COMBATING CLIMATE CHANGE AND CREATING OPPORTUNITIES THROUGH TECHNOLOGY INNOVATION

AT THE 13TH INTERNATIONAL OF THE NIGERIA COMPUTER SOCIETY (NCS)

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WHAT WE KNOW

- The level of greenhouse gases in the atmosphere have increased, causing the Earth's temperature to rise.

- The greenhouse gases has steadily increased over the past century largely due to human activity (anthropogenic).

- The emissions have a significant impact on the world around us.

The ‘Paris Agreement’

195 countries, including Nigeria, adopt first universal, climate agreement to:

1.5-2°C

Keep temperature well below 2°C

$$$

Provide more than $100 billion in support from developed to developing countries

Increase support for technology transfer and capacity building

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- The Nigeria Nationally Determined Contributions (INDC) towards addressing climate change envisages reduction of emission by 20% below BAU by 2030, rising to 45% with support from the international community.
- The NDCs have been ratified for effective implementation.

Climate change is threatening national development across all sectors

1.
More extreme weather – floods and droughts

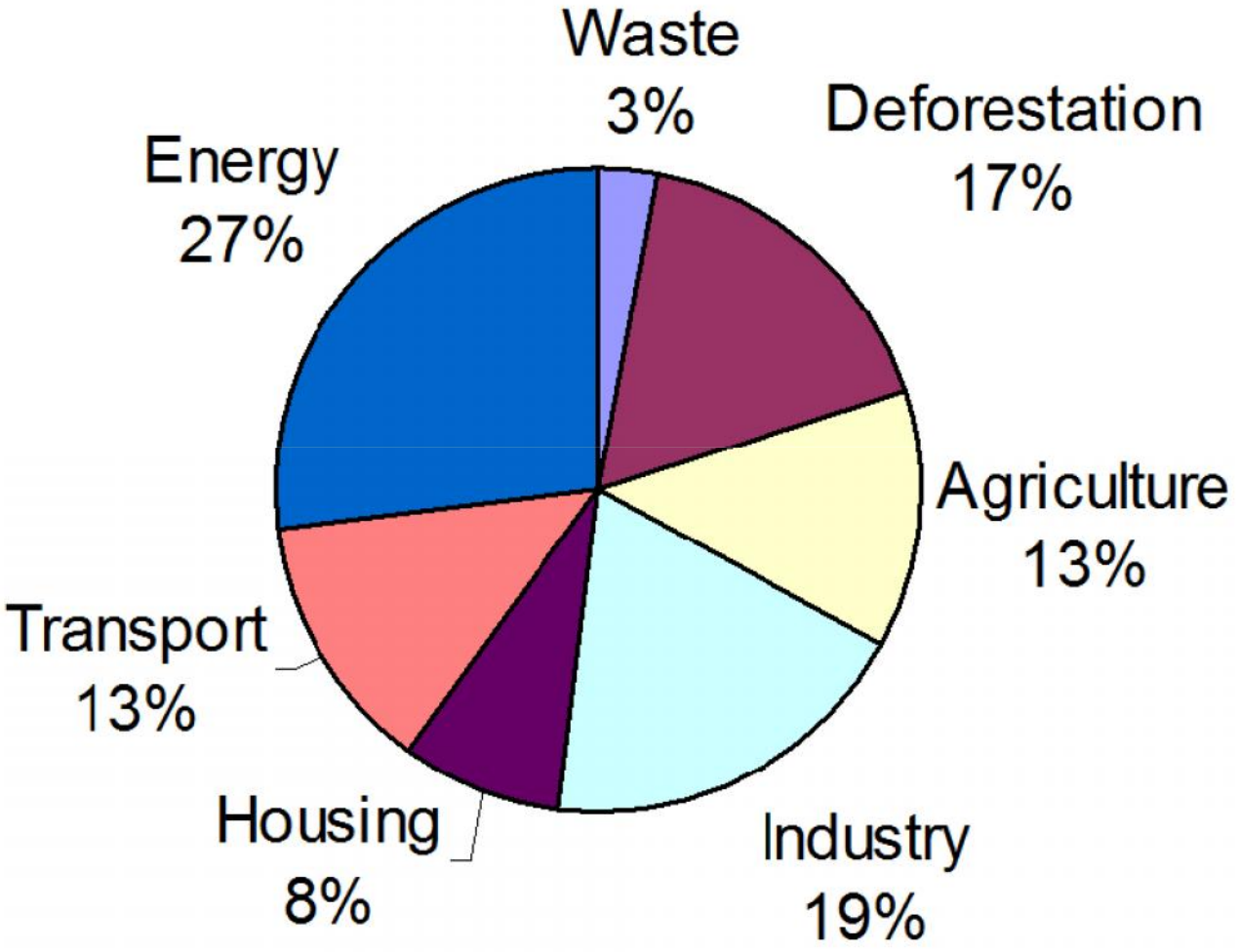
2.
Loss of agriculture and increased water scarcity

