

Department of Infrastructure  
and Energy

# Climate change impacts on Energy & Transport Systems in Africa

Dakar, Senegal

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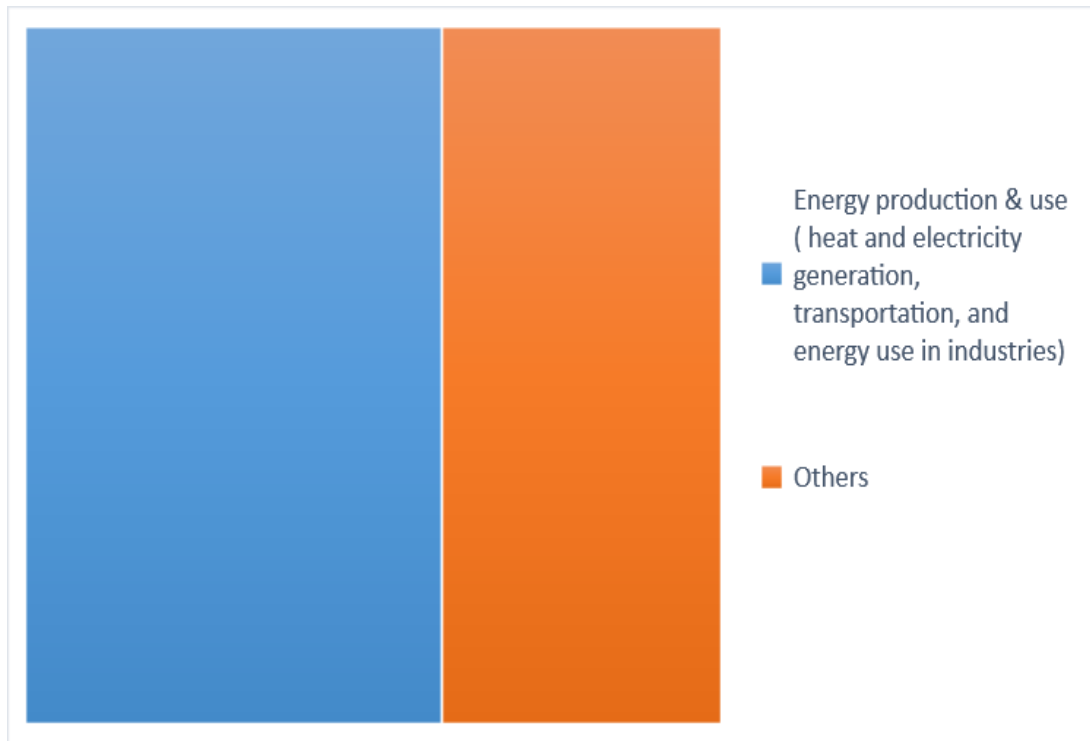
## About AU Infrastructure and Energy Department (IED)

- **IED Mandate** - *“to enhance Regional and Continental efforts for accelerated integrated infrastructure development and the **effective and sustainable deployment of energy resources**”*
- To support achievement of AU Agenda 2063 Aspirations including Flagship Projects – SAATM, Integrated High Speed Train Network, Inga hydropower, Digital Transformation Strategy, among others
- Develop Efficient Transportation Network
- Support MS and RECs towards achievement of Sustainable Development Goals, esp. SDG 7

