

BUDGETING FOR CLIMATE CHANGE IN THE HOUSING SECTOR



CENTRE FOR SOCIAL JUSTICE (CSJ)

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By

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ACRONYMS

BEEG	Building Energy Efficiency Guideline
CBN	Central Bank of Nigeria
CO ₂	Carbon Dioxide
FGN	Federal Government of Nigeria
FMB	Federal Mortgage Bank
GDP	Gross Domestic Product
HUDR	Housing and Urban Development Roadmap
ICESCR	International Covenant on Economic, Social and Cultural Rights
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
LEED	Leadership in Energy and Environmental Design
LPG	Liquefied Petroleum Gas
MDAs	Ministries, Departments and Agencies of Government
NASPA-CCN	National Adaptation Strategy and Plan of Action on Climate Change in Nigeria
NHF	National Housing Fund
NIIMP	Nigeria Integrated Infrastructure Master Plan
NPE	National Policy on Environment
R&D	Research and Development
SCBI	Sustainable Construction and Building Initiative
UNEP	United Nations Environmental Programme
WHO	World Health Organization

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EXECUTIVE SUMMARY

Nigeria is currently experiencing a growing urban population and a housing deficit estimated as ranging between 17-23 million homes. The incidence of largely fast expanding human settlements and unplanned cities is ascribed to a number of challenges in the sector. Notwithstanding the need for the building of more human settlements and adequate housing, the challenge is that the impact of construction and human activities is contributing a great deal to climate change. The recent Nigeria Land, Housing and Urban Development Roadmap identified one of the challenges in housing development to be the abuse of the natural environment due to lack of adequate land use planning and poor land husbandry resulting in loss of biodiversity, deforestation, desertification, soil erosion and pollution of land, air and water.

The impacts of climate change can be classified as physical, ecological, social and economic. With regards to its impacts on housing, the most obvious is the physical impacts including increased temperature, sea level rise, coastal erosion, water shortage, climate related health risk, drought and desertification, increased flooding associated with high rainfall events and high winds. Moreover, if climate change impacts decrease the national Gross Domestic Product (GDP), this will in turn lead to decreased available funding for the construction and renovation of housing.

The building and construction industry is a major contributor to environmental pollution, with high levels of energy consumption and greenhouse gas emissions, all of which contribute to climate change. Housing is the single largest sub-sector of the construction industry. It is also a basic need associated with social and economic benefits, and its demand in most emerging economies is substantial. Hence, it is a sector with significant potential not only to mitigate the negative impact of climate change on buildings and people, but also to reduce the impact of the construction industry on the natural environment. Housing is a fundamental need of humanity and its availability is integral to advancing economic and social well-being, education and public health and managing climate change.

This Study highlights the significant and varied ways in which the budget of the Federal Ministry of Lands and Housing supports policies that actively contribute to reducing the negative impacts of climate change. The Study reviews key policy provisions on housing and climate change including National Adaptation Strategy and Plan of Action for Climate Change in Nigeria (NASPA-CCN), Building Energy efficiency Guideline for Nigeria, the mandate of the Ministry of Lands and Housing, etc. It reviewed the trend of allocations to the housing sector between 2013 and 2016; positive impact of budget allocations on climate change and projects and programmes that should be continued.

Further, it reviewed policies and programmes that should be discontinued due to their negative impact on climate change, analyses low hanging fruits and ends with budget and policy recommendations.

The recommendations are as follows:

A. Strengthening Policies and Budgeting

Improve the allocation and implementation of budget to the housing sector to provide for social mass housing that is environmentally friendly.

B. Appropriate Funds to the National Housing Fund

In accordance with section 6 of the National Housing Fund Act, FGN should on a yearly basis, appropriate funds to compliment contributions and thereby increase the pool of funds available to NHF for disbursement to contributors. Include climate change mitigation in the broad mandate of the Fund, primary mortgage institutions and users of the Fund.

C. Tap Alternative Sources of Funds for Housing

Alternative funding can be explored as follows:

- The Central Bank of Nigeria should consider the establishment of a special fund for the housing sector which should be in the neighbourhood of not less than N1 trillion. Similar funds have been set up in the past by CBN for other sectors.
- Long term concessionary funding can be raised by FGN and the states and specially dedicated to the housing sector.
- The prospect of using pension funds for ecologically sustainable buildings. The funds can be accessed through new prudential guidelines from the Pension Regulatory Commission and with the full support and guarantee of the Federal Government.
- Green Bonds can also be used to finance the sector.
- The Nigeria Mortgage Refinancing Company should be strengthened with more resources to increase its impact in bridging the green housing deficit.

D. Private Sector Participation: Create an enabling and conducive environment including fiscal incentives for private investment into affordable green housing and to include mass tree planting in estate developments for ecosystem balance and environmental protection.

E. Climate Change R&D: Appropriations should be dedicated to fund climate change specific research and development in the housing sector. Existing universities, polytechnics and research institutes should lead the way.

F. Finance Curriculum Change in Public Tertiary Institutions: Beyond R&D, it is imperative that FGN and states should finance curriculum change in major courses that award degrees and diplomas in the built environment in such courses as architecture, engineering, etc. Creating the necessary sensitization for professional associations in the sector to engage in retraining of professionals is also imperative.

G. Build Local Production and Service Delivery Capacity: A good number of the materials required for housing that responds to the climate change challenge may need to be imported. Government should use tariff and non-tariff measures and new policies to build local capacity for production and service of these materials. Pioneer industry status, tax holidays, higher tariffs for fully built and imported materials, lower tariffs for CKDs and raw materials for local manufacture, etc., should be explored.

H. Centralized Solar Plants: There is need for centralized solar plants which will take care of boreholes and streetlights together. This will save cost of establishing solar powered boreholes and solar powered streetlights separately.

I. Relevant Evolving Policies and Housing: Future housing construction should be driven by evolving government policies such as the 'National Energy Efficiency Action Plan' and the 'Building Energy Efficiency Design Guideline'. It should also incorporate the principle of sustainability, demographical changes, land supply, planning and the fast evolution of innovative technology. The federal and relevant state MDAs should review and modify housing designs and building codes in the light of climate change to specifically incorporate new roofing requirements, water harvesting, alternative materials, etc.

