



ACCELERATING SUSTAINABLE ENERGY TRANSITION

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Ministry of Water, Irrigation and
Energy of Federal Democratic
Republic of Ethiopia



1. Overview of ELECTRICITY ACCESS AND CLEAN COOKING

- Over the past two decades with around 2 Billion people gaining energy access worldwide according to the 2019 SDG7 tracking report, an estimated **840 Million people** in the world are still left behind.
- The 47 LDCs represent the poorest and most vulnerable segment of the international community, being home to about half of the global population without access to electricity.

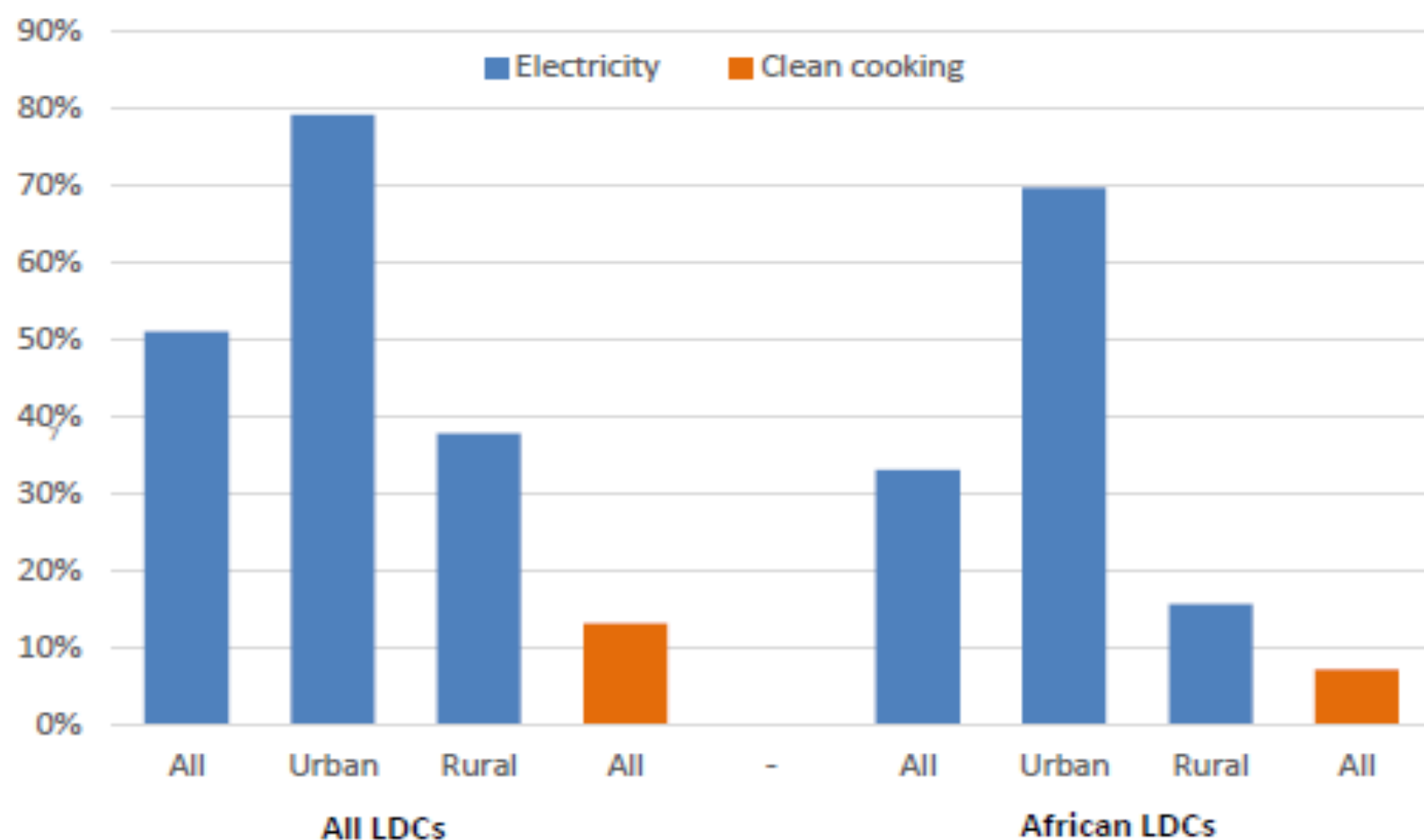
Access to Electricity

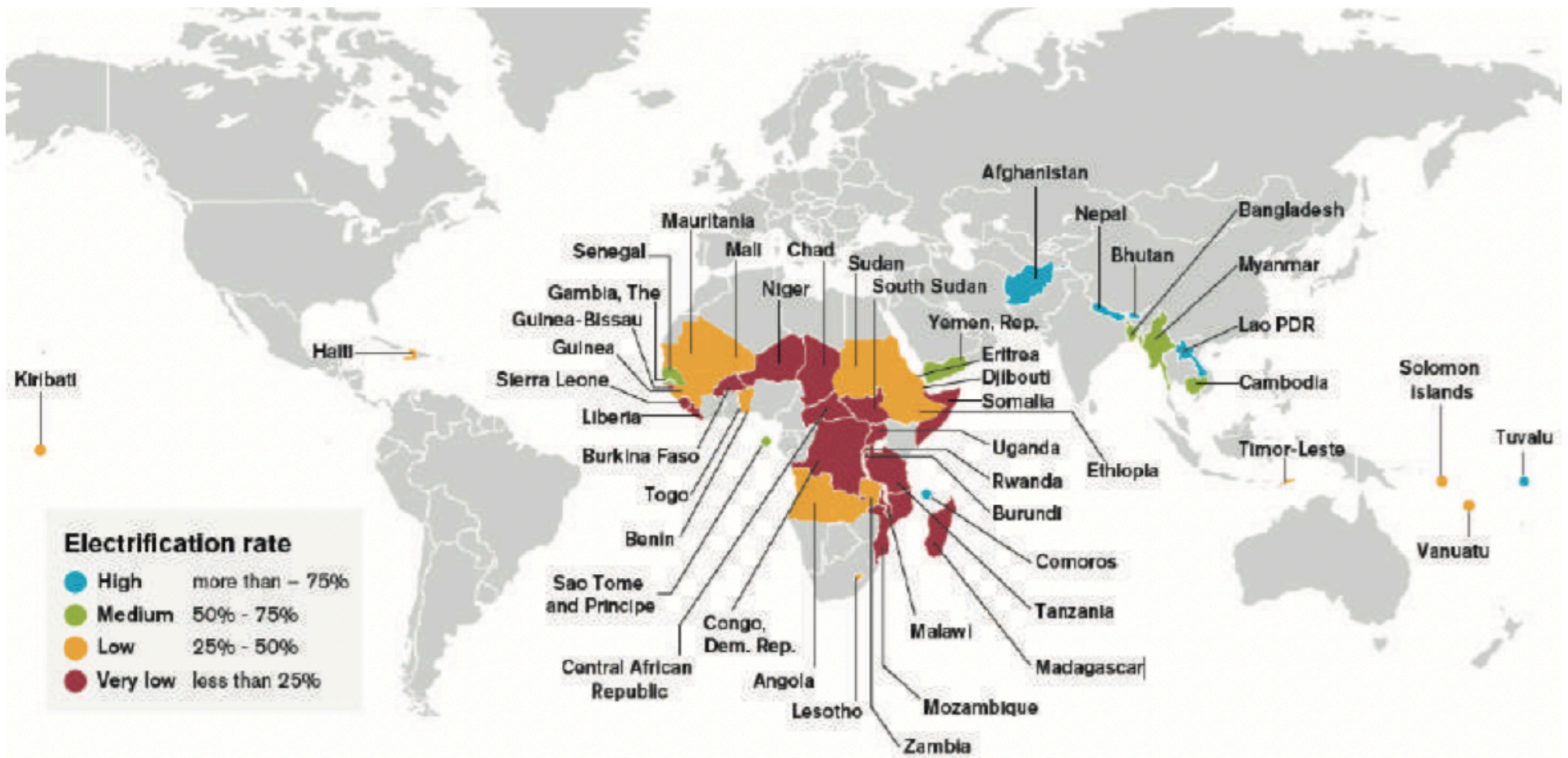
- The average electricity access rate in LDCs was at **51%** in 2017 compared to the global average of **89%**.
- Access situation vary greatly by region: African LDCs (**33** out of 47 countries) are the ones with the **largest access deficit** with an rate of only **33% in 2017** .
- Beyond electricity, the share of the population with access to clean cooking is **low at 13 %** in LDCs in 2017 and only **7.2% in African LDCs**.

Access to Electricity