Increased instability/ insurgency

3.
Up to 11% GDP loss by 2020 without adaptation and mitigation

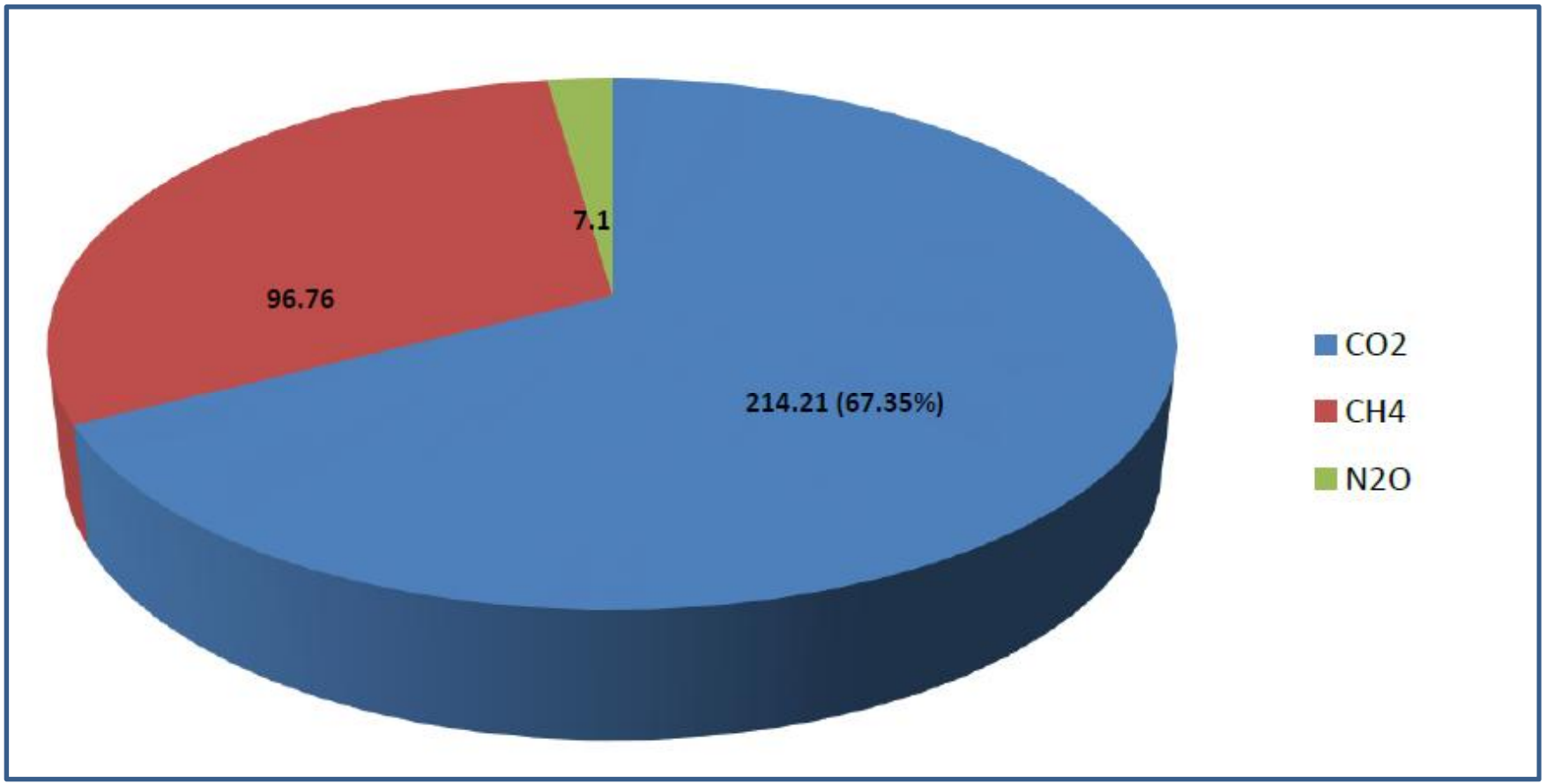
4.
Damage to roads, buildings, transport, energy facilities

Global Emission Sources (in 2004)



Source: IPCC AR4, 2007

Nigeria's GHG Emissions by Gas Type



Source: NSNC , 2000

Nigeria's GHG Emissions by sector

Sector	Emissions ($MtCO_2e$)	Emissions (%)
Energy:		
• Fuel Combustion	133.01	60.32
• Fugitive Fuel Emissions	22.33	10.13
Agriculture	60.69	27.52
Industrial Processes	2.10	0.95
Waste	2.38	1.08
TOTAL	**220.51**	**100**

Source: NSNC,2000.

