial development and foster innovation in LLDCs (SDG-9)

Universal access to sustainable energy services requires scaling up and maintenance of centralized and decentralized energy infrastructure. In the case of rural and remote areas, where grid extension turns out to be no competitive option, alternative decentralized renewable energy (hybrid) solutions will be applied. However, a weakly developed domestic sustainable energy manufacturing and servicing industry has become a major bottleneck for the further uptake and sustainability of decentralized renewable energy markets in many LLDCs. It could be very helpful if the G20 Initiative on Supporting Industrialization in Africa and Least Developed Countries (LDCs) could be extended to all the LLDCs as this could strengthen the domestic sustainable energy manufacturing and servicing capacities of the LLDCs. UNIDO is requested to increase its programmatic effort to support LLDCs in strengthening domestic energy entrepreneurs and innovation through targeted supplier side support complementary to demand-side stimulating activities. The areas of renewable energy (hybrid) mini-grids and cooking solutions were identified as key areas with high potential for domestic value creation. With this approach, UNIDO addresses a major growth barrier for sustainable energy markets, reduces negative environmental externalities (GHG, local pollution) and promotes value and job creation simultaneously.

5. The following priority activities for the promotion of domestic sustainable energy servicing and manufacturing industries in LLDCs were identified:

(a) strengthening sustainable energy value creation and innovation policies, as well as institutional coordination,

(b) promoting investments and partnerships with international companies, cluster-building and regional market access; and strengthening capacities and knowledge management;

(d) use the sub-regional level as accelerator for creating business opportunities and spin-offs.

The establishment of technology clusters or industrial parks could be an interesting option in some LLDCs. By combining their knowledge, financial resources and contacts, they can improve their export potential and reduce costs and risks. Clusters may use the same suppliers of raw materials, cater to the same markets and clients, share the same territory, infrastructure and services, as well as face common challenges. Cluster building is a tool to upgrade productive capacities, increase access to international markets and generate innovation spin-offs. In this context, innovative multilateral, public-private partnerships such as the CTI Private Financing Advisory Network (PFAN) and GEF Clean Tech Programme to promote sustainable energy businesses and innovation should be strengthened. Given that informal and formal small and medium enterprises (SMEs) are the backbone of broad-based economic growth, it is crucial to ensure energy access for micro, small and medium enterprises. It is also important to create income-generating and entrepreneur opportunities in the energy sector; and applying innovative financial approaches, such as microfinance to energy services. There is need to increase the cleaner production capacities of domestic private sector.

6. Enabling environments

Many of the LLDCs have adopted sustainable energy targets in the context of the INDCs or other policy documents. However, the implementation of these commitments lacks behind due to manifold barriers. LLDCs are encouraged to create and support enabling environments that facilitate public and private sector investment in relevant and needed cleaner energy technologies. LLDCs should improve coherence between energy, industrial, human resource, research, innovation and export policies and support instruments. Cross-sectoral approaches need to facilitate the mainstreaming of sustainable energy solutions into key industries (e.g. agro-business, tourism, fishery, construction, transport). National policy processes should take advantage of regional processes.

4 - Regionally coordinated approach to implement the ECOWAS Renewable Energy Policy (EREP), ECOWAS Energy Efficiency Policy (EEEP) and SE4ALL Action Agenda through National Action Plans and Investment Prospectuses, led by ECREEE with support of international partners (e.g. AfDB, SE4ALL, UNIDO, EU).

5 - In line with the new SE4ALL Strategic Framework for Results 2016 to 2021.

The experience in Europe and West Africa has demonstrated that regional policies and implementation processes can be an important tool to accelerate the development and implementation of national policies and standards.

7. Improved energy efficiency

It is important for LLDCs to implement energy efficiency measures in urban planning, buildings and transportation, and in the production of goods and services and the design of products and promote incentives in favor of, and removing disincentives to, energy efficiency. To increase the competitiveness and productivity of industries and SMEs in LLDCs there is need to up-scale the use of energy management standards and systems (e.g. standard ISO 50001), as well as cleaner production practices. This is in line with the SE4ALL Industrial Energy Efficiency Accelerator and the international campaign of the Clean Energy Ministerial, which aim at 50,001 global certifications to International Organization for Standardization (ISO) 50001 by 2020. Sub-regional cooperation could play an important role in up-scaling the dissemination of such standards.

8. Sustainable cities and sub-national jurisdictions

Sustainable cities and sub-national jurisdictions are emerging as key platforms for sustainable energy and climate action in LLDCs, but these will be fully successful only to the extent that they are strongly supported and linked to national strategies and policies. Sub-regional cooperation between cities on sustainable energy issues will be an important aspect of the way forward.

9. Nexus between energy, climate, transport, food, water, health and circular economy

The nexus between energy, climate, transport, food, water, health and circular economy is inseparable and essential contributor to social progress and human well-being. It needs to be approached in an integrated manner for adequate solutions. No longer can governments and policymakers afford to focus policies and resources on single issues or single-sector issues. Integrated strategies and solutions are needed to meet multiple objectives simultaneously. Given that energy is central to every economic, environmental, security and developmental issue today, promoting and deploying sustainable energy solutions within a framework of integrated policy options will be a prerequisite for achieving inclusive sustainable development within planetary boundaries. Providing sustainable energy solutions to meet multiple objectives such as climate change mitigation, eliminating energy poverty, increasing productive capacity, etc., will also have significant impacts (both positive and negative), for water, food, security and health. In turn, each of these sectors will impact (again both positively and negatively) the ener-

gy sector. There is a growing and urgent need for research aimed at understanding these complex interactions to ensure the most effective solutions are deployed and that limited resources are invested effectively and efficiently in LLDCs and in general. Moreover, sustainable energy is an important aspect of the circular economy concept. The policy concept assists LLDCs to reduce needs for resources through cleaner production, greener products, service-based business models, extended product lifetimes, increased recycling and minimized waste. In this context, important initiatives, such as the Network for Resource Efficient and Cleaner Production Centers (RECPnet) to LLDCs should be expanded.