- Both access to electricity and clean cooking have increased only **marginally** since the beginning of the decade.
- **8%** of the world's population (about **650 million people**) would still lack access to electricity in **2030**, **89%** of them living in **Sub-Saharan Africa unless substantial and targeted effort is done to scale up the energy transition.**

Level of electricity access and access to clean cooking in LDCs and African LDCs in 2017 (in urban and rural areas)

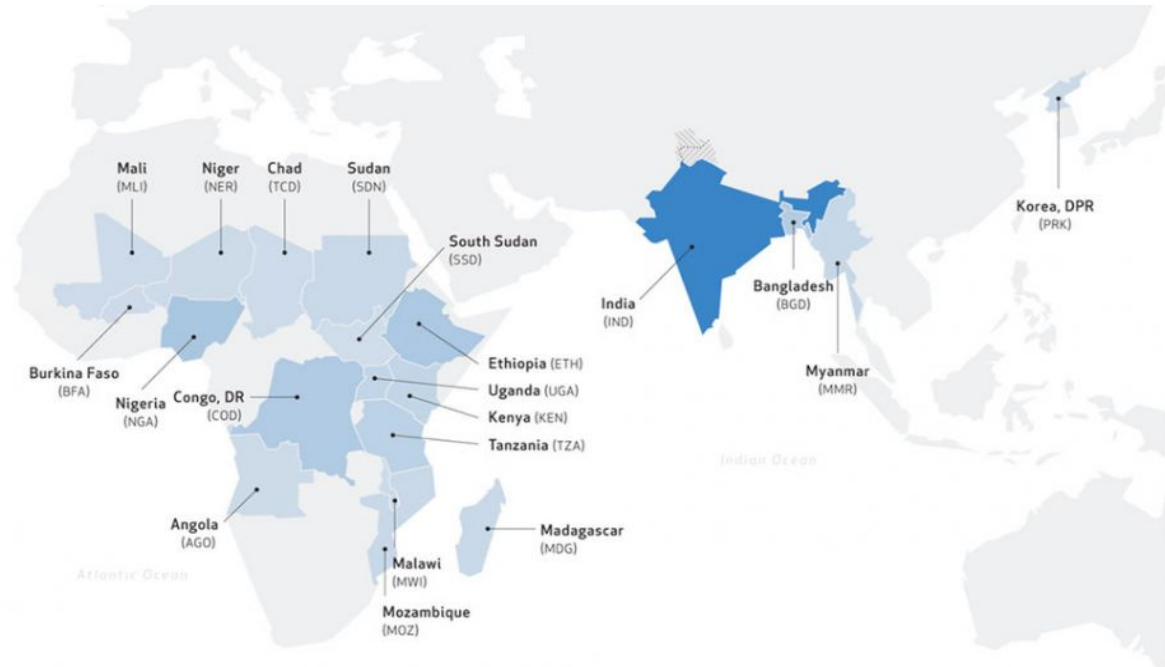




Electrification rate in LDC's (%) SE4ALL 2014

SITUATION IN HIGH-IMPACT ODCs

- According to SE4All's *Heatmaps*, “in 2014, **80 percent** of people without access to electricity were living in just 20 high impact countries, all of them in SubSaharan Africa and Asia.”
- The **top 20 High-Impact countries** (as shown on the map to the right) could potentially have the highest and most critical impact in universal energy access considering they are the **countries with the highest share of population lacking access**. These High-Impact countries all face **sustainable energy challenges across four access categories** and they are: **electricity access, clean cooking, energy efficiency and renewable energy**.