In line with the Convention, Nigeria's activities and measures towards combating climate change includes

- Assessing the amount of greenhouse gases in Nigeria atmosphere (Greenhouse Gas Inventory)
- Designing and implementing greenhouse mitigating options (REDD+, Renewable Energies etc);
- Assessing vulnerability to, and impacts of, climate change;
- Developing adaptation options to the impacts of climate change;
- Creating awareness on climate change
- Advising Government on policies and actions in relation to climate change;

CC and ITC tools

- IT components
- ICT Tools be used in MRV all CC activities
- Activity data collection
- Storage
- Analysis
- Archiving

Nigeria and Climate Change

- Nigeria is Party to the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol;
- Nigeria ratified the Convention and the Protocol in 1994 and 2004 respectively;
- Also, the Paris Agreement has been adopted, signed by Mr. president .
- DCC undertakes and coordinates National Implementation of the Convention ,the Kyoto Protocol and Paris Agreement activities in Nigeria .

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Nigeria is particularly vulnerable to the impact of climate change in many fronts considering:

- Its Geography, climate, vegetation, soils;
- Its Economic structure, population and settlement, energy demands and agricultural activities;
- Low adaptive capacity due to:
  - low levels of awareness,
  - human and financial resources, and
  - institutional and technological capability.

Response to Climate Change

- Responding to climate change falls into two broad classes of action, **mitigation and adaptation.**
- Mitigation refers to measures that may either reduce the increase in greenhouse emissions (abatement) or increase terrestrial storage of carbon (sequestration).
- Adaptation refers to all the responses that may be used to reduce vulnerability.

Mitigation measures identified in the INDC

1. **Energy**

- Renewable energy, particularly decentralized
- Multi-cycle power stations
- Scalable power stations of 20-50MW
- Enforced energy efficiency
- Use of natural gas rather than liquid fuels

2. Oil & Gas

- Improved enforcement of gas flaring restrictions

3. Agriculture and Land Use

- Climate Smart Agriculture
- Stop using charcoal

Cont'd

4. Industry

- Benchmarking against international best practice for industrial energy usage
- Adoption of green technology in industry

5. Transport

- Modal shift from air to high speed rail
- Moving freight to rail
- Upgrading roads
- Urban transit
- Toll roads/ road pricing
- Increasing use of CNG
- Reform petrol/ diesel subsidies

Nigeria's Mitigation Efforts

Energy Sector

- The Clean Development Mechanism (CDM) under KP to which Nigeria is a signatory has provided ample opportunities for emission reduction from the energy sector in the country.
- Examples among others include :

- ❑ The conversion of the natural gas that was once flared in the process of petroleum exploitation into cooking gas. This is running in Kwale oil gas processing plant
- ❑ Efficient wood stove is capable of reducing emission by 31,309 tCO_2

Forestry and Land Use Sectors

- Afforestation and reforestation programme
- REDD+
- Tree cultivation in forestry is an indisputable efficient mechanism for carbon sequestration

Mitigation in the Agricultural Sector

- Suitable agricultural management practices such as zero- or minimum-tillage,
- Improved fallows, crop rotation and retention of residues on the soil surface

Other Mitigation options

- Massive sensitization on the dangers of bush burning;
- Awareness creation on methods to avert bush fires;
- Rehabilitation of degraded areas
- Effective watershed management.

Some Focus areas for Innovations

- Resource Use Efficiency: Waste-to-energy, materials recovery, reuse and recycling.
- Water Management: Potable water, rainwater harvesting, efficient irrigation, wastewater treatment and recycling, water use efficiency, desalination.
- Sustainable Agribusiness: Water/energy efficient irrigation systems; waste management; high-value agribusiness; sustainable land use practices; waste-to-energy; and wind and solar energy for farms.
- Solar Energy: Residential and commercial self-generation, residential and commercial water heating, solar-powered air-conditioning.
- Energy Efficiency: Lighting, household appliances, air-conditioning, commercial cooling and ventilation systems, consumer behaviour, building energy management systems, building design and materials.

