Route Form

MINISTRY OF PUBLIC WORKS
09 MAY 2018
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TO: HONOURABLE MINISTER OF DEPARTMENT OF PUBLIC WORKS

DEPARTMENT OF PUBLIC WORKS
OFFICE OF THE DIRECTOR - GENERAL
PRETORIA
2018 -04- 20
PRIVATE BAG X 65
PRETORIA 0001

DEPARTMENT OF PUBLIC WORKS
OFFICE OF THE DIRECTOR - GENERAL
PRETORIA
2018 -05- 03
PRIVATE BAG X 65
PRETORIA 0001

SUBJECT	**APPROVAL OF PUBLIC WORKS GREEN BUILDING POLICY**

RANK	INITIALS AND SURNAME	SIGNATURE	DATE REFERRED	DATE RETURNED
HEAD : GREEN BUILDING UNIT	MR. M. XULU KA DLAMINI	18/04/2018	18/04/2018	
CHIEF DIRECTOR: FACILITIES MANAGEMENT	MR. S. MDAKANE		19/04/2018	19/04/2018
HEAD OF PMTE	MR. P.J MAROGA		20/04/2018	
DIRECTOR GENERAL OF PUBLIC WORKS	ADV. S. VUKELA		07/05/2018	
DEPUTY MINISTER OF PUBLIC WORKS	Hon. J Cronin (MP)		8/5/18	
MINISTER OF PUBLIC WORKS	Hon. T.W. NXESI (MP)		31/5/18	

MINISTRY OF PUBLIC WORKS
RECEIVED ON
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DEPARTMENT OF PUBLIC WORKS
DEPUTY MINISTRY
CAPE TOWN
DATE RECEIVED 2018 -05- 08
SIGNATURE:

public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA

PROPERTY MANAGEMENT TRADING ENTITY

INTERNAL MEMORANDUM

TO:	Hon. T. W NXESI (MP) MINISTER OF PUBLIC WORKS	REF:	APPROVAL OF PUBLIC WORKS GREEN BUILDING POLICY
FROM:	ADV. S. VUKELA DIRECTOR-GENERAL	OFFICE:	CGO ROOM A704
TEL:	012 406 1569	FAX:	

SUBJECT: **SUBMISSION OF GREEN BUILDING POLICY FOR MINISTERIAL APPROVAL**

1. PURPOSE

The purpose of this submission is:

1.1. To provide a brief on the Public Works Green Building Policy development and multi-stakeholder engagement process; and

1.2. To request approval of the Public Works Green Building Policy by Honourable Minister.

2. BACKGROUND

The Draft Public Works Green Building Policy together with the associated Sector Plan has been taken through a vigorous consultative process with various Stakeholders, in the public and private sector, who are relevant to the area of Sustainability goals Implementation since 2014 until 2016. The timelines and list of the various stakeholder engagements are attached.

MinMec adopted the National Green Building Policy on the 01 December 2015, for implementation by the National and Provincial Departments of Public Works.

Given the MinMec directive and adoption, the final draft of the Green Building Policy was subsequently presented to Client Departments, the Department of Energy (DoE), Department of Environmental Affairs (DEA), Department of Water and Sanitation (DWAS), Department of Trade and Industry (DTI) and the Department of Science and Technology

(DST) for alignment with climate change mitigation actions, resource efficiency imperatives, industrial localisation and transformation interventions.

Over the period, the consultation process further included critical contribution from Public Works units and entities, i.e. Construction Industry Development Board (CIDB), Council for Built Environment (CBE), Agrément SA, and Independent Development Trust (IDT) – undertaken by Facilities Management working with the Property and Construction Policy Branch.

In line with these consultative processes, inputs were received from industry stakeholders, which included the Property Charter Council of South Africa (PCCSA) and the Green Building Council of South African amongst others.

The Public Works Green Building Policy was subsequently distributed to the Executive Management Team for support of approval of the Policy in February 2017. The approval of the Policy was fully supported by the Executive Management Team, including Honourable J. Cronin (MP); and the Property Management Trading Entity.

3. DISCUSSION

3.1. National Climate Change Response Strategy

The Department of Public Works Green Building Programme is recognised as one of the country's flagship projects in the National Climate Change Response Strategy and Nationally Determined Contributions (NDC) in the reduction of Greenhouse Gas emissions, championed by DEA. This followed DPW's development and launch of the Green Building Framework in 2011. The programme provides for development and implementation aimed at contributing to Sustainable Development Goals (SDGs), resource efficiency, technology mobilisation and creation of green jobs.

In context, world leaders adopted the Sustainable Development Goals (SDGs) in September 2015 for implementation from January 2016. More than 150 countries, South Africa included have pledged to mobilise efforts to end all forms of poverty, fight inequalities and to tackle climate change. On 6 September 2017, the President of the Republic of South Africa made a call for full implementation of Sustainable Development Goals. This necessitates the urgency for DPW to be bold in its plans on the Green Build Sector Plan. The Green Building Policy will serve as a departure point for the Department of Public Works in this full implementation of the Green Building Sector Plan as the government lead department in the built environment. The Department is working on providing leadership to the sector and SADC through implementation of the Green Building Policy.

3.2. Green Economy Accord

The Department of Public Works is a signatory to the Green Economy Accord, which was signed in 2011. The accord forms the basis for social partners and government to collectively advance the green economy in South Africa – and thereby achieve a sustainable and low-carbon economy that will accelerate opportunities for job creation, economic growth, and poverty eradication. DPW has a unique contribution to make in successful implementation for the accord. On behalf of the Director General, the Green Building unit recently gave an update to the Department of Economic Development on progress made in contributing to the Green Economy Accord. The DPW input was based mainly on the Green Building Programme subsets and the work done in collaboration with EPWP on the creation of green jobs in the built environment.

3.3. Key Principles of the Public Works Green Building Policy

a) Leadership: DPW will champion the adoption of Green Building principles and practices within the public sector and the establishment of Green Building network amongst key sector institutions;

b) Planning and implementation of Energy, Water, Waste Management and Eco-labelling of building materials and processes as part of resource efficiency. These aspects include research, development, skills development, and training;

c) Building indoor environmental quality and comfort;

d) Product and materials management – contribution to industrial localisation and enterprise development;

e) Built environment Indigenous Knowledge Systems (IKS) – development of guidelines for inclusions of building related indigenous knowledge of communities and critical regionalisation;

f) Sustainable horticulture and landscaping;

g) Facilitation of green procurement, i.e. green leasing from private property owners which has potential to contribute to the transformation of the property sector.

At an implementation level, a National-Provincial Green Building Sector Plan is being implemented in line with the respective Annual Performance Plans with progress monitored on a quarterly basis through the National-Provincial Green Building Technical Committee.

4. RECOMMENDATION

4.1. In order to adhere to Sustainable Development prescripts, provide uniformity in Green Building interventions, including alignment of new buildings and precincts which are currently pursuing Green Building principles across the country, the Department of Public Works needs to commence with the process of full policy implementation and advocacy;

4.2. Accordingly, the Public Works Green Building Policy is hereby submitted to Honourable Minister for approval. Green Building Policy attached (Annexure B).

19/04/2018

MFUNDO XULU KA DLAMINI
Programme Manager: Green Building
DATE: 19/04/2018

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Supported/ ~~Supported with comments~~/~~Not Supported~~

Mr SIFISO MDAKANE
Facilities Management
DATE: 19/04/2018
Comments:

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4. RECOMMENDATION

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4.2. Accordingly, the Public Works Green Building Policy is hereby submitted to Honourable Minister for approval. Green Building Policy attached (Annexure B).

Supported/ Supported with comments/Not Supported

Mr JACOB MAROGA
HEAD: Property Management Trading Entity
DATE: 20/04/2018
Comments:
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Supported/ Supported with comments/Not Supported

ADV SAM VUKELA
Director General
DATE: 07/05/2018
Comments:
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Supported/ Supported with comments/Not Supported

HON. JEREMY CRONIN (MP)
Deputy Minister of Public Works
DATE: 2018/5/8
Comments:
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4. RECOMMENDATION

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4.2. Accordingly, the Public Works Green Building Policy is hereby submitted to Honourable Minister for approval. Green Building Polity attached (Annexure B).

Approved/ ~~Not approved / Approved with comments~~

MR T W NXESI, MP
MINISTER OF THE DEPARTMENT OF PUBLIC WORKS
DATE: 31/05/2018

Comments:

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DEPARTMENT OF PUBLIC WORKS
Private Bag X65, Pretoria 0001

RECEIVED: 2018/06/14
OFFICE OF THE DIVISIONAL HEAD:
FACILITIES MANAGEMENT
DOC NO: 005/JN

public works

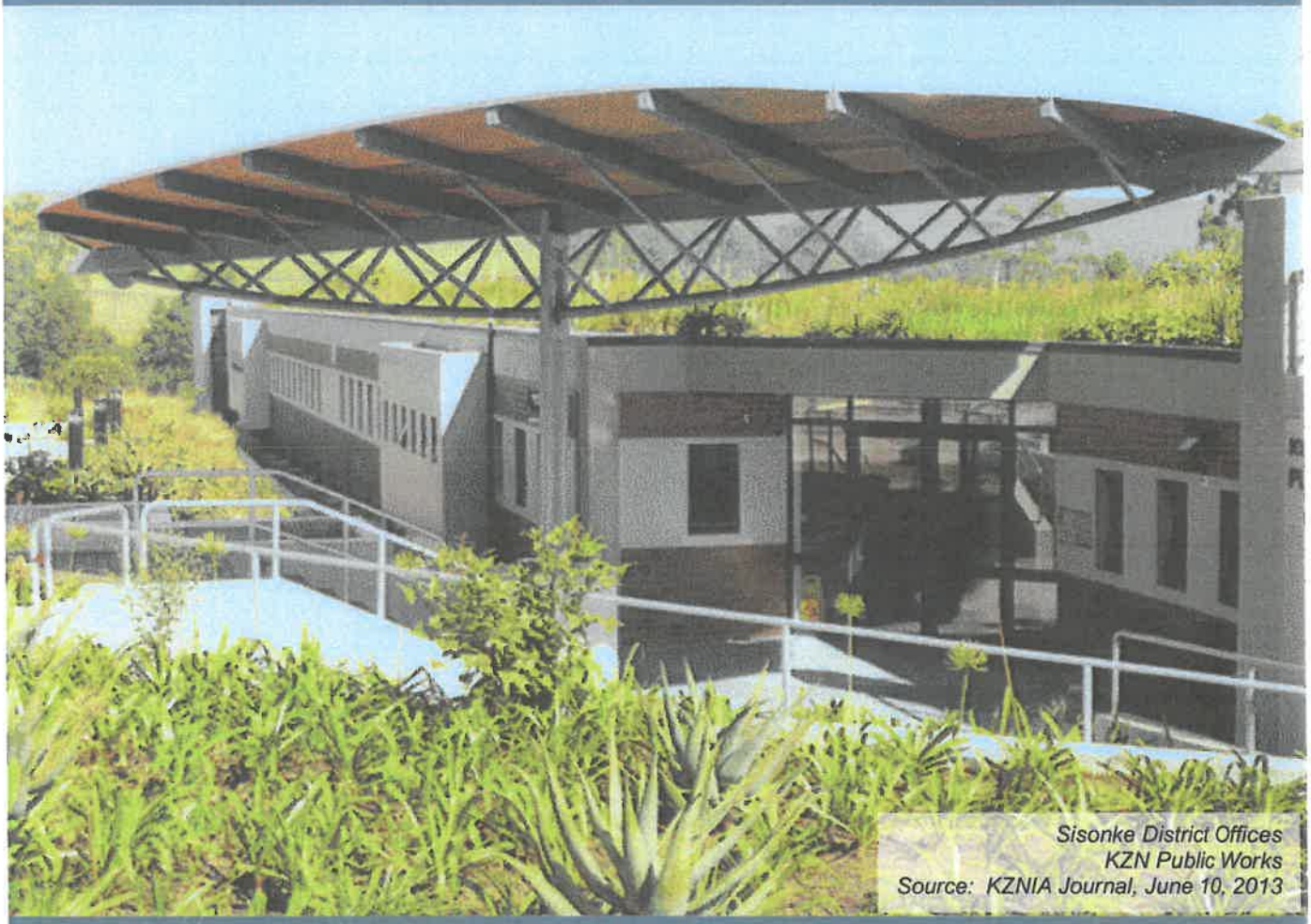
Department:
Public Works
REPUBLIC OF SOUTH AFRICA

PROPERTY MANAGEMENT TRADING ENTITY

GREEN BUILDING POLICY DEVELOPMENT - STAKEHOLDER CONSULTATIVE PROCESS

DATE	ACTION
6 May 2016	Consultation with Provinces through the Green Building Technical Committee
25 May 2016	Consultation with the Task Team for the Draft Public Works Green Building Policy comprising DPW FM and Policy Units, CBE, cidb, ASA and Free State Province
8 June 2016	Consultation with Provinces through the Giama Technical Committee
15 August 2016	Consultation with User Departments through KAM
18 August 2016	Meeting held to secure inputs from Head of PMTE and DDG: FM
22 August 2016	Engagement held between DPW and International Labour Organization (ILO) – Partnership for Action on Green Economy
24 August 2016	Consultation with the Task Team for the Draft Public Works Green Building Policy (Only DPW FM and Free State Province) meeting
26 August 2016	Internal Green Building Directorate meeting (Waste, Energy and Water Efficiency).

PUBLIC WORKS GREEN BUILDING POLICY



Sisonke District Offices
KZN Public Works
Source: KZNIA Journal, June 10, 2013

public works

Department:
Public Works
REPUBLIC OF SOUTH AFRICA

Contents

Minister's Foreword

As the custodian of state properties, the Department of Public Works is the largest South African player in the property sector. As such, we have the responsibility to provide leadership in relation to green buildings and greening the economy. It is our responsibility to take decisive steps to ensure that our portfolio of state buildings reduces its environmental impact, is energy efficient, resource efficient and environmentally responsible.

The Department has already taken steps to reduce the environmental impact of its buildings, including steps to reduce energy and water usage within state properties, the introduction of renewable energy technologies, as well as the design and construction of best practice green buildings. Buildings such as the new offices of the Department of Environmental Affairs in Pretoria and the Agrivaal building in Pretoria, the new Sisonke District Office in KwaZulu-Natal and others demonstrate our commitment to green buildings.

