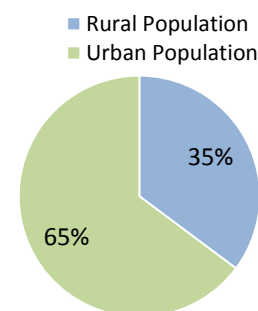


# Country: South Africa



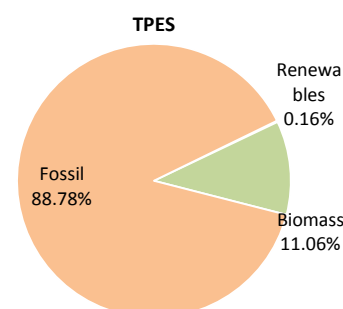
## Socio- economic framework

	Year	Unit	Value
Population	2014	million	54.00 <sup>1</sup>
Demographic growth	2014	%	1.57% <sup>1</sup>
Surface	2014	km2	1219090 <sup>1</sup>
GDP	2014	M US\$	350085 <sup>1</sup>
GDP per capita	2014	US\$ per cap	6483 <sup>1</sup>
GDP growth	2014	% /year	1.5% <sup>1</sup>
Fragile country status	2014	Index	No <sup>2</sup>
Governance	2014	Index	73 <sup>3</sup>
Governance variation over 5 years	2014	Index	0.9 <sup>3</sup>
Human development	2013	Index	0.666 <sup>4</sup>



## Consumed Energy (million toe=11.65 MWh)

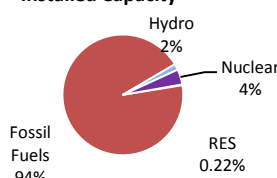
	Year	Unit	Value
Total Primary energy Supply (TPES)	2013	Million toe	141.27 <sup>5</sup>
Primary energy Supply - Biomass	2013	Million toe	15.26 <sup>5</sup>
Primary energy Supply - Fossil	2013	Million toe	122.5 <sup>5</sup>
Fraction of Non-Renewable Biomass	2009	%	25% <sup>6</sup>
Primary energy Supply - Renewable (incl..hydro)	2013	Million toe	0.22 <sup>5</sup>
Primary energy - Net Import electricity	2013	Million toe	-0.39 <sup>5</sup>
Primary energy - Net import hydrocarbon	2013	Million toe	-19.13 <sup>5</sup>
Total Final Energy Consumption	2013	Million toe	74.23 <sup>5</sup>
Final energy - Modern BLEN <sup>(*)</sup>	2013	Million toe	18.87 <sup>5</sup>
Final Energy - Electricity	2013	TWh	196.07 <sup>5</sup>



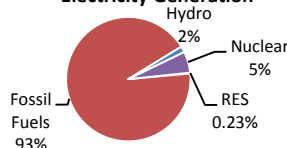
## Electricity

	Year	Unit	Value
Peak demand	2013	MW	36276 <sup>7</sup>
Installed connected capacity	2013	MW	44170 <sup>8</sup>
Thermal installed capacity (fossil fuels)	2013	MW	41559 <sup>8</sup>
Hydro installed capacity	2013	MW	714 <sup>8</sup>
Nuclear installed capacity	2013	MW	1860 <sup>8</sup>
Renewable installed capacity (ex.hydro)	2013	MW	97 <sup>8</sup>
IPP/installed capacity	2013	%	6% <sup>9</sup>
Total Electricity production	2013	GWh	256073 <sup>10</sup>
Electricity generation from fossil fuels	2013	GWh	237349 <sup>10</sup>
Electricity generation from hydro	2013	GWh	4040 <sup>10</sup>
Electricity generation from nuclear	2013	GWh	14106 <sup>10</sup>
Electricity generation from renewable	2013	GWh	578 <sup>10</sup>
Electricity consumption including self-consumption and losses	2013	GWh	248382 <sup>10</sup>
Average consumption per capita	2013	kWh per cap	4330 <sup>10</sup>
Total losses (technical and non-technical) as a production %	2013	%	9% <sup>11</sup>
Total losses (technical and non-technical)	2013	GWh	22351 <sup>11</sup>
Imports (+) exports (-)	2013	GWh	-4501 <sup>10</sup>
Global electrification rate	2012	%	86% <sup>1</sup>
Urban electrification rate	2012	%	97% <sup>1</sup>
Rural electrification rate	2012	%	67% <sup>1</sup>
HV lines <sup>(**)</sup>	2014	km	31107 <sup>12</sup>
MV lines <sup>(**)</sup>	2014	km	482780 <sup>12</sup>
LV lines <sup>(**)</sup>	2014	km	281510 <sup>12</sup>
Renewable energy/global electricity production (incl. hydro)	2013	%	1.8% <sup>10</sup>
Connections to the LV network <sup>(**)</sup>	2014	Thousands	5338 <sup>12</sup>
Average tariff	2014	US\$/kWh	8.97 <sup>13</sup>
Ratio cost/tariff	2014		