Mitigation Strategy : Transportation Efficiency

Fuel efficient cars get more miles per gallon (mpg)

Increasing the fuel efficiency of cars will reduce the amount of CO_2 emitted into the atmosphere

Mitigation Strategy cont'd: Transport Conservation

With more cars on the road, the amount of CO_2 emitted steadily increases.

Reducing the time and number of cars on the road will reduce emissions.

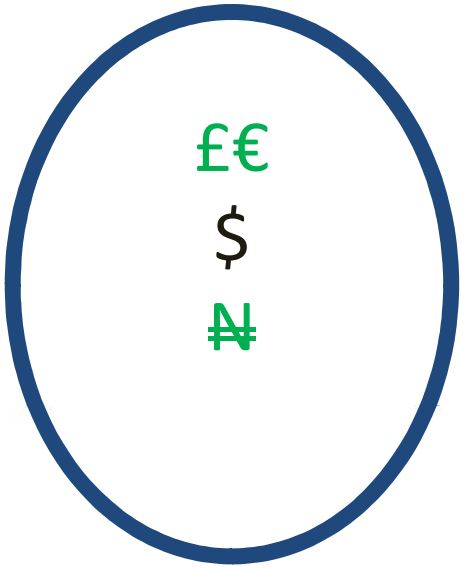
Increasing the use of public transportation would reduce the amount of individual driving time.

Mitigation Strategy cont'd: Building Efficiency

Mitigation Strategy Cont'd: Efficient Energy Production

ENERGY EFFICIENCY AND REFORESTATION PROJECT

- Mitigating climate change impacts in the country requires among other things :
- huge financial commitment;
- Technology



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- Technology can be a powerful solution for simultaneously addressing climate change and advancing development.
- Towards combating the impacts of climate change, Government is promoting technologies and practices such as sustainable land management, climate resilient agriculture, water efficiency, clean energy etc
- Also, we have put in place a Climate Change Policy and Response Strategy with the strategic goal of fostering a low-carbon, high growth economic development path and building a climate resilient society.

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- Since technology is a source of greenhouse gas (GHG) emissions, achieving global reduction of GHGs requires innovation to make current technologies cleaner and climate-resilient.

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- The **Strategic Objectives of the Policy include issues related** to:
- climate change mitigation,
- adaptation,
- climate science
- technology,
- public awareness, private sector participation, and strengthening national institutions and mechanisms

Low carbon growth can drive grid powered industrializat

...New Gas policy, RE s

...Low Carbon Growth , off grid drives small infrastructure for rapid delivery into clusters to improve quality…..

…potentially Coops can **reduce annual $750bn post harvest losses** with irrigation, cold chains storage…

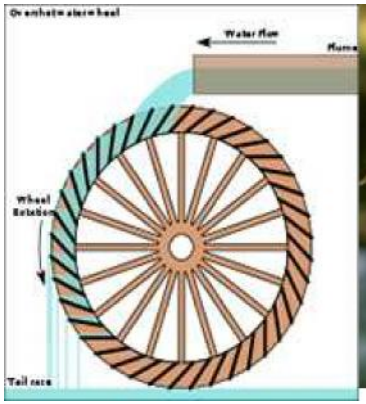
Powering agribusiness & commerce,

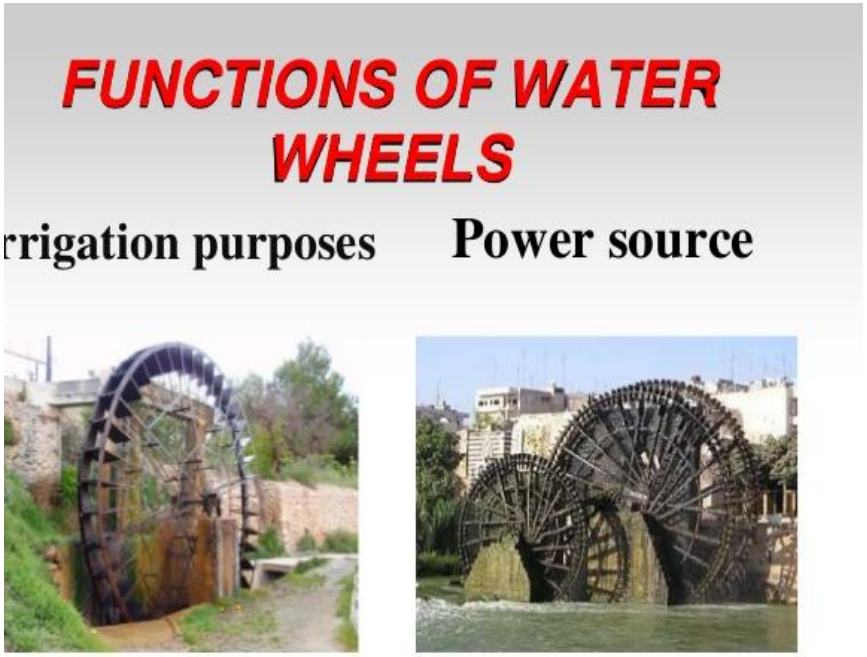
…Low Carbon Growth, off grid enables telecoms to leapfrog tech into rural, peri-urban communities