This *Public Works Green Building Policy* is a further milestone in government's trajectory of green buildings and a green built environment. The *Green Building Policy* is also a demonstration of South Africa's support to on-going local and international commitments, including the *Green Economy Accord*, the *South African National Climate Change Response White Paper* and the *National Energy Efficiency Strategy*.

This *Green Building Policy* sets out the principles by which the Department of Public Works will develop, maintain and operate our portfolio of buildings and reduce its impact on the environment. But, in so doing, this *Green Building Policy* also lays the basis for the creation of green jobs, for up-skilling and training of participants, and the development of improved working and living conditions.

This *Green Building Policy* is a collaborative effort between my Department of Public Works and all the provincial Public Works Departments. It is my vision that this *Green Building Policy* will also be adopted by all provincial Public Works Departments as well as other government institutions. Working together, we continue to strive for a sustainable built environment.

HON. THEMBELANI THULAS NXESI
MINISTER OF PUBLIC WORKS

PUBLIC WORKS GREEN BUILDING POLICY

Executive Summary

The impact of buildings on global warming and climate change, as well the resource consumption and waste generation associated with buildings is well recognised:

i) over a third of all CO_2 emissions come from building construction and operations;

ii) over a third of all energy and material resources is used to build and operate buildings; and

iii) over a third of total waste results from construction and demolition activities.

This document sets out the Department of Public Works' *Green Building Policy* for buildings which are owned, operated and leased by the Department of Public Works (DPW). DPW will promote the adoption of this *Policy* within the broader public sector.

Economic, social and environmental sustainability are at the very core of government's vision: the principles of sustainability are ultimately enshrined in the Constitution, in legislation, and in policy direction. This *Green Building Policy* supports the principles of sustainable development that government is bound to by the Constitution, and has already committed itself to through legislation, policy direction, international conventions and agreements. In doing so, this *Policy* will ensure that DPW will not only deliver the performance benefits to be gained through green building, but will also contribute to meeting government's national and international commitments. As a catalyst for job creation and youth development, DPW will ensure that the built environment contributes to government objectives of shared growth through the subsets of green building such as energy efficiency, renewable energy, water efficiency and waste management.

The Public Works *Green Building Policy* is aligned to:

i) the *National Water Act* (1998);
ii) the *National Climate Change Response White Paper* (2001);
iii) the *National Energy Efficiency Strategy* (2005, 2012);
iv) the *South African Long Term Mitigation Scenarios* (LTMS) (2007);
v) the Government Immovable Asset Management Act (GIAMA) (2007)
vi) the *National Framework for Sustainable Development in South Africa* (2008);
vii) the *DPW National Framework for Green Building* (2011);
viii) the *National Water Resource Strategy* (2013); and
ix) the *National Immovable Asset Maintenance Management* (NIAMM) *Framework* (2015).

The *Green Building Policy* is built on the following principles which will be applied within buildings that are owned, operated or occupied by DPW:

i) Leadership;
ii) Energy, water and waste management;
iii) Indoor environmental quality and comfort;
iv) Product and materials management;
v) Promotion of Indigenous Knowledge Systems (IKS);
vi) Acceptable horticulture and landscaping construction practices;
vii) Green Procurement; and
viii) Monitoring and reporting.

In giving effect to this *Green Building Policy*, DPW will:

i) Provide leadership in the procurement and operation of green building materials and products within the broader public sector;
ii) Champion and promote the adoption of the *Green Building Policy* within the broader public sector;
iii) Facilitate and encourage the uptake of green building practices within other organs of state;
iv) Establish, implement, and support, relevant green building demonstration projects;

v) Create awareness through cross-cutting education and information campaigns including campaigns targeting occupants of public sector buildings to reduce energy, water and waste;
vi) Develop and implement guidelines and minimum standards for compiling *Sustainable Building Reports* for the DPW portfolio of buildings; and
vii) Develop a detailed implementation plan that responds to the development and implementation of this Policy including the allocation of responsibilities, target dates and resources for the development and implementation of action items.

Furthermore, DPW will enter into a Green Building Accord with the property sector, industry associations, NGOs and other relevant organisations to formalise the expectations and commitments from DPW, the public sector and the green building sector in furthering this *Green Building Policy* and green building in general in South Africa.

Through the implementation of this *Green Building Policy*, DPW will support:

i) *sustainable development* within South Africa;
ii) *job creation* and the development of green jobs;
iii) the development of *improved working and living conditions*; and
iv) the development of *cost effective solutions* and the *efficient use of resources* during the life of buildings.

Monitoring and evaluation of this *Green Building Policy* will be undertaken by a joint committee established through DPW's Green Building Project Management Office. A formal review of the *Policy* will be undertaken every five years or in accordance with changes in legislation.

Glossary of Acronyms

ASA	Agrément South Africa
BAU	Business as Usual
B-BBEE	Broad Based Black Economic Empowerment
CBE	Council for the Built Environment
cidb	Construction Industry Development Board
CPD	Continuing Professional Development
CO_2	Carbon Dioxide
CSIR	Council for Scientific and Industrial Research
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DED	Department of Economic Development
DoE	Department of Energy
DWA	Department of Water Affairs (currently DWS)
DWS	Department of Water and Sanitation
DPW	Department of Public Works
DSM	Demand-side Management
EPWP	Expanded Public Works Programme
ESCo	Energy Service Company
GBCSA	Green Building Council of South Africa
GBPN	Green Buildings Performance Network
GDID	Gauteng Department of Infrastructure Development
GHG	Greenhouse Gas
GIZ	German International Co-operation
GPP	Green Public Procurement
Green Star SA	Green Star SA rating tool
IKS	Indigenous Knowledge Systems
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
JPOI	Johannesburg Plan of Implementation
kWhr	Kilowatt hour
KFW	formerly the Kreditanstalt für Wiederaufbau, Germany
LCC	Life-cycle Costing
LEED	Leadership in Energy and Environmental Design
LTMS	Long-Term Mitigation Strategy
M&V	Measurement and Verification

MDG	Millennium Development Goals
Mt CO_2eq	Million tonnes of Carbon Dioxide (CO_2) equivalents
NBR	National Building Regulations
NDCs	Nationally Determined Contributions
NDP	National Development Plan
NEMA	National Environmental Management Act
NFSD	National Framework for Sustainable Development
NGP	New Growth Path
NIAMM	National Immoveable Asset Maintenance Management Framework
NIMS	National Infrastructure maintenance Strategy
PJ	Peta Joule (approximately 278 million Kilowatt hour)
PPP	Public Private Partnership
PPPFA	Preferential Procurement Policy Framework Act
Public Works	National and provincial departments of Public Works
PV	Photovoltaic
SANEDI	South African National Energy Development Institute
SANS 10400X	National Building Regulations, Environmental Sustainability; SANS 10400X
SANS 10400XA	National Building Regulations, Environmental Sustainability; Energy Use in Buildings; SANS 10400XA
SBCI	Sustainable Building and Climate Initiative
SDC	Swiss Agency for Development and Cooperation
the dti	Department of Trade and Industry
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Convention on Climate Change
WSSD	World Summit on Sustainable Development

PUBLIC WORKS GREEN BUILDING POLICY

1. Introduction

The impact of buildings on global warming and climate change, as well the resource consumption and waste generation associated with buildings is well recognised, namely that[1]:

iv) over a third of all CO_2 emissions come from building construction and operations;

v) over a third of all energy and material resources is used to build and operate buildings; and

vi) over a third of total waste results from construction and demolition activities.

To this end, South Africa has joined international accords on the need to see development centered on sustainability and mitigation actions against climate change, aligned this commitment to national prescripts and programmes on climate change mitigation actions and adaptation, energy efficiency, and green building. This commitment has been amplified through the introduction of the *National Climate Change White Paper by the Department of Environmental Affairs*[2], the *National Energy Efficiency Strategy by the Department of Energy*[3], the *National Green Building Framework* by the Department of

1 UNEP (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, United nations Environmental Programme, www.unep.org/greeneconomy/

2 Government of SA (2011). *National Climate Change Response White Paper*, October 2011, Republic of South Africa, accessed at www.environment.gov.za.

3 DoE (2012). *Draft Second National Energy Efficiency Strategy Review*. Government Gazette 35920. Department of Energy, November 2012.

Public Works[4], as well as studies undertaken by the cidb[5] and the Council for the Built Environment[6].

Internationally, some trends in green building are already emerging, including requirements for certification, application of the precautionary principle, material and product traceability, price signals as an instrument of driving change, a focus on retrofitting, a growing need for workforce training, reinstating and greening infrastructure, saving water and energy consumption, and introducing food production into the built environment. These trends are incorporated into this Public Works *Green Building Policy*.

As custodian of the built environment sector, DPW presents this *Green Building Policy* to contribute to the aspiration of the *National Climate Change Response White Paper* and to South Africa's *Intended Nationally Determined Contributions*[7] (INDCs).

Drawing on the *National Green Building Framework*, this *Green Building Policy* is presented on the basis that the built environment sector has a direct influence on greenhouse gas emissions. Lights, heating and cooling systems contribute to carbon emissions. Therefore, through this policy, DPW will mitigate carbon emissions and adapt the sector to a green built environment by providing a base for development of the green building programme to ensure existing and new government buildings are environmentally responsible.

This *Green Building Policy* was developed under the guidance of a Green Building Technical Team comprising of representatives from:

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4 DPW (2011). *Towards A Green Building Policy Framework* , Prepared by CSIR, Department of Public Works, January 2011.

5 UNEP-SBCI (2009). *South African Report on Greenhouse Gas Emission Reduction Potentials from Buildings; A Discussion Document*. United Nations Environment Programme, Sustainable Building and Climate Initiative. Undertaken by the cidb, accessible at www.unep.org/sbci.

6 CBE (2011). *Greenhouse Gas Mitigation Support Strategies in the Building Sector; Review of Green Building Rating Tools in Terms of Their Potential as a Tool For Greenhouse Gas (GHG) Mitigation.* Council for the Built Environment, www.cbe.org.za.

7 Government of SA (2015). *South Africa's Intended Nationally Determined Contributions*, Republic of South Africa, accessed at http://www4.unfccc.int/submissions/INDC.

i) DPW Chief Directorate: Property and Facilities Management;

ii) DPW Construction and Property Policy Unit;

iii) DPW Regional Offices;

iv) Provincial Departments of Public Works;

v) cidb (Construction Industry Development Board);

vi) CBE (Council for the Built Environment);

vii) Agrément South Africa; and

viii) CSIR (Council for Scientific and Industrial Research).

The *Green Building Policy* was approved by DPW MinMec on 1 December 2015. The *Policy* is accompanied by the *Public Works Green Building Sector Plan* which sets out the strategic objectives, performance measures and activities for the Public Works in the attainment of the objectives and principles of this *Policy*.

2. Strategic Context of the Policy

Economic, social and environmental sustainability are at the very core of government's vision: the principles of sustainability are ultimately enshrined in the Constitution, in legislation, and in policy direction. Since green building is located within the sustainable development paradigm, it should be possible to ensure that the objectives of green building match and support the principles of sustainable development that government is bound to by the Constitution, and has already committed itself to through legislation, policy direction and international conventions and agreements.

Doing this will ensure that implementing a green building strategy and programme will not only deliver the performance benefits to be gained through green building, but also contribute to meeting government's national and international commitments.

As a catalyst industry for job creation and youth development, DPW will ensure that the built environment contributes to government objectives of shared growth through the implementation of the subsets of green building such as energy efficiency, renewable energy, water efficiency and waste management.

3. Problem Statement

Buildings and structures form and alter the nature, function and appearance of the natural and built environment. They impact on rural areas, villages, towns and cities. They are known to have a long life. Many of the buildings still in use around the world are many hundreds of years old. Their construction, use, repair, maintenance and demolition consume energy and resources and generate waste in excess of any other industrial sector.

Construction and maintenance activities are consumers of materials and scarce resources (water and energy). They are a significant contributor to greenhouse gasses (including CO_2 from the burning of fossil fuels); contribute to air pollution (smoke and dust pollution); generate vast quantities of waste; contaminate the soil and destroy existing vegetation.

According to estimates reflected in the Energy and Climate Change Strategy, 2015 – 2050[8], commercial buildings consume 15% of South Africa's electricity culminating into 10% greenhouse gases (GHGs). Heating, ventilation and air-conditioning accounts for 26% consumption while 18% is attributable to lighting, 14% to motors, 8% to water heating, 9% to fans and pumps and 9% and others to appliances and computers 23%.

Globally, the operation of buildings accounts for about 40% of energy consumption contributing to 30% GHG emissions.

Yet buildings are a crucial part of governments' strategy to improve the quality of life: They constitute the infrastructure through which, for instance, health care, education and housing are provided. The economic, social and environmental benefits that may result from a more efficient and sustainability-led industry are not difficult to imagine.

8 DoE (2015). Energy and Climate Change Strategy for the Public Building Sector; 2015 to 2050. Compiled by Surya Power, Department of Energy, September 2015.

Building activity varies significantly between developed and developing countries. Whereas more of the building work in developed countries is orientated around renovation and maintenance (33% and rising in Europe); activity in developing countries has more to do with new construction. Both activities must recognise that buildings are resources that must be adapted rather than demolished.

The maintenance and construction of buildings is becoming increasingly expensive, requiring substantial financial resources. DPW has to ensure that all the buildings within its portfolio are properly maintained in order to continue to function as efficiently and effectively as possible and to preserve their financial, functionality and aesthetic appearance.

High level DPW condition assessments reveal a very daunting scenario indicating that the suitability, performance and functionality of these buildings are very poor and require maintenance. Other buildings do not comply with statutory regulations such as SANS 10400 which now has a requirement for environment and energy efficiency. In 2015, 15% of the building stock was in the good to very good category, 60% was fair, while 25% was in a very poor state[9]. These buildings will require moderate to major refurbishment to achieve the required level of energy efficiency.

DPW therefore has a daunting task of striking a balance between potentially conflicting principles, namely green building versus containment of initial costs, when evaluating alternative choices.

Recognising that the core mandate of DPW is to provide suitable accommodation to user departments in support of their service delivery objectives, and pursuant to this mandate, among others, DPW undertakes construction of new buildings, refurbishment and reconfiguration of existing buildings, and leasing-in from the private sector.

9 DoE (2015). Energy and Climate Change Strategy for the Public Building Sector; 2015 to 2050. Compiled by Surya Power, Department of Energy, September 2015.

Recognising the significant impact of buildings on global warming and climate change, and that the construction, use, repair and maintenance and demolition of buildings consume energy and resources and generate waste in excess of any other industrial sector.