Installed Capacity



Electricity Generation



To be confirmed



## Legal, regulatory and institutional framework

Energy policy	<ul style="list-style-type: none"> <li>- National Development Plan to 2030 (2012).</li> <li>- New Households Electrification Strategy, Department of Energy (2013)</li> <li>- Integrated Resource Plan 2010-2030 (March 2011) updated in November 2013, Dept. of Energy (DoE).</li> <li>- Integrated Energy Planning (June 2013) (DoE).</li> <li>- Integrated National Electrification Programme (INEP), DoE 2016.</li> <li>- Policy to support the energy efficiency and DSM, DoE 2008. National Energy Efficiency Strategy 2009.</li> <li>- Biofuels Industrial Strategy 2007.</li> </ul>
Energy laws	<ul style="list-style-type: none"> <li>- National Energy Act 34/2008. Nuclear Energy Act 46/1999. National Nuclear Regulator Act 47/1999.</li> <li>- National Energy Regulator Act 40/2004. Electricity Regulation Act 4/2006 and Amendment Act 28/2007.</li> <li>- Petroleum Products Amendment Act 58/2003 and Amendment Act 2/2005. Petroleum Pipelines Act 30/2003 and Petroleum Pipelines Levies Act 28/2004. Gas Act 48/2001 and Gas Regulator Levies Act 75/2002.</li> </ul>
Enforcement texts	Electricity Regulations on New Generation Capacity (amendment of 2015). Amendment of Regulations made in terms of Petroleum Pipelines Act (2015). Amendment of Regulations regarding Petroleum Products Site and Retail Licenses (2012). Regulations regarding the Mandatory Blending of Biofuels with Petrol and Diesel (2012). Amendment of Regulations regarding Petroleum Products Specifications and Standards (2012). Piped Gas Regulations (2007).
Electricity/energy regulator	The National Energy Regulator of South Africa (NERSA) established by the National Energy Regulator Act (2004) "to regulate the electricity, piped gas and petroleum pipeline industries". The National Nuclear Regulator regulates "nuclear activities" including nuclear power stations.
Electricity operators	ESKOM Holdings Ltd a public vertically integrated company that generates 95% of the electricity is the owner of the National Grid. There are more than 90 renewable energy IPPs after three bid rounds. A number of IPPs exist who own coal fired, gas fired and hydro power plants. A number of distributors (mainly municipalities) supply electricity to local consumers.
Rural electrification body	No. The Integrated National Electrification Programme (INEP) is managed by a unit within the Department of Energy (DoE).
Renewable energy body	The DoE is responsible for RE policy and planning. The South African National Energy Development Institute (SANEDI) is a state owned entity whose main function is to direct, monitor and conduct applied energy research and development, demonstration and deployment as well to undertake specific measures to promote the uptake of Green Energy and Energy Efficiency.
Energy conservation body	The DoE is responsible for EE policy and planning. SANEDI contributes to applied research and development.
Energy objectives	The National Development Plan foresees that 97% of households will have access to electricity by 2030 and 300,000 households will be electrified with quality non-grid solutions by 2025. Renewables are planned to reach 17.8GW installed capacity by 2030. There is a long-term vision of 5 million SWH installations by 2030. There was a target of 2% penetration level of biofuels in the national liquid fuel supply by 2013.
Feed-in tariff policy	A REFIT programme was established in 2009 but it ended in 2011 (without operating at all) and was replaced by a competitive bidding process the Renewable Energy IPP Procurement Programme (REIPPPP). REIPPPP has successfully completed three bidding rounds until 2015.
Metering policy for billing	Distribution Metering Code sets the requirement and procedures for tariff metering installations. A large share of ESKOM's customers use prepayment meters.
Public procurement (auctions)	The Renewable Energy IPP Procurement Programme (REIPPPP) established in 2011 is a competitive bidding process for RE. Currently there are competitive bidding programmes for coal and gas fired electricity plants as well as CHP plants.
Unbundling	ESKOM is the state owned vertically integrated company that owns the National Grid. There is a considerable number of IPPs (mainly renewable energy installations) and licensed distributors of electricity (mainly municipalities that act as redistributors).

## Private sector environment

Sector private bodies	South African Independent Power Producers Association (SAIPPA). Southern African Bioenergy Association (SABA). South African Wind Energy Association (SAWEA). South African PV industry Association (SAPVIA). South Africa Solar Thermal and Electricity Association (SASTELA). IPPs (mainly renewable energy).
Public incentives	Public funding is available for the installation of solar water heaters. Energy Efficiency Tax incentives for verified energy savings in companies.
Financial grants	The Green Fund supports green initiatives for the transition to a low carbon economy. The financial support may take the form of grants, loans or equity and the project include EE, waste-to-energy and RE electricity.
IPPs	There is a number of RE IPPs and some thermal and hydro plants IPPs. The DOE is actively looking for more investments by IPPs through its IPP procurement programme for gas, coal, renewables and cogeneration plants.
PPPs	REIPPPP is considered as a successful PPP approach. The concept of PPP is actively promoted in all sectors of the economy.
Business index	Listed 73 out of 189 countries by the WB "Ease of doing business" index in 2015 <sup>14</sup> .