**Climate change impacts on  
Energy  
Systems in Africa**

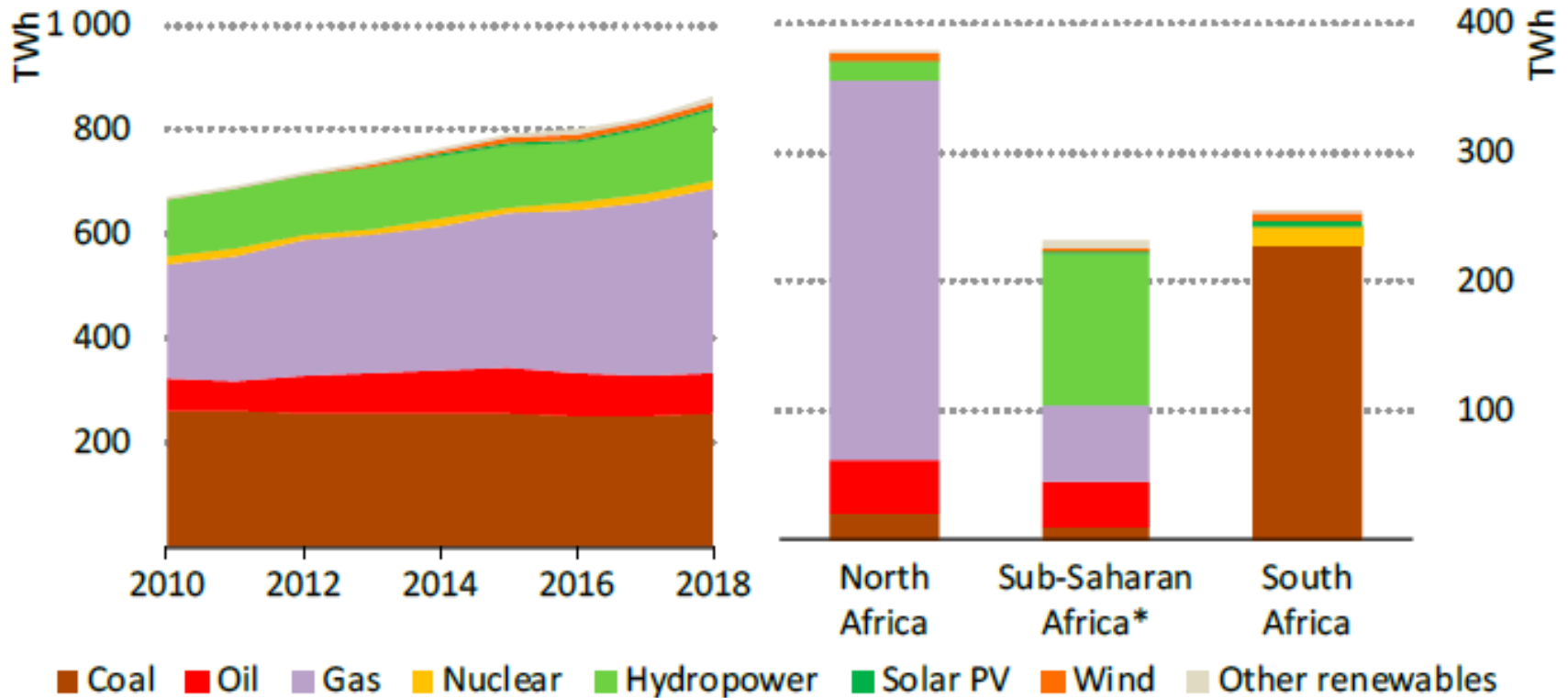
# Energy Sector and Its Greenhouse Gas Emissions

Energy **production & use** is the largest source of greenhouse gas emissions from human activities.



**FACT:** About two thirds of global greenhouse gas emissions are linked to energy production and use

# Electricity generation by fuel source in Africa (2010-2018)



**Natural gas dominant in North Africa, Coal in SA, and Hydro, NG & Oil in other parts**

# Potential impact of climate change in energy in Africa

## 1. Uncertainties and variabilities in Hydropower generation

- A number of African countries have hydropower making up more than 90% of their generation mix
- Frequent and extreme weather events such as **droughts** and floods may increase uncertainties and variabilities in hydropower output
- Some countries that mainly relies on hydropower have in the past experienced drought that led to a decline of almost 50% of the country's hydroelectric generation.
- Decline in hydropower generation resulted in **extended load-shedding** and use of **emergency power generation from fossil fuels**

Impact of CC on hydropower dependent countries:

- Spend their limited hard currency to procure emergency power generation
- Load-shedding, therefore, the economy indirectly lose money associated with **Unservd Energy**.



# Other potential impact of climate change in energy in Africa

- Increased demand for Indoor Cooling – due to rise in temperatures
- Increased vulnerability of existing power generation and transmission assets – due to flooding
- Reduced crop yield for production of biofuels

# Possible measures to achieve deep reductions in carbon emissions across the energy system

- Accelerate Renewable Energy Deployment
  - ✓ It is now cheaper to develop renewables than conventional sources of energy
  - ✓ Africa has abundant RE resources
- Develop enhanced interconnections and power pools across countries – to share RE resources
- Rapidly deploy natural gas-to-power (in short term as energy transition in Africa takes shape)
- Enhance Energy Efficiency – including minimum energy performance standard (MEPS)  
*NB: Energy efficiency is one of the most ideal and cheapest measures for reducing emissions especially in those sectors considered as “hard to decarbonize eg industries”.*
- Price on carbon - carbon tax and cap-and-trade/carbon trade (maybe yes/maybe no)