10. Improved energy data collection and management

The development and implementation of sustainable energy policies and investments in LLDCs needs a considerable strengthening of domestic capacities to collect and manage reliable energy statistics, indicators, bankable investment data and reports at all levels – national, regional and global. In this context, the ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX) will be expanded to other LLDCs regions in Africa and beyond. The domestic ownership in the regularly updated regional renewable energy and energy efficiency data reports will be increased and interlinked with regional/national capacity building activities on data collection and management.

11. Capacity building

Development partners are encouraged to strengthen capacity-building, including education and training, certification and in developing 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. To avoid duplication of efforts and efficient use of domestic and international resources, the sub-regional level will play an important role in defining the training needs and priority areas of intervention. The use of innovative regional train the trainer approaches is encouraged.

12. Improved sustainable energy use to promote trade facilitation

LLDCs and transit countries are encouraged to enhance the role of energy to facilitate trade in conjunction with harmonization of customs systems and documentation. Energy provision should be made reliable so as to eliminate any delays at the borders and in transit.

13. Sustainable energy and women's empowerment are mutually reinforcing goals

The empowerment of women to become agents of sustain-

able energy will be key to achieving truly inclusive and sustainable development in LLDCs. 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. For women to be key agents of sustainable energy, they need to be empowered and fully engaged at all levels of decision making processes. Therefore, SDG 5 on women’s empowerment and SDG 7 on sustainable energy must be tackled jointly through an integrated approach that promotes women’s transformational roles in providing innovative energy solutions. Sustainable energy is the golden thread connecting the sustainable development agenda with climate action; gender equality should be the intertwining thread that weaves all components stronger together. Increased financing and policy action are required to accelerate gender mainstreaming of energy interventions, and women’s empowerment through sustainable energy solutions. Availability of gender disaggregated indicators will be important for monitoring and evaluating all sustainable energy initiatives. Sub-regional cooperation could play an important role in promoting gender mainstreaming. In this context, the ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN) will be expanded to other regions in Africa.

14. Support from Bilateral and multilateral development partners

Bilateral and multilateral development partners are encouraged to increase their technical and financial assistance to support sustainable energy for all in LLDCs. They are encour-

aged to increase capital flows for the implementation of sustainable energy projects in LLDCs on renewable energy and energy efficiency and to support the Aid for Trade initiative, giving special consideration to the requirements of LLDCs. 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 LLDCs, as set out in the Addis Ababa Action Agenda and the Johannesburg Plan of Implementation, and highlight the importance of integrating sustainable energy needs of LLDCs in the Technology Facilitation Mechanism.

15. United Nations, International, Regional and Sub-regional organizations

Organizations of the United Nations system, and other international organizations, the Regional Development Banks, and Regional Economic Communities, are invited to provide more and better targeted technical assistance and technology transfer to support accelerated universal access, renewable energy and energy efficiency development in LLDCs including capacity building on optimal policy, regulatory and financial frameworks for energy service provision. International and regional organizations in particular OHRLLS, UNIDO, UNCTAD, UNDP and the International Think Tank for LLDCs, Regional Banks and others should provide LLDCs with technical assistance on how to enhance the role of energy to lower trading costs, boost trade, and stimulate structural transformation. They should also promote pooling of knowledge, sharing of best practices and advising on new technologies.

ENERGY DATA COLLECTION & MANAGEMENT	CAPACITY BUILDING	BUILD RESILIENT SUSTAINABLE ENERGY INFRASTRUCTURE		
SYNERGIES OF THE THREE GOALS OF SUSTAINABLE ENERGY FOR ALL	SDG-7 & SDG-13: ACCELERATION OF POLICY PROCESSES	PROMOTION OF DOMESTIC SUSTAINABLE ENERGY SERVICING	ENABLING ENVIRONMENTS	NEXUS BETWEEN ENERGY, CLIMATE, TRANSPORT, FOOD, WATER, HEALTH & CIRCULAR ECONOMY
SUB-REGIONAL, SOUTH-SOUTH AND TRIANGULAR COOPERATION	VPOA AND 2030 AGENDA The VPoA and 2030 Agenda need to be implemented in a coherent manner to foster the synergies for the optimal benefit of the LLDCs and in order to ensure that no one is left behind.		IMPROVED ENERGY EFFICIENCY	SUSTAINABLE CITIES & SUB-NATIONAL JURISDICTIONS

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ANNEX

Annex 1. Proportion of population with access to electricity %

COUNTRY	2000	2005	2010	2014
Afghanistan	0.2	23.0	42.7	89.5
Armenia	98.9	99.8	99.8	100.0
Azerbaijan	98.0	99.7	100.0	100.0
Bhutan	32.1	59.8	82.4	100.0
Bolivia	70.0	68.3	84.5	90.0
Botswana	27.2	37.5	48.0	56.5
Burkina Faso	9.2	12.1	13.1	19.2
Burundi	3.9	4.8	5.3	7.0
Central African Republic	6.0	7.9	9.8	12.3
Chad	2.9	4.6	6.4	8.0
Ethiopia	12.7	14.0	21.9	27.2
Kazakhstan	99.0	99.3	99.7	100.0
Kyrgyzstan	99.8	99.6	99.0	99.8
Lao People's Democratic Republic	43.1	57.2	68.0	78.1
Lesotho	0.4	8.6	19.0	27.8
Malawi	4.8	6.8	8.7	11.9
Mali	10.4	16.3	22.3	27.3
Mongolia	67.3	86.2	81.9	85.6
Nepal	27.2	47.3	67.5	84.9
Niger	8.0	7.1	12.4	14.3
Paraguay	88.7	94.7	97.4	99.0
Republic of Moldova	98.4	98.6	99.9	100.0
Rwanda	6.2	4.8	9.7	19.8
South Sudan		0.4	1.5	4.5
Swaziland	22.0	36.4	51.0	65.0
Tajikistan	98.4	99.3	99.4	100.0
TFYR of Macedonia	95.8	98.5	100.0	100.0
Turkmenistan	99.6	99.7	100.0	100.0
Uganda	8.4	8.9	13.2	20.4
Uzbekistan	99.8	100.0	100.0	100.0
Zambia	16.7	20.4	22.0	27.9
Zimbabwe	33.1	34.3	35.6	32.3
LLDCS AVERAGE	34.9	36.9	41.9	48.5

Source: UNSD SDG Indicators Global Database.