solar kiosks innovations… skills, commerce, advisory services, entertainment biz…

…many pilots… but Smes need quality, standards and scale…

Low Carbon Growth leverages the Ecosystem for cost efficiency





- **Cost Efficiency** -- low carbon growth drives rural economy thru off grid power eg generate power using water wheels without need for dams**;**
- **Resource optimization** eg converts gas flares to develop downstream commerce and revenues, supports envi and public health.
- **Leveraging Ecosystem Functions and Habitat services** eg. USEPA reports 30% increased yield against fertilizers; wild honey business is booming in Nigeria now being merged into crops, saves environment , saves costs
- **Restore Ecological Scarcities:** Eg restoring biodiversity loss in Lake Chad for 33m people
- **Reclaim Eroded Lands** using plants known for Soil Stabilization s more sustainable & cheaper

Low Carbon Growth drives New Economic Zones & Industrial Hubs

Cyber café

Café

Shop/Offices

School

AgFin Centre

AgBank Building
(partitioned like a normal banking hall)

Worship Centre

Recreation Centre

Tractor Hire

Agricultural Hub

Technology Mechanisms Under the UNFCCC

- CTCN
- UNFCCC Technology Transfer
- GEF

Cont’d

- **Climate Technology Centre and Network (CTCN)**
- The CTCN promotes the accelerated transfer of environmentally sound technologies for low carbon and climate resilient development at the request of developing countries.
- They provide technology solutions, capacity building and advice on policy, legal and regulatory frameworks tailored to the needs of individual countries

- The Climate Technology Centre & Network facilitates the transfer of technologies through three core services :

- Providing technical assistance at the request of developing countries to accelerate the transfer of climate technologies;
- Creating access to information and knowledge on climate technologies.
- Fostering collaboration among climate technology stakeholders via the Centre's network of regional and sectoral experts from academia, the private sector, and public and research institutions.

- Through these services, we aim to address barriers that hinder the development and transfer of climate technologies, and to thereby help create an enabling environment for:

- Reduced greenhouse gas emissions and climate vulnerability
- Improved local innovation capacities
- Increased investments in climate technology projects.

GEF

- Technology transfer plays a critical role in the effective global response to the climate change challenge.
- The GEF has a mandate from the UNFCCC to finance the transfer of Environmentally Sound Technologies, and has evolved into the largest public-sector funding source in this area.
- These technologies, compared to others, have the potential for significantly improved environmental performance.

- The GEF will support projects in the following categories:
- Technologies with transformational potential;
- Acceleration of low emission technology innovation and uptake through demonstration, deployment, and transfer using policies and mechanisms;
- Collaborative initiatives with stakeholders, including the private sector, to adapt technologies to user needs.

Some Focus areas for Innovations

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- Energy Efficiency: Lighting, household appliances, air-conditioning, commercial cooling and ventilation systems, consumer behaviour, building energy management systems, building design and materials.

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- Efficiency improvement is proving to be the most cost-effective, near-term option with multiple benefits, such as reducing adverse environmental and health impacts, alleviating poverty, enhancing energy security and flexibility in selecting energy supply options,
- and creating employment and economic opportunities. Research shows that required improvements in energy efficiency particularly in end-use can be achieved quickly.

  For example:
- retrofitting buildings can reduce heating and cooling energy requirements by 50–90 percent
- new buildings can be designed and built to very high energy performance levels, often using close to zero energy for heating and cooling
- electrically-powered transportation reduces final energy use by more than a factor of three, as compared to gasoline powered vehicles

THANK YOU FOR YOUR ATTENTION