## International Cooperation in the energy sector

Joint Declaration EU-country	No. The South Africa-EU Strategic Partnership Joint Action Plan was signed in May 2007 and the SA-EU Trade, Development and Cooperation Agreement in 1999.
Energy as focal sector for 11th EDF	No.
Donors active in the country	EU, EIB, AfDB, AfD, GEF, GIZ, KfW, Norad. Austrian Development Cooperation, Energy and Environment Partnership (EEP), Spanish Gov.
Coordination among donors	According to the National Official Development Assistance (ODA) guidelines, all requests for funding needs flow through the International Development Cooperation Directorate (IDC) and all donors need to approach work in SA through the IDC.

## Main issues and opportunities

- Load shedding in the electricity system due to inadequate levels of installed capacity.
- High level of CO<sub>2</sub> emissions due to the electricity generation based on coal fired power plants.
- Rural electrification is still at 67% and should be increased to reach the 2030 target.
- Non-grid electrification should be developed since “universal access” cannot be achieved with grid electrification only.
- Important solar and wind potential that can be exploited.
- Local coal resources that could be utilised in new clean coal installations.

(\*) BLEN includes Biogas, LPG, Electricity and Natural Gas.

(\*\*) HV is 765kV, 533kV DC, 400kV, 275kV, 220kV, MV is 132kV, 88-33kV, LV is below 22kV

(\*\*\*) The number stated here are ESKOM residential customers. There are also 804 redistributors with their own LV customers.

### Sources:

- 1 World Bank; Available: <http://data.worldbank.org/country/south-africa>, [Accessed on 27/03/2016]. The source of the share of rural and urban population is based on the CIA World Factbook available at: <https://www.cia.gov/library/publications/resources/the-world-factbook/geos/sf.html> [Accessed on 27/03/2016].
- 2 South Africa is not included in the list of fragile countries of the World Bank Country Policy and Institutional Assessment (CPIA) Score; Available: <http://www.worldbank.org/content/dam/Worldbank/document/Fragilityandconflict/FY14FragileSituationList.pdf>, [Accessed on 27/03/2016].
- 3 Ibrahim Index of African Governance (IIAG), Available: [www.moiabrahamfoundation.org/interact](http://www.moiabrahamfoundation.org/interact), [Accessed on 27/03/2016].
- 4 UNDP - Human Development Reports, Available: <http://hdr.undp.org/en/countries/profiles/ZAF>, [Accessed on 27/03/2016].
- 5 IEA Energy Balances 2013; Available at <https://www.iea.org/statistics/statisticssearch/report/?country=SouthAfrica&product=balances> [Accessed on 27/03/2016].
- 6 Bailis, R., Drigo, R., Ghilardi, A. & Masera, O. “The carbon footprint of traditional woodfuels”, Nature Climate Change 5: 266-272, 2015.
- 7 “Transmission 10 Year Development Plan 2015 -2024 (TDP 2014)”, ESKOM, October 2014. Available at [http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2015-2024TDP\\_PublicPres10Oct-2014.pdf](http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2015-2024TDP_PublicPres10Oct-2014.pdf) [Accessed on 27/03/2016].
- 8 UNStat Energy Yearbook 2013 Available at <http://unstats.un.org/UNSD/energy/yearbook/2013/t30.pdf> [Accessed on 27/03/2016].
- 9 “System Adequacy Outlook Issue 6: 14 January 2015”, NERSA, available: <http://www.nersa.org.za/Admin/Document/Editor/file/News%20and%20Publications/Publications/Archived%20Issues/NERSA%20System%20Adequacy%20Outlook,%20Issue%20no%206.pdf>, [Accessed on 29/03/2016].
- 10 IEA Statistics 2013; Available at <https://www.iea.org/statistics/statisticssearch/report/?year=2013&country=SouthAfrica&product=ElectricityandHeat> [Accessed on 27/03/2016].
- 11 Eskom’s energy and revenue loss management, June 6th, 2014, Published in Articles: EE Publishers, Articles: Energize, available: <http://www.ee.co.za/article/eskoms-energy-revenue-loss-management.html>, [Accessed on 29/03/2016].
- 12 ESKOM Factsheets 2014/15, available: [http://www.eskom.co.za/IR2015/Documents/Eskom\\_fact\\_sheets\\_2015.pdf](http://www.eskom.co.za/IR2015/Documents/Eskom_fact_sheets_2015.pdf), [Accessed on 29/03/2016].
- 13 “South Africa electricity prices vs the world” S. Writer, 2014 available: <http://businesstech.co.za/news/general/71291/south-africa-electricity-prices-vs-the-world/>, [Accessed on 29/03/2016].
- 14 World Bank, Available at: <http://data.worldbank.org/indicator/IC.BUS.EASE.XQ>, [Accessed on 16/03/2016].