J. Shift to New Technologies: Meeting the challenge of climate mitigation will require dramatic advances in technologies and a shift in how Nigeria generates and uses energy. Building green is one of the best strategies for meeting the challenge of climate change because the technology to make substantial reductions in energy and CO₂ emissions already exists. According to International Energy Agency (2015), the average Leadership in Energy and Environmental Design (LEED) certified building uses 32% less electricity and saves 350 metric tons of CO₂ emissions annually. Modest investments in energy-saving and other climate-friendly technologies can yield buildings and communities that are environmentally responsible, profitable and healthier places to live and work, and that contribute to reducing CO₂ emissions.

Investing in Green Buildings provide abundant opportunities for saving energy and mitigating CO₂ emissions. The use of high efficiency boilers for heating, LED lighting, ENERGY STAR appliances all save money over the long term and reduce energy consumption. Reduced energy consumption at home means less fossil fuel combustion at the power plant and less impact on the climate.

K. Invest in Behavior Change, Sensitisation and Awareness Creation: When considering sustainable housing, appropriate design and technology are not enough, it is also necessary to foster sustainable behavioral change.

L. Adequately Fund Relevant Regulatory and Enforcement Agencies: This will ensure that policies and plans are implemented to the letter and will not remain mere aspirations and dreams. The existing building codes and guidelines should be strengthened and effective mechanisms for implementation created.

1.0 INTRODUCTION: ADEQUACY OF HOUSING

Adequate housing is a fundamental need of humanity. The right to adequate housing is guaranteed by various international and regional human rights conventions, national constitutions and laws. The International Covenant on Economic, Social and Cultural Rights to which Nigeria is a signatory guarantees the right to adequate housing and continuous improvement of living conditions.¹ Although the Nigerian Constitution does not guarantee a right to housing, section 16 of the Constitution mandates the State to direct its policy towards ensuring suitable and adequate shelter for all citizens². Section 43 of the same constitution also guarantees the right of every Nigerian to acquire and own immovable properties in Nigeria. Nigeria is a signatory to the Africa Charter on Human and Peoples' Rights and article 14 of the Charter also guarantees the right to own properties including housing.

Nigeria is currently experiencing a growing urban population and a housing deficit estimated as ranging between 17-23 million homes. The incidence of largely fast expanding human settlements and unplanned cities is ascribed to a number of challenges in the sector. Notwithstanding the need for the building of more human settlements and adequate housing, the challenge is that the impact of construction and human activities is contributing a great deal to climate change. The recent Nigeria Land, Housing and Urban Development Roadmap identified one of the challenges in housing development to be the abuse of the natural environment due to lack of adequate land use planning and poor land husbandry resulting in loss of biodiversity, deforestation, desertification, soil erosion and pollution of land, air and water³.

The central theme that links housing, the environment and climate change is the concept of "adequacy". It is not just enough to have a roof over the head as housing must be adequate. In this regard, part of the seven functional parameters of adequate housing focuses on availability of services, materials, facilities and infrastructure; habitability and location⁴.

Availability of services, materials, facilities and infrastructure: An adequate house must contain certain facilities essential for health, security, comfort and nutrition. All beneficiaries of the right to adequate housing should have sustainable access to natural

¹ See Article 11 of the Convention.

² 1999 Constitution of the Federal Republic of Nigeria, CAP 23 LFN 2004. Note that the provisions of Section 16 of the Constitution 1999 as well as all other sections in Chapter Two are non-justiciable by virtue of Section 6(6) (c) of the Constitution.

³ 'Nigeria Land, Housing and Urban Development Roadmap: Transforming Land Administration, Housing Delivery and Urban Development In Nigeria Year 2014-2043' available at <http://www.landsandhousing.gov.ng/orhttp://baraka.consulting/uploads/Final%20Road%20Map%20FMLHUD.pdf>

⁴ See General Comment No.4 (Sixth Session 1991) on the Right to Adequate Housing interpreting article 11 (1) of the Covenant on Economic, Social and Cultural Rights.

and common resources, safe drinking water, energy for cooking, heating and lighting, sanitation and washing facilities, means of food storage, refuse disposal, site drainage and emergency services.

Habitability: Adequate housing must be habitable, in terms of providing the inhabitants with adequate space and protecting them from cold, damp, heat, rain, wind or other threats to health, structural hazards, and disease vectors. The physical safety of occupants must be guaranteed as well. The Committee encourages States parties to comprehensively apply the Health Principles of Housing prepared by WHO which view housing as the environmental factor most frequently associated with conditions for disease in epidemiological analyses; i.e. inadequate and deficient housing and living conditions are invariably associated with higher mortality and morbidity rates.

Location: ...Similarly, housing should not be built on polluted sites nor in immediate proximity to pollution sources that threaten the right to health of the inhabitants⁵.

1.1 HOUSING AND CLIMATE CHANGE

Recent estimates of the United Nations Environmental Programme (UNEP)'s Sustainable Construction and Building Initiative (SCBI) assigns 30-40% of the global energy use to the housing sector. Thus, the housing sector is one of the key sources of demand for energy and materials that produce greenhouse gases. Moreover, there are greenhouse gas emissions from deforestation when vegetation is cleared to make way for houses. Almost 90% of the world's energy is supplied through the combustion of fossils and every time we burn fossils to create energy, we release other greenhouse gases such as methane, nitrous oxide, carbon dioxide etc. into the atmosphere. Carbon dioxide, in turn is the principal component of the greenhouse gases that are responsible for warming the planet, rising sea levels, extreme weather conditions and drought, with associated human insecurity. Traditional energy use and climate change are two sides of the same coin. But they need not be so necessarily interwoven if renewables are mainstreamed. Thus, the high-energy requirement of the building sector translates into global warming.

The Paris Climate Change Agreement in its article 2 (a) requires that we hold the:

"..global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change".

According to Obot (2010), collective evidence presented at the 2009 Copenhagen Climate Negotiation indicates that in order to avoid dangerous climate change; we must

⁵ Supra, General Comment No.4.

keep global warming at below 2°C above pre-industrial levels (we are currently at 0.7° C above pre-industrial levels).