Recognising that as the custodian of state properties, DPW is the largest South African player in the property and construction sectors, and DPW therefore has the responsibility to provide leadership in relation to green buildings and the green economy.

This *Public Works Green Building Policy* is presented on the basis that DPW strives to create sustainable green buildings that will:

i) mitigate climate change, and adapt to the impact of climate change;
ii) minimise harm to the natural environment and maximise the ecological function of the landscape;
iii) create economic value for Public Buildings;
iv) create opportunities for green jobs, up-skilling, training of participants and the development of improved working and living conditions.

4. Context: Green Buildings

This Chapter examines various sustainable development and green economy concepts, which provide the context for green buildings. The Chapter recognises that public sector buildings are typically the largest component of the building stock. It examines the role of government in providing leadership in green buildings. Government leadership is a key component of this *Green Building Policy*.

4.1 Sustainable Development

Sustainable development provides for meeting the needs and aspirations of people (especially the poor) in a manner that does not impede future generations from being able to meet their own needs and aspirations.

South Africa has formalised its definition of sustainable development by including it in law. The definition of sustainable development in the *National Environmental Management Act*[10] (NEMA), (Act No. 107 of 1998) is as follows:

> *"Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations."*

Sustainable development is also increasingly being recognised in terms of the water, energy and food security nexus (Table 4.1), meaning that the three sectors of water

10 Government of SA (1998). National Environmental Management Act, Act No. 107 of 1998, Government Gazette 19519, 27 November 1998, Republic of South Africa, accessed at www.environment.gov.za.

security, energy security and food security are inextricably linked and that actions in one area more often than not have impacts in one or both of the others[11]:

Table 4.1 Water, energy and food security nexus

Element	Description
Water Security	The elements of water security are: (1) water access; (2) water safety; and (3) water affordability so that every person can lead a clean, healthy and productive life, while ensuring that the natural environment is protected and enhanced.
Energy Security	The elements of energy security are: (1) continuity of energy supplies relative to demand; (2) physical availability of supplies; and (3) supply sufficient to satisfy demand at a given price.
Food Security	The elements of food security are: (1) food availability: influenced by production, distribution and exchange of food; (2) access to food: including affordability, allocation and preference; (3) utilization: nutritional value, social value and food safety (4) food stability over time.

4.2 Green Economy

The United Nations Environmental Programme (UNEP) defines a green economy as one that results in "improved human well-being and social equity, significantly reducing environmental risks and ecological scarcities"[12]. In its simplest expression, green economy is low carbon, resource efficient, socially inclusive.

The green economy is an economic development model based on sustainable development and knowledge of ecological economics. In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services.

11 IISD (2013). *The Water–Energy–Food Security Nexus: Towards a Practical Planning and Decision-Support Framework for Landscape Investment and Risk Management.* Livia Bizikova, et al. International Institute for Sustainable Development, February 2013.

12 UNEP (2011). *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers*, United Nations Environmental Programme, www.unep.org/greeneconomy.

Buildings, and the built environment, are central concepts of the green economy[13,14]. Cabinet has adopted the green economy as an economic and environmental policy to guide its future investments and strategic decision-making.

4.3 Sustainable Buildings

Green buildings are a sub-set of sustainable buildings, and are predominantly associated with the environmental sustainability component of building and construction, while the broader issues of sustainability and the green economy are associated with sustainable buildings. This *Policy* focuses primarily on green buildings.

Notwithstanding this, it should be noted that the social issues of sustainable buildings are in fact well entrenched within the public sector through, amongst others:

i) the *Preferential Procurement Policy Framework Act* (PPPFA) (2011);

ii) the *Guidelines for the Implementation of Labour-Intensive Infrastructure Projects* under the Expanded Public Works Programme (EPWP)[15] (which includes the SANS 1921-5: 2004 specification Part 5: Earthworks activities which are to be performed by hand);

iii) *B-BBEE Construction Codes of Good Practice*[16];

iv) cidb *Standard for Indirect Targeting for Enterprise Development*[17];

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13 UNEP (2011). *Towards a Green Economy: Buildings; Investing in Energy and Resource Efficiency*. United Nations Environmental Programme, www.unep.org/greeneconomy.

14 UNEP (2011). *Towards a Green Economy: Cities; Investing in Energy and Resource Efficiency*. United Nations Environmental Programme, www.unep.org/greeneconomy.

15 DPW, et al (2004). *Guidelines for the Implementation of Labour-Intensive Infrastructure Projects under the Expanded Public Works Programme*, 2nd Edition, July 2005, accessible at www.epwp.gov.za.

16 the dti (2009). *Construction Codes of Good Practice: 2000-2800 for Broad Based Black Economic Empowerment*, Issues in terms of Section 9 (1) of the BBBEE Act 53, 2003, Notice 862 of 2009, Government Gazette 32305, Department of Trade and Industry, accessible at www.info.gov.za.

17 cidb (2013). *cidb Standard for Indirect Targeting for Enterprise Development* . Government Gazette 36190, 25 February 2013. Construction Industry Development Board, accessible at www.cidb.org.za.

v) cidb *Standard for Developing Skills on Infrastructure Contracts*[18]; and

vi) cidb *Practice Note 34: Balancing Delivery, Development and Empowerment*[19].

4.4 Green Buildings

The concept of green buildings, sustainable buildings, or sustainable construction is broad. It is however, generally viewed as the building structure and the construction process that is environmentally responsible and resource-efficient throughout the whole life-cycle of the building, from inception and design, through the operation, maintenance and refurbishment of buildings, to deconstruction.

In this regard, the US Environmental Protection Agency (US EPA) defines green building as[20]:

> *…. the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction*

A similar definition (as per the Green Building Council of South Africa: GBCSA[21]) recognises that:

> *green building incorporates design, construction and operational practices that significantly reduce or eliminate the negative impact of development on the*

18 cidb (2013). *cidb Standard for Developing Skills on Infrastructure Contracts*. Government Gazette 36760, 23 August 2013, Construction Industry Development Board, accessible at www.cidb.org.za.
19 cidb (2015). *cidb Practice Note 34; Balancing Delivery, Development and Empowerment* . Construction Industry Development Board.
20 EPA. *Definition of Green Building*. US Environmental Protection Agency. http://www.epa.gov/greenbuilding/pubs/about.htm.
21 GBCSA. Green Building Council of South Africa, www.gbcsa.org.za.

environment and people. Green buildings are energy efficient, resource efficient and environmentally responsible.

In general, the largest impact on life-cycle decisions impacting on green buildings is made at the planning and design phase of a building. Hence, it is important that the design of a building reflects the desirable sustainability norms, standards and best practices. Key to this, are green building codes of practice, green building rating tools and energy efficiency standards. In this regard, international practice is now recognising and promoting a 'Deep Path' transformational change agenda to enabling an 80% global reduction of thermal energy demand from buildings by 2050[22].

One of the greatest challenges with regard to green buildings is that of dealing with the existing building stock – much of which is resource inefficient. In this regard, a report on greenhouse gas (GHG) emissions from the building sector in South Africa shows that under likely scenarios of introducing energy efficiency requirements for buildings, the annual emissions from the existing building stock by 2050 will still exceed that of new buildings constructed[23].

Retrofitting of existing buildings to enhance their energy and water efficiency is therefore a key focus around the world. However, retrofitting of buildings is often complex, and international experience shows that it is necessary to avoid any possible lock-in to inefficient retrofits with long-term consequences.

4.5 Green Landscaping and Horticulture

eThekweni Municipality[24] notes that urban landscapes are often not sustainable as they are resource hungry, requiring significant energy, water and chemical inputs. Plant

22 GBPN (2012). *Buildings for Our Future, The Deep Path for Closing the Emissions Gap in the Building Sector*. Green Buildings Performance Network, accessible at www.gbpn.org/reports.

23 UNEP-SBCI (2009). *South African Report on Greenhouse Gas Emission Reduction Potentials from Buildings; A Discussion Document*. United Nations Environment Programme, Sustainable Building and Climate Initiative. Undertaken by the cidb, accessible at www.unep.org/sbci.

24 eThekweni (2009). *Green Landscaping Guideline*. eThekweni Minicipality, www.durban.gov.za

selections are often unsuited to local conditions and inappropriate practices result in excessive water usage, soil depletion, chemical contamination of the surrounding environment, unsuitable use of natural materials (such as rocks, pebbles and wood), and damaging water run-off.

In response to the earths declining biodiversity, there is therefore a growing global mandate that any investment into development of the landscape should be done to achieve maximum ecological benefit wherever possible. A well-functioning ecology not only provides refuge for a diversity of plant, animal and insect species, but also allows a good supply of "ecosystem goods and services" to be produced – while creating landscapes that are useful to and benefit human beings in a range of ways.

Green landscaping and horticulture aims to[25]:

i) minimise harm to the natural environment;

ii) maximise the ecological function of the landscape;

iii) save time and money with lower maintenance requirements; and

iv) create healthier and safer places for people to live, work and play.

4.6 Indigenous Knowledge Systems

Indigenous knowledge systems (IKS) in sustainable building design would in a similar way be a holistic approach that considers the environment, people and the economy. In the context of South Africa, the experiences, skills, innovation, climatic conditions, and knowledge of local indigenous peoples as defined by the country's respective regions can be used to enhance sustainable design and green buildings.

25 eThekweni (2009). *Green Landscaping Guideline*. eThekweni Minicipality, www.durban.gov.za

An important component of IKS is the critical regionalism approach to architecture[26], which supports IKS objectives around the engagement of local environment, materials, designs, culture, and people in buildings. Critical regionalism is closely aligned to the concepts of vernacular architecture, based on local needs, construction materials and reflecting local traditions. The three contexts of IKS are highlighted in Table 4.2.

Table 4.2 Contexts of indigenous knowledge systems

a) Environmental	b) Socio-cultural	c) Economic
• Understanding local climate • Understanding the landscape, river/water systems and geological context • Flora and fauna • Food, energy, water nexus	• Understanding local customs and practices and other cultural phenomena • Understanding local lived experiences • Relationships and social dynamics • Connecting with past and present forms of identity	• Value chain for local businesses • Development of local economies • Local building techniques • Local skill and crafts • Local manufacturing

4.7 Green Precincts

Green buildings which are increasingly being placed within the context of sustainable urban development, green precincts, green neighbourhoods, etc. are receiving significant attention. Green precincts focus on strategic location linkages and land-use such as positioning residential developments and commercial offices within close proximity of each other. By so doing, green precincts encourage reduction in car travel, the associated GHG emissions and promote more efficient energy and water use.

4.8 Socio-Economic Value of Green Buildings

There is growing evidence and recognition both internationally and locally that green buildings are not only more environmentally friendly, but also create economic value.

26 "Critical regionalism is an approach to architecture that strives to counter the placelessness and lack of identity of the International Style, but also rejects the whimsical individualism and ornamentation of Postmodern architecture" (after Wikipedia).

Amongst others, the recent *World Green Building Trends 2016 Smart Market Report*[27] summarises the business benefits expected from green building investments, as highlighted in Table 4.3.

Table 4.3 Business benefits of green buildings

Business benefits as compared to a conventional 'non-green' building or to a conventional 'non-green' retrofit	New Green Building	Green Building Retrofit
Decreased operating costs over one year	9%	9%
Decreased operating costs over five years	14%	13%
Increased Building Asset Value for Green versus Non-Green Projects (According to AEC Firms)	8%	7%
Increased Asset Value for Green versus Non-Green Projects (According to Owners)	7%	7%
Payback Time for Green Investments	7 Years	6 Years

It can be seen in Table 4.3, for example, that a new green building results in around a 14% decrease in operational costs over five years compared to a conventional new 'non-green' building. Similarly, it can be seen that a green building retrofit results in around a 13% decrease in operational costs over five years compared to a conventional 'non-green' retrofit.

Note that the operational savings due to green building interventions and retrofitting depends on the extent and nature of the retrofit. For example, a standard retrofit or refurbishment will often achieve energy savings ranging between 20% and 30% and sometimes less. However, research by the Green Buildings Performance Network (GBPN) indicates that with a "deep" renovation, it is possible to reduce a building's energy use by more than 75%[28]. Notwithstanding the variations that can be achieved, the business benefits highlighted above are acceptable industry norms.

The *World Green Building Trends 2016 Smart Market Report* also highlights the social reasons for building green – and in particular improved health and productivity benefits. The Report notes that 55% of firms rate greater health and well-being as the top social

27 Dodge Data & Analytics (2016). *World Green Building Trends 2016 Smart Market Report*, http://analyticsstore.construction.com/2016WorldGreen-9408.html

28 GBPN. *What is Deep Renovation*? Green Buildings Performance Network, http://www.gbpn.org/

reasons for building green. Improved health and productivity of green buildings is also emphasised in the report *The Business Case for Green Building*.[29]

In terms of specific health care improvements, a study undertaken by the US Department of Energy quantified that building retrofits which improved the indoor environment of a building resulted in reductions of: communicable respiratory diseases of 9% to 20%; allergies and asthma of 18% to 25%; and non-specific health and discomfort effects of 20 to 50%[30].

However, while green buildings offer significant direct advantages in terms of business benefits as well as improved health and productivity of participants, significant socio-economic benefits, including job creation, arise through retrofitting and maintenance activities, waste management, recycling and other activities underpinning green buildings.

4.9 Public Sector Portfolio

Public sector buildings are classified within the commercial category, which is the largest component of the total building stock in South Africa. The total building stock in South Africa is estimated at 50,2 million m^2, at an estimated value of R250 to R500 billion[31,32].

Estimates of the total public sector building stock (including the municipal sector) are given in Table 4.4.

29 WGBC (2015). *The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors and Occupants*, World Green Building Council, http://www.worldgbc.org/

30 Fisk, W J. (2000). *Health and Productivity Gains from Better Indoor Environments and their Implications for the U.S. Department of Energy*. viahttp://energy.lbl.gov/ie/viaq/pubs/lbnl-47458.pdf

31 DoE (2015). Energy And Climate Change Strategy for the Public Building Sector; 2015 to 2050. Department of Energy.

32 DoE (2016). Development of post-2015 National Energy Efficiency Strategy, Targets, Measures and Implementation Plan; Costs and Benefits of Proposed Policy Measures. Rev. 10 February 2016.