2. ENERGY TRANSITION TRACK AND LDC'S TARGET

To address the overwhelming climate warming, the UN has identified **9 interdependent thematic areas** for the Climate Action Summit including the **Energy Transition Track** that focuses on accelerating the shift away from fossil fuels and towards renewable energy and make major gains on Energy Efficiency,

The Energy Transition Track has **Four Key Engagement Themes:**

1. Investment and financing for clean energy transition;
2. Public Private Partnerships;
3. Challenging (emitting) sectors; and
4. Leaving no one behind (energy access, etc.).

LDCs, as part of their *Renewable Energy and Energy Efficiency Initiative for Sustainable Development (LDC REEEI)*, the LDCs are aiming to achieve :

- **100% access to sufficient, affordable, modern and renewable energy by all citizens in LDCs by 2030.**
- **100% electricity from renewable energy sources in all LDCs by 2050.**
- **100% energy efficiency along the value chain by 2040.**

3. SUSTANABLE ENERGY ACCESS

- The Co-leads for Energy Transition Track are Ethiopia, Denmark and Sustainable Energy for All, with Colombia, Indonesia, Italy, Morocco and Palau, as Coalition partners. Ethiopia and Morocco, have taken the initiative of preparing the package focusing on the ***“Leaving no one behind”*** (Sustainable Energy Access) among the four key energy transition strands to address the many people still without access to electricity and clean energy.
- This coalition project aims¹⁰ at responding to the vital need of the LDCs, and high-impact Developing countries in terms of **electricity access, clean water, irrigation, heating, cooling and clean cooking with the ambition of "leaving no one behind"**.

3. SUSTANABLE ENERGY ACCESS.....

- This can be achieved by mobilizing competitive technical, legal and financial mechanisms and tools to deploy renewable energy solutions to tackle the energy access deficit.
- Achieving SDG 7, which is the access to affordable and clean energy for all, can have a positive domino effect on the other sustainable goals, such as access to better health, food security, clean water supply and employment in the energy sector with the creation of local markets. It is for these reasons that this coalition aims to focus on accelerating¹¹ the access to affordable and clean energy in remote areas that have significant energy deficit.

Examples of linkages between SDG 7 (Affordable and Clean Energy) and other SDGs according to IRENA:

SDG	LINKAGES	
	Access to basic energy services is a prerequisite for eradicating poverty and stimulating economic activity. Decentralised renewables can enable significant savings on fuel spending, which disproportionately affects the poor in both developing and developed countries.	1
	Renewable-powered pumping technologies can improve agricultural yields and reduce vulnerability to changing rainfall patterns, thereby helping achieve food security and improved nutrition. Renewables also provide energy for refrigeration and food preservation, which can reduce food waste.	2
	Improved cookstoves and clean energy for cooking reduce risks of respiratory diseases due to indoor air pollution. Decentralised renewables support the functioning of health clinics and hospitals in remote and rural areas. Renewables for power and transport reduce risk of diseases associated with outdoor air pollution.	3
	Renewable-based power solutions allow study time after nightfall, access to information and communication technologies, and free up time previously required for fuel collection.	4
	Renewables relieve the burden on women and children of fuel collection and alleviate adverse health impacts of traditional biomass use. Renewable-based street lighting can improve safety and allows girls and women to attend educational, community or productive activities after dark.	5
	Solar PV and wind power, the most rapidly growing technologies, consume up to 200 times less water than conventional technologies including thermal power plants. Water desalination and pumping with renewables can increase the supply of clean drinking water.	6
	Renewables employed 9.4 million people globally in 2015 (including large-scale hydropower). Doubling the share of renewables in the global energy mix by 2030 could increase global GDP by up to USD 1.3 trillion and support over 24 million jobs in the sector. Providing off-grid communities energy for productive services enables economic development.	8
	Creation of local markets for renewables can create, directly and indirectly, new local businesses and industries. Development of infrastructure to support renewable-based charging for local transportation reduces local air pollution and greenhouse gas emissions.	9
	Construction, commercialisation, installation and maintenance of renewable energy technologies create jobs and small businesses, leading to income generation and helping to overcome barriers to development. Relying on domestic energy sources frees local funds/foreign currency for non-energy purposes.	10
	Cities can decarbonise their energy supply and use through renewables, notably in buildings (for heating, cooling, cooking and appliances) as well as for transport. Benefits can include reductions in pollution and in energy imports, as well as increased resilience.	11
	Renewables offer the potential to make the world's energy supply cleaner and safer, given that they are produced and deployed in a manner that is environmentally and socially sustainable.	12
	Scaling up renewable energy, coupled with energy efficiency, could put the world on track to keep the rise of temperatures within 2° Celsius, in line with the Paris Agreement. Renewables can support efforts for adaptation, e.g., solar pumping and desalination can provide water amid changing climatic conditions.	13
	Renewable technologies that replace or reduce consumption of fossil fuels can reduce pipeline and tanker traffic, reducing the risk of spills in water bodies. Renewable energy can reduce the risk of future warming and acidification of oceans by decreasing CO ₂ emissions.	14
	Well-designed renewable energy projects can avoid negative impacts on ecosystems and biodiversity compared with conventional energy sources. The use of modern renewables can displace fuel wood and charcoal in off-grid settings, thus decreasing forest degradation.	15
	Renewables can provide access to clean energy to those deprived of it, thereby decreasing social and economic inequalities within societies and between countries as well as contributing to peaceful and inclusive societies.	16
	Linking renewable energy deployment with the broader goals of sustainable development requires enabling frameworks at the local level and global partnerships.	17