According to International Energy Agency data (2015)⁶, global residential emissions of carbon dioxide (CO₂) account for about 6% of total global direct CO₂ emissions from combustion sources. Of the total CO₂ emissions from electricity and heat, 11% of it is from residential buildings, for example, in the use of LPG/gas, oil for cooking, heating and cooling. This estimate relates to CO₂ emissions from combustion only. It does not consider climate change pollutants that may have an even more powerful global warming potential than CO₂, such as methane, and black carbon emitted by household biomass combustion in developing countries including Nigeria. Also excluded are refrigerants and powerful climate change agents used for home appliances and air conditioners. While a more complete accounting of emissions is thus needed, the data reflects the significant contribution of the housing sector to climate change. The rate of energy consumption and use at homes, offices and industrial areas plays a great role in the effect of climate change in Nigeria. Homes and commercial buildings use large amounts of energy for heating and cooling and use up a lot of fossil energy which contributes to global warming and climate change.

The Federal Government recently launched the Building Energy Efficiency Guideline (BEEG) 2016, which is an update of the National Building Code of 2006.⁷ The Guidelines aim to ensure access to sustainable energy service in the housing sector, energy efficiency in buildings and factors to consider in achieving it. The Guideline is expected to be a handbook for all professionals in the built environment. It stipulates that to maximize energy efficiency in buildings, factors to be considered include the specific micro climatic condition of the site; site selection, orientation and shape of the building, in line with wind direction; conscious selection of building materials and envelop systems aimed at maximizing heat and cooling; the use of energy efficient lighting and equipment and deployment of renewable energy in powering some or all the building's electrical loads.

Currently, the demand for energy for domestic use, especially in the housing sector far outstrips the supply from the national grid and it places a great burden on power generation, transmission and distribution. As a result of the infrastructural and service delivery gaps in the power sector, Nigerians have resorted to generating power privately through the use of generators powered with fossil fuels in their homes as alternative

⁶ <https://www.iea.org/>

⁷ 'Government Unfolds National Building Energy Efficiency Guidelines' available at <http://guardian.ng/property/government-unfolds-national-building-energy-efficiency-guidelines/> See also the National Energy Efficiency Action Plans (NEEAP) (2015 – 2030) available at <http://www.power.gov.ng/Press%20Release/NATIONAL%20ENERGY%20EFFICIENCY%20ACTION%20PLANS.pdf>

sources of energy. Buildings (including our homes) account for large sources of greenhouse gas emissions through heating, cooling, lighting and other domestic use.

2.0 KEY IMPACT OF CLIMATE CHANGE ON THE HOUSING SECTOR

The National Adaptation Strategy and Plan of Action for Climate Change in Nigeria (NASPA-CCN) states as detailed in Box 1 of the key impacts of climate change on human settlements and housing.

Box 1: Key Impacts of Climate Change on Human Settlements and Housing

Climate change will have an economic impact on housing throughout the country due to the wide range and distribution of hazards including sea level rise, increased frequency and severity of storm surges, increased flooding associated with high rainfall events and high winds. Moreover, if climate change impacts decrease the national GDP as projected, this will in turn result in decreased available funding for the construction and renovation of housing.

- **Temperature**

High temperatures create heat stress. In settlements, this situation can be exacerbated by heat islands (particularly urban heat islands). High temperatures can indirectly contribute to sand dune encroachment in settlements in the Sahel and can increase the possibility that some settlements will be abandoned. High temperatures speed up deterioration of housing stock and bitumen roads, and increase energy demands through increased use of air conditioning/other cooling systems.

- **Rainfall**

Increased rainfall can cause flooding in urban and rural areas; accelerate erosion and cause landslides; and lead to deterioration of roads and other infrastructure. Both extremely low and high rainfall can cause housing deterioration, decreasing the overall quality of housing in settlements. In some cases, changes in rainfall can displace people and communities, creating environmental refugees.

- **Extreme Weather Events**

Extreme weather events can cause loss of habitable land, housing damage, and building collapse (for instance as a result of windstorms and flooding), and loss of human lives.

- **Sea-Level Rise**

Sea-level rise including storm surge, can cause houses and island communities to disappear; threaten critical public and private infrastructure; and may create the need to rebuild levees, dykes, and other protective measures. Lagos and communities in the Niger Delta are particularly vulnerable.

2.1 CLIMATE MITIGATION CHALLENGE BEFORE THE HOUSING SECTOR

One of the main challenges facing the housing and building sector in the near and distant future is the need to respond to climate change, both to cope with its ongoing effects and to reduce carbon emissions. Before merging the sector with Federal Ministry

of Power and Works, Housing was under the Ministry of Lands and Housing which according to the website of the Federal Ministry of Land and Housing was the umbrella policy arm of the Federal Government charged with the responsibility of:

- Ensuring adequate and sustainable housing delivery and maintenance of a conducive living environment that meets the needs and aspirations of Nigerian Citizens.
- Establishing a sustainable housing delivery system that will ensure easy access to home ownership and rental schemes by the Nigerian populace in an environment where basic physical and social amenities are available.
- And to facilitate the provision of housing for all Nigerians, in both the urban and rural areas, in secure, healthy and decent environment.

In terms of energy efficiency, the Building Energy Efficiency Guideline for Nigeria⁸ states that:

“The main goal for the building sector is to achieve a demand reduction that can ameliorate the effects of urban development and poor grid infrastructure. The main strategies for achieving substantial energy demand reduction while maintaining and even increasing human comfort are based on the following:

1. Bioclimatic architectural design to reduce energy demand. Bioclimatic design refers to architectural building design that seeks to optimize its performance by adapting the design to the local climate and achieve a more resource efficient building.

2. Planning energy efficient mechanical systems based on low demand. Alongside bioclimatic measures, active systems such as air conditioning may be required to guarantee the comfort of occupants. In keeping with the objective to be resource-efficient, energy efficient systems and appliances should be adopted where required.

3. Covering the remaining energy demand (partly) by renewable energies. Once demand has been reduced by passive design and the necessary mechanical systems have been designed and selected to optimise their performance and efficiency, then renewable energy generation can add even more building performance”.