Table 4.4 Total public sector building stock

Million m^2	2012	2015	2020	2025	2030
Offices	23,17	27,25	36,00	48,82	63,35
Educational Facilities	11,48	11,74	13,28	15,01	16,97
Healthcare Facilities	5,75	5,77	6,53	7,38	8,34
Other	6,69	7,61	7,71	8,72	9,86
Total	47,09	52,37	63,99	79,93	100,52

Adapted for 2012-2030 from ECCS for public buildings (DoE, 2015)

The *Energy and Climate Change Strategy* (ECCS) for the government buildings sector in South Africa by the Department of Energy describes a scenario for the refurbishment of the current building stock to high standards of energy efficiency. This could result in savings from such refurbishments by 2030 of 10 PJ (or 2 800 million kWh) annually. Based on an average 8% year-on-year tightening in energy performance regulations, further savings of about 40 PJ (or 11 100 million kWh) in annual consumption are possible by 2030 – yielding total annual energy savings of around 50 PJ (or 14 000 million kWh) by 2030.

By comparison, DPW has established a national target for energy savings of 5,9 PJ (1 628 million kWh) over the five years 2015/16 to 2019/20.

In addition to the energy savings potentials highlighted above, significant potential also exists for water efficiencies, waste reduction, recycling, etc.

4.10 Green Public Procurement

Green Public Procurement (GPP) can be defined as a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured[33].

33 COM (2008). *400 Public Procurement for a Better Environment*. European Commission, http://ec.europa.eu/environment/gpp/what_en.htm

Amongst others, Green Public Procurement policies aim to[34]:

i) demonstrate environmental leadership and influence industry and citizens to use environmentally preferable goods, services and processes;

ii) stimulate innovation and market development of, and demand for, environmentally preferred goods and services, making them available and mainstreaming them for other sectors of society;

iii) support emerging environmental technologies;

iv) benefit the environment by contributing to environmental objectives;

v) result in more environmentally responsible planning, acquisition, use and disposal practices in the federal government; and

vi) support a healthier working environment for employees and citizens through the purchase of environmentally preferable goods and services.

Green Public Procurement policies need to comply with relevant procurement regulation, and need to take cognisance of a wide range of issues, including[35]:

a) *Life-cycle Costing (LCC) and environmental considerations*: Green Public Procurement Policies should incorporate LCC to evaluate tenders and to preference products and services which have lower environmental impacts across their life cycle compared with competing products and services;

b) *Award criteria* could include minimum eligibility criteria and / or functionality criteria. Minimum eligibility criteria need to be specified in the contract data, and normally include minimum performance levels, including requirements such as for green building rating, eco-labelled building materials and products, and test reports and certificates. Functionality could include certification to SANS/ISO 9001 Environmental Management Systems, and public disclosure on environmental and social performance.

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34 OECD. *Smart Procurement: Best Practices for Green Procurement; Canada*. Organization for Economic Cooperation and Developmenthttp://www.oecd.org/gov/ethics/best-practices-for-green-procurement.htm

a) 35 EC (2016). *Buying Green! A Handbook on Green Public Procurement 3rd Edition*. European Commission, http://ec.europa.eu/environment/gpp/buying_handbook_en.htm

c) For green buildings, selection criteria are essential for project managers, architects and engineers on experience in sustainable building design, and for contractors in implementing improved designs and specifications.

d) *Contract performance clauses*: Environmental considerations to specify the supply of goods and for the supply of works or services can be included in contract performance clauses.

e) *Monitoring contract compliance* (including monitoring of sub-contractors) is essential.

4.11 Public Sector Leadership

Government and the public sector have a critical role in providing leadership in green buildings, and within the broader green economy. Such public sector leadership programmes typically include:

4.11.1 ***Leading by example*** by establishing and implementing policies and practices for public sector institutions and their buildings – creating visibility, awareness and by sharing best practice and encouraging other sectors to follow.

UNEP-SBCI notes that public leadership programs that are mandatory on the public sector institutions are more effective than voluntary programmes[36]. An example of such public leadership is that of Executive Order 13514 on Federal Leadership in Environmental, Energy, and Economic Performance signed by President Obama in October 2009 to lead by example by mandating that Federal Agencies shall[37]:

i) increase energy efficiency;

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36 UNEP-SBCI (2009). *Buildings and Climate Change: Summary for Decision-Makers.* United Nations Environment Programme – Sustainable Building and Climate Initiative. Available at www.unep.org.

37 The White House (2009*). Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance*. Office of the Press Secretary, The White House, USA. October 2009, www.whitehouse.gov/assets/documents/2009fedleader_eo_rel.pdf.

ii) measure, report, and reduce their greenhouse gas emissions from direct and indirect activities;

iii) conserve and protect water resources through efficiency,

iv) reuse, and storm water management;

v) eliminate waste, recycle, and prevent pollution; and

vi) design, construct, maintain, and operate high performance sustainable buildings in sustainable locations.

4.11.2 ***Demonstration projects*** assist in engaging policy makers and implementers, both within the public and private sectors, to showcase best practice and to share learning, to demonstrate technologies and processes, and to encourage the uptake of green buildings.

Demonstration projects and programmes typically promote processes, technologies and behaviours that are better than current legal standards – thereby testing, developing and promoting future standards. An example of such a public demonstration project is the KFW (formerly the Kreditanstalt für Wiederaufbau) in Germany that promotes the construction of new energy-efficient homes and the energy-efficient refurbishment of older residential buildings, in particular, with grants or loans available from KFW at favourable conditions. KFW is promoting the Efficiency House Plus in Germany that generates more energy than it consumes[38]. The demonstration projects align with Germany's energy efficiency strategy, as well as its sustainable transport strategy of encouraging transportation based on clean energy.

Another example of a public sector led demonstration project is that of the US General Services Administration (GSA)[39]. GSA is dedicated to improving building performance, reducing energy use and environmental and health impacts of Federal buildings. In order to improve understanding of how sustainable technologies and

38 KFW. Housing, home modernisation and energy conservation. Bank aus Verantwortung, www.kfw.de/inlandsfoerderung/EN/Domestic-Promotion/Our-offers/Housing-home-modernisation-and-energy-conservation/index-2.html.

39 GSA (2013). Living in a High-Performance Building: The Story of EPA's Region 8 Headquarters. US General Services Administration www.epa.gov/region9/waste/features/greenbuilding/.

approaches can improve building performance, GSA's Office of Federal High-Performance Green Buildings (OFHPGB) conducts demonstration research projects at selected Federal green buildings. GSA recently finished a multi-year demonstration research project on "The Wynkoop Building" – a 'Leadership in Energy and Environmental Design' (LEED) Gold accredited building.

The research project at The Wynkoop Building deployed scientific teams from the National Department of Energy (DOE) laboratories as well as academic and public sector organizations to assess performance in acoustics, under floor air distribution, data centre energy use, day lighting, indoor water use, thermal comfort, occupant experience, workplace functionality, and green roof applications. In all cases where the building was underperforming, the research teams made recommendations for improvements.

A further example of leadership through demonstration projects is the US Environmental Protection Agency's (EPA's) *Green Buildings on Brownfields* pilot projects in 8 states[40]. In terms of this initiative, the EPA provides technical assistance to Brownfields pilot projects and the EPA hopes these pilots serve as models, providing an incentive to localities and developers to build green buildings on Brownfields.

Many of the planned green building activities of the Gauteng Department of Infrastructure Development can also be seen as demonstration projects to encourage the uptake of green building technologies – such as the planned roll-out of solar photovoltaic (PV) plants on the Gauteng government's state-owned buildings.

Similarly, the Department of Environmental Affairs 6 Star Green Star SA certified building[41] is about 60%more energy efficient than the minimum requirements of

40 EPA. *Sustainable Redevelopment of Brownfields: Green Buildings on Brownfields Initiative*. US Environmental Protection Agency, accessible at www.epa.gov/brownfields/sustain.htm.

41 DEA (2013). *6 Green Stars to Shine at Environmental Affairs Head Office*. Department of Environmental Affairs, https://www.environment.gov.za/6greenstars_shine_atenvironmentalaffairs

SANS 10400: It can also be seen as a demonstration project to encourage energy efficiency.

Within a South African context (and within a developing countries context) it is important that demonstration projects incorporate vernacular (or traditional) architecture, as well as indigenous building materials and methods[42]. The Tsoga Environmental Resource Centre of the City of Cape Town[43] is an example of the use of such indigenous technologies, and was awarded the Cape Institute of Architecture Award in 2006 and the Holcim Foundation for Sustainable Construction Bronze Award in 2007.

4.11.3 ***Awareness raising, education and information campaigns:*** To change individual behaviours, attitudes, values, or knowledge, and to encourage the uptake of green buildings, in general, public sector campaigns are aligned to the strategic goals and objectives of the relevant public sector institution.

Similarly, an example of a public advocacy campaign at a local government level is the Brisbane City Council's Green Heart environmental engagement program that encourages the residents of Brisbane "to make changes to our everyday lives to help Brisbane achieve its goal of becoming Australia's most sustainable city – and making Brisbane a carbon-neutral city by 2026"[44]. The awareness raising, education and information campaigns includes the Green Heart Life sustainability e-newsletter that provides up to date sustainability news and events.

The advocacy campaign responds to the following six Brisbane city-wide outcomes:

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42 UNEP-SBCI (2010). Guidelines for Education Policy for Sustainable Built Environments. United Nations Environment Programme – Sustainable Building and Climate Initiative. Available at www.unep.org.

43 Holcim (2007). *Tsoga Environmental Centre, Community Centre in South Africa*. Holcim Foundation for Sustainable Development, accessible at http://download.holcimfoundation.org/1/docs/Tsoga_web.pdf.

44 City of Brisbane. *Green Living*. accessible at www.brisbane.qld.gov.au/environment-waste/green-living/index.htm.

i) well-designed and responsive built environment;

ii) green and bio-diverse city;

iii) sustainable water use;

iv) towards zero waste;

v) cleaner sustainable energy use; and

vi) green and active transport.

The importance of information dissemination, training and professional development and the role of Professional Councils, tertiary institutions, government departments and research institutions is highlighted by the Council for the Built Environment (CBE)[45]. The CBE notes the importance of Continuing Professional Development (CPD) in migrating the professions towards the needs of climate change and green building. The CBE motivates that "a specified number of CPD points by specified constituent councils should comprise programmes with substantial content (recommended initially at 10%, and subject to annual review) regarding climate change, or sustainability science, or green building practice.

4.12 Monitoring and Reporting

There is increasing recognition that government regulators and organizations need to track and manage their building stock, and to enhance the sustainability of this stock. Monitoring and reporting on sustainable buildings is a necessary requirement to both demonstrate leadership in the building sector and to prepare for future policies and regulations. Various reporting protocols for buildings exist, but primarily for GHG emissions – such as the *GHG Protocol for the U.S. Public Sector*[46], but this does not

45 CBE (2011). *Greenhouse Gas Mitigation Support Strategies in the Building Sector; Policy Guidelines to Incorporate Principles and Practices of Sustainable Development and Greenhouse Gas (GHG) Mitigations Strategies and Implementation Measures in the Building Sector Through Continuous Professional Development and the Accreditation of BE Programmes.* Council for the Built Environment, www.cbe.org.za

46 WRI-LMI (2010). *The GHG Protocol for the U.S. Public Sector: Interpreting the Corporate Standard for U.S. Public Sector Organizations.* A joint publication by World Resources Institute & Logistics Management Institute. Washington. http://www.ghgprotocol.org/standards/public-sector-protocol

address broader sustainability issues. The draft UNEP-SBCI SB Protocol[47] however does provide such a framework for monitoring and reporting on the influence of the performance of the building stock on core sustainability issues.

Within the broader area of sustainability reporting, internationally recognised reporting protocols conform to the following principles[48]:

i) *Comprehensive*: Sustainability reports must be comprehensive in terms of reporting scope, reporting boundary and reporting time.

ii) *Representative*: Sustainability reports must, where relevant, disclose the extent and method of stakeholder involvement. Methods for stakeholder involvement should be based on systematic and generally accepted methodologies and approaches.

iii) *Strategic*: Sustainability reports must enable:

- *Balanced* analysis of the positive and negative influences of the performance of building stock on sustainable development within a jurisdiction;
- *Comparability* of the influence of building stock over time; and
- *Monitoring* of the effectiveness of policy and innovation implemented to encourage more sustainable building activity.

iv) *Validated*: Sustainability reports must be validated through provision of transparency on data quality and independent peer and stakeholder review processes.

Within South Africa, it is envisaged that a national Building Energy Performance Register will be established and maintained by SANEDI (or its delegated authority) using information recorded in Energy Performance Certificates (EPCs). The Building Energy Performance Register will be an important input into monitoring of energy usage in buildings in South Africa.

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47 UNEP-SBCI (2013). *Sustainable Building Protocol (Pilot Version); Part II: Financial and/or Operational Control.* United Nations Environmental Programme – Sustainable Building and Climate Initiative (unpublished)

48 GRI (2011). *GRI Sustainability Reporting Guidelines.* Global Reporting Initiative, Amsterdam. www.globalreporting.org

Of importance to note is the National Immovable Asset Maintenance Management (NIAMM) Monitoring and Evaluation Protocol[49] which presents a protocol for the monitoring and evaluation of the implementation of the NIAMM Standard (hereafter referred to the "the Standard") for immovable assets under the custodianship of the National and Provincial Departments of Public Works. The Monitoring and Evaluation Protocol provides for a State of Public Works' Asset Report that will present a strategic, national overview on the state of assets, asset care needs, improvements in management practice and institutional capacity, and related topical matters such as the progressive greening of immovable asset portfolios.

These various monitoring and reporting protocols can be used as the basis for monitoring and reporting on governments green building programme.

49 DPW & cidb (2015). *Monitoring and Evaluation Protocol for Immovable Assets under the Custodianship of National and Provincial Departments of Works.* Department of Public Works & Construction Industry Development Board. www.cidb.org.za

5. The South African Context

This Chapter provides an overview of the South African legislative and policy landscape informing and supporting this *Green Building Policy*, as well as the progress made by Public Works towards the implementation of Green Buildings. An overview of other country and economic grouping of green building and green economy policy positions can be found in Annexures A and B.

5.1 Overview

South Africa is a country in dynamic change. It is a country with significant development challenges, and creating sufficient decent employment opportunities at the heart of the *New Growth Path*[50] (NGP) and the *National Development Plan*[51] (NDP). Central to the growth and development of South Africa, is the recognition of the threat of climate change and the interventions this will demand in terms of the development of alternative economic growth models and the development of technologies required for supporting those alternative models.

A report on greenhouse gas emissions (GHGs) in the built environment in South Africa[52] concluded that the operation of the non-residential and residential building sectors account for around 23% of total emissions in South Africa. Of this, non-residential sector accounts for around 10% of total emissions and the urban and rural high-medium income residential sectors account for around 8%. In addition, the report estimated that the manufacture of building materials accounts for around 5% of total emissions.