## ANNEX 1 – PRIMARY DATA STATISTICS AND ACCESS TO MODERN ENERGY SOURCES

SE4ALL Objectives	Indicators	Unit	Statistics						Target
Universal access to modern energy	Electricity access	% of population	Total				Rural	Urban	Total
			1990	2000	2010	2012	2010	2010	2030
			65	66	83	85	64	94	95%
Doubling energy efficiency	Non-solid fuels access	% of population	60	75	85	87	63	94	n.a.
			1990		2010	2012	1990-2010	2010-2012	2030
Doubling the renewable energy share	Improvement rate of Primary energy intensity	CAGR %					-0.39	-3.85	n.a.
	Cumulated energy savings	PJ					5500	1295	n.a.
	Ratios primary energy/final energy		56.1		44.9	( <sup>1</sup> )			n.a.
	Primary energy intensity level	MJ/\$2011 PPP	10.9		10.1	9.3			n.a.
Doubling the renewable energy share	Total final consumption	PJ	1990	2000	2010	2012			2030
					2405	2777			n.a.
			16.6	18.2	18.7	16.9			n.a.
					1.0	1.0			n.a.
					2.0	2.7			n.a.

Sources:

SE4ALL Progress towards Sustainable Energy 2015, Global Tracking Framework (GTF), Available: <http://www.se4all.org/tracking-progress/> [Accessed on 16/03/2016]

SE4ALL Global Tracking Framework 2013, Available: <http://www.se4all.org/tracking-progress/> , [Accessed on 16/03/2016].

*Note: Figures used in this annex are those of the GTF which uses the same definitions for all countries. However, these definitions are not always those used in the other parts of the fiche.*

<sup>1</sup> This indicator is not available in the GTF 2015 publication.

## Country: South Africa

### ANNEX 2 – INSTITUTIONAL AND POLITICAL FRAMEWORK

**N** : not achieved    **F**:foreseen    **D** : drafted    **AP** : Approval national process    **A**: adopted    **I** : implemented    **S** : Success story

POLICY ASPECTS		N	F	D	AP	A	I	S	COMPLEMENTARY ASSESSMENT ELEMENTS	
<b>1</b>	<i>Energy sector</i>									
Political objectives Energy laws						✓			The Integrated Energy Planning, updated in 2013, sets as objectives the security of energy supply, the minimisation of energy costs, increased access to energy, diversification of supply sources, minimisation of emissions, promotion of EE and promotion of water conservation. The National Development Plan (NDP) foresees that 97% will have access to electricity by 2030. N. Gas and renewables will reach 29GW by 2030. Target for 17.8GW of RE for electricity capacity by 2030. The NDP has a long-term vision of 5 million SWH installations by 2030. A target of 2% penetration level of biofuels in the national liquid fuel supply by 2013. The main laws in the energy sector are: National Energy Act 34/2008; Nuclear Energy Act 46/1999; National Nuclear Regulator Act 47/1999; National Energy Regulator Act 40/2004; Electricity Regulation Act 4/2006 and Amendment Act 28/2007; Petroleum Products Amendment Act 58/2003 and Amendment Act 2/2005; Gas Act 48/2001 and Gas Regulator Levies Act 75/2002; Petroleum Pipelines Act 30/2003 and Petroleum Pipelines Levies Act 28/2004.	
Energy regulation authority							✓		The National Energy Regulator of South Africa (NERSA) established by the National Energy Regulator Act (2004) “to regulate the electricity, piped gas and petroleum pipeline industries”. The National Nuclear Regulator regulates “nuclear activities” including nuclear power stations.	
Partnership agreement with the EU						✓			The Cotonou Partnership Agreement rules the relations between South Africa and the EU. South Africa-EU Strategic Partnership Joint Action Plan (May 2007).	
Fragile country status									No. South Africa is not included in the list of fragile countries of the World Bank Country Policy and Institutional Assessment (CPIA) Score. South Africa is listed in the “Low Warning” group of countries in the Fragile States Index of the Fund for Peace <sup>2</sup> .	
<b>2</b>	<i>Engagement and preparation for SE4ALL</i>									
Opting-in	✓									
Gap analysis						✓			Rapid Assessment/Gap Analysis completed.	
Action Agenda	✓									
NREAP					✓				White Paper on Renewable Energy (2003). Integrated Resource Plan for electricity (2010, 2013).	
NEEAP						✓			The First National Energy Efficiency Plan (NEEAP) was developed and finalised in 2012.	