NASPA-CCN sets the goal in human settlements and housing as developing patterns and practices that enhance climate change adaptation and resilience. The overall strategies are to develop climate change adaptation action plans for urban areas particularly those at greatest risk; assist communities to reduce vulnerability through

⁸ Federal Ministry of Power, Works and Housing, 2016 at page 15.

participatory planning of land use and housing; discourage buildings into vulnerable areas, high risk zones and low lying areas. Others are to discourage settlement practices that are maladaptive in the face of climate change whilst strengthening rural settlements to reduce migration to urban areas⁹. Key actions points are in housing design and building codes, risk mapping, land use plans, training of builders and construction workers, revitalization of green spaces and windbreaks¹⁰.

Despite its large contribution to climate change, the residential and commercial building sector was described by the IPCC Fourth Assessment Report as having the greatest potential for reducing GHG emissions cost effectively within a short time frame, using available and mature technologies. This is in comparison to other sectors subject to IPCC assessment including transport, agriculture, industry, forestry, energy supply and waste generation. The residential and commercial building sector is described as having:

“the highest immediate mitigation potential in terms of absolute reductions in CO₂ emissions that could be attained by the year 2030 at a low cost. This is in comparison to reductions that could reasonably be achieved in sectors such as transport, agriculture, industry, forestry, overall energy supply and waste management. At the same time, the building sector also provides the largest source of low cost and easily attainable reductions in energy consumption and thus greenhouse gas emissions”¹¹.

In many cases, the climate friendly options in our homes are those options that can also save us money.

To align with the plans and strategies of Nigerian Government, especially the National Policy on Environment, NASPA-CCN and the INDCs, the fiscal budget allocations to the Federal Ministry of Lands and Housing for four years (2013-2016) will be reviewed. The Study aims to assess the response of the budget to climate change impacts, vulnerability and adaptation in Nigeria’s Housing sector. The Study identifies the impacts of climate change in the sector, identifies mitigation and adaptation options currently being used, and outlines potential for future adaptation through appropriate budgetary allocations.

⁹ NASPA-CCN at page 46.

¹⁰ NASPA-CCN, supra.

¹¹ IPCC Fourth Assessment Report.

3.1 TREND OF BUDGET ALLOCATION TO FEDERAL MINISTRY OF LAND AND HOUSING FROM 2013-2016

In the 2016 federal budget, the Federal Government appropriated the overall sum of N456,936,811,203 for the Ministry of Works, Power and Housing. Out of this sum, N422,964,928,495 is for capital expenditure whilst N33,971,882,707 is for recurrent expenditure. The Minister of Works, Power and Housing declared in a media interview that 62% of the Ministry's 2016 allocation will be set aside for works, 23% will go to power whilst housing will get 15%.

The Nigeria Integrated Infrastructure Master Plan (NIIMP) projected the sum of USD 0.4 billion to USD 1.4 billion per annum by 2018 for the housing sector. Table 1 shows the trend of allocations to housing, its percentage and the funding gap using the NIIMP projections.

Table 1: Trend of Allocations and the Funding Gap (NIIMP)

Year	Overall Federal Budget	Total Allocation to Housing	% of Vote to Housing to Overall Vote	NIIMP Projection	Variance between Allocation and Projection: The Funding Gap
2013	4,987,382,196,690	32,179,108,276	0.65	223,860,000,000.00	191,680,891,724.00
2014	4,695,190,000,000	21,381,376,410	0.46	256,900,000,000.00	235,518,623,590.00
2015	4,493,363,957,158	7,312,088,618	0.16	278,740,000,000.00	271,427,911,382.00
2016	6,060,677,358,227	68,540,521,680	1.13	441,000,000,000.00	372,459,478,320.00

Source: Budget Office of the Federation and NIIMP

From Table 1, FGN budgeted 0.65%, 0.46%, 0.16% and 1.13% of its overall budget to the housing sector for the years 2013, 2014, 2015 and 2016 respectively. This is an average vote of 0.60% for the four years. This is a very low percentage of the budget voted for the sector. The total sum budgeted for the sector in four years comes up to N129.413 billion which is an average of N32.35 billion a year. The funding gap for the four years comes up to N1.07 trillion and a yearly average of N267.77 billion. However, the NIIMP is not a document designed with climate change sensitivity. The implication is that more resources will be needed for adaptation, mitigation and improving resilience in the sector than stated in the NIIMP. Thus, the funding gap is bound to widen if climate change mitigation is factored into the funding requirement.

Table 2 and Chart 1 show the composition of allocations to the Housing sector for the years 2013 to 2016.

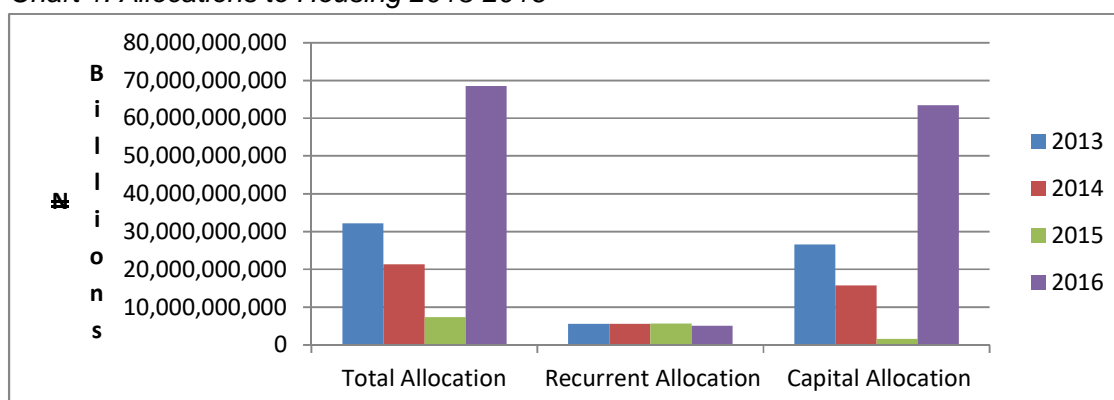
Table 2: Composition of Budget Allocation to Housing from 2013-2016

Year	Total Allocation	Recurrent Budget Allocation	Percentage of Recurrent Expenditure	Capital Budget Allocation	Percentage of Capital Expenditure
2013	32,179,108,276	5,581,294,683	17.34	26,597,813,593	82.65
2014	21,381,376,410	5,624,655,407	26.31	15,756,721,003	73.7
2015	7,312,088,618	5,649,088,618	77.26	1,663,000,000	22.74
2016	68,540,521,680	5,095,782,406	7.43	63,444,739,274	92.57

Source: Budget Office of the Federation (2013-2016)

Table 2 is further illustrated in Chart 1.