Annex 2. Proportion of population with primary reliance on clean fuels and technology in LLDCs

COUNTRY	2005	2010	2012	2014
Afghanistan	21	19	18.1	17.3
Armenia	88.8	95	95	>95
Azerbaijan	80.4	89.7	93.4	>95
Burundi	<5	<5	<5	<5
Burkina Faso	<5	6	6.5	7
Bolivia (Plurinational State of)	69.5	74.9	77.1	79.3
Bhutan	49	59.6	63.8	68
Botswana	52	57.8	60.2	62.5
Central African Rep.	<5	<5	<5	<5
Ethiopia	<5	<5	<5	<5
Kazakhstan	86.5	89.5	90.7	91.8
Kyrgyzstan	66.9	72.2	74.3	76.4
Lao People's Democratic Republic	<5	<5	<5	<5
Lesotho	23.9	28.3	30	31.8
Republic of Moldova	86.8	90.5	92	93.5
The Former Yugoslav Republic of Macedonia	60.9	61.2	61.4	61.5
Mali	<5	<5	<5	<5
Mongolia	29.2	30.7	31.3	31.9
Malawi	<5	<5	<5	<5
Niger	<5	<5	<5	<5
Nepal	14	20.7	23.4	26.1
Paraguay	49.4	57.4	60.6	63.8
Rwanda	<5	<5	<5	<5
South Sudan	<5	<5	<5	<5
Swaziland	30.1	33	34.2	35.3
Chad	<5	<5	<5	<5
Tajikistan	66	69.2	70.4	71.7
Turkmenistan	>95	>95	>95	>95
Uganda	<5	<5	<5	<5
Uzbekistan	84.3	87.6	89	90.3
Zambia	14.3	15.3	15.7	16.1
Zimbabwe	29.5	30.5	30.9	31.3

Source: UNSD SDG Indicators Global Database.

Annex 3. Renewable energy share in the total final energy consumption

COUNTRY	2000	2005	2006	2007	2008	2009	2010	2011	2012
Afghanistan	59.5	40.3	37.3	33.8	21.4	18.0	15.2	10.8	
Armenia	7.2	6.5	7.7	7.0	6.4	7.8	9.4	8.0	6.57
Azerbaijan	2.1	3.4	2.9	3.8	3.1	3.3	4.5	3.6	2.85
Burundi	93.5	97.3	96.8	96.9	96.8	96.9	96.9	96.7	
Burkina Faso	86.5	86.5	84.6	82.4	83.0	83.8	83.7	80.0	
Bolivia (Plurinational State of)	41.6	43.2	42.3	41.6	39.8	39.3	33.5	32.7	27.99
Bhutan	95.5	91.8	92.1	92.4	92.1	92.8	91.4	90.0	
Botswana	36.1	30.5	29.4	27.1	26.5	27.6	24.1	24.5	23.85
Central African Rep.	85.9	86.0	85.1	81.2	80.9	80.9	79.8	78.4	
Ethiopia	96.0	95.1	94.8	94.4	94.4	94.5	94.4	94.0	93.49
Kazakhstan	2.5	2.1	2.1	1.8	1.2	1.3	1.4	1.4	1.36
Kyrgyzstan	35.2	28.0	27.8	24.5	22.1	24.7	25.6	26.0	22.48
Lao People's Democratic Republic	91.2	90.2	90.1	89.8	87.5	87.3	87.5	86.5	
Lesotho	100.0	5.4	5.3	5.3	4.2	4.2	4.1	4.2	
Republic of Moldova	5.7	4.3	5.0	4.5	4.9	4.8	4.2	4.4	4.67
The Former Yugoslav Republic of Macedonia	19.4	16.6	17.9	13.4	14.7	18.4	22.6	17.8	16.47
Mali	85.6	86.2	85.7	85.3	85.0	84.4	83.9	83.9	
Mongolia	5.7	5.7	5.0	5.3	5.1	4.9	3.8	3.5	3.22
Malawi	76.9	82.7	82.3	82.5	80.3	81.4	78.7	79.2	
Niger	93.9	90.6	89.7	87.1	86.1	82.8	80.1	81.3	
Nepal	88.3	89.5	91.3	91.3	90.5	88.9	87.3	87.0	84.72
Paraguay	70.4	68.8	67.3	66.8	68.0	66.4	64.3	63.1	62.68
Rwanda	89.3	89.2	90.6	90.3	90.6	90.5	90.7	86.8	
Swaziland	46.8	39.1	38.1	37.8	37.5	39.0	39.4	39.5	
Chad	97.8	91.7	91.8	90.7	90.1	91.1	90.8	90.6	
Tajikistan	62.4	63.7	61.6	53.8	54.6	60.6	62.1	60.3	57.97
Turkmenistan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Uganda	94.5	92.9	92.4	91.8	91.1	91.5	91.1	90.3	
Uzbekistan	1.2	1.9	1.9	1.4	2.3	2.2	2.6	2.2	2.37
Zambia	89.9	89.3	90.0	92.8	92.0	91.8	91.8	90.5	88.15
Zimbabwe	69.3	80.1	78.3	77.4	81.1	79.6	77.8	75.8	75.6

Source: UNSD SDG Indicators Global Database.

