Renewables in Developing nations
Africa and its Energy plans

- Ethiopia, Kenya and Uganda are among the most populous countries in East Africa, and have the largest populations both with and without access to electricity.
- In West Africa, electricity access rates range from below 20% in Liberia, Sierra Leone, Niger and Burkina Faso to more than 50% in Senegal and above 70% in Ghana.
- More than 90 million people in Nigeria (55% of the population), do not have access to (grid) electricity. However, the widespread use of back-up generators suggests that the population without.
- For those that do have electricity access in sub-Saharan Africa, average residential electricity consumption per capita is 317 kWh per year (225 kWh excluding South Africa). 4% of the world’s totals.
- Installed grid-based power generation capacity in Africa has been steadily increasing in recent years and reached 158 gigawatts (GW) in 2012.
Africa's Power Demands

- Grid-based electricity supply is insufficient to meet electricity demand in sub-Saharan Africa.
- It is reported to be unavailable for 540 hours per year on average (6% of the year), but this figure is much higher in some countries, such as Nigeria, Guinea and the Central African Republic.
- The unreliability of the grid is a serious problem in all generating countries.
- Dependence on Generators is real in West-African nations for power.
Africa’s Energy potential

• The Energy Revolution
• Africa’s potential for renewable energy production is extensive.
• Africa has a rather extensive and expensive job to create distribution grids across the continent.
African energy

https://www.youtube.com/watch?v=-1EjiWqNtCk
Africa and creating power

- Although almost 89% of the world has access to electricity
- Africa has an average of about 60%
- An energy deficit has effectively stunted Africa’s development, with an estimated 70 percent of people in sub-Saharan Africa without reliable access to electricity.
- IDA & IBRD stand for countries that are taking on developing or reconstructing their nations
- Sub-Saharan Africa has more people living without access to electricity than any other world region – more than 620 million people, and nearly half of the global total

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Reasons for Lack of Power

- due to poor maintenance which causes power stations to fall into disrepair.
- Many rehabilitation projects are ongoing, but much of the capacity in disrepair will never restart.
- Other factors also reduce the total capacity in operation, including lack of reliable fuel supply, particularly for gas, inefficient grid operations and insufficient transmission capacity.
- The effect of fuel supply limitations is made worse by the fact that the fleet of fossil fuel led power plants in sub-Saharan Africa consists largely of technologies with the lowest efficiencies, often favored due to their lower upfront capital costs.
- the fleet of coal-fired power plants employs low-efficiency subcritical technologies, with a fleet average efficiency of 34%.
Ethiopia and Electricity generation

- Population: currently sits at 102.4 million people
- With 43% having access to electricity
- Electricity production 56771 GWh
- Country in the horn of Africa
- Total area - 1.13 km²
- ~ 100 million inhabitants, 2.3% growth rate/year
- Average annual GDP growth rate ~ 10%
- However they produce almost no electricity from oil, gas and Coal sources
- They emit 7.8 million metric tons of CO2 from the consumption of fossil fuels
- Ethiopia current emits 11599 kt in 2014 but is steadily been climbing recently.
Ethiopia and renewables

- Installed Capacity: 4,206 MW
- Hydroelectric: 3,743 MW (89%)
- Wind: 337 MW (8%)
- Thermal: 126 MW (3%)
- Ethiopia’s Growth and Transformation Plan (GTP) Under GTP I (2010-2015), hydro power projects were constructed to increase the installed generation capacity from 2,000 MW to 10,000 MW.
- Currently the country has approximately 4,290 MW of installed generation capacity. GTP II (2015-2020) aims to increase generation capacity by more than 10,000 MW to over 17,000 MW
Power production in Ethiopia

- Ethiopia ranks #1 in Africa's Hydropower production
- consists of 12 major hydro-powerplants in its fleet
- HYDROPOWER GENERATION 9,674 GWh
  - 4054MW installed capacity
- New Zealand has a hydro power generation of 5,346 MW.
- Africa has massive hydropower capacity, of which less than 7% has been harnessed.
Equatorial Guinea

- Produces 439 GWh
- 77.44% is the share of renewable capacity in the total capacity
- Has 127 MW of Hydropower installed
- Has a population of 2.04 million people
- 67.86% has access to electricity
- 44.8% from renewables large room for growth