Chart 1: Allocations to Housing 2013-2016



Source: Calculated from Budget Office of the Federation Figures

From Table 2, the average of recurrent expenditure over the four years is 32.09%. The year 2015 was an exception where the recurrent expenditure spiked to 77.26%. For capital expenditure, the four year average is 67.92%. Again, the 2015 capital expenditure was very low at 22.74%. The distribution between capital and recurrent is in the right direction considering that this is a capital intensive sector. However, the percentage of capital expenditure should have been not less than 80% of overall appropriation for the four years.

3.2 POSITIVE IMPACT OF BUDGET ALLOCATIONS ON CLIMATE CHANGE AND PROGRAMMES AND PROJECTS THAT SHOULD BE CONTINUED

Table 3 below shows some of the line items from the allocations of Federal Ministry of Land and Housing that have positive impact on climate change mitigation and adaptation for the period under review.

Table 3: Positive Impact of Budget Allocations on Climate Change

Year	Project	Allocation (N)
2015	SOLAR BOREHOLE AT OKOH ABENGA, OKPAMA STREET OJIRA OTUKPO LGA, BENUE STATE	10,000,000
	SOLAR STREET LIGHTS AT KAITA, KATSINA STATE	10,000,000
	PROVISION OF 2 NOS SOLAR BOREHOLE AT UBEGU AMEZE AND AMUZU AMAGU AND 1 NO MOTORIZED BOREHOLE IEI ELUACHARA SITE, NGWOGWO ISHIAGU, IVO LGA, EBONYI STATE	30,000,000
	EROSION CONTROL AND DRAINAGE WORKS SURFACE DRESSING 900 MTS AT SURFACE NOTUROKIM COMMUNITY AKPARABONG IKOM, CROSS RIVER STATE	30,000,000
	PROVISION OF SOLAR BOREHOLE AT ELUOBODO AMUZU, AMAGU, IVO LGA, EBONYI STATE	10,000,000
	PROVISION OF SOLAR LIGHTS IN OBUBRA/ETUNG FEDERAL CONSTITUENCY, CROSS RIVER STATE	100,000,000
	RESEARCH AND DEVELOPMENT	144,500,000
2014	CONSTRUCTION OF SOLAR POWERED BOREHOLE IN KONTAGORA/MARIGA/MA SHEGU/WUSHISHI FEDERAL CONSTITUENCY, NIGER STATE	10,000,000
	INSTALLATION OF SOLAR POWERED BOREHOLES IN TWO LOCATION IN JERE FEDERAL CONSTITUENCY, BAUCHI STATE	30,000,000
	SOLAR STREET LIGHT EUGENE NDUBUISI CLOSE/OSI-EFA CRESCENT AT LILLY ESTATE, AMUWO ODOFIN, OFF FESTAC LINK ROAD, LAGOS STATE	30,000,000
	SOLAR STREET LIGHT IN BIRNIN KUDU LGA, JIGAWA STATE	10,000,000
	SOLAR POWERED BOREHOLE IN BUJI LGA, JIGAWA STATE	10,000,000
	SOLAR STREET LIGHTS IN ISU UMUABU VILLAGE, OBA IDEMILI SOUTH LGA, ANAMBRA STATE	10,000,000
2013	10NOS. SOLAR STREETLIGHT AT OBI ABANIHI, UMUOPKARA UBUHU AMAIGBO ALONG UMHELENMAI/IHIALA FEDERAL HIGHWAY @ 980,000 NAIRA EACH	9,800,000
	20NOS SOLAR STREET LIGHTS IN IBARAPA EAST/IDO	19,600,000
	SOLAR STREET LIGHTING (24 POLES) @ N600,000 FOR KABBA TOWN	14,400,000
	PROVISION OF 27 NOS. POLES OF SOLAR STREET LIGHTS AT HAITA VWANG DISTRICT, JOS	15,000,000
	PROVISION OF 27 NOS. POLES OF SOLAR STREET LIGHTS AT DURBI, SHERE WEST, JOS-EAST LGA	15,000,000
	PROVISION OF 27 NOS. POLES OF SOLAR STREET LIGHTS AT RIZEK, FOBUR 'B' JOS-EAST LGA	15,000,000
	PROVISION OF SOLAR POWERED STREETLIGHTS IN YOBE STATE COLLEGE OF AGRICULTURE GUJBA L.G.A	50,000,000

SOLAR POWERED STREET LIGHT AT ANAMBRA EAST	15,500,000
SOLAR POWERED STREET LIGHT AT ANAMBRA WEST	15,500,000
SUPPLY AND INSTALLATION OF SOLAR POWERED STREET LIGHT AT WARDS IN IDEMILI NORTH AND SOUTH ANAMBRA	23,000,000
PROVISION OF SOLAR POWERED STREET LIGHTS AT ONITSHA NORTH AND ONITSHA SOUTH	42,000,000
PROVISION OF SOLAR STREET LIGHTS AT OLOGOGHI/AMUREKENI COMMUNITIES, BAYELSA STATE	50,000,000
26 UNITS OF SOLAR STREET LIGHTS (1) ADEBOYE STREET, BARIGA 10 POLES; (2) IKYWADARE STREET SINIKY 8 POLES; (3) SODIMU STREET, SOMOLU IN SOMOLU FEDERAL CONSTITUENCY, LAGOS	15,000,000
SOLAR BOREHOLE AT OJOKORO EYITA COMMUNITIES, IKORODU LGA, LAGOS	10,000,000
SOLAR BOREHOLE AT MAGBON/KILASO, IKORODU LGA, LAGOS	10,000,000
SOLAR BOREHOLE AT ORETA COMMUNITY ROAD, IKORODU LGA, LAGOS	10,000,000
SOLAR BOREHOLE AT IGBALU VILLAGE, IKORODU LGA, LAGOS	11,000,000
TWO PANEL SOLAR BOREHOLE (3 UNITS) AT APAPA, LAGOS STATE	9,600,000
SOLAR STREET LIGHTS (7 POLES) AT MARKET STREET, LAGOS MAINLAND, LAGOS.	3,500,000
TREE PLANTING	10,000,000
RESEARCH AND DEVELOPMENT	298,000,000