4. CHALLENGES TO ACHIEVE SUTAINABLE ENERGY ACCESS

1. MOBILIZATION OF FINANCE
2. AFFORDABILITY OF ELECTRICITY
1. RELIABILITY OF ELECTRICITY

Mobilization of Finance

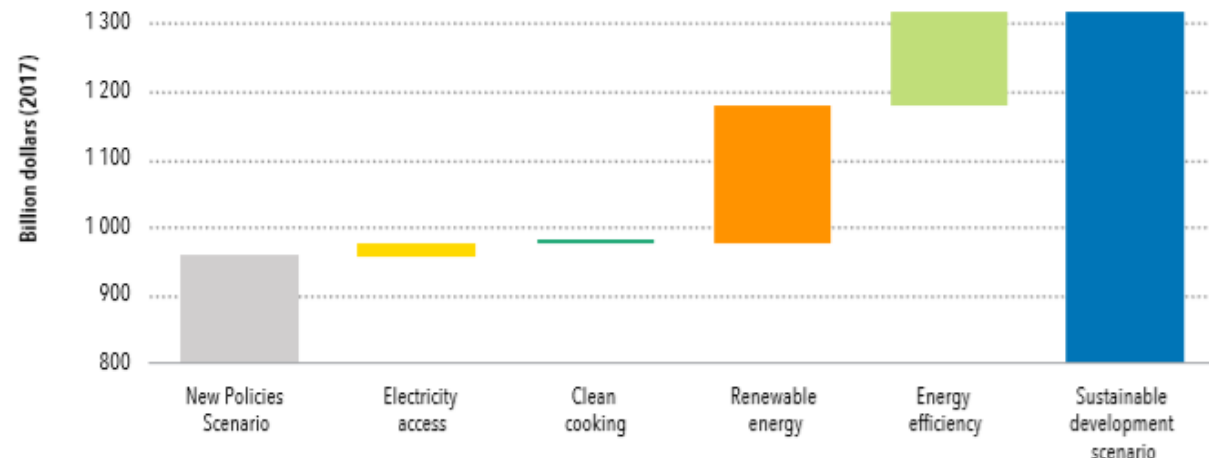
WHILE THERE HAS BEEN A DRAMATIC AND ENCOURAGING INCREASE IN ELECTRICITY ACCESS INVESTMENTS OVER THE LAST YEARS, THE ELECTRIFICATION INVESTMENT GAP REMAINS LARGE WHERE IT IS MOST NEEDED AND ITS URGENCY IS INTENSIFYING.

The total amount committed falls well short of the estimated **USD 52 billion per year** (IEA 2017) needed to provide electricity to all by **2030**. At **USD 30.2 billion per year**, this means we are only reaching just over half of this goal, and with each passing year, falling further behind.

Achieving the SDG7 goal worldwide would require **an additional investment of \$ 334 billion** between 2018 and 2030, divided as follows:

- **On-grid (37%)**
- **Mini-grid (34%)**
- **Off-grid (29%).**

ADDITIONAL ANNUAL AVERAGE NEEDED INVESTMENTS TO ACHIEVE SDG 7 TARGETS, 2018-2030



Source: IEA 2018a.

Note: New Policies Scenario and Sustainable Development Scenario investments in this figure only include those related to SDG 7.

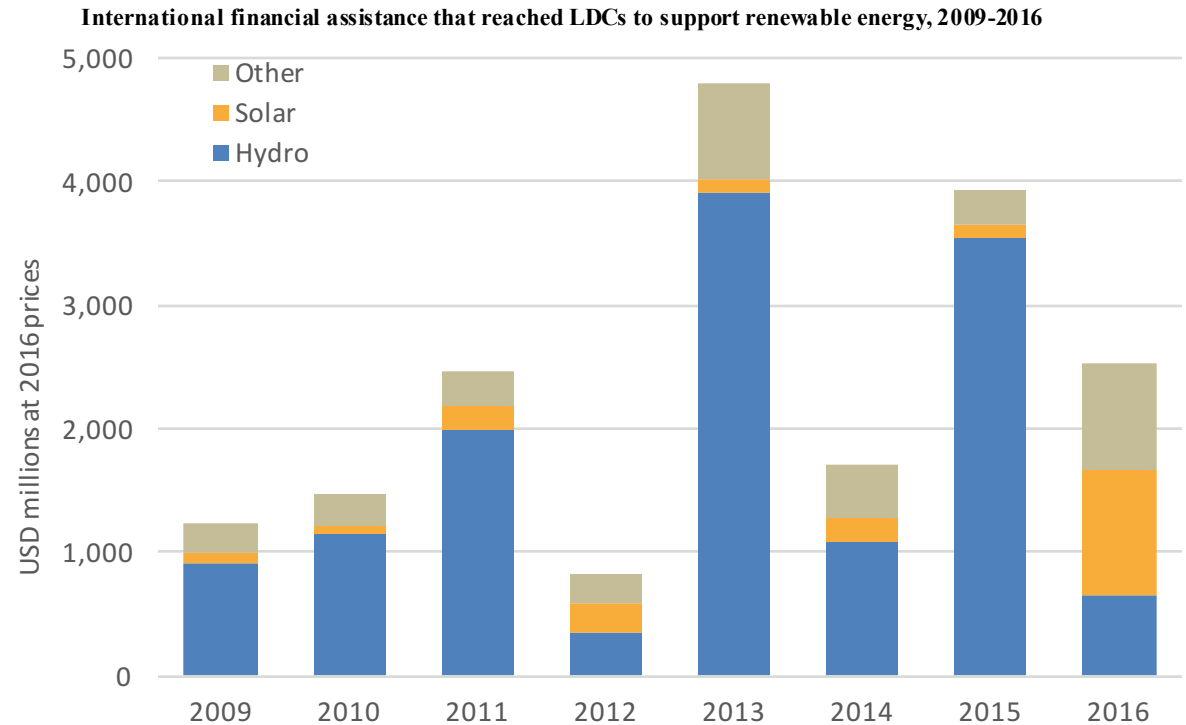
Mobilization of Finance...

Overview of financial flows in LDCs

- From 2009 to 2016, foreign donors have committed about **19 billion USD** to support the deployment of renewables in LDCs. About 70% of this has been invested in hydropower, 10% in solar energy and 20% in other projects.
- USD 2.5 billion committed to LDCs in 2016 is **only 13% of the USD 18.6 billion** in international financial assistance committed to the expansion of renewables in developing countries in that year.

Donors do not meet aid commitments

- LDCs are falling far behind the rest of the world in terms of achieving energy access.
- In order to achieve the 2030 goal, the report has estimated an investment cost of **12 to 40 billion USD per year**, which is very costly and exceeds the currently available resources of **3 billion USD per year** of total official development assistance (ODA) to the energy sector.
- There has been a **radical drop of ODA in 2014**. In 2016, the energy aid amounted to around 2500 millions of USD, which is a little more than a half of the amount invested in 2013.