<sup>2</sup> Fragile States Index 2015, Fund for Peace, available at <http://fsi.fundforpeace.org/> [Accessed on 16/03/2016].

## Country: South Africa

Investment Prospectus	✓									
SE4ALL Secretariat	✓									There is a focal point in DoE.
<b>3</b>	<b>Private sector participation</b>									
Investment and concession laws					✓					The Protection of Investment Act (2015) aimed to modernise South Africa's policy approach on foreign investment and to treat foreign and local investors equally. PPPs in the electricity sector are a success story (in particular the implementation of the Renewable Energy Independent Power Procurement Program.
Private sector activities						✓				ESKOM is the vertically integrated state owned utility in the electricity sector which covers 95% of the electricity generation and owns the national grid. A number of RE and conventional plants IPPs exists as well as a number of electricity distributors (mainly municipalities). In the oil sector there are two private and one state owned refineries.
Investors protection					✓					The country is ranked 12 out of 189 countries in the "protecting investors" topic according to the World Bank "Doing Business" analysis <sup>3</sup> for 2015.
National financial incentives					✓					Tax incentives for EE investments; Credit facility for green projects; Solar Water heaters subsidy scheme; fuel tax rebate for biodiesel.
Institutional support to private sector					✓					A PPP unit in the National Treasury provides support for PPPs in general. In the electricity sector the DoE has a programme for Independent Power Producer Procurement.
<b>4</b>	<b>Energy access</b>									
Energy access policy and targets					✓					The National Development Plan foresees that 97% will have access to electricity by 2030. Annual target for installing 10000 solar home systems supported by Government subsidy. The Integrated National Electrification Programme (INEP) sets the targets for electrification. By 2025 electrification of about 90% of households through grid connection and the rest with high-quality non-grid solar home systems or other possible technologies based on cost effective options
Agency / Rural energy fund				✓						The Electrification programme is managed by a unit in DoE. There is no specific fund but the required funds are earmarked in the national budget.
Rural electrification master plan					✓					The Integrated National Electrification Programme (INEP). A Non-grid electrification Masterplan is being developed by the INEP unit in DoE <sup>4</sup> .
Increasing EA investment plan					✓					The Integrated National Electrification Programme (INEP) includes required investments analysis.
EA decentralized initiatives					✓					Deployment of 300000 solar home systems and a target to reach universal access for formal households in 2025.
Traditional fuels replacement				✓						National Liquid Petroleum Gas (LPG) Strategy has the main objectives to provide access to safe, cleaner, efficient, portable, environmentally friendly and affordable thermal fuel for all households, and to switch low-income households away from the use of coal, paraffin and biomass to LPG. Target to convert 1.6million

<sup>3</sup> World Bank "Doing Business" analysis available at <http://www.doingbusiness.org/data/exploreeconomies/southafrica> [Accessed 17/03/2016].

<sup>4</sup> EU Technical Assistance Facility for the "Sustainable Energy for All" Initiative (SE4ALL) - Eastern and Southern Africa, "Analysis and Redesign of the Existing Concept for Off-Grid Renewable Rural Electrification in South Africa - Situation Report", July 2014

## Country: South Africa

						households to LPG by 2016
Independent distribution networks				✓		Municipalities act as distributors of electricity and manage their own distribution networks connected to the national grid.
Electricity distribution master plan			✓			The Transmission Development Plan 2016 - 2025 Rev. 5 <sup>5</sup> includes distribution grid masterplan.
Specific measures for the poor				✓		Free Basic Electricity foreseen under the provision of Free Basic Services according to the Constitution. Up to 50kWh per month of FBE is supplied to poor households identified by the Municipalities.
Microfinance instruments				✓		Microfinance is a large and growing sector of the economy. The sector is helping create more sustainable energy initiatives.
Pre-electrification				✓		Annual target for installing 10000 solar home systems supported by Government subsidy. From 2002 to date, about 65,000 households were supplied with non-grid technology solar panels.
<b>5 Renewable energy (RE)</b>						
RE Policy				✓		The Integrated Resource Plan for Electricity (2010) which was updated in 2013 foresees 17.8GW of renewable energy by 2030. A competitive bidding process for RE the “Renewable Energy Independent Power Producer Procurement Programme” (REIPPPP) has proved very successful for the development of RE for electricity generation. The Biofuel Industrial Strategy (2007) targets a 2% penetration level of biofuels in the national liquid fuels supply.
Agency / RE Fund	✓					The DoE is responsible for the RE policy and the REIPPPP and the promotion of DSWH.
RE master plan			✓			RE White paper of 2003. RE included in the IRP (2010). South African Solar Thermal Technology Roadmap (2015).
Biofuels regulatory frameworks				✓		Regulations regarding the Mandatory Blending of Biofuels with Petrol and Diesel (2012).
Wood energy regulations				✓		The National Forest Act (1998) sets the guidelines for sustainable woody biomass production and related licenses.
Solar/wind regulations				✓		Electricity regulation on New Generation Capacity 2009, 2010.
RE resources mapping				✓		Wind atlas of South Africa <sup>6</sup> , Wind and Solar PV Energy Strategic Environmental Assessment <sup>7</sup> . Bioenergy Atlas <sup>8</sup>
RE Promotion				✓		RE is promoted for electricity generation through the REIPPPP. Domestic Solar Water heaters are promoted by the DoE for peak reduction.
RE long-term funding			✓			REIPPPP creates a stable environment for investments in renewable electricity.