Source: Budget Office of the Federation (2013-2015)

Beyond the projects listed above, over a hundred projects and programmes in the allocations of the Ministry have positive impact on climate change. They range from solar powered boreholes, solar powered street lights, research and development, erosion control, tree planting, drainage works, etc. They are strategic projects and key into national plans for climate change mitigation. Realising that motorized boreholes are usually powered by fossil fuel, it is a step in the right direction to introduce the use of solar energy to power boreholes which are cleaner and eco-friendly. However, in many of the areas where new boreholes have been sunk, the real challenge of access to portable water would have been solved without sinking new boreholes. The reticulation of water from existing boreholes and reservoirs to un-served areas of the city or community would have solved the challenge.

Erosion control is an important technique for preventing water pollution, soil loss, wildlife habitat loss and property destruction and loss. Research and development is also very essential for human and scientific development. Tree planting is another line item from the budget which is imperative for climate change mitigation. However, its frequency is minimal and appears just once in the budget of 2013 with a vote of N10 million. The

importance of tree planting in land and housing projects cannot be over emphasized, realising its huge potential in climate mitigation. Regrettably, in subsequent years within the remaining years under study, there is hardly any allocation for tree planting projects.

R&D and its budget allocation are not disaggregated to give details of the specifics it sets out to achieve. However, channeling funds from this line item towards climate change mitigation will increase capacity building and climate education in support of the Ministry's adaptation and mitigation strategies.

3.3 NEGATIVE IMPACT OF BUDGET ALLOCATIONS ON CLIMATE CHANGE AND PROGRAMMES THAT SHOULD BE DISCONTINUED

In identifying budget line items that have negative impact on climate change mitigation, Table 4 below shows the line items from the budget of Federal Ministry of Lands and Housing for a four year period under review (2013-2016). The line items include international travels - it is a necessity if there is actual need for it. This line item has negative impact on climate change mitigation because frequent long distance air travels increase carbon foot prints. Trainings can be localized or if the international travels are unavoidably necessary, they should be minimized. Top government officials should stop travelling with retinue of aides and each, accumulating carbon footprints to the detriment of the environment and increasing the cost of governance. Maintenance and fuelling of plants and generators negatively impact on climate change mitigation. Ministries, Departments and Agencies of Government (MDAs) should take the lead in using solar energy and other renewables to power their office complexes. Motorized water boreholes using fossil fuel also has negative effects on climate mitigation.

Table 4: Negative Impact of Budget Allocations on Climate Change and Programmes and Projects that should be Discontinued

Year	Project	Allocation
2015	INTERNATIONAL TRAVEL & TRANSPORT: TRAINING	5,218,750
	INTERNATIONAL TRAVEL & TRANSPORT: OTHERS	7,449,950
	MAINTENANCE OF PLANTS GENERATORS	3,887,500
	PLANT / GENERATOR FUEL COST	6,000,000
	MOTORISED BOREHOLE WITH STORAGE TANK AT FIRST GATE, NO. 1 OBA AFUNBIOWO ESTATE, BESIDE NATIONAL OPEN UNIVERSITY OF NIGERIA, IDANRE ROAD, AKURE	10,000,000
	MOTORISED BOREHOLE WITH STORAGE TANK AT EXCELLENCE DRIVE, OBA-ILE HOUSING ESTATE EXTENSION, AKURE, ONDO STATE	10,000,000
	MOTORISED BOREHOLE AT GINDIRI 1 TOWN (SUM-PYEM PALACE) MANGU LGA, PLATEAU STATE	10,000,000
	MOTORISED BOREHOLE AT GINDIRI II TOWN (PUMBUSH,	10,000,000

	KASUWAN ALI, MANGU LGA, PLATEAU STATE	
2014	MAINTENANCE OF PLANTS/GENERATORS	2,789,667
	INTERNATIONAL TRAVEL & TRANSPORT: TRAINING	4,713,627
	INTERNATIONAL TRAVEL & TRANSPORT: OTHERS	9,129,771
	PLANT/GENERATOR FUEL COST	45,551,278
	CONSTRUCTION OF ONE MOTORISED BOREHOLE AT GARKO ACEDEMY GAMAWA IN GAMAWA LGA BAUCHI STATE	10,000,000
	CONSTRUCTION OF MOTORISED BOREHOLE IN ST. PAUL'S CATHOLIC CHURCH, IVOGBA MBAYEM USHONGO LGA BENUE STATE	10,000,000
	CONSTRUCTION OF MOTORISED BOREHOLE AT IGBUISHEGBA IN EDEOHA EAST LGA OF RIVERS STATE	10,000,000
	CONSTRUCTION OF 2NOS MOTORISED BOREHOLES AT ILORIN WEST LGA KWARA STATE	20,000,000
	MOTORISED POWERED BOREHOLE AT ORKUMA KATYO COMPOUND, MBATOV, USHONGO LGA, BENUE STATE	10,000,000
	2013	MAINTENANCE OF PLANTS/GENERATORS
PLANT / GENERATOR FUEL COST		39,527,946
CONSTRUCTION OF 1 UNIT OF MOTORISED BOREHOLE IN DIKKUMARI VILLAGE, DAMATARU L.G.A		10,000,000
CONSTRUCTION OF MOTORISED BOREHOLE AT ORE-OGHENE STR. AND OBA AKENZUA ROAD		14,000,000
PROVISION OF MOTORISED BOREHOLE IN KANO/JIGAWA STATES		100,000,000
COMMUNITY BASED MOTORIZED BOREHOLE, WATER SUPPLY WITH PUBLIC STAND PUMPS IN 2NO COMMUNITY IN ASA LGA (SAPATI & LADUBA		20,000,000
CONSTRUCTION OF 3 NOS MOTORISED BOREHOLE AT VARIOUS LOCATIONS IN GAMAWA LGA, BAUCHI STATE		33,500,000
URBAN RENEWAL AND SLUM UPGRADE - 6NOS. MOTORISED BOREHOLES WITH STAND POST @ 10,000,000 NAIRA EACH		60,000,000
2NOS COMMUNITY BASED WATER SUPPLY WITH PUBLIC STAND POST (MOTORISED) AT VARIOUS LOCATIONS IN KANO NORTH SENATORIAL DISTRICT		20,000,000
COMMUNITY BASED MOTORIZED BOREHOLE WITH PUBLIC STAND PUMPS IN MANDATE ESTATE ADEWOLE, ILORIN, KWARA STATE.		10,000,000
COMMUNITY BASED MOTORIZED BOREHOLE WITH PUBLIC STAND PUMPS IN LANLATE	10,000,000	