Annex 4. Energy intensity level of primary energy (millijoules (MJ) per constant 2011 PPP GDP¹)

COUNTRY	2000	2005	2006	2007	2008	2009	2010	2011	2012
Afghanistan		1.4	1.6	1.6	2.3	2.8	3.1	4.0	4.6
Armenia	9.4	6.6	5.9	5.8	5.7	5.8	5.4	5.6	5.8
Azerbaijan	13.2	8.3	6.1	4.5	4.4	3.6	3.4	3.6	3.9
Burundi	11.7	15.5	15.0	14.5	14.1	13.8	13.5	13.3	13.0
Burkina Faso	6.8	7.7	7.3	7.9	8.0	7.8	7.4	7.3	7.0
Bolivia (Plurinational State of)	6.6	6.2	7.2	5.9	5.9	6.0	5.9	5.8	6.0
Bhutan	21.9	16.2	15.5	13.8	13.7	13.1	12.6	11.9	11.8
Botswana	4.2	3.7	3.5	3.3	3.4	3.4	3.5	3.2	3.1
Central African Rep.	9.1	8.0	7.5	8.5	8.2	7.5	7.2	7.1	7.2
Ethiopia	30.0	25.6	23.8	22.0	20.8	19.9	18.6	17.7	17.0
Kazakhstan	10.3	9.0	9.8	9.7	9.9	8.9	9.1	9.4	8.7
Kyrgyzstan	9.6	8.8	8.4	9.0	8.9	7.9	7.6	8.6	10.8
Lao People's Democratic Republic	5.7	4.6	4.3	3.6	3.4	3.2	3.1	2.8	2.6
Lesotho	7.2	11.0	10.8	10.4	12.0	11.8	11.6	11.1	11.0
Republic of Moldova	14.3	12.3	11.6	11.0	10.1	10.2	10.2	9.4	9.3
The Former Yugoslav Republic of Macedonia	6.0	5.9	5.8	5.7	5.4	5.1	5.0	5.3	5.1
Mali	4.7	3.7	3.5	3.5	3.4	3.3	3.2	3.2	3.3
Mongolia	10.7	8.6	8.8	8.5	7.8	8.2	8.2	7.3	7.1
Malawi	13.8	13.3	13.1	12.3	11.8	10.7	10.5	10.1	10.2
Niger	11.6	8.1	7.0	6.6	5.6	6.3	6.2	6.8	6.3
Nepal	9.3	8.9	8.6	8.4	8.2	8.1	8.0	8.0	7.3
Paraguay	5.0	4.7	4.6	4.5	4.4	4.7	4.5	4.3	4.5
Rwanda	8.6	8.8	8.5	8.2	7.6	7.5	7.3	6.0	5.6
Swaziland	8.7	7.5	8.2	8.1	8.2	7.8	7.7	7.9	7.8
Chad	8.0	4.3	4.3	4.3	4.3	4.2	3.7	3.8	3.6
Tajikistan	12.3	8.4	8.1	8.0	7.1	5.9	5.7	5.3	5.1
Turkmenistan	25.9	26.0	24.0	24.6	21.7	18.0	18.8	17.8	16.6
Uganda	15.7	12.6	11.7	11.1	10.5	10.0	9.7	9.2	9.1
Uzbekistan	34.8	24.7	23.5	21.3	20.4	16.8	15.1	15.3	14.4
Zambia	12.3	11.3	11.0	10.3	10.1	9.8	9.4	9.2	9.0
Zimbabwe	13.3	18.8	19.8	20.0	22.4	21.4	19.6	18.0	17.5

Source: UNSD SDG Indicators Global Database.

Note: ¹A nominal measure of GDP does not account for changes in the relative purchasing power of a good across time; it ignores inflation and deflation. Purchasing power parity (PPP) compares how many goods and services an exchange-rate-adjusted unit of money can purchase in different countries.

Nepal	Hydropower	1,599	1,788	1,837	1,882	2,152	2,163	2,401	2,292	2,321
	Solar Energy	8	9	11	12	17	23	30	38	48
Niger	Solar Energy	2	2	2	2	3	4	6	7	8
Paraguay	Hydropower	53,773	53,714	55,455	54,939	54,065	57,624	60,232	60,378	55,276
Republic of Moldova	Hydropower	377	377	389	358	407	352	269	310	312
	Wind Energy								1	1
	Solar Energy								0	1
Rwanda	Hydropower	38	42	72	99	112	149	182	148	194
	Solar Energy	0	0	0	0	0	0	0	0	13
	Bioenergy	1	2	1	2	2	2	2	2	2
South Sudan	Solar Energy							0	0	0
Swaziland	Hydropower	159	174	163	248	290	337	275	243	244
	Solar Energy	0	0	0	0	1	1	1	1	1
	Bioenergy	151	155	142	125	178	259	285	276	320
Tajikistan	Hydropower	16,700	17,114	15,800	15,900	16,400	16,200	16,900	17,071	16,312
The Former Yugoslav Republic of Macedonia	Hydropower	1,649	1,009	840	1,271	2,432	1,433	1,040	1,584	1,207
	Wind Energy									71
	Solar Energy					0	1	3	9	14
Turkmenistan	∅									
Uganda	Hydropower	1,239	1,412	1,467	1,281	1,605	1,691	1,725	1,946	2,013
	Solar Energy	8	12	18	22	23	26	27	29	31
	Bioenergy	49	47	55	66	156	125	160	192	282
Uzbekistan	Hydropower	9,160	6,400	11,360	9,330	10,846	10,240	11,210	11,560	10,310
	Solar Energy								1	1
Zambia	Hydropower	8,984	9,732	9,801	10,364	10,435	11,483	12,351	13,282	14,043
	Solar Energy	1	1	2	2	2	2	2	2	3
	Bioenergy	39	39	34	54	64	63	67	66	71
Zimbabwe	Hydropower	5,311	5,384	5,707	5,458	5,800	5,202	5,388	4,983	5,403
	Solar Energy	1	2	2	2	3	4	5	6	7
	Bioenergy	126	126	126	130	130	148	158	173	148

Source: IRENA, 2016

Notes: 1. Figures between 0 and 0.5 are shown as "0".