<sup>5</sup> [http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2016-2025TDP\\_\\_Oct2015Rev5.pdf](http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2016-2025TDP__Oct2015Rev5.pdf)

<sup>6</sup> <http://www.wasaproject.info/>

<sup>7</sup> <http://egis.environment.gov.za/frontpage.aspx?m=27>

<sup>8</sup> <http://www.saeon.ac.za/enewsletter/archives/2012/august2012/doc07>

## Country: South Africa

Green Energy Fund					✓		The Green Fund supports green initiatives for the transition to a low carbon economy. The financial support may take the form of grants, loans or equity and the projects include EE, waste-to-energy and RE electricity.
Network connection studies					✓		South African Grid Connection Code for Renewable Power Plants connected to the electricity transmission or the distribution system (2014) <sup>9</sup> .
<b>6</b>	<b>Energy Efficiency (EE)</b>						
EE Policy					✓		National Energy Efficiency Strategy (2008) reviewed in 2012, has the vision of reducing the energy intensity of the economy through energy efficiency and set a target of 12% EE by 2015. Among the other deliverables are the finalisation of establishment and implementation of the energy efficiency monitoring system, energy management regulations and plans, measurement and verification of the past energy savings, functional energy efficiency incentive scheme.
EE national action plan					✓		National Energy Efficiency Strategy (2008) reviewed in 2012.
EE Standards and labels					✓		The South African Bureau of Standards has published a number of standards on solar water heaters, air conditioners etc. Appliance labelling programme by the DoE <sup>10</sup> .
EE Promotion					✓		The Energy Efficiency Directorate of the DoE runs an Appliance Labelling Campaign and coordinates DSM programmes. In addition, 32 large companies have joined forces with the Department of Energy and Eskom by signing an energy-efficiency accord, committing themselves to targets contained in the Department of Energy's strategy. The Private Sector EE programme aims to improve EE in commercial and industrial companies.
Electricity losses reduction programme					✓		ESKOM has a target to reduce the technical and non-technical losses (which are the level of 9%). While transmission losses are lower than the target, distribution recorded higher than target losses. Interventions to manage the losses include, amongst others, continuing with the energy and revenue losses programme reduction activities and the Operation Khanyisa social marketing campaign <sup>11</sup> (a national partnership initiative aiming to mobilise all sectors of South African society to stand for legal, safe and efficient power use, and stop electricity theft).
Improved stoves programs					✓		A programme for improved cook stoves has been submitted by the DoE for a CDM project <sup>12</sup> . Use of LPG in 1.2 million households over 5 years is targeted according to the LPG strategy.
Ban on non-efficient appliances	✓						
Incentives for efficient appliances					✓		Energy Efficiency Tax incentives <sup>13</sup> for verified energy savings.
Demand-side management					✓		ESKOM has a DSM programme and municipalities are implementing their own EE strategies.

<sup>9</sup> <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/TechnicalStandards/South%20African%20Grid%20Code%20Requirements%20for%20Renewable%20Power%20Plants%20-%20Version%202%208.pdf>

<sup>10</sup> <http://www.energy.gov.za/EEE/eeeAppLabellingCampaign.html>

<sup>11</sup> ESKOM Integrated report 2014/15, available at <http://www.eskom.co.za/IR2015/Pages/Default.aspx>, [Accessed 30/3/2016]

<sup>12</sup> [http://www.energy.gov.za/files/esources/kyoto/2012/POA\\_DD\\_13\\_04\[1\].pdf](http://www.energy.gov.za/files/esources/kyoto/2012/POA_DD_13_04[1].pdf)

<sup>13</sup> [http://www.sanedi.org.za/wp-content/uploads/2014/03/sanedi%20roadshow%20durban/12l\\_ee\\_tax\\_faq.pdf](http://www.sanedi.org.za/wp-content/uploads/2014/03/sanedi%20roadshow%20durban/12l_ee_tax_faq.pdf)