# Overview of Some AUC Energy Programmes – Enhance energy access and address climate change

## **Projects led by Energy Division:**

1. Harmonised Regulatory Framework for the Electricity Market in Africa (Africa Single Electricity Market - AfSEM)
2. Regional Geothermal Programme and GRMF
3. Africa Bioenergy Policy Framework and Guidelines
4. Modernizing Cooking Technologies in Africa
5. Solar Energy and Mini/Off-grid Development
6. Renewable Energy in Small Island Developing States (SIDS)

## **Projects shared with other Divisions:**

1. Programme for Infrastructure Development in Africa (PIDA)

**Climate change impacts on  
Transport  
Systems in Africa**

# Climate change, a threat to africa's transport systems

Transportation infrastructure, such as roads and railway systems, is one of the sectors most threatened by climate change. Extreme weather events – such as flooding, sea level rises and storm surges – repeatedly wreak havoc on transport networks.

In Africa, extreme weather is a threat that can cause extensive structural damage. It can also accelerate the ageing of infrastructure components. This can lead to considerable financial losses.

## Impact of climate change on various modes of transport

- Roads and Railways: Heavy rains result in flooding which disrupt traffic, delays construction activities and weaken or wash out the soil and culverts that support roads, railways and bridges. On the other hand land transport systems contribute to high level of CO2 emissions
- Maritime transport and ports infrastructure: Changes in precipitation affect shipping in many ways: closing shipping channels, creation of silt debris causing shallower and less accessible channels
- Airport infrastructure : Increased rains and flooding disrupt air travel, storms can cause many airports to close, flight delays and cancellation



# Contribution of transport modes to CO2 emissions

**Transport emissions** — which primarily involve road, rail, air and marine transportation — account for over 24% of global CO2 emissions in 2016.

In terms of transport, **72% of global transport emissions come from road vehicles**, which accounted for 80% of the rise in emissions from 1970-2010.

Emissions have also increased in other transport modes, **such as international aviation, domestic aviation and international and coastal shipping**. The main exception is railways; powered by a significant share of electricity, rail emissions have actually declined.

(Source : World resource Institute)

# What must be done to mitigate impacts of climate change to transport systems

- African Governments should ensure that transport infrastructure is developed with the ability to cope with current and future climate shifts
- Climate change and adaptation should be incorporated in transport infrastructure project design and implementation **through environmental impact assessments and environmental management plans ( ESMPs)**
- Every country in Africa has some form of legislation that requires an environmental impact assessment. However the challenge is that in most african countries the recommendations of EIAs **are not implemented throughout the project cycles.**
- The drive to carry out the EIAs is just a result of pressure from climate sensitive international organizations and financial institutions and most african countries lack the necessary resources to invest in climate adaptation projects
- Integrating climate change into an environmental impact assessment and environmental management plans is a simple steps but it's not being done in Africa. This is due to various challenges including **lack of knowledge, awareness, technical and financial resources and legislation support**

# Ongoing and planned initiatives-AU Department of infrastructure and Energy

## **Land Transport systems**

1. In line with the African road safety action plan, the AUC jointly with UNEP is engaging various partners to implement a project on safer and cleaner used/imported cars piloted by UNEP
2. AUC is developing the African Railway Market with an objective to encourage a reasonable shift from road to railway. The Ministers of Transport recently adopted the minimal norms and standards of the African Railway network (defined) as well as the roadmap toward the development of the African railway market. The market will support the intra-African Trade, industrialization and the AfCFTA.
3. The adopted Railway Technical specification of interoperability promote electrical traction trains
4. AUC is planning to develop a continental green, SMART and clean Transport policy, intermodal transport strategy and the Non Motorized Transport strategy based on the existing Continental Transport Policy

## **Air Transport system :**

1. Offsetting CO<sub>2</sub> will also help in reducing emissions from air travel through individual actions before and after a flight.
2. African member States and Airlines are working with ICAO to address aviation's greenhouse gas emissions during the recovery of air transport industry by focusing on four priority areas: State Environmental Action Plans, sustainable alternative fuels; Market-based Measures (MBMs); and global aspirational goals to ensure long-term sustainability of aviation. Availability of sustainable alternative fuels should be guaranteed by national policies that incentivize their development and their deployment.

Thank you  
Merci  
شكرا  
Obrigado