2. Data of Chad and Turkmenistan are not available, shown as ∅

Annex 6. Distributed Renewable Energy Markets and Installed Capacities in LLDCs: Examples

COUNTRY	Technology/System	Capacity Added in 2014	Cumulative at End-2014	Additional Information (including programme, financing partner and project developer)
Bhutan	Biogas systems	581 units	1,420 units (2013)	- Implemented by SNV under an ADB-funded project
Bolivia (Plurinational State of)	Solar PV (pico)	260 units	260 units	- Implemented under the EnDev Programme
	Solar lanterns		5,705 units	- Implemented under the Household and Social PV Systems Global Partnership Output Based Aid (EDAU-GPOBA)
	Biogas systems		500 units	- Implemented under the EnDev Programme
	Improved cookstoves		44,400 units	- Implemented under the EnDev Programme
Burkina Faso	Solar home systems	159 kWp	342 kWp	- 3,365 people electrified - Installed by ARE members (FRES)
	Solar lamps	3,000 units	3,325 units	- Implemented under the SNV-funded Pico PV for Africa Project
	Solar PV (pico)	21,352 units		- Implemented under a joint GOGILA and World Bank project GPOBA
	Hybrid mini-grid (PV/diesel)		45 kWp	- Three hybrid PV-diesel mini-grid projects, each with an installed capacity of 15 kWp (as of July 2014) - Consolidated at country level
	Biogas digesters	1,448 units	5,462 units	- 4,741 households - Implemented by SNV/HIVOS under the African Biogas Partnership Programme funded by the Directorate General for International Cooperation, Netherlands (DGIS)
	Improved cookstoves	24,500 units	124,700 units	- Implemented under the EnDev Programme
	Improved cookstoves	845 units	966 units	- For productive use in agricultural SMEs - Implemented under the SNV-funded Energy, Poverty and Gender in Agro Processing (EPGAP) project
Burundi	Solar lanterns	250 units	500 units	- Consolidated at country level
	Solar PV (pico)	5,300 units	9,800 units	- Implemented under the EnDev Programme
	Improved cookstoves	900 units	1,700 units	- Implemented under the EnDev Programme
Ethiopia	Solar PV		5 MW	- 60% installed for rural telecom applications, 20% for water pumping, and 20% for solar home systems - Consolidated at country level
	Solar PV (pico)	44,300 units	71,700 units	- Implemented under the EnDev Programme
	Solar PV (pico)	580,930 units		- Implemented under a joint GOGILA and World Bank project
	Solar water pumping systems		15 units (2012)	- Implemented by Plan International under the ACP-EU Energy Facility Programme
	Solar lanterns		9,000 units	- Installed by the ARE network
	Solar powerpacks		500 kWp	- 1,500 people electrified - Installed by the ARE network
	Solar home systems	1,600 units	3,200 units	- Implemented under the EnDev Programme
	Solar home systems		500 units	- Installed by ARE members systems
	Biogas digesters	1,465 units	10,678 units	- 3,136 households from 2012 to 2014 - Implemented by SNV/HIVOS under the DGIS-funded Africa Biogas Partnership Program
	Improved cookstoves	15,100 units	352,200 units	- Implemented under the EnDev Programme
	Improved cookstoves	3,200 units	3,200 units	- Implemented under the SNV-funded Integrated Renewable Energy Services project
	Improved cookstoves	19,046 units	32,246 units	- 32,246 households - Implemented under a project funded by OPEC Fund for International Development (OFID) and SNV
Lao People's Democratic Republic	Biogas systems		2,888 units	- Implemented by SNV under a DGIS-funded project
Lesotho	Solar home systems		1,537 units	- Implemented under a project funded by OPEC Fund for International Development (OFID) and SNV Implemented under the Lesotho Renewable Energy Based Rural Electrification Programme (closed in March 2013)

Malawi	Solar water heaters		1,500 units	- Implemented under the EnDev Programme
	Isolated home systems		700 kWp	- Off-grid units that range from 20 kW to 240 kW - Consolidated at country level
	Improved cookstoves	10,200 units	14,400 units	- Solar home systems and mini-grid providing electricity to 6,314 people - Installed by ARE members
Mali	Solar PV		13 units	- Off-grid units that range from 20 kW to 240 kW - Consolidated at country level
	Solar PV		902 kWp	- Solar home systems and mini-grid providing electricity to 6,314 people - Installed by ARE members
	Solar PV		2 units	- Off-grid systems installed in schools - Implemented under a Plan International project
	Solar PV (pico)	700 units	1,800 units	- Implemented under the EnDev Programme
	Solar lamps	2,275 units	2,867 units	- Implemented under an SNV-funded project
	Solar water heating systems		3 kWp	- Implemented under a Plan International project
	Solar kiosks	9 kWp	30 units	- Recharging stations implemented by Plan International under the ACP-EU Energy Facility Programme
	Solar home systems	86 kWp	280 kWp	- 2,286 systems installed - Installed by FRES
	Isolated home systems		216 kWp	- Consolidated at country level
	Mini-grids (solar)		622 kWp	- Installed by FRES
	Hybrid mini-grid (PV/diesel)		2.1 MW	- 21 hybrid mini-grids installed - Consolidated at country level
	Improved cookstoves	17,529 units	25,459 units	- Domestic and productive stoves - Implemented under the SNV-funded EPGAP project
Improved cookstoves		3,100 units	Implemented under a Plan International project	
Mongolia	Solar PV		100,000 households	- Implemented under the 100,000 Solar Ger project
Nepal	Mini-grid (hydro)	500 kWp	600 kWp	- Implemented under the EnDev Programme
	Hybrid mini-grid (solar and wind)	7 kWp		- 5 kWp from wind turbines and 2 kWp from solar PV - Implemented under the ADB Energy for All initiative
	Biogas systems	35,108 units	70,526 units	- 70,526 households - Implemented by SNV under the DGIS-funded Biogas Program
	Improved cookstoves	19,046 units	32,246 units	- 32,246 households - Implemented under a project funded by OPEC Fund for International Development (OFID) and SNV - International Development (OFID) and SNV
Niger	Solar PV		4 MW	- Consolidated at country level
	Solar lamps	7,600 units		- Implemented under an SNV-funded project
	Mini-grid (solar)		27.5 kWp	- 105 households electrified and electricity for productive use - Implemented by Plan International under the ECREEE EREF II