## Country: South Africa

7	Electricity sector					
Legal definition of the institutional players					✓	The National Energy Regulator Act 40/2004 and the Electricity Regulation Act 4/2006 and Amendment Act 28/2007, define the roles of the institutional players in the electricity sector.
Tariff policy					✓	Tariffs are approved by NERSA after submission of a request for tariff adjustment by the distributors.
Interconnection rules					✓	The Transmission grid code and the distribution grid code set the requirements for the interconnection of power plants. The power system of South Africa is interconnected to Namibia, Botswana, Zimbabwe, Mozambique, Lesotho and Swaziland.
Isolated networks rules				✓		The Distribution Code sets all the necessary specifications. <sup>14</sup>
Feed-in tariff policy	✓					A REFIT was introduced in 2009 but never operated. The scheme was replaced by a bidding process in 2011.
RE minimum % imposed to producers	✓					No
RE certificates trade	✓					No
Free access to the domestic network					✓	The National Energy Act of 2008 (No. 34 of 2008) and the Electricity Regulation Act (ERA) of 2006 (No. 4 of 2006) facilitate the fair treatment and non-discrimination between IPPs for grid access. ESKOM operates a Grid Access unit to deal with the application of IPPs for connection.
Net metering	✓					No. NERSA has published the draft "Small Scale Embedded Generation: Regulatory Rules" <sup>15</sup> for public consultation in December 2015, which includes a net-billing scheme.
Unbundling		✓				ESKOM is a vertically integrated state owned utility that owns the national grid. IPPs and independent distributors exist. The Independent System and Market Operator bill is currently under discussion with the stakeholders.
Decentralized transport networks	✓					
Least cost development plan					✓	The Integrated Resources Plan for Electricity of 2010, revised in 2013.
Electricity master plan					✓	The Integrated Resources Plan for Electricity of 2010, revised in 2013.
Privatization / commercialisation				✓		There are a number of IPPs and the DoE is actively looking for more investors in order to provide the much needed new capacity. Some municipalities act as distributors.
Utility management contract	✓					
Utility financing plan				✓		ESKOM is a state owned company whose financing plan is supported by the Government.

<sup>14</sup> <http://www.nersa.org.za/>

<sup>15</sup> <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/Consultation%20Paper%20Small%20Scale%20Embedded%20Gx.pdf>

## ANNEX 3 – ELECTRICITY SECTOR ASSESSMENT

CRITERION	INFORMATION
Electricity sector policy	
Electricity sector laws	Electricity Regulation Act 4/2006 and Amendment Act 28/2007.
Unbundling	ESKOM is a vertically integrated state owned utility that owns the national grid. IPPs and independent distributors exist. The Independent System and Market Operator bill is currently under discussion with the stakeholders.
Regulation of the sector	The National Energy Regulator of South Africa regulates the electricity sector under the mandate of the National Energy Regulator Act of 2004.
Master Plans / Least cost development plans/ Capacities expansion plan	The Integrated Resource Plan for electricity (IRP 2010 revised in 2013) is a least cost capacity expansion plan.
Networks and access development	South African Transmission Grid Code <sup>16</sup> and Distribution Grid code <sup>17</sup> . Grid connection code for renewable power plants <sup>18</sup>
IPPs	There are more than 90 renewable energy IPPs after three bid rounds. A number of IPPs exist who own coal fired, gas fired and hydro power plants. The DoE has a bidding programme for IPPs using renewable, gas and coal <sup>19</sup> .
RE based electricity production objectives	According to the IRP there is a target of 17.8GW of RE for electricity generation by 2030 plus 2.9 GW of large hydro.
Power purchase agreements, feed-in tariffs	A REFiT programme was created in 2009 but it was never applied and was replaced by a competitive bidding scheme in 2011 which proved to be quite successful. An ESKOM standard for the interconnection of embedded generation and a generic PPA and a connection agreement have been developed.
Access to transport networks regulations	South African Transmission Grid Code.
Sector reforms	The last major sector reform took place with the enforcement of the National Energy Regulator Act of 2004 and the Electricity Regulation Act of 2006. The Independent System and Market Operator bill which will lead to more sector reforms is currently under discussion with the stakeholders.

<sup>16</sup> <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/IndustryStandards/SAGC%20Preamble%20Version%209%20July%202014.pdf>

<sup>17</sup> <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/IndustryStandards/RSA%20Distribution%20Network%20Code%20Ver%206.pdf>

<sup>18</sup> <http://www.nersa.org.za/Admin/Document/Editor/file/Electricity/TechnicalStandards/South%20African%20Grid%20Code%20Requirements%20for%20Renewable%20Power%20Plants%20-%20Version%202%208.pdf>