Source: *The Least Developed Countries Report 2017: Transformational Energy Access* of UNCTAD & IRENA

Mobilization of Finance...

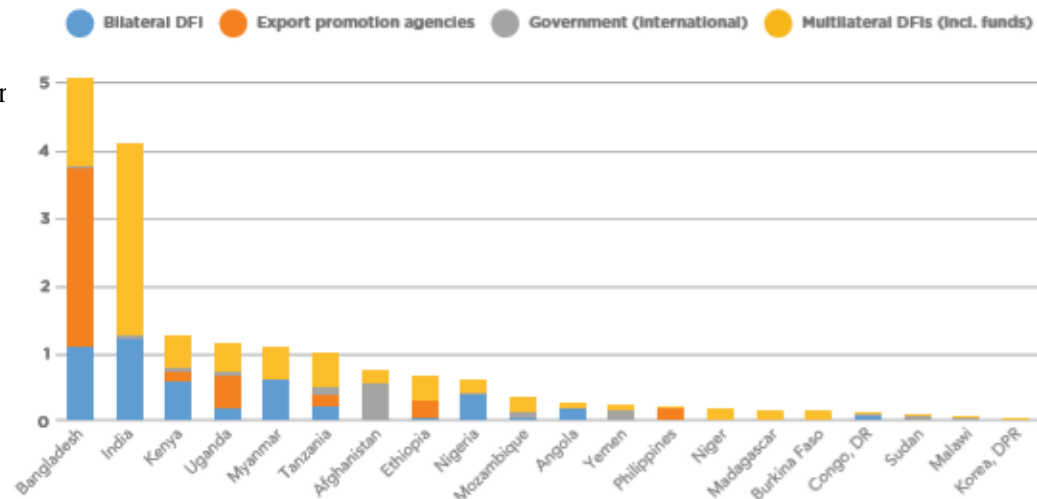
Sources

Multilateral development finance institutions (DFIs) remain the largest provider of public finance, with **13%**

About **61%** of electricity finance in 2015-16 was from domestic sources, mainly the private sector

Approximately **USD 2.7 billion**, of all the finance from commercial banks (both domestic and international), was committed to **grid-connected, fossil fuel projects**.

Recipients of international public finance by provide type (USD billion)



Recipients

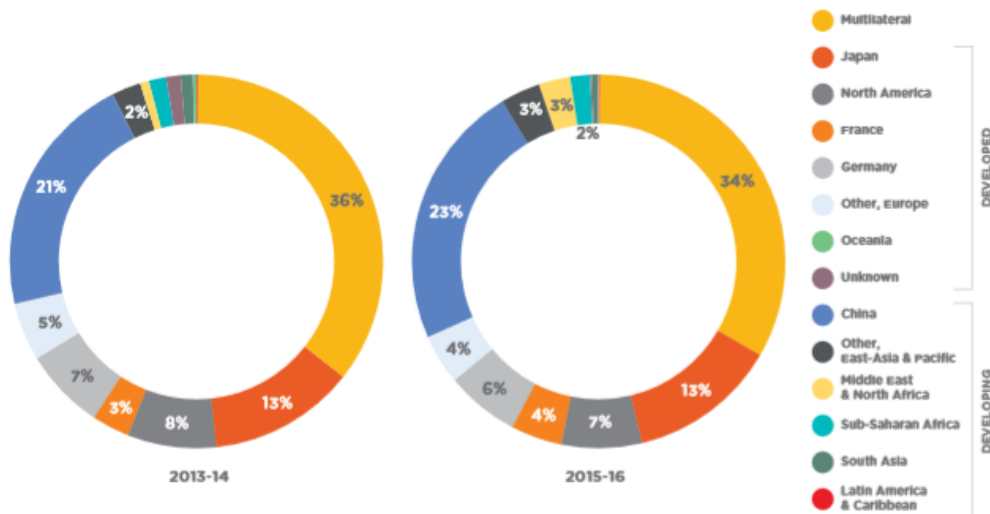
Sub-Saharan African countries received a much lower level of financing than most Asian countries.

Investment in Sub-Saharan African countries reached **USD 5 billion**, accounting for **17%** of the total electricity finance.

16 high-impact countries (mostly located in Sub-Saharan Africa) received **less than USD one billion** in annual commitments. 7 of these countries (Afghanistan, Angola, Ethiopia, Malawi, Mozambique, Nigeria and Sudan) reported a **decline** of more than **50%** in their electricity finance.

Source: SE4ALL Energizing Finance 2018, Bloomberg New Energy Finance and IJ Global

Sources of international finance commitments for electricity to the 20 HICs (%)



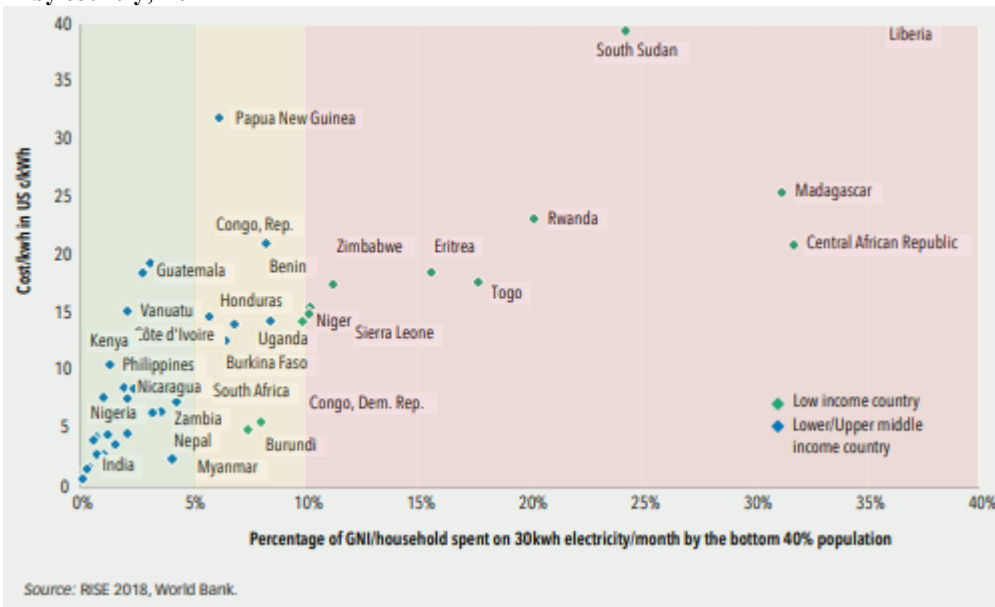
Challenges To Achieving Sustainable Energy Access

According to the Tracking SDG7 report, the affordability and reliability of electricity are the two most critical elements to be tackled in order to make progress on SDG7.1.1: Proportion of population with access to electricity.