Rwanda	Solar PV (pico)	80,111 units		- Implemented under a joint GOGLA and World Bank project
	Solar home systems	400 kWp		- 4,000 installations; 21,200 people electrified - Installed by Mobisol
	Mini-grid (hydro)		1,000 kWp	- Implemented under the EnDev Programme
	Hybrid mini-grid (PV/diesel)		50 units	- 50 minigrids of 3–6 kWp for health care centres - Consolidated at country level
	Biogas systems	200 units	1,700 units	- Implemented under the EnDev Programme
	Improved cookstoves	24,769 units	24,769 units	- Clay-based, efficient Canarumwe stoves - Implemented by SNV under the World Bank-funded Improved Cook Stoves project
Uganda	Solar PV (pico)	5,900 units	14,000 units	- Implemented under the EnDev Programme
	Solar PV (pico)	70,022 units		- Implemented under a joint GOGLA and World Bank project
	Solar kits	200 units	200 units	- Implemented by Oolux under a REPIC co-funded project
	Solar kits	130 units	130 units	- Implemented by Oolux under a SYMPHASIC co-funded project
	Solar home systems	600 units	1,700 units	- Implemented under the EnDev Programme
	Solar home systems	114 kWp	544 kWp	- 3,482 people electrified - Installed by ARE members (FRES)
	Isolated home systems		400 kWp	- 15,000 systems installed - Consolidated at country level
	Hybrid mini-grid		5 kWp	- Consolidated at country level
	Improved cookstoves	5,200 units	12,400 units	- Implemented under the EnDev Programme
	Improved cookstoves	3,847 units	3,847 units	- Implemented under the SNV-funded International Renewable Energy Services programme
	Biogas digesters	527 units	5,695 units	- 3,793 households - Implemented by SNV/HIVOS under the DGIS-funded African Biogas Partnership Program
Zimbabwe	Solar powerpacks		550 kWp	- 1,650 residents electrified - Installed by ARE members
	Solar lamps	25,000 units	25,803 units	- Implemented under an SNV-funded project

Source: REN 21, 2015

Annex 7. Selected Examples on Energy Efficiency in LLDCs

COUNTRY	Energy Efficiency
Armenia	<ul style="list-style-type: none"> According to the National Program on Energy Saving and Renewable Energy (ESRE) supported by USAID, the potential for energy efficiency (EE) savings in Armenia is large, including 40% in building sector, 35-40% in food industry, while optimization of lighting was estimated to save 475 million kWh over the next 10 years. The Commercialization of Energy Efficiency Program (CEEP) was implemented by Advanced Engineering Associates International (AEIA) from 2007-2010, with the overall budget of around US\$3 million to facilitate private provision of long-term financing for energy efficiency projects and to implement a limited number of socially-oriented energy efficiency projects.
Azerbaijan	<ul style="list-style-type: none"> The Azerbaijani Government has adopted the State Programme for the Development of the Fuel and Energy Sector (2005–2015), which targets the reduction of losses and prevention of theft and the inefficient use of energy in order to cover the electric power and natural gas demands. It is stated that full payment of the cost of the electricity and natural gas consumed is one of the factors that would ensure the efficient use of these resources. Although the government sets the targets for an energy efficient economy, there is no law or secondary legislation specific to EE activities.
Burkina Faso	<ul style="list-style-type: none"> With household energy needs predominantly being met with traditional biomass fuels, the potential for efficiency in the residential sector is high. The construction and sale of energy-efficient stoves for cooking has been successful in reducing biomass demand, a project run by German Technical Assistance (GTZ) and Foyers Améliorés au Burkina Faso (FAFASO). Energy efficiency projects have also been run in the beer brewing sector, financed by the Global Environmental Facility (GEF).
Bolivia (Plurinational State of)	<ul style="list-style-type: none"> Energy Efficiency levels are relatively good in Bolivia, an example is the saving of about 100 megawatts (MW) from the use of energy-saving light bulbs following a 2008 campaign to replace traditional incandescent bulbs.
Bhutan	<ul style="list-style-type: none"> Bhutan has one of the highest per-capita electricity consumptions in South Asia, at 1,174 kWh in 2005. Per-capita energy consumption was 0.62 toe in 2005. The government has recognised the need for energy efficiency in Bhutan's energy sector, and improvements in efficiency and energy conservation standards for the building sector are being promoted by the government, particularly in terms of lighting and ventilation.
Botswana	<ul style="list-style-type: none"> The scale-up of the public transport system as an alternative to using private cars presents opportunities for an efficient urban transport system in Botswana. This thinking permeates the draft Botswana Integrated Transport Policy. The options vary from the sophisticated rapid bus transport system to elementary changes such as dedicated lanes for mini buses and increased signage (at bus stops) depicting which bus-route passes where. With signage integrated with branding and advertisement, these can be done through private sector with no costs to the municipalities. The National Development Plan for 2010-2016 targets decentralising some transport functions to local authorities to allow for increased focus on such elements as non-motorized transport. In the area of energy efficiency, the Government of Botswana, with the support of the World Bank, is developing an energy efficiency strategy. The exercise started in November 2015 and six goals have been set. The goals are (a) improving the availability of information and awareness of potential benefits of energy efficiency; (b) building capacity and improving coordination around energy efficiency in key institutions; (c) promoting energy efficiency in new and existing housing; (d) promoting energy efficiency in new and existing government buildings and institutions; (e) promoting energy efficiency in new and existing industrial facilities; and (f) keeping local institutions informed of local, regional and international developments regarding the feasibility of implementing different energy efficiency incentives.
Lesotho	<ul style="list-style-type: none"> As laid out in Lesotho Energy Policy (2015-2025), government will promote energy efficient practices and equipment in all sectors of the economy. Strategies: (a) implement demand side management programmes and projects; (b) introduce a metering system and tariff structure that will support energy efficiency and demand side management; (c) discourage the use of intensive energy use devices and promote the use of energy efficient technologies ; (d) carry-out dissemination campaigns on wise use of energy; (e) promote the adoption of renewable energy technologies that reduce total end-use electricity consumption; (f) implement energy efficiency programmes in buildings; (g) introduce incentives to support energy efficiency programmes and activities; (h) support applied research and development in energy efficiency programmes and activities; (i) develop specific principles for the policy statement.
Tajikistan	<ul style="list-style-type: none"> A new Law on energy efficiency and energy saving was adopted on 19 September 2013. The law stipulates the legal and organisational framework for energy efficiency and provides for the introduction of energy efficiency materials, appliances and technologies. The law has provisions for introducing mandatory energy audits, establishing procurement procedures that incorporate criteria on energy efficiency, and requirements for energy use in buildings and household appliances, etc. Currently, Government financing is not available for energy efficiency activities and projects in Tajikistan. The establishment of the National Energy Efficiency Fund envisaged in the new Law on energy efficiency and energy saving energy; furthermore, this framework is expected to be capitalised with the support of donors and international financial institutions as well as with national budget allocations.