Source: Budget Office of the Federation (2013-2015)

3.4 POORLY IMPLEMENTED PROJECTS RELEVANT FOR CLIMATE CHANGE MITIGATION

The major line item in the budget of the Federal Ministry of Lands and Housing in the period under review which is very good for climate change but poorly implemented is tree planting projects. Trees serve as carbon sinks. Global warming is the result of excess greenhouse gases; heat from the sun, reflected back from the earth, is trapped in this thickening layer of gases, causing global temperatures to rise. Carbon dioxide (CO₂) is a major greenhouse gas. Trees absorb CO₂, removing and storing the carbon while releasing the oxygen back into the air. In one year, an acre of mature trees absorbs the amount of CO₂ produced when you drive a car for 26,000 miles (Wulfinghoff, D.R, 2003). For the benefit of cities and communities, trees cool the city by up to 10°F, by shading our homes and streets, breaking up urban heat islands and releasing water vapor into the air through their leaves. Also, trees help prevent soil erosion; on hillsides or stream slopes, trees slow runoff and hold soil in place, trees conserve energy. Three trees placed strategically around a single-family home can cut summer air conditioning needs by up to 50 percent. By reducing the energy demand for cooling our houses, we reduce carbon dioxide and other pollution emissions from power plants. Budgeting and implementing tree planting projects and exercises should not be domiciled in the Ministry of Environment alone. If the Federal Ministry of Land and Housing wants to maintain sustainable housing projects, tree planting projects should form part of the plans and strategies to achieve that.

4.1 AFFORDABLE LOW HANGING FRUITS TO IMPLEMENT MITIGATION AND ADAPTION IN HOUSING SECTOR

Considering the paucity of funds available for climate related projects in the budget of the Federal Ministry of Lands and Housing in the period under review, the Ministry should consider low hanging fruits to pursue climate change mitigation measures. The new Housing Design and Building Code and the Building Energy Efficiency Guideline for Nigeria should be mainstreamed in housing and human settlements planning and construction. Some of the measures will be undertaken by the federal government in collaboration with states and local governments to build capacity for implementation at the state and local levels. Other measures will be achieved through regulation, enforcement and implementation of existing policies. The low hanging fruits to be achieved through fiscal, monetary policies and the enabling macroeconomic and policy environment include:

- Promote green buildings through collaboration with states and local governments in training of trainers and capacity building thereby creating “extension workers” who will implement this programme at the state level. Green buildings are the

easiest, fastest, cheapest and most effective means of addressing global warming and are vital tools in the fight against climate change.

- Provide capacity building and training for builders and construction workers on the updated building codes and land use management. This can be done in collaboration with various faculties in human settlements and environment in tertiary institutions across the country.
- Reduce exposure of vulnerable places by hard and soft engineering; use regulation and policy frameworks to reduce vulnerability of building materials.
- Avoid housing and human settlements 'at risk' locations. Formulate and enforce policies that will discourage building and urban encroachment into vulnerable areas, high risk zones and low lying areas.
- Promote greater resilience of buildings and infrastructure, storage and recycling of water and provide enhanced cooling without loss of efficiency and mainstream green and blue city infrastructure¹².
- Enhance the use of renewable sources for heating and cooling and other household energy needs through fiscal incentives.
- Mainstream and use trees as additional carbon sinks; promote tree planting across human settlements in the country.
- Promote decentralized energy infrastructure.
- Assist communities to reduce vulnerability through participatory planning of land use management and housing.
- Use regulation and policy frameworks to discourage housing and settlement practices that are maladaptive in the face of climate change.
- Provide a framework for strengthening rural settlements in order to reduce migration.

¹²See https://en.wikipedia.org/wiki/Blue-Green_Cities **Blue-Green** Cities aim to recreate a naturally oriented water cycle while contributing to the amenity of the city by bringing water management and **green infrastructure** together. "Examples of *green* landscape elements are hedgerows, copses, bushes, orchards, woodlands, natural grasslands and ecological parks. *Blue* landscape elements are linked to water. They can be pools, ponds and pond systems, wadis, artificial buffer basins or water courses. Together they form the *green-blue infrastructure*".
https://www.google.com/search?q=green+and+blue+infrastructure+definition&ie=utf-8&oe=utf-8&client=firefox-b&gfe_rd=cr&ei=eiRHWKioGqT38AePzqalDw.

- Promote improved building designs that promote local content such as bricks; which gives insulation effect for extreme hot or cold weather condition.
- Unlike climate change mitigation strategies in other sectors, high performance building options are much better. Whether via retrofit or by way of new construction, high performance homes have dramatic impact on the long term outlook for climate change. High performance building techniques are the 'low hanging fruit' of climate change mitigation.

Beyond the budget, there are other quasi fiscal measures such as the National Housing Fund which should be promoted to raise funds for the improvement of the sector including the adoption of climate smart housing. Funding is one of the greatest challenges delaying mitigation and adaptation in the sector. The National Housing Fund is established by Act No. 3 of 1992¹³. It is a pool of funds made from contributions of 2.5% income of Nigerian workers both in the private and public sectors. Banks are expected to invest 10% of their loans and advances at an interest rate of 1 percent above the interest rate payable on current accounts by banks. Insurance companies are to make an investment of 20% of their non-life funds and 40% of life funds in the housing sector with 50% directly in the Fund. Also, the FGN is obliged to make contributions to the Fund for long term loans and to facilitate delivery of housing. The Fund is managed by the Federal Mortgage Bank which disburses to contributors and developers through mortgage banks¹⁴. By section 2 of the Act, the aims and objectives of the Fund are:

- *Facilitate the mobilization of the Fund for the provision of houses for Nigerians at affordable prices;*
- *Ensure the constant supply of loans to Nigerians for the purpose of building, purchasing and improvement of residential houses;*
- *Provide incentives for the capital market to invest in property development;*
- *Encourage the development of specific programmes that would ensure effective financing of housing development, in particular low cost housing for low income workers;*
- *Provide proper policy control over the allocation of resources and funds between the housing sector and other sectors of the Nigerian economy; and*
- *Provide long-term loans to mortgage institutions for on-lending to contributors of the Fund.*

¹³ Cap. N45, Laws of the Federation of Nigeria 2004.