AFFORDABILITY

A major contributing factor to the lack of energy access is the unaffordability of grid electricity. Low electrification rates are often coupled with high connection costs. The World Bank defines affordable electricity as **30 kWh of electricity that costs no more than 5% of a household's income**. In 2017, out of 26 access-deficit countries, over half have an electricity connection that costs more than one month's income for their poorest 40% of households, which is the equivalent of 400 million people.

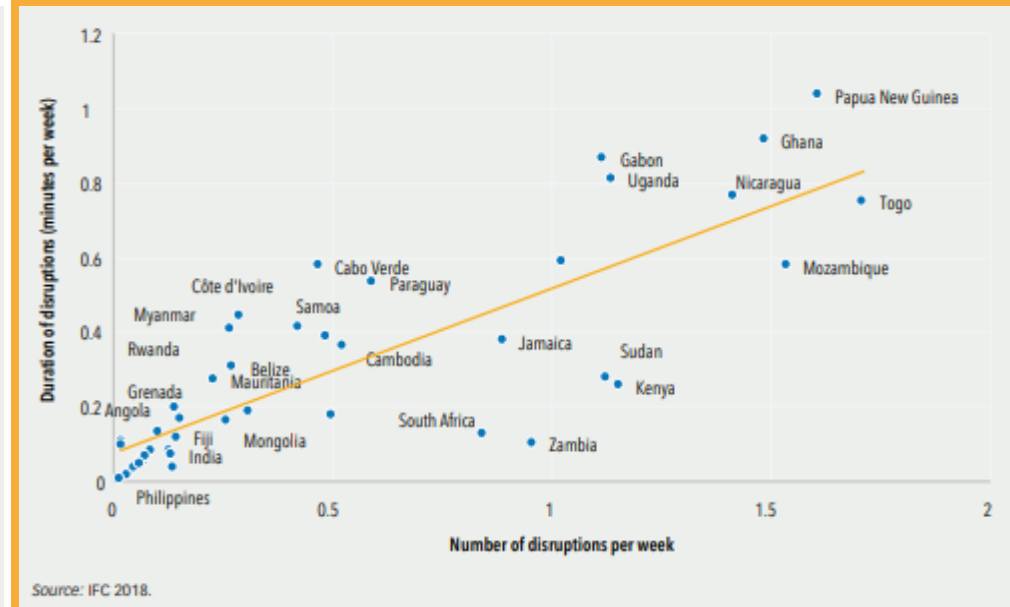
Electricity Tariffs as a share of GNI per Household among the poorest 40% of households, by country, 2017



RELIABILITY

Reliability is also another essential attribute and it consists of how frequent outages occur and how long they last. In other words, **continuous and uninterrupted supply** of electricity are indicators of reliable electricity access. **One third of the access-deficit countries experience more than one weekly disruption** that can last for over four minutes on average.