Uganda	<ul style="list-style-type: none"> The Promotion of Renewable Energy and Energy Efficiency Programme (PREEEP) is a key project by the Ministry of Energy and Mines in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), to promote energy efficiency and renewable energy. The government is also promoting the use of energy saving bulbs by distributing approximately 800,000 of them to low-income households. The Energy Advisory Project, also funded through the GTZ, aims to provide energy users with information about energy efficiency, as well as promote the use of efficient equipment and appliances in manufacturing and at home, and assess the benefits that improved efficiency could have on the transport and agricultural sectors, particularly in terms of maintenance of fleet vehicles and auditing of agricultural businesses. Efficiency standards-setting is another goal of the project. The Energy Advisory Project goals have recently been incorporated into the PREEEP, and as such continue to be pursued. The government, under the recently-implemented Renewable Energy and Energy Efficiency Policy, acknowledges a number of key areas where energy efficiency could be improved, by the policy's goal date of 2017. These include increasing solar water heater installations to 30,000 m², and implementing industrial energy auditing and the dissemination of efficient equipment to industries.
Zimbabwe	<ul style="list-style-type: none"> Through the draft national energy policy, the government plans to ensure efficient utilization of energy resources. The International Energy Initiative has previously run programs to promote the efficient use of energy, most notably the Zimbabwe Energy Efficiency Project (ZEEP). Under ZEEP, industrial efficiency has been increased and efforts were undertaken to produce government standards for efficient appliances and equipment, for example, lighting, water heaters and refrigerators. Transmission and distribution losses in the country are considerably lower than in many African nations, standing at approximately 11%. Demand-side efficiency could be further encouraged in the country, as electricity tariffs remain amongst the lowest in Africa, at roughly US\$ 0.06/kWh, due to heavy subsidies. The low non-technical losses in the transmission and distribution system have been attributed to the exceptionally low power tariffs.

Source: Clean Energy Info Portal-Reegle, 2016, The World Bank, 2009

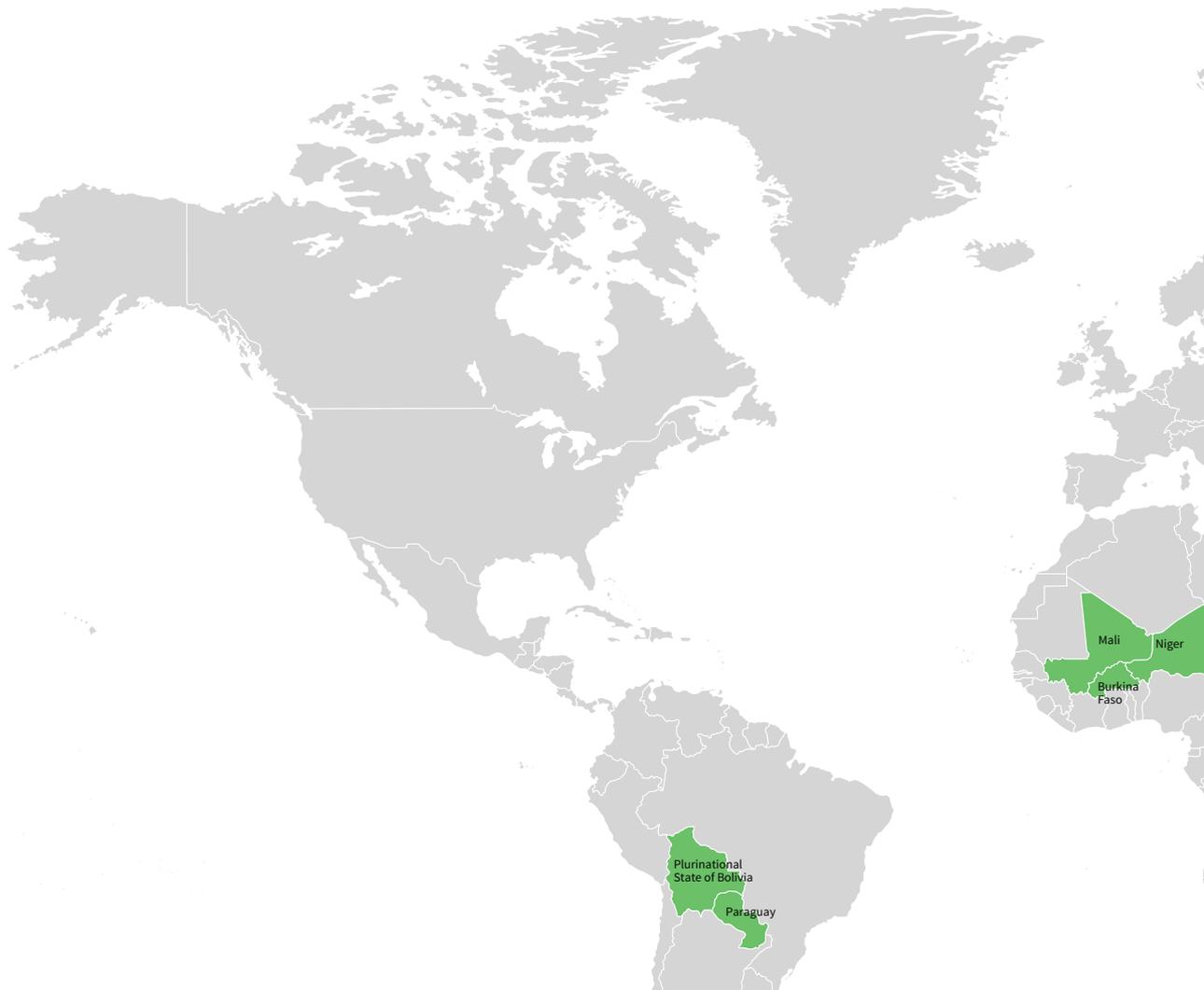
Annex 8. Public Renewable Energy Finance Flows (USD million) in LLDCs