¹⁴ <http://www.fmbn.gov.ng/doc/Funding>

The NHF should be re-organised and re-engineered. Competent hands should be put in charge of its management. The Fund does not require personnel and management who have a sense of entitlement and civil service mentality. It needs creative and innovative minds that see the Fund as an opportunity to revolutionize the Nigerian economy and the standard of living of the people through the housing sector. The rules for accessing the Fund should be re-engineered to make contributions the basis of getting access. A situation where the contributors are marginalised to the advantage of profit seeking artificial persons is antithetical to equity, natural justice and good conscience. All persons who by law are liable to contribute to the Fund should be made to contribute 2.5% of their income as required by law under the pain of punishment for failure to obey the law. Negotiations with labour unions to iron out rough ends and utmost good faith in the management of the Fund will encourage more contributors to the Fund. The informal sector should also be encouraged to contribute to the Fund.

4.2 BUDGET AND POLICY RECOMMENDATIONS

Based on the analysis, a strong and stable fiscal environment is necessary to drive implementation of policies that will mitigate the effect of climate change in the housing sector. Therefore, the following recommendations are imperative.

4.2.1 Strengthening Policies and Budgeting

Improve the allocation and implementation of budget to the housing sector to provide for social mass housing that is environmentally friendly.

4.2.2 Appropriate Funds to the National Housing Fund

In accordance with section 6 of the National Housing Fund Act, FGN should on a yearly basis, appropriate funds to compliment contributions and thereby increase the pool of funds available to NHF for disbursement to contributors. Include climate change mitigation in the broad mandate of the Fund, primary mortgage institutions and users of the Fund.

4.2.3 Tap Alternative Sources of Funds for Housing

Alternative funding can be explored as follows:

- The Central Bank of Nigeria should consider the establishment of a special fund for the housing sector which should be in the neighbourhood of not less than N1 trillion. Similar funds have been set up in the past by CBN for other sectors.
- Long term concessionary funding can be raised by FGN and the states and specially dedicated to the housing sector.
- The prospect of using pension funds for ecologically sustainable buildings. The funds can be accessed through new prudential guidelines from the Pension

Regulatory Commission and with the full support and guarantee of the Federal Government.

- Green Bonds can also be used to finance the sector.
- The Nigeria Mortgage Refinancing Company should be strengthened with more resources to increase its impact in bridging the green housing deficit.

4.2.4 Private Sector Participation: Create an enabling and conducive environment including fiscal incentives for private investment into affordable green housing and to include mass tree planting in estate developments for ecosystem balance and environmental protection.

4.2.5 Climate Change R&D: Appropriations should be dedicated to fund climate change specific research and development in the housing sector. Existing universities, polytechnics and research institutes should lead the way.

4.2.6 Finance Curriculum Change in Public Tertiary Institutions: Beyond R&D, it is imperative that FGN and states should finance curriculum change in major courses that award degrees and diplomas in the built environment in such courses as architecture, engineering, etc. Creating the necessary sensitization for professional associations in the sector to engage in retraining of professionals is also imperative.

4.2.7 Build Local Production and Service Delivery Capacity: A good number of the materials required for housing that responds to the climate change challenge may need to be imported. Government should use tariff and non-tariff measures and new policies to build local capacity for production and service of these materials. Pioneer industry status, tax holidays, higher tariffs for fully built and imported materials, lower tariffs for CKDs and raw materials for local manufacture, etc., should be explored.

4.2.8 Centralized Solar Plants: There is need for centralized solar plants which will take care of boreholes and streetlights together. This will save cost of establishing solar powered boreholes and solar powered streetlights separately.

4.2.9 Relevant Evolving Policies and Housing: Future housing construction should be driven by evolving government policies such as the 'National Energy Efficiency Action Plan' and the 'Building Energy Efficiency Design Guideline'. It should also incorporate the principle of sustainability, demographical changes, land supply, planning and the fast evolution of innovative technology. The Federal and relevant state MDAs should review and modify housing designs and building codes in the light of climate change to specifically incorporate new roofing requirements, water harvesting, alternative materials, etc.

4.2.10 Shift to New Technologies: Meeting the challenge of climate mitigation will require dramatic advances in technologies and a shift in how Nigeria generates and

uses energy. Building green is one of the best strategies for meeting the challenge of climate change because the technology to make substantial reductions in energy and CO₂ emissions already exists. According to International Energy Agency (2015), the average Leadership in Energy and Environmental Design (LEED) certified building uses 32% less electricity and saves 350 metric tons of CO₂ emissions annually. Modest investments in energy-saving and other climate-friendly technologies can yield buildings and communities that are environmentally responsible, profitable and healthier places to live and work, and that contribute to reducing CO₂ emissions.

Investing in Green Buildings provide abundant opportunities for saving energy and mitigating CO₂ emissions. The use of high efficiency boilers for heating, LED lighting, ENERGY STAR appliances all save money over the long term and reduce energy consumption. Reduced energy consumption at home means less fossil fuel combustion at the power plant and less impact on the climate.

4.2.11 Invest in Behavior Change, Sensitisation and Awareness Creation: When considering sustainable housing, appropriate design and technology are not enough, it is also necessary to foster sustainable behavioral change.

4.2.12 Adequately Fund Relevant Regulatory and Enforcement Agencies: This will ensure that policies and plans are implemented to the letter and will not remain mere aspirations and dreams. The existing building codes and guidelines should be strengthened and effective mechanisms for implementation created.

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