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50 DED (2010). *The New Growth Path*. Department of Economic Development, South Africa, November 2010.

51 The Presidency (2012). *The National Development Plan*. National Planning Commission, The Presidency, South Africa, August 2012.

52 UNEP-SBCI (2009). *South African Report on Greenhouse Gas Emission Reduction Potentials from Buildings; A Discussion Document*. United Nations Environment Programme, Sustainable Building and Climate Initiative. Undertaken by the cidb, accessible at www.unep.org/sbci.

Importantly, the report concluded that based on historical trends and anticipated government investment programmes, it is likely that the total building stock could double between 2008 and 2050. If CO_2 emissions were unchecked, this would result in a twofold increase in emissions between 2008 and 2050!

In order to be effective, South Africa's numerous global environmental commitments, including those that encompass sustainable development, require implementation strategies and action plans. These global commitments require countries to adopt bold, goal-oriented policies and strategies supported by the necessary actions to meet the various targets set.

In this regard, the NDP devotes an entire chapter to "*Ensuring environmental sustainability and an equitable transition to a low-carbon economy*". Key points noted within the NDP include:

i) South Africa has a rich endowment of natural resources and mineral deposits, which, if responsibly used, can fund the transition to a low-carbon future and a more diverse and inclusive economy.

ii) Developmental challenges must be addressed in a manner that ensures environmental sustainability and builds resilience to the effects of climate change, particularly in poorer communities.

iii) Investment in skills, technology and institutional capacity is critical to support the development of a more sustainable society and the transition to a low-carbon economy. Focused, institutionalised capacity building and management structures are needed.

iv) Carbon-pricing mechanisms that target specific mitigation opportunities need to be implemented.

v) Consumer awareness initiatives and sufficient recycling infrastructure should result in South Africa becoming a zero-waste society.

vi) The development of environmentally sustainable green products and services, including renewable energy technologies, will contribute to the creation of jobs in niche markets where South Africa has or can develop a competitive advantage.

The NDP then sets the following objectives, in which buildings and the built environment are central:

i) Zero emission building standards by 2030;

ii) Absolute reductions in the total volume of waste disposed to landfill each year; and

iii) At least 20 000MW of renewable energy should be contracted by 2030.

5.2 Legislative and Policy Framework

South Africa has a significant history of environmental conservation, and the protection of the environment is enshrined in the Constitution. There is also a significant body of legislation protecting the environment, although the focus has historically been on the natural environment. Sustainable development features directly in the policy domain specifically through the National Framework for Sustainable Development although the key principles of sustainable development are in evidence in many other government policies.

5.2.1 Constitution

The South African Government is charged with respecting, protecting, promoting and fulfilling the rights in Chapter 2: Bill of Rights as contained in the Constitution (Act 108 of 1996). Specifically the Bill of Rights makes specific reference to rights associated with the natural and built environment.

Section 24 grants everyone the right to an environment that is not harmful to their health or well-being, and to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

5.2.2 The National Building Regulations and Buildings Standards Act (1977)

The *National Building Regulations and Buildings Standards Act* (Act 103 of 1977, as amended)[53] provides for SANS 10400 *The Code of Practice for the Application of the National Building Regulations*. SANS 10400 was amended in 2011 to include Part X *Environmental Sustainability*, and *Part XA Energy Usage in Buildings*. SANS 10400X will in time be expanded to include other green building areas, including water efficiency, indoor air environment, recycling and reuse of building materials.

5.2.3 The National Water Act (1998)

The *National Water Act* (Act No 36 of 1998)[54] provides for water management strategies, the protection of water resources, and the use of water to ensure the sustainable use of water through the protection of the quality of water resources for the benefit of all water users.

5.2.4 National Energy Efficiency Strategy (2005, 2012)

The *National Energy Efficiency Strategy*[55,56] (NEES) was mandated by the White Paper on Energy Policy and links energy sector development with national socio-economic development plans as well as being in line with other Government

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53 Government of SA (1977). *The National Building Regulations and Buildings Standards Act. Act 103 of 1977, as Amended*. Republic of South Africa.

54 Government of SA (1998). *National Water Act. Act 103 of 1977*. Government Gazette 19182, 26 August 1998, Republic of South Africa.

55 DME (2005). *Energy Efficiency Strategy of the Republic of South Africa*. Department of Minerals and Energy, March 2005.

56 DoE (2012). *Draft Second National Energy Efficiency Strategy Review*. Government Gazette 35920. Department of Energy, November 2012.

departmental initiatives. The strategy sets a target for energy efficiency improvements of 15% for the commercial and public building sectors by 2015.

5.2.5 Long Term Mitigation Scenarios (LTMS) (2007)

South Africa has ratified the *United Nations Framework Convention on Climate Change* and its Kyoto Protocol and plays a proactive role in the climate negotiations. Thus far, South Africa has been exempt from taking mandatory action to reduce our high level of relative emissions. In the *United Nations Framework Convention on Climate Change* (UNFCCC) the principle of equity and "common but differentiated responsibility" was agreed upon. Developed nations would take the lead in mitigating greenhouse gases. South Africa has a loose commitment to mitigate against greenhouse gas emissions under the Convention but no legally binding, quantified target.

In 2006, Cabinet commissioned a process to examine the potential for mitigation of South Africa's greenhouse gas emissions, resulting in the *Long Term Mitigation Scenarios*[57] (LTMS) that would provide a sound scientific analysis from which Cabinet could draw up a long-term climate policy. Such a policy would give South African negotiators under the UNFCCC clear and mandated positions for their negotiations. It would also ensure that South African stakeholders understood and committed to a range of realistic strategies for future climate action:

i) Energy-efficiency options in the industrial, commercial, residential and transport sectors;

ii) Electricity-generation options including cleaner fuels; and

iii) Economic instruments including CO_2 tax and subsidies for solar water heaters and renewable electricity.

57 Scenario Building Team (2007). *Long Term Mitigation Scenarios: Technical Summary*. Department of Environment Affairs and Tourism, Pretoria, October 2007, www.erc.uct.ac.za/Research/LTMS/LTMS-intro.htm.

The LTMS was endorsed by Cabinet in 2008 as the strategic direction for national climate policy. President Zuma internationalised this pledge in Copenhagen in 2009, and committed South Africa to take mitigation action that will reduce South Africa's emissions by 34% below the business as usual (BAU) trajectory by 2020, as long as there is support from developed countries. More recently, South Africa has reaffirmed its commitment to the LTMS through its commitment to South Africa's intended nationally determined contributions (INDCs) to the Paris agreement (COP21) (see Annexure A.3),

5.2.6 Government Immovable Asset Management Act (2007)

The *Government Immovable Asset Management Act* (GIAMA)[58] provides for a uniform framework for the management of immovable assets that are held or used by a national or provincial department, and to ensure the coordination of the use of immovable assets with the service delivery objectives of a national or provincial department.

The objects of GIAMA include that of optimising the cost of service delivery by "*protecting the environment and the cultural and historic heritage*".

5.2.7 National Framework for Sustainable Development in South Africa (2008)

The *National Framework for Sustainable Development*[59] (NFSD) notes that the negotiated outcome of the World Summit on Sustainable Development (WSSD) held in September 2002, the Johannesburg Plan of Implementation (JPOI), sets out 37 targets for achieving sustainable development, inclusive of the Millennium Development Goals. South Africa has numerous strategies and programmes that include sustainable development considerations; however there is no coherent and overarching national strategy for sustainable development. The National Framework

58 Government of SA (2007). *Government Immovable Asset Management Act. Act No 19 of 2007.* Republic of South Africa, 2007.

59 DEAT (2008). *A National Framework for Sustainable Development in South Africa.* Department of Environment and Tourism, July 2008.

for Sustainable Development seeks to address this void by initiating a broad framework for sustainable development in South Africa that can serve as a basis for developing a national strategy and action plan.

The identification of five priority areas for strategic intervention, and supporting priority recommendations, was based on the analysis of the natural resources, economic, social and governance trends.

i) Enhancing systems for integrated planning and implementation;

ii) Sustaining ecosystems and using natural resources efficiently;

iii) Economic development via investing in sustainable infrastructure;

iv) Creating sustainable human settlements; and

v) Responding appropriately to emerging human development, economic and environmental challenges.

The *National Framework for Sustainable Development* included several focus areas and required actions, including:

i) *Dematerialising the economy*, which targets improvements in the efficiency of production and consumption systems by reducing the total quantity of materials and energy required per unit of production, and reducing eventually to zero the quantity of waste outputs that are predominantly disposed of in landfills, air, marine and aquatic systems.

ii) *Air quality*, which requires a multi-pronged strategy including a national investment in air quality monitoring, and an acceleration of investments into clean coal technologies, ecologically sustainable biofuels and renewable energy sources.

iii) *Energy efficiency* which targets reducing oil imports and switching to cleaner and renewable energy sources, and requires strategy development and setting of targets through research and consultation.

5.2.8 National Environmental Management: Waste Act (2008, 2014)

The *National Environmental Management: Waste Act* (as amended) and *Amendment Act*[60,61] provides for regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development and related matters.

5.2.9 National Climate Change Response White Paper (2011)

The South African *National Climate Change Response White Paper*[62] presents the South African Government's vision for an effective climate change response and the long-term, just transition to a climate-resilient and lower-carbon economy and society. South Africa's response to climate change has two objectives:

i) Effectively manage inevitable climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity.

ii) Make a fair contribution to the global effort to stabilise greenhouse gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

The *White Paper* notes that the achievement of South Africa's climate change response objective is guided by the principles set out in the Constitution, the *Bill of*

60 Government of SA (2009). *National Environmental Management: Waste Act*, 2008 Amended. Act No. 26 of 2014, Government Gazette 32000, 10 March 2009, Republic of South Africa.
61 Government of SA (2014). N*ational Environmental Management: Waste Amendment Act*, 2014. Act No. 26 of 2014, Government Gazette 37714, 2 June 2014, Republic of South Africa.
62 Government of SA (2011). *National Climate Change Response White Paper*. Republic of South Africa, October 2011 accessed at www.environment.gov.za.

Rights, the *National Environmental Management Act* (NEMA), the MDGs and the UNFCCC.

The *White Paper* identifies a suite of Near-term Priority Flagship Programmes consisting of both new initiatives and the scaling up of existing initiatives that will be implemented. Included amongst these is the *Energy Efficiency and Energy Demand Management Flagship Programme*.

Furthermore, as part of the Flagship Programme, the DoE in collaboration with DPW and the DEA, and supported by SANEDI, the Swiss Agency for Development and Cooperation (SDC), the German International Co-operation (GIZ) and the Royal Danish Embassy (RDE) energy efficiency programmes is developing a Vertically Integrated National Appropriate Mitigation Action (V-NAMA) for Energy Efficiency in Municipal and Provincial Public Buildings.

5.2.10 National Water Resources Strategy (2013)

The *National Water Resource Strategy* (NWRS) has been developed as a legal instrument for implementing the *National Water Act*, and is binding on all authorities and institutions implementing the *National Water Act*[63]. It is the primary mechanism to manage water across all sectors towards achieving the national government's development objectives.

5.2.11 National Immoveable Asset Maintenance Management Framework (2015)

The *National Infrastructure Maintenance Strategy* (NIMS) was approved by Cabinet in August 2006. To give effect to NIMS, the development of the *National Immovable Asset Maintenance Management* (NIAMM) *Framework* is currently being concluded, and consists of:

63 DWA (2013). *National Water Resources Strategy*. Department of Water Affairs.

i) NIAMM Standard

ii) NIAMM Accounting Framework

iii) NIAMM Planning Guidelines

iv) NIAMM Competency Framework

v) NIAMM Monitoring and Evaluation Protocol

vi) Developing the Maintenance Industry.

Green building is an integral component of the NIAMM Framework, as noted below:

i) The NIAMM Standard recognises that asset care through renewals, especially in the case of buildings, provides significant scope for green retrofitting and the associated benefits of improved water and energy efficiencies, and reduction in waste generated; and

ii) NIAMM Monitoring and Evaluation Protocol recognises a "green renewals agenda ratio" for monitoring of environmental sustainability of infrastructure maintenance, which is aligned to government legislation and this *Green Building Policy*.

5.3 Public Works: Energy, Water and Waste Management

It is recognised that this *Green Building Policy* draws on and expands on many energy, water and waste management activities that have been initiated within national and provincial Public Works departments. Some of these activities are highlighted briefly below:

5.3.1 National Department of Public Works Green Building Framework (2011)

The DPW *Green Building Framework*[64] (2011) outlines the Department's commitments to address key elements in the Government's New Growth Path (NGP) and Industrial Policy Action Plan (IPAP) by promoting, inter alia, sustainable development, reducing greenhouse gas emissions, promoting energy efficiency, stimulating new green industries, etc.

DPW is committed to implementing strategies and redress mechanisms towards energy and water savings on newly constructed buildings and reducing the energy demand on existing properties. Immense gains have already been achieved through the incorporation of energy efficiency into the building design and energy efficient technologies (Smart Metering and Lighting) into existing buildings.

Going forward, DPW has adopted a multipronged approach which will be implemented towards achieving energy efficiency, combining the already successfully implemented interventions with new initiatives, including:

i) Implementation of shared energy savings contracts;

ii) Implementation of shared water savings contracts;

iii) Implementation of renewable energy projects;

iv) Green building norms and standards;

v) Energy management plans (EMPs);

vi) Water and sanitation projects; and

vii) Energy efficiency awareness campaigns.

In this regard:

i) DPW has implemented shared energy savings contracts in all the nine regions, and is targeting energy savings of 25 0000 000 kWh to be achieved throughout the buildings on the Department's book for 2016/17;

64 DPW (2011). *Towards A Green Building Policy Framework*, Prepared by CSIR, Department of Public Works, January 2011.

ii) DPW has implemented shared water savings contracts in all the regions, and targeted water savings of 4,1 million kilolitres to be achieved throughout the buildings on the Department's book for 2016/17;

iii) DPW is currently maintaining and refurbishing 13 Water and 26 Wastewater Treatment Plants to improve the condition of the Plants, in-line with the Blue Drop Compliance Requirements and Green Drop Compliance Requirements. Maintenance and the refurbishment of 50 Water and Wastewater Treatment Plants will be undertaken during the 2016/17 financial year; and

iv) Thirty (30) new boreholes will be drilled to augment water supplies in areas where there is a shortage of water.