COUNTRY	2009	2010	2011	2012	2013	2014
Afghanistan	2	8		3		
Armenia				25	25	24
Azerbaijan	Ø					
Bhutan					105	121
Bolivia (Plurinational State of)	101				96	74
Botswana	Ø					
Burkina Faso					30	32
Burundi					46	217
Central African Rep.	Ø					
Chad	Ø					
Ethiopia		60				190
Kazakhstan				96	91	79
Kyrgyzstan						110
Lao People's Democratic Republic						110
Lesotho						15
Malawi	Ø					
Mali	85	34	2	1	25	1
Mongolia				76		
Nepal				3	414	261
Niger						1
Paraguay	Ø					
Republic of Moldova			93			
Rwanda					211	13
South Sudan	Ø					
Swaziland						1
Tajikistan					136	50
The Former Yugoslav Republic of Macedonia	Ø					
Turkmenistan	Ø					
Uganda	150		3		31	160
Uzbekistan					110	
Zambia				158		242
Zimbabwe	Ø					

Source: IRENA, 2016

Notes: This table presents an overview of investment transactions for renewable energies from selected public financial institutions.

The World's 32 Landlocked Developing Countries

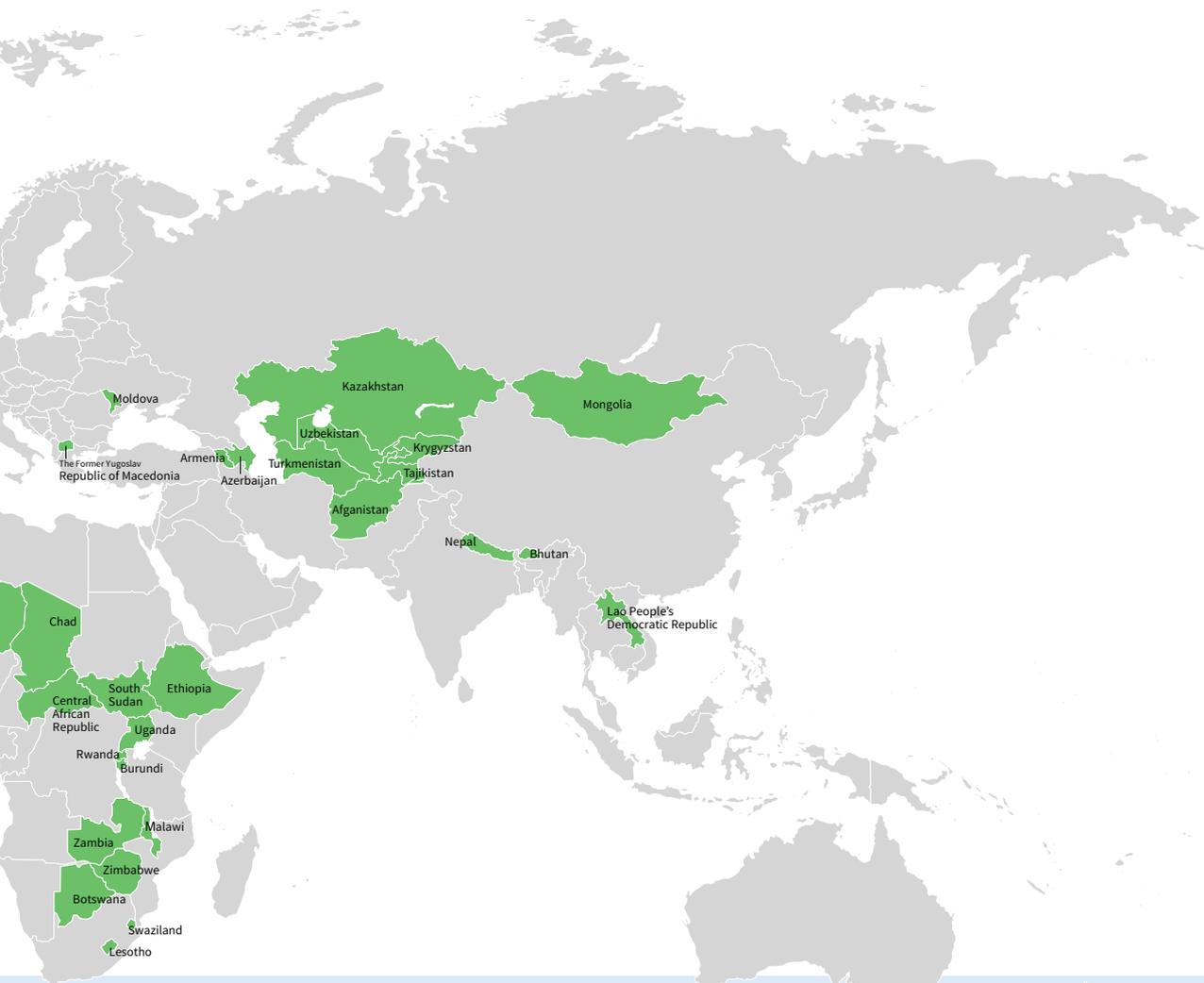


SOUTH AMERICA

Plurinational State of Bolivia
Paraguay

AFRICA

Botswana
Burkina Faso
Burundi
Central African Republic
Chad
Ethiopia
Lesotho
Malawi
Mali
Niger
Rwanda
South Sudan
Swaziland
Uganda
Zambia
Zimbabwe



EUROPE

Armenia
Azerbaijan
Republic of Moldova
The Former Yugoslav
Republic of Macedonia

ASIA

Afghanistan
Bhutan
Kazakhstan
Kyrgyzstan
Lao People's
Democratic Republic
Mongolia
Nepal
Tajikistan
Turkmenistan
Uzbekistan

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