Weekly average number of and duration of disruptions, 2017



5. ETHIOPIA'S ENERGY SECTOR CONTEXT

Potential

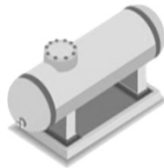
5.5 kWh/m²/day
Average
Irradiance



45,000 MW
Theoretical
Potential



10,000 MW
Theoretical
Potential



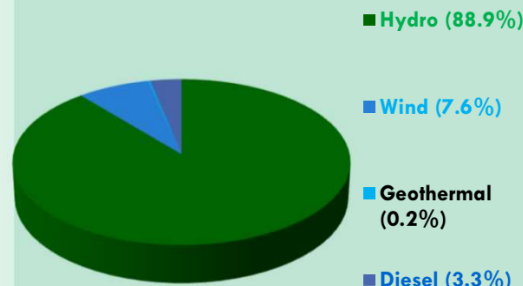
7 m²/s @ 50 m
Average Wind
Speed



Generation

4300 MW
Total Installed Capacity

Electric power
generation by source



Consumption

33%

Grid
Electrification

11%

Off-grid
Access

5.3%

Rural
Access

2500 MW

Peak
Demand

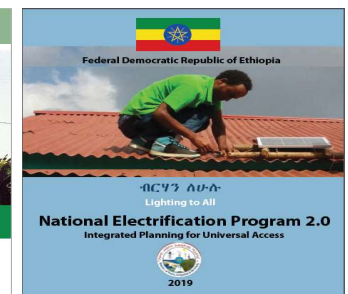
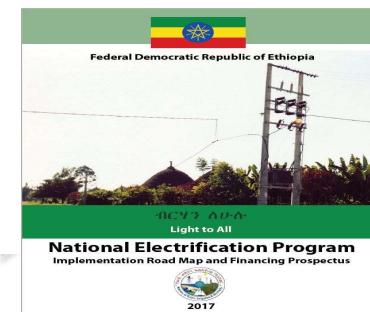
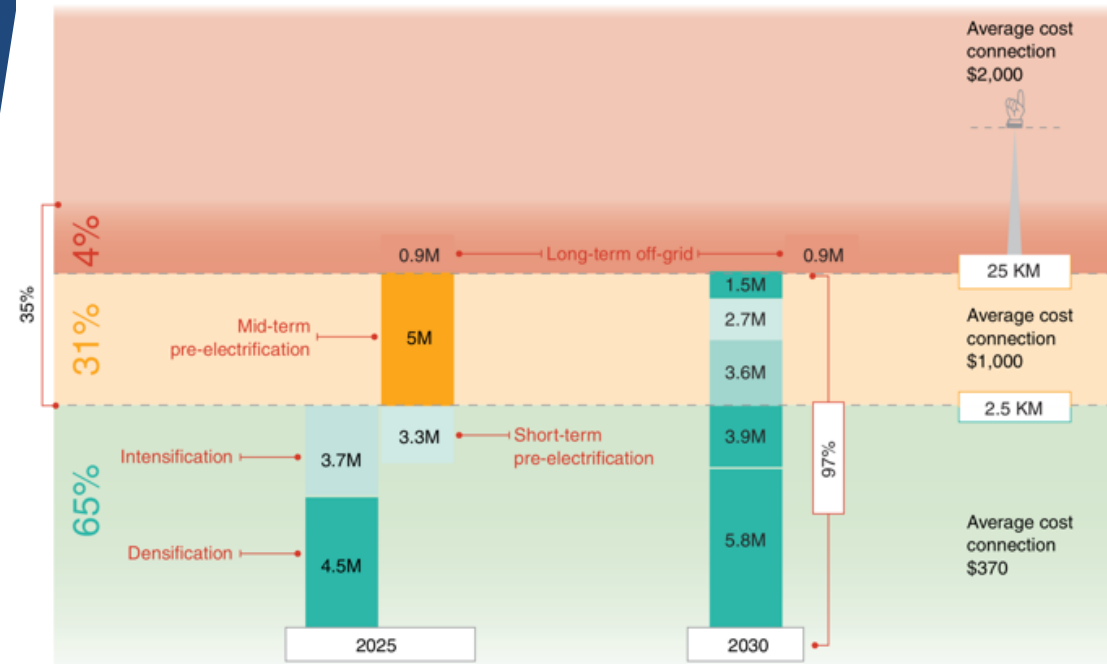
19%

Demand Growth
Per annum

5. ETHIOPIA'S ENERGY SECTOR CONTEXT

LDCs – Least-Cost Electrification Planning through National Electrification Program (NEP)

- Geospatial Study to Determine Least-Cost Electricity Planning
- 2025 – Ethiopia plans to achieve Universal Electrification
 - 65% On-grid Access –
Densification and Intensification
 - 35% Off-grid Access – Mini-Grids and Stand Alone Systems
- 2030 – Ethiopia to achieve 96% On-Grid Electrification via Grid Expansion
- Enables Lighting, Productive Use and Clean Cooking via Electric Cook Stoves

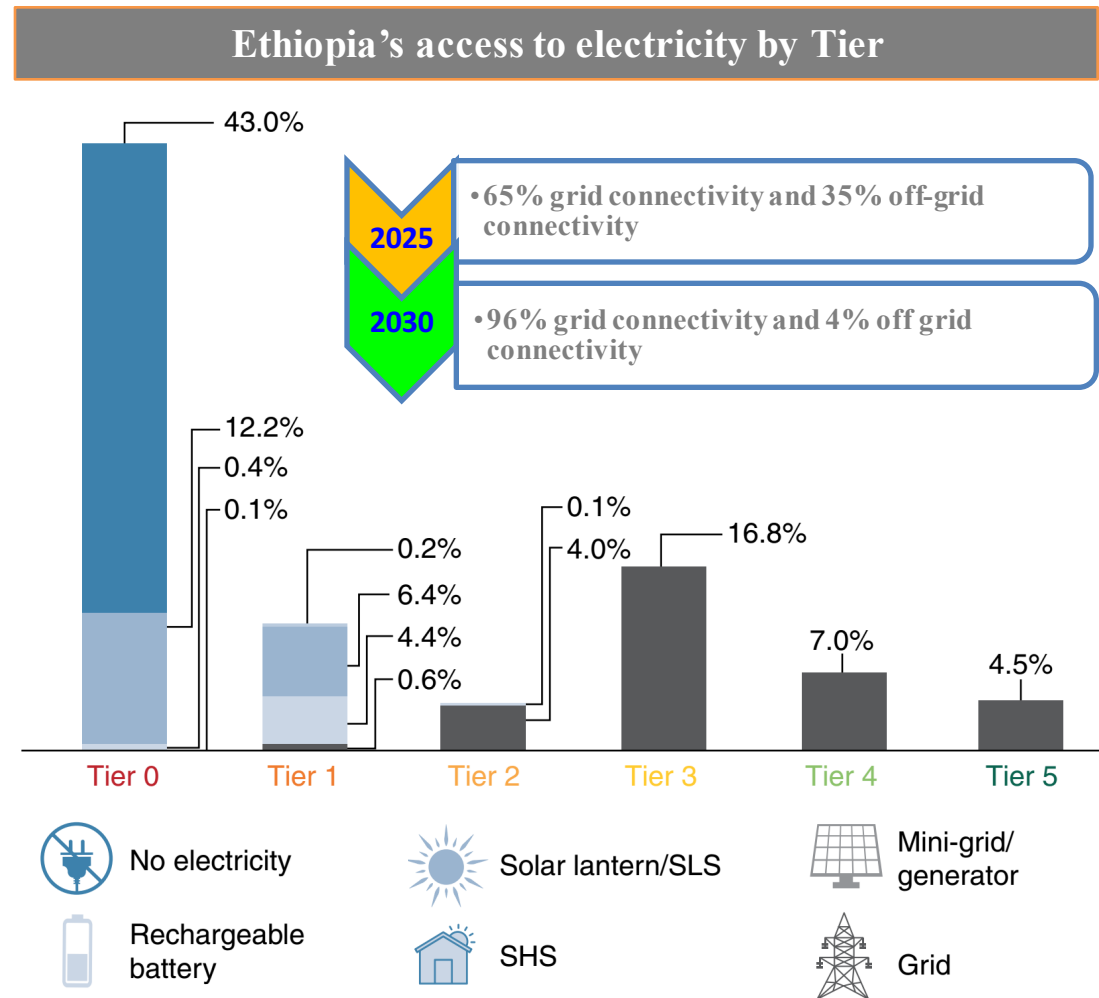


Best Practices

Examples of Success Stories that can be Replicated in Other Countries

ETHIOPIA'S NATIONAL ELECTRIFICATION PROGRAM (NEP)

- Following Ethiopia's lead and initial success, NEP is being replicated in Kenya, Madagascar, Tanzania, Niger, Guinea, Senegal, Togo, Benin, DRC and Myanmar.
- NEP has an implementation cost of more than \$6.5 Billion and the World Bank has already availed \$375 Million and committed for an additional \$500 Million. Similarly AfDB has committed \$100Million.
- only 44% of the population have access to electricity with usage level from Tier 1 to 5 as shown in the figure.