5.3.2 Gauteng Province; Department of Infrastructure Development

A key objective of the Gauteng Department of Infrastructure Development (GDID) is to promote a *Green Agenda* which will put Gauteng at the forefront of the green economy. Key elements of the *Green Agenda* include:

i) *Rooftop solar PV* rollout programme;

ii) *Resource efficiency retrofit* programme;

iii) *Gas infrastructure programme*, which involves migration from coal and diesel to gas for 21 hospitals with 24 boilers. The province aims to complete the conversion of all its 53 coal powered boilers within the 2015/16 Financial Year;

iv) *Energy Efficiency Retrofit Program, in which the Department* in partnership with ESKOM conducted energy audits for all the Provinces' 237 clinics with a view to replace lighting at all health care centres. To date, the Department has replaced over 105 381 lighting systems with LEDs; and

v) Water efficiency, waste management and microgeneration.

5.3.3 Western Cape; Department of Transport and Public Works

The Western Cape Government *Green Economy Strategic Framework* was approved and adopted by the Western Cape Province in March 2013, which provided for the establishment of the Green Economy Steering Committee in 2013.

The Steering Committee oversees the implementation of the Framework, with a key focus on:

i) *Resource management and efficiency*, including Property Efficiency Reports, property management reporting, metering, office modernisation and green building policy;

ii) *Renewable energy*, including rooftop PV;

iii) *Greening of the built environment*, including GBCSA certification, office modernisation, heat pumps, a green school pilot project and;

iv) *Waste management*, including ground water harvesting, recycling and aqua trip devices.

A notable output of the Department is the annual *Property Efficiency Report* – a series of annual benchmarking and monitoring reports aimed at guiding and facilitating the Western Cape Government's drive to ensure the efficient and cost-effective utilisation of its property portfolio.

5.4 Green Building Certification

Whilst a policy position on green building certification was previously not established by DPW, various projects in the public and private sector have resulted in the construction of exemplary resource efficient buildings.

Specific to the context of the Republic of South Africa it is acknowledged that specific trends have emerged with regard to certification or third-party validation of resource efficient buildings.

These trends have meant that Green Star SA rating system of the GBCSA has been mainly utilised for construction projects where green building certification has been established. Other organisations such as those utilised by the Council for Scientific and Industrial Research (CSIR) have established the use of internally developed Green Building Norms and Standards.

In line with the national Research and Development (R&D) potential for sustainable building, it is further acknowledged that the built industry has potential for technical plurality in green building and related pragmatic knowledge forms, underpinned by congruence and cohesion at leadership level – as employed by BRICS countries.

Consistent with this ethos and the requirements of a growing industry, the Public Works policy trajectory of establishing Green Building Norms and Standards shall accommodate the use of various certification model(s) available internationally or locally.

This position is consistent with a fundamental need for ongoing growth and transformation of the construction and property industry, specific to the extent to which the sector contributes to the realisation of a climate-resilient and green economy for South Africa.

In context, existing international forms of certification are:

i) Building Environmental Assessment Method (BREAM);
ii) Ecology, Energy Saving, Waste Reduction and Health (EEWH);
iii) Green Mark; Green Building Standard SI-5281;
iv) Leadership in Energy and Environmental Design (LEED)
v) LiderA; Haute Qualité Environnementale (HQE);
vi) 3-Star;
vii) Green Rating for Integrated Habitat Assessment (GRIHA); and
viii) GreenStar.

6. Purpose of the Green Building Policy

The primary purpose of this *Green Building Policy* is to articulate DPW's vision for sustainable building and construction known as 'green building' and to indicate strategic interventions to re-calibrate construction and property industries, particularly with regard to the environmental and social manner in which it forms immovable assets, with reference to *A National Framework for Sustainable Development in South Africa* (2008)[65]. This *Policy*:

i) Aims specifically at defining shared perceptions of the long-term environmental impacts of fixed asset creation and the appropriate efforts needed to deal successfully with the problems of protecting and enhancing the natural and built environments.

ii) Crafts in broad terms how a policy framework can calibrate DPW's immovable asset formation with national imperatives and strategies, including the move toward a green economy. It sets out implementation measures and instruments to achieve inter-departmental alignment and coordination within government. This includes technical measures i.e. technology mobilisation on various green building subsets.

iii) Provides the basis for a long-term process of integrating sustainability as a key component of the discourse regarding the construction and management thereon. It confirms South Africa's re-commitment to the principles of sustainable development agreed to at international summits and conferences in the economic, social and environmental fields, including the World Summit on Sustainable Development (WSSD) and the Kyoto Protocol.

iv) Is aligned to the green economy by creating green buildings that are environmentally friendly, create economic value and create green jobs.

65 DEAT (2008). *National Framework for Development in South Africa*, Department of Environment Affairs and Tourism, Pretoria.

7. Policy Objectives

The overall objective of this *Green Building Policy* is to ensure that activities of the construction and property industries actively support the green economy and improve the quality of the natural environments by improving the performance of the asset in terms of energy and water usage; application of green procurement; enhancing social well-being; creating new and decent green jobs; and facilitating the reuse of materials and elements at the asset's end-of-life stage.

Specifically, the *Policy* aims at:

i) Providing guidelines on the implementation of green building programmes;

ii) Providing steps that will enable government to transition to a low carbon economy;

iii) Contributing to the implementation of energy efficiency programmes;

iv) Providing parameters for the integrated planning and design of green building programmes, thus promoting sustainable development;

v) Contributing towards initiatives aimed at transitioning to a climate resilient and low carbon economy;

vi) Contributing to the global effort to stabilise and reduce greenhouse gas emissions by applying appropriate mitigation actions to climate change;

vii) Contributing to dematerialising the economy and promotion of air quality;

viii) Providing for institutional arrangements to enable the implementation of the DPW Green Building Programme through establishing a Green Building Project Management Office (PMO);

ix) Strengthening intergovernmental cooperation in all spheres of Government through advocating for the establishment of Green Building PMO counterparts in Provincial Public Works Departments;

x) Promoting social-equity through weaving principles of Indigenous Knowledge Systems (IKS) into green building, with a focus on African historic; contemporary; scientific and cultural built epistemologies; and

xi) Contributing to the *National Development Plan* (NDP) Vision 2030 and achievement of local designation and support to black industrialists as championed by the Department of Trade and Industry (**the dti**).

8. Application and Scope

This *Green Building Policy* will be applied by all custodians and users in line with the *Government Immovable Asset Management Act* (GIAMA), with a view to developing initiatives that seek to strike a balance between the construction and property functions and principles that promote creation of suitable development. The scope will inter alia include:

i) Promotion of a uniform, integrated and sustainable planning approach;

ii) Identification of relevant techniques that promote use of natural resource in the achievement of green building principles (e.g. locally available natural materials); and

iii) Ensuring the achievement of excellent energy, water, and waste management in government buildings/ structures.

9. Policy Outcomes and Benefits

The fundamental benefit of this *Green Building Policy* is to integrate the concept of sustainability into immovable asset management in public buildings. The main outcomes and benefits of the *Policy* are that it:

i) Pro-actively informs the development of plans and programmes;

ii) Identifies the opportunities and constraints which the environment places on development;

iii) Identifies key strategic areas of green building interventions;

iv) Provides integration of the principles of green building across the entire property portfolio under the custodianship of DPW;

v) Improves the way in which cumulative effects can be realised, for example, climate change adaptation and mitigation strategies and Black Economic Empowerment;

vi) Focuses on the maintenance and enhancement of a chosen level of environmental and social quality, rather than on minimising individual impacts; and

vii) Utilises the immovable asset-backed mandate of DPW to ensure that the green building trajectory is a catalyst for sustainable development equity, job creation, technology transfer, and the broader economic empowerment.

Furthermore, the *Green Building Policy* communicates DPW's expectations of, and commitments to, the South African property sector in general, and specifically with regard to buildings which DPW leases from the private sector.

10. Policy Principles

The *Green Building Policy* is built on the following policy principles:

10.1 Leadership

DPW will champion the adoption of green building policies and practices within the public sector, and will establish a green building network amongst key public sector institutions to:

i) Facilitate and encourage the uptake of green building policies and practices within the public sector as appropriate; and

ii) Establish, implement, or support, relevant green building demonstration projects, together with awareness raising, education and information campaigns aligned to selected key strategic objectives – including campaigns targeting occupants of public sector buildings to reduce energy, water and waste.

Specifically:

i) DPW will facilitate the development of an implementation plan for public sector green building demonstration projects within DPW;

ii) DPW will facilitate the development and implementation of a cross-cutting awareness raising, education and information campaign;

iii) DPW will facilitate the inclusion of green building concepts in the curricula of institutions of learning and relevant SETA qualifications in order to institutionalize green building training and entrench climate change best practice imperatives; and

iv) DPW, through CBE, will partner with PALAMA, the Property Charter Council, the Green Building Council of South Africa (GBCSA) and other relevant property

industry organisations to provide ggreen building and/or climate change training and capacity building to officials and SMMEs.

10.2 Energy, Water and Waste Management

i) Energy Performance Certificates (EPCs)

DPW will develop guidelines and minimum standards for display of EPCs issued in terms of SANS 1544 Energy Performance Certificates for buildings which are owned, operated or occupied by DPW. These EPCs will be displayed in prominent places that are clearly visible to the public.

DPW will develop guidelines and minimum standards for leasing of buildings by DPW in line with the measured energy performance as recorded in EPCs.

DPW will develop guidelines and minimum standards for prioritising and for retrofitting of buildings owned by DPW in line with the measured energy performance as recorded in EPCs.

ii) Water Performance Certificates (WPCs)

DPW will facilitate a process whereby a relevant authority will champion the development and implementation of WPCs, together with an implementation directive. These WPCs will be displayed in prominent places that are clearly visible to the public on buildings which are identified and which are owned, operated or occupied by DPW.

DPW will develop guidelines and minimum standards for leasing of buildings by DPW in line with the measured water usage as recorded in WPCs.

DPW will develop guidelines and minimum standards for prioritising and for retrofitting of buildings owned by DPW in line with measured water usage as recorded in WPCs.

iii) Energy, Water and Waste Management Plans (EWWMPs)

DPW will develop guidelines and minimum standards for EWWMPs to reduce energy, water and waste in buildings, as well as recycling of waste and increasing the purchase of recycled materials. The guidelines and minimum standards will take cognisance of the different material and product waste streams.

iv) National Building Regulations; Environmental Sustainability (SANS 10400X)

DPW will develop and communicate a clear medium-term vision for energy efficiency within government buildings, and will facilitate a clear plan to incrementally ramp-up energy efficiency in SANS 10400XA. This medium-term vision for energy efficiency within government buildings will be set with a view to achieving the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building[66].

In achieving the policy principle, the following shall apply:

a) Minimum targets for B-BBEE i.e. enterprise development and job creation shall be set out in Green Building Norms and Standards for energy and water efficiency audits, establishment of performance certificates, Measurement and Verification projects. Provision for minimum socio-economic requirements shall also be stipulated for Renewable Energy and Waste Management contracts.

b) The Green Building Guidelines and Minimum Standards and the Green Building Norms and Standards (Section 10.7) shall endeavour to establish an energy mix in all new buildings and retrofits as part of contributing to energy demand reduction in the national electricity grid.

66 EC (2010). *Calculation of Cost-optimal Levels of Minimum Energy Performance Requirements: Directive 2010/31/EU: Article 5 on the Energy Performance of Buildings (recast)*. European Parliament, 19 May 2010, accessible at ec.europa.eu/energy/efficiency/buildings/buildings_en.htm.

c) This shall include the use of Renewable Energy in Government buildings. These measures will include use of Solar Photovoltaic and waste-to-energy interventions in Government Facilities where viable.

d) The Green Building Guidelines and Minimum Standards shall specify requirements for Solid Waste Management, including development of waste categorisation or characterisation.

10.3 Indoor Environmental Quality and Comfort

DPW will develop guidelines and minimum standards for prioritising and for retrofitting of buildings which pre-date existing and future amendments to SANS 10400X. Specifically, the guidelines and minimum standards will address operational requirements of indoor environmental quality and comfort as and when these are incorporated into SANS 10400X.

DPW will develop and implement guidelines and minimum standards for leasing of buildings by DPW in line with the selected requirements of SANS 10400X, including indoor environmental quality and comfort.

10.4 Product and Materials Management

i) Inefficient and Harmful Products

DPW will phase out the use of energy inefficient and environmentally harmful products (such as T12 fluorescent lights and gasses that are harmful to the environment) in buildings which are owned, operated or occupied by DPW.

DPW will engage the Department of Trade and Industry (**the dti**) to assess the potential for setting threshold for designation of lights in terms of local manufacturing. This process shall be done through the revised Preferential Procurement Policy Framework Act (PPPFA) regulations, which came into effect on

the 7 December 2011 empowering the Minister of Trade and Industry to designate industries, sectors and sub-sectors for local procurement at specified levels of local content.

A consultative process will be followed in this regard with relevant stakeholders.

ii) Eco-labelling of Building Materials and Products

DPW will facilitate the establishment of an eco-labelling system for building materials and products, and will ensure that requirements for the use of environmentally sensitive eco-labelled materials and products be incorporated into SANS 10400X and in particular into indoor environmental quality and comfort, and material resource conservation and efficiency.

DPW will develop guidelines and minimum standards for using environmentally sensitive eco-labelled materials. These guidelines and minimum standards will be incorporated into the relevant Specifications for Construction Works of DPW.

iii) Construction Waste Management and Recycling

DPW will develop guidelines and minimum standards for the management and recycling of construction waste. These guidelines and minimum standards will be incorporated into the relevant Specifications for Construction Works of DPW.

10.5 Indigenous Knowledge Systems (IKS)

DPW will develop guidelines and minimum standards for an IKS component which links both scientific and cultural aspects of historic built epistemologies, and provide bases for accurate heritage identification specific to green building.

In achieving the policy principle, the following shall apply:

a) Green Building Guidelines and Minimum Standards that will be developed in terms of this Green Building Policy shall specify requirements for the design, construction, refurbishment work, through the use of processes and materials which promote critical regionalism and the use of local building materials. This shall include use of local indigenous materials and Alternative Building Technologies (ABT) where feasible.

b) Guidelines and Minimum Standards and the Green Building Norms and Standards shall further specify requirements for use of local and indigenous arts and design to establish a South African internal and external aesthetics of green building.

10.6 Horticulture, Biodiversity, and Landscaping

DPW will develop guidelines and minimum standards for acceptable horticultural practices for the propagation, cultivation and maintenance of plants and the use of plant material for the improvement of the environment on DPW properties.