ETHIOPIA'S SUSTAINABLE GROWTH MODEL THAT FOLLOWS A SECTORAL APPROACH

- On the basis of its **Climate Resilient Green Economy Strategy (CRGE)** initiated in 2011, Ethiopia has embarked in developing and exploiting its RE resources. 50 experts from more than 20 leading government institutions have been driving the initiative. The CRGE has identified and prioritized more than 60 initiatives, to help the country achieve its development goals while limiting 2030 GHG emissions to around today's 150 Mt CO₂e
- Ethiopia ambitions to achieve middle-income status by 2025 and become the **Green Economy Frontrunner**
- With an estimated total expenditure of about **150 Billion US Dollars** over the next 20 years, providing access to climate finance in exchange for GHG emissions abatement

6. How Will The Coalition Be Implemented?

DEVELOPING A GENERIC MODEL TO UNDERSTAND THE NEEDS IN TERMS OF ENERGY ACCESS

This model would be scalable and adaptable to various countries and configurations. In order to identify the needs of a typical isolated community, the average load curve will be based on the required energy for an average family in terms of lighting, cooling, heating, irrigation and water sanitation as well as clean cooking for example. The model would be representative of the majority of cases with slight adaptation for each country.

MASTERING THE USE OF RENEWABLE ENERGY SOLUTIONS

This step consists in mobilizing the competent authorities for a better understanding and sharing of the available technical solutions whilst taking into account the renewable energy resources available as well as the final users requirements. It will help the authorities to better fulfill their needs while optimizing the cost of energy. This covers the off-grid from solar home system and mini-grids. These mini-grids could later be interconnected between them and with the existing electrical grid, thus contributing to grid expansion, intensification and densification.

CREATE A BEST PRACTICES SHARING PLATFORM

Create a platform to identify the best practices from each country to develop projects including a better resource assessment, improving the legal framework, the most effective levers and incentives to increase bankability and attracting investors in RE systems. These include the provision of guarantees, a good understanding of the market, identifying the most competitive financing sources and adopting the most effective procurement processes for faster delivery (transparent, competitive and efficient tenders) in order to attract the best private actors.

MAPPING OF EXISTING INITIATIVES AND ALIGN SUSTAINABLE ENERGY ACCESS AMBITIONS BY CREATING SYNERGIES

All the initiatives deployed, the promises made and the projects launched will only achieve concrete and significant results if there is a coordination between the respective initiatives, the actors involved and the countries concerned.

INCREASING THE VISIBILITY OF THE LOCAL MARKET'S OFFGRID RENEWABLE ENERGY PROJECTS IN ORDER TO ATTRACT INVESTORS AND CREATING A LOCAL ECOSYSTEM WITH MAXIMUM ADDED VALUE

This consists in communicating appropriately about the size and the potential of the market in developing countries with lack of electricity access, including LDCs and ODCs with a high impact on universal energy access, to attract manufacturers while identifying all the components that could be manufactured locally and assessing the exact rate of the added value in order to maximize local know-how, employment and integration. This could help accelerate the development of new renewable energy based industrial ecosystems.

MAPPING R&D RESEARCH AND PLATFORMS IN ORDER TO BOOST INNOVATION

R&D is essential in improving RE equipment and products and their efficiency. This step would consist in finding the correspondence between the solutions to be tested and the most appropriate platforms that are representative of the environment where the products are to be used. This would allow to test the products in real outdoor conditions and to determine their performance, durability and ways to improve their characteristics. In summary, this would lead to adapt the right technologies to the right environments.



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How Will The Coalition Be Implemented?

Finance energy access:

as it is shown by the example of Ethiopia, there is significant financing gap of 5.5B USD for access alone. The financing gap to reach the 840 Million population and **“leaving no one behind”** requires considerable commitment from various sources such as domestic, Public Private Partnership and development partners and streamlining these commitments to developing countries, specially LDCs, to transform national markets and accelerate investments for an effective energy transition



How Will The Coalition Be Implemented?

7. Next Steps

- Receive support from developing countries, especially LDCs with a High Impact on universal energy access that are interested in accelerating their Access to Energy, or any other country that would like to share its know-how and experience or benefit from others' know-how and experience.
- Engage with the different stakeholders and explore ways they could support the work of the coalition in a concrete manner;
- Further reflect on the ways to implement this coalition and solidify our commitment;
- Select regions or lead countries that can share their experiences and know-how to other countries.
- Establishing an implementing task force headed by steering coordinators, and composed of coalition members and primary stakeholders to assist countries, among others, in mobilizing and developing capacities, in formulating tailored policies and regulatory frameworks, Projects preparation, in unlocking investment in the energy sector.



STAKEHOLDERS

EXPECTED ASSOCIATED PRIMARY PARTNERS

AFDB

AUC

IRENA

SE4ALL

UNDESA

UNIDO

UNDP

UNFCCC

WORLD BANK ESMAP

EXPECTED ASSOCIATED COALITION COUNTRY MEMBERS

MALAWI:

Global Coordinator of LDCs' Group

DENMARK:

Co-lead of the Energy Transition Track and Coalition Country
Member

BHUTAN:

Chair of LDCs' Negotiating Group on Climate Change

COLOMBIA:

Energy Transition Track Country Member

DEMOCRATIC REPUBLIC OF CONGO:

LDC Energy Transition Coalition Country Member

INDONESIA:

Energy Transition Track Country Member

ITALY:

Energy Transition Track Country Member

SUDAN:

LDC Energy Transition Coalition Country Member.

EXPECTED SUPPORTS

BILATERAL SUPPORT

MULTILATERAL SUPPORT

COUNTRY SUPPORT

Thank you