DPW will develop guidelines and minimum standards for acceptable DPW landscape construction practices.

Requirements for indigenous planted flora in Government buildings shall be included in the Green Building Horticulture and Landscaping Guidelines and Minimum Standards.

10.7 Green Procurement

i) Green Procurement Policy

Aligned to the PPPFA, DPW will develop guidelines and minimum standards for a Green Building Public Procurement Policy.

In achieving the policy principle, the following shall apply:

a) DPW will ensure that the green procurement policy will not cause barriers to entry into the industry, in particular, SMMEs.
b) DPW will set targets and requirements that foster B-BBEE and transformation in the property sector in line with B-BBEE and procurement legislation.
c) This *Policy* will identify social-cohesion and IKS as an important aspect of how sustainable building and green building is to be achieved in the context of addressing Government imperatives.

ii) Green Building Rating

DPW will establish a government Green Building Rating Tool.

As an interim requirement, DPW will establish a panel of green building certification and/or rating mechanisms for new buildings which are owned by DPW and for PPPs, which will be designed to achieve minimum criteria set out in the DPW Green Building Norms and Standards, and a self-assessment will be undertaken on completion of the design.

DPW will develop Resource Efficiency Leasing Guidelines incorporating Green Building Norms and Standards for leasing of buildings by DPW.

iii) Green Building Costs

In alignment with the Green Building Guidelines and Minimum Standards that will be developed in terms of this Green Building Policy (Sections 10.2, 10.4 and 10.5) and the Green Building Norms and Standards (Section 10.7), the design and construction, including refurbishment work, shall pursue the use of processes and materials which promote environmental sustainability and resource efficiency.

Green buildings shall endeavour to be designed to achieve a cost-optimal balance between the investments involved and the costs saved throughout the lifecycle of the building.

10.8 Monitoring and Reporting

DPW will develop a detailed implementation plan that responds to the development and implementation of this *Green Building Policy* including the allocation of responsibilities, target dates and resources for the development and implementation of action items (see Section 11.2.vii).

DPW will periodically publish a *State of Public Works' Green Building Report*, which will cover:

i) energy efficiency;
ii) renewable energy generation and alternative sources of energy;
iii) water efficiency;
iv) alternative water sources;
v) recycling of waste and waste management;
vi) green renewal of buildings; and
vii) socio-economic impacts and job creation.

The *Report* will align to global reporting protocols (see Section 4.12), including independent peer and stakeholder review.

11. Stakeholder Relations and Responsibilities

Stakeholder relations will be guided by signed Service Level Agreements (SLAs) or Protocols in accordance with the Inter- Government Relations Act No 13 of 2005.

11.1 Role Players

Green buildings are impacted on by many role players, both internationally and within South Africa. A summary of key role players within the South African context is given below:

11.1.1 Department of Public Works

As the custodian of all immovable assets vested in the national government, which are not otherwise vested in the custodianship of other departments through legislation, DPW is central to providing leadership and practice with regard to green buildings in both the public and private sectors. DPW is the custodian of this *Green Building Policy*.

11.1.2 Department of Energy

As the custodian of the *National Energy Efficiency Strategy*, the Department (as well as its South African National Energy Development Institute, SANEDI) has a key role in influencing energy efficiency in buildings in South Africa. Central to this has been the DPW's and SANEDI's role in furthering energy efficiency in buildings through its support for, amongst others:

i) SANS 10400XA: *The Application of the National Building Regulations, Part X: Environmental sustainability, Part XA: Energy usage in buildings*;

ii) SANS 1544: *Energy Performance Certificates for Buildings*;

iii) Pending regulations on an allowance for energy efficiency savings in which building owners (amongst others) will be entitled to claim a deduction for substantiated energy efficiency savings[67]; and

iv) Overseeing the Measurement and Verification (M&V) of all energy efficiency and DSM projects undertaken by registered Energy Service Companies (ESCo's).

11.1.3 Department of Environment

The Department of Environment is the custodian of South African climate change and sustainable development policies which impact on the built environment, including:

i) the *Long Term Mitigation Scenarios*[68] (LTMS) that would provide a sound scientific analysis from which Cabinet could draw up a long-term climate policy; and

ii) the *National Framework for Sustainable Development in South Africa* (2008)[69].

11.1.4 Department of National Treasury

National Treasury is the custodian of the *Carbon Tax Policy Paper* which seeks to introduce a tax on Scope I carbon emissions (i.e. source emissions) in support of reducing climate change. It is estimated that the carbon tax could result in an increase of around 5c/kWh for electricity, and the intent is that this tax will encourage energy efficiency in, amongst others, buildings.

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67 DoE (2011). *Regulations on the Allowance for Energy Efficiency Savings*. Government Gazette 34596, 16 September 201, Department of Energy, accessible at www.energy.gov.za.

68 Scenario Building Team (2007). *Long Term Mitigation Scenarios: Technical Summary*. Department of Environment Affairs and Tourism, Pretoria, October 2007, www.erc.uct.ac.za/Research/LTMS/LTMS-intro.htm.

69 DEAT (2008). *National Framework for Development in South Africa*, Department of Environment Affairs and Tourism, Pretoria.

11.1.5 Department of Trade and Industry

the dti is custodian of the *National Building Regulations and Building Standards Act*, which provides for the establishment of the National Building Regulations (the NBRs). The NBRs are supported by a number of South African National Standards, including *SANS 10400XA; Environmental Sustainability*.

the dti is also custodian of the *Industrial Policy Action Plan*[70] (IPAP) which seeks to upscale productivity and industrial diversification of our economy. It has a strong focus on the green economy, including investment in waste management and recycling.

The Department has also set up the National Cleaner Production Centre (NCPC-SA) which is a national programme of government that promotes the implementation of resource efficiency and cleaner production methodologies to assist industry to lower costs through reduced energy, water, materials usage, and waste management.

Through the introduction of Section 12I Tax Allowance, aimed at stimulating manufacturing, the dti combines regulatory and market instruments; by offering a green tax allowance and mobilising private financial resources to invest in energy-efficient industrial development, skills and green jobs.

11.1.6 Department of Water and Sanitation

As custodian of the *National Water Act* and the *National Water Resource Strategy*, the Department of Water and Sanitation has a key role in influencing water efficiency in buildings and water quality of effluents.

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70 the dti (2014). *Industrial Policy Action Plan; Economic Sectors and Employment Cluster IPAP 2014/15 - 2016/17*. The Department of Trade and Industry, accessible at www.gov.za.

11.1.7 Provincial and Local Government

Several provincial and local government institutions, and related institutions, have and are playing a key role in furthering green buildings through local initiatives – including initiatives at the Gauteng Department of Infrastructure Development, City of Cape Town, and others. Many of these initiatives focus on specific interventions such as solar water heaters, solar energy and renewable energies.

11.1.8 Agrément South Africa, CBE and the cidb

Agrément South Africa (ASA), the Council for the Built Environment (CBE) and the Construction Industry Development Board (cidb) all play an important role with respect to green buildings in terms of:

i) the certification of non-standardised building products and systems;

ii) promoting and maintaining a sustainable built environment and natural environment, promoting ongoing human resource development in the built environment; and

iii) determining, establishing and promoting improved performance and best practice of public and private sector clients, contractors and other participants in the construction delivery process.

11.1.9 Academic Institutions and the CSIR

Academic institutions and the CSIR have played a significant role in research and development that has supported the development of green buildings in South Africa and internationally. Substantial expertise exists at the CSIR and at several academic institutions in energy efficiency and green buildings in general.

11.1.10 Green Building Council of South Africa

The Green Building Council of South Africa (GBCSA) was established in 2007 with the aim of promoting, encouraging and facilitating green building in the South African property and construction industry, by focusing on advocacy and promotion of green buildings; the development and implementation of green building rating tools; education and training; and by providing green building resources including access to technical manuals, guides, research, news and case studies.

The GBCSA operates the Green Star SA rating tools.

11.1.11 Property Sector and Green Building Industry

The property sector and green building industry, including property developers, facilities managers and product, equipment and materials manufactures and suppliers are key stakeholders in the provision of green buildings.

11.2 DPW Responsibilities

DPW's responsibilities are highlighted below:

i) DPW will provide leadership in the procurement and operation of green building materials and products within the broader public sector;

ii) DPW will champion and promote the adoption of the *Green Building Policy* within the broader public sector;

iii) DPW will facilitate and encourage the uptake of green building practices within other organs of state;

iv) DPW will establish, implement, and support, relevant green building demonstration projects;

v) DPW will create awareness through cross-cutting education and information campaigns including campaigns targeting occupants of public sector buildings to reduce usage of energy, water and waste generation.

vi) DPW will develop and implement guidelines and minimum standards for compiling *Sustainable Building Reports* for the DPW portfolio of buildings. DPW will promote the adoption of these guidelines and minimum standards within the broader public sector;

vii) DPW will develop a detailed implementation plan that responds to the development and implementation of this *Policy* including the allocation of responsibilities, target dates and resources for the development and implementation of action items; and

viii) Through the implementation of this *Green Building Policy*, DPW will support:

a. ***sustainable development*** within South Africa;
b. ***job creation*** and the development of green jobs;
c. the development of ***improved working and living conditions***; and
d. the development of ***cost effective solutions*** **and the** ***efficient use of resources*** during the life of buildings.

11.3 User Department Responsibilities

All User Departments will abide by the content of this policy. In addition, the following are their responsibilities:

i) The Accounting Officer of a user department will ensure that officials in their Departments adhere to the principles of this policy;

ii) All User Departments must annually prepare and submit User Asset Management Plans (UAMPs) which depict their green building concept requirements;

iii) UAMPs will be the basis for a request for green building services such as, retrofitting, maintenance, rehabilitation procurement and reconfiguration;

iv) All User Departments will submit green building infrastructure facilities management requirements to DPW and

v) User Departments will use a standard Facilities Management contracts to procure green building services.

11.4 Property Sector and Green Building Industry

DPW will enter into a Green Building Accord with the property sector, industry associations, NGOs and other relevant organisations to formalise the expectations and commitments from DPW, the public sector and the green building sector in furthering this *Green Building Policy* and in furthering green building in general in South Africa.

12. Policy Review

Monitoring and evaluation of this *Green Building Policy* will be undertaken by a joint Committee established through DPW's Green Building Project Management Office, and will draw on formal and structured inputs from:

i) Department of Public Works;
ii) Provincial Departments of Public Works;
iii) Department of Energy;
iv) Department of Environmental Affairs;
v) Department of Water Affairs and Sanitation;
vi) Construction Industry Development Board;
vii) Council for the Built Environment;
viii) Agrément South Africa;
ix) The South African Bureau of Standards; and
x) Council for Scientific and Industrial Research.

A formal review of this *Green Building Policy* will be undertaken every five years or in accordance with changes in legislation, regulation and related policies.

Annexures; Context to Public Works Green Building Policy

A. Climate Change

The effects of global warming and climate change are well known and have led to international and regional collaborative approaches across the world. This Annexure examines relevant national and international climate change agreements and policies, which provide a context to this *Green Building Policy*.

A.1 The Kyoto Protocol (1997)

The Kyoto Protocol to the *United Nations Framework Convention on Climate Change* (UNFCCC)[71], adopted in 1997, obligates developed countries to reduce greenhouse gas (GHG) emissions by at least 5% below 1990 levels in the commitment period 2008 to 2012. The developed countries are seen as primarily responsible for the current high levels of GHG emissions in the atmosphere due to their industrialisation activities. The Protocol is designed to also assist developing countries in adapting to the negative effects of climate change. Consequently, an Adaptation Fund was established to finance adaptation projects and programmes in developing countries that are parties to the Kyoto Protocol.

A.2 South African National Climate Change Response Paper (2011)

In an effort to meet its Kyoto Protocol obligation, South Africa published the *National Climate Change Response White Paper*[72] and commits to reduce its GHG emission to

71 UNFCCC (1997). *Kyoto Protocol* , United Nations Framework Convention on Climate Change, 1997, accessed at http://unfccc.int/kyoto_protocol/items/2830.php.

72 Government of SA (2011). *National Climate Change Response White Paper*, October 2011, Republic of South Africa, accessed at www.environment.gov.za.

34% in 2020 and 42% in 2025. The *National Climate Change Response White Paper* compels sectors of the economy to *"prioritize in accordance with the provisions of this policy, the requirement for all key actors, organisations or participants in relevant sectors or sub-sectors to prepare, submit, implement, monitor and report the implementation of detailed climate change response strategies and action plans that clearly articulate their roles, responsibilities, policies, measures, and interventions or actions to contribute to the achievement of the National Climate Change Response Objective in a measurable way."*

A.3 COP21 (2015)

More recently, the Paris Agreement of December 2015 and the accompanying COP 21 decisions agreed to:

i) Reaffirm the goal of limiting global temperature increase well below 2 degrees Celsius, while urging efforts to limit the increase to 1.5 degrees;

ii) Establish binding commitments by all parties to make "nationally determined contributions" (NDCs), and to pursue domestic measures aimed at achieving them;

iii) Commit all countries to report regularly on their emissions and "progress made in implementing and achieving" their NDCs, and to undergo international review;

iv) Commit all countries to submit new NDCs every five years, with the clear expectation that they will "represent a progression" beyond previous ones;

v) Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;

vi) Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;

vii) Extend a mechanism to address "loss and damage" resulting from climate change, which explicitly will not "involve or provide a basis for any liability or compensation;"

viii) Require parties engaging in international emissions trading to avoid "double counting;" and

ix) Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC.

The African continent is mostly vulnerable to climate change. According to the Intergovernmental Panel on Climate Change (IPCC), Africa has little capacity to adapt to the effect of climate change, and needs 5% to 10% of their GDP to adapt to the negative impact of climate change. In 2007, the Continent, through the African Union, adopted the *Declaration on Climate Change and Development in Africa*[73]. This Declaration urges the 54 African Union member states, including South Africa, to ratify the Kyoto Protocol.

COP21 reaffirmed the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, and agreed to extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025.

A.4 South Africa's Intended Nationally Determined Contributions (INDCs) (2015)

South Africa's commitments are further confirmed in the *Intended Nationally Determined Contributions* (INDCs) to the Paris agreement (COP21), which are summarized below[74]:

i) South Africa's mitigation component of its INDC moves from a "deviation from business-as-usual" form of commitment and takes the form of a peak, plateau and decline GHG emissions trajectory range. South Africa's emissions by 2025 and 2030 will be in a range between 398 and 614 Mt CO2e, as defined in national policy.

ii) South Africa will use five-year periods of implementation at the national level, specifically, 2016-2020 focused on developing and demonstrating the above mix of policies and measures in order to meet South Africa's Cancun pledge, and the periods 2021-2025 and 2026-2030 for this INDC. This level of effort will enable

73 AU (2007). *Eighth Ordinary Session. Heads of State and Government of the African Union, Addis Ababa*, Ethiopia, African Union, 30 January 2007, www.au.int.

74 Government of SA (2015). *South Africa's Intended Nationally Determined Contributions*, Republic of South Africa, accessed at http://www4.unfccc.int/submissions/INDC.

South Africa's greenhouse gas emissions to peak between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter.

B. Country Perspectives

This Annexure presents an overview of various country and economic grouping green building and green economy policy positions. The *Green Building Policy* is aligned to and draws on these policy positions.

B.1 Africa

B.1.1 Indigenous Knowledge

In the epistemology of relationships between societies, buildings, the environment, and the management thereof, the continent of Africa presents world-renowned examples of historic practice in green building. These examples include, amongst others[75]:

i) The ruins of the ancient Great Zimbabwe City built around 11th Century A.D., declared by the United Nations Education Scientific and Cultural Organisation (UNESCO) as a World Heritage Site;

ii) Mapungubwe, South Africa's "lost city of gold", the largest kingdom in the Sub-Sahara which strived as a sophisticated international trade centre between 1220 to 1300 A.D. Mapungubwe is also a UNESCO World Heritage Site; and

iii) The Freedom Park complex and Memorial Park, launched on the 1st of June 2000, situated in Pretoria. Thus, the asset is not only a place where South Africa's heroes are honoured and the complex story of the nation and its peoples told. It also represents modern environmentally sound planning, architecture, and facilities management excellence emulating earlier internationally acclaimed African offerings.

75 See also Bizzell (2002). *Blueprints in Black and White; The Built Environment Professions in South Africa – an Outline History*. Sponsored by the Department of Public Works, Solo Collective, Durban.

B.1.2 Nairobi Declaration on Green Building for Africa Conference on Green Building Rating Systems in Africa (2010)

Recognising that green building rating tools is a specific focus on green buildings, specific reference must also be made here to the *Nairobi Declaration on Green Building for Africa Conference on Green Building Rating Systems in Africa* (2010), developed at the Conference on Promoting Green Building Rating in Africa, in May 2010 in Nairobi[76]. The conference attracted more than 50 participants, plus a number of additional speakers, who represented 19 countries in Africa and several countries from outside the region. The participants were private professionals and public officials representing all aspects of the building and construction industry.

Key extracts from the *Nairobi Declaration* are given below:

> *We, experts, practitioners and decision makers from twenty countries in Africa, meeting at the Conference on Green Building Rating Systems for Africa, after three days of fruitful debates and discussions, declare our commitment to promoting and fostering green building practices in Africa.*

> *We take note of the tremendous environmental challenges and threats currently being faced by the African Continent:*

> *We resolve that in order to reduce CO_2 emissions and help strengthen the ability of cities to adapt to climate change while improving the quality of the built environment, it is urgent to improve the environmental performance and energy efficiency in buildings.*

76 UN-HABITAT (2010). *Conference on Promoting Green Building Rating in Africa*, Un-HABITAT, Nairobi, Kenya, May 2010, accessible at http://www.unhabitat.org/.

We are committed to being the promoters of green practices, from planning, design, construction and operation of the built environment, as well as to the use of appropriate building materials, technologies, services and processes that minimize CO_2 emissions in our Continent.

We underline the importance of taking into account social and cultural specificities of Africa in particular:

Exploring traditional practices that have been proved to be environmentally beneficial while addressing the need for mass housing constructions in Africa, given the fact of rapidly increasing urban population growth;

We emphasize the importance of:

i) Sourcing building materials and appropriate technology that are locally available.
ii) Designing buildings taking into account climatic conditions on the continent and by so doing making use of naturally available energies that can be harnessed profitably.
iii) The role of urban design and planning in sustainable urban development.
iv) The use of renewable energy.
v) The development and or use of a green building rating system.

We further emphasize the importance of training professionals, and introducing green building practices in the education system, in order to increase public awareness and skills to spread green practices.

The *Nairobi Declaration* called for green rating systems to be developed that cater for the different country needs and specificities on a national and/or on a sub-regional basis while collaborating with different countries.

B.1.3 Gaborone Declaration on Climate Change and Africa's Development (2013)

While climate change is a global phenomenon arising, largely from, the industrialisation of developed nations, developing countries are particularly vulnerable to the impact of climate change. This is noted in, amongst others, the *Gaborone Declaration on Climate Change and Africa's Development*[77] (2013) by African Ministers of the Environment which notes that:

> *Stressing Africa's vulnerability to the effects of climate change, in particular the adverse effects on ecosystems, food security, social and economic development in Africa; and noting the urgent need for Africa to adapt to the adverse impacts of climate change and further noting the need for the reduction of greenhouse gas emissions into the atmosphere by all countries,*
>
> *Calling on all parties to fulfill their commitments and to work together to preserve and strengthen the international architecture to address climate change through multilateral cooperation based on sound science, equity the principles and provisions of the United Nations Framework Convention on Climate Change and the Kyoto Protocol thereto,*
>
> *Reaffirming our commitment to implementing the regional flagship programmes ….. in the following five clusters: green economy, sustainable consumption and production, integrated environmental assessment, energy, sustainable land management and related cross-cutting areas. .*

B.1.4 Africa's Intended Nationally Determined Contributions (INDCs)

A summary of *Intended Nationally Determined Contributions* (INDCs) focusing on energy reduction submitted by selected African countries ahead of the Paris 2015 COP 21 is given in the Table B.1[78]: Note that "unconditional" INDCs refers to

77 ACEM (2013). *Gaborone Declaration on Climate Change and Africa's Development*. African Ministers of Environment, October 2013, accessible at www.unep.org.za.

78 C2ES (2015). *Submitted Intended Nationally Determined Contributions (INDCS)*. Centre for Climate and Energy Solutions, http://www.c2es.org/international/2015-agreement/indcs

unconditional commitments made by the countries. "Conditional" INDCs refers to commitments made by the countries, but are conditional on international support. (The full list of INDCs submitted by African, and other countries, is available at C2ES[79].)

Table B.1 Intended Nationally Determined Contributions of African Countries

Country	Intended Nationally Determined Contributions (INDCs)
Angola:	• Angola plans to reduce GHG emissions up to 35% unconditionally by 2030 as compared to the BAU scenario (base year 2005). • In addition, it is expected that through a conditional mitigation scenario the country could reduce an additional 15% below BAU emission levels by 2030. • In achieving its unconditional and conditional targets Angola expects to reduce its emissions trajectory by nearly 50% below the BAU scenario by 2030 at overall cost of over USD 14.7 billion.
Botswana:	• Intends to achieve an overall emissions reduction of 15% by 2030, taking 2010 as the base year. • Botswana will use market mechanisms under the convention.
Congo:	• Conditional contribution of at least 48% reduction in emissions compared to BAU in 2025 and 55% in 2035. [C2ES Translation]
Democratic Republic of the Congo (DRC):	• A reduction of 17 percent below 2000 levels by 2030. This contribution is conditional on the provision of finance equalling US$12.5 billion for mitigation and US$9.1 billion for adaptation. [C2ES Translation]
Kenya:	• Kenya seeks to abate its GHG emissions by 30% by 2030 relative to the BAU scenario of 143 MtCO2eq; and in line with its sustainable development agenda. • This is also subject to international support in the form of finance, investment, technology development and transfer, and capacity building.
Mozambique:	• Implementation of various policies and program actions. Estimation of total reduction of about 76,5 $MtCO_2eq$ in the period from 2020 to 2030, with 23,0 MtCO2eq by 2024 and 53,4 $MtCO_2eq$ from 2025 to 2030. • Mozambique is willing to participate in the market mechanisms to be established.
Nigeria:	• An unconditional contribution to reduce emissions 20 percent below BAU projections by 2030 • Conditional on external support, Nigeria will reduce emissions 45 percent below BAU projections by 2030.

79 ibid

South Africa:	• South Africa's mitigation component of its INDC moves from a "deviation from business-as-usual" form of commitment and takes the form of a peak, plateau and decline GHG emissions trajectory range. South Africa's emissions by 2025 and 2030 will be in a range between 398 and 614 Mt CO_2e, as defined in national policy. • South Africa will use five-year periods of implementation at the national level, specifically, 2016-2020 focused on developing and demonstrating the above mix of policies and measures in order to meet South Africa's Cancun pledge, and the periods 2021-2025 and 2026-2030 for this INDC. This level of effort will enable South Africa's greenhouse gas emissions to peak between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter.
Uganda:	• Mitigation measures and activities to be accelerated between 2016 and 2030 that could result in approximately 22 percent reduction of overall national GHG emissions in 2030 compared to the BAU project of 77.3 $MtCO_2eq$/year in 2030.
Zambia:	• It is expected from this scenario that by the end of 2030, estimated 38,000 Gg CO_2eq could be mitigated, compared to 20,000 Gg CO_2eq under the domestic efforts with limited international support. • This translates into a reduction potential of 25% and 47% against 2010 as the base year for the domestic efforts with limited international support and domestic efforts with substantial international support respectively.
Zimbabwe:	• The Mitigation Contribution for Zimbabwe is set conditionally as 33% below the projected BAU energy emissions per capita by 2030.

This *Green Building Policy* is aligned to the Intended Nationally Determined Contributions of African countries of reducing GHG emissions.

B.2 The G20

The G20 represents 85% of the world's output and world trade, and two-thirds of the world's population. The members of the G20 are Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, United Kingdom, United States and the European Union.

With its substantial economic power, the G20 forum for global economic cooperation aims to drive the world economy on a growth path that is socially inclusive, sensitive towards the environment, and pro-poor. This *Green Building Policy* is aligned to a green economic path that is socially inclusive, sensitive towards the environment, and pro-poor.

In creating partnerships for collaboration towards resource efficiency in Government buildings, Public Works and the Department of Energy will form part of programmes of the G20 aligned to International Partnership on Energy Efficiency Cooperation (IPEEC) and the International Energy Agency.

B.3 BRICS

The BRICS is an economic grouping of the five major emerging economies of Brazil, Russia, India, China and South Africa.

A summary of the policy positions of the BRICS countries with regard to the green economy is given below – which are verbatim extracts from the SAIIA extracts largely verbatim from the SAIIA position paper, *The Green Economy and the BRICS Countries: Bringing Them Together*[80].

B.3.1 Brazil

Brazil seeks dialogue with other countries in the BRICS economic bloc to co-ordinate harmonised responses to mandates and commitments regarding the development of a green economy as elaborated on in the G20.

With regard to green building, the *Sustainable Building in Brazil - a four year Review study* developed for the World Sustainable Building Conference (2008) states found that there are currently two rating/certification systems in use in Brazil:

- The Leadership in Energy & Environmental Design (LEED), licensed from the US Green Building Council; and
- The AQUA Process, derived from the French HQE approach, launched in early April 2008

80 SAIIA (2013). The Green Economy and the BRICS Countries: Bringing Them Together. South African Institute of International Affairs, by Lesley Wentworth and Chijioke Ojl, December 2013, www.saiia.org.za.

B.3.2 Russia

In a bid to modernise its economy and move away from resource-based economic development, Russia considers the development of a green economy to be a strategic option that could increase overall economic efficiency. Russia, in co-operation with some international organisations such as UNEP, has developed a network of environmental institutions and legislative frameworks to promote its plan for developing a green economy.

B.3.3 India

As a member of the G20, India's decision to promote the concept of a green economy is linked to its overall aim to foster prosperity and sustainability in development as elaborated in the country's 11th Five-Year Plan (2007–2012). In embracing green growth, India envisages poverty alleviation and the lowering of economic inequalities as a key benefit that could be derived from implementing the green economy concept.

With regard to green building rating systems, there are three main systems used in India:

- Green Rating for Integrated Habitat Assessment (GRIHA): GRIHA is India's own rating system jointly developed by TERI and the Ministry of New and Renewable Energy, Government of India. A variety of buildings in India have received GRIHA rating;
- LEED is the rating system which the Indian Green Building Council licenced from the U.S. Green Building Council (USGBC); and
- Bureau of Energy Efficiency (BEE): BEE developed its own rating system and the Energy Performance Index (EPI).

B.3.4 China

China faces high levels of resource constraints and environmental challenges. The development of a green economy can help to address the challenges that it faces,

but the government – aware of this strategic option – proceeds cautiously, consistently weighing the impact of developing a green economy on the country's development objectives. In its current green development plan, China has now elaborated its strategy for green growth in the medium to long term. The overarching objective of the plan is to help China achieve inclusive, green and competitive development.

With regard to green building, there are two widely used green building standards used in China:

- China's Green Building Evaluation Labeling (GBEL), or China 3-Star, established by the Chinese Ministry of Construction; and
- LEED, licenced from the US Green Building Council.

A study on the green building industry in China by the U.S. Consulate General Shanghai Commercial Service (2015) suggests that "as green building systems proliferates across the China, they spread awareness of the environmental problems caused by conventional building practices".

Consistent with the position of these countries, South Africa can meet its socio-economic development imperatives through green building by fostering emergence of multiple systems to be used collaboratively, including establishment of a Government-developed system to encourage transparency. India and China are constantly used for benchmarking South Africa's socio-economic growth. Their lessons in establishing green building dispensations are relevant for the *Public Works Green Building Policy* to meet environmental imperatives and address people's development and cultural context, as integral parts of the environmental considerations.

B.3.5 South Africa

South Africa regards the concept of a green economy as a viable path to sustainable development[81]. This stems from the potential of the green economy to foster economic development while preserving the integrity of the natural environment.

From the above assessment of the BRICS nations, it is seen that the green economy pathway towards a low carbon inclusive economy has been adopted by all of the BRICS nations. Green buildings, and this *Green Building Policy*, play an important role in this regard.

A common theme in all BRICS countries is that the concept of green building specific to building in harmony with the environment has been around since pre-colonial era. However, selective building and infrastructure development trends of the colonial epoch played a significant part in the emergence of inefficient buildings. Some of this inefficient building models resulted from the colonial trend of imposing resource-intensive foreign building trends and methods, ignoring sustainable models of the locals.

81 DEA (2013). *About the Green Economy*. Department of Environmental Affairs, Pretoria. May 2013, accessible at www.environment.gov.za/projectsprogrammes/greeneconomy/.