<sup>19</sup> <https://www.ipp-projects.co.za/>

## Country: South Africa

CRITERION	INFORMATION
<i>Enterprises and services</i>	
<b>PRODUCTION</b>	
Main companies and shareholders	ESKOM owns 94% of the installed capacity in South Africa (44189MW installed capacity in 2014 with 41995MW nominal capacity <sup>20</sup> - the difference between installed and nominal capacity reflects auxiliary power consumption and reduced capacity caused by the age of plant and/or low coal quality). There are more than 90 renewable energy IPPs and a number of conventional power generation including Aldwych International which owns 214MW of coal fired Power Plant, City of Tchwane which owns 480MW coal fired PP, IPSA Group which owns 18MW gas fired PP, International Power which owns 935MW gas fired PP and City of Cape town which owns 180MW hydro.
Production (GWh)	256073GWh in 2013 <sup>21</sup> .
Installed capacity (MW)	In 2014 the total installed capacity of ESKOM was 44189MW of which 661MW hydro, 1400 MW pump storage hydro, 37759MW coal fired, 2426MW gas/liquid fuel turbine stations and 1940MW nuclear power plants <sup>21</sup> . The total nominal capacity was 41995MW (the difference between installed and nominal capacity reflects auxiliary power consumption and reduced capacity caused by the age of plant and/or low coal quality).
Production mix (GWh)	In 2013 237349GWh (93%) were generated from fossil fuels (209483GWh from coal fired power plants and the remaining from gas/liquid fired turbines), 4040 GWh (2%) from hydro, 14106GWh (5%) from Nuclear and 578GWh (0.23%) from RES <sup>21</sup> .
Peak demand (MW)	In 2013 36276MW <sup>22</sup> .
<b>TRANSPORT</b>	
Enterprises	ESKOM is the owner and operator of the National grid.
HV lines length and capacity	In 2014 there were 2235km of 765kV, 1035km of 533kV DC, 18377km of 400kV, 7361km of 275kV, 1217km of 220kV, 882km of 132kV lines as well as 65km of 132kV and higher of underground cables in the transmission system <sup>23</sup> .
Exports/Imports	In 2013: total exports 13929GWh and total imports 9428GWh <sup>21</sup> .
<b>DISTRIBUTION</b>	
Enterprises (s)	ESKOM is the owner and operator of the National grid and the largest distributor. There are around 300 distributors (mainly municipalities) that supply electricity to local consumers <sup>24</sup>
MV and LV lines length and capacity	In 2014 there were 24929km of 132kV, 23349km of 88-33kV, 281510km of 22kV and lower, as well as underground cables: 361km of 33-88kV and 7010km of 22kV and lower <sup>23</sup> .

<sup>20</sup> Ten year statistical overview – ESKOM, available: <http://integratedreport.eskom.co.za/supplementary/app-overview.php>. [Accessed on 31/3/2016]

<sup>21</sup> IEA Statistics 2013; Available at <https://www.iea.org/statistics/statisticssearch/report/?year=2013&country=SouthAfric&product=ElectricityandHeat> [Accessed on 27/03/2016].

<sup>22</sup> "Transmission 10 Year Development Plan 2015 -2024 (TDP 2014)", ESKOM, October 2014. Available at [http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2015-2024TDP\\_PublicPres10Oct-2014.pdf](http://www.eskom.co.za/Whatweredoing/TransmissionDevelopmentPlan/Documents/2015-2024TDP_PublicPres10Oct-2014.pdf) [Accessed on 27/03/2016].

<sup>23</sup> ESKOM Factsheets 2014/15, available: [http://www.eskom.co.za/IR2015/Documents/Eskom\\_fact\\_sheets\\_2015.pdf](http://www.eskom.co.za/IR2015/Documents/Eskom_fact_sheets_2015.pdf), [Accessed on 29/03/2016].

<sup>24</sup> [http://www.eskom.co.za/AboutElectricity/ElectricityTechnologies/Pages/How\\_Electricity\\_Is\\_Distributed.aspx](http://www.eskom.co.za/AboutElectricity/ElectricityTechnologies/Pages/How_Electricity_Is_Distributed.aspx)

## Country: South Africa

CRITERION	INFORMATION
Clients	In 2014 Eskom had a total of 5477591 clients. Out of these 804 were redistributors, 5338723 residential consumers, 50613 commercial, 2773 industrial, 1034 mining, 83136 agricultural and 508 rail.
Total sales and tariff categories	The total sales of electricity from Eskom to local consumers in 2014 were 204274GWh. NERSA approves the tariffs of local authorities and other redistributors to their customers and the tariffs of Eskom for their customers and redistributors. The latest approved tariffs of Eskom include: for large consumers seasonal variation of energy charge and demand charge (difference in high demand season Jun-Aug and low demand season Sep-May) which varies with the transmission zone, transmission and distribution network and ancillary services charges; time of use tariffs for consumers who are able to shift load (seasonal variation and three ToU zones). For residential customers a block tariff for energy (0-600kWh and above 600kWh) and a network capacity charge <sup>25</sup> . Redistributors have their own tariff structures that usually have a block structure for the residential tariffs <sup>26</sup>
Demand forecast on the interconnected network (MW)	According to the updated IRP for Electricity (2013) <sup>27</sup> the peak demand in 2020 is expected to reach 46759MW in the “moderate decline scenario”, 44040MW in the “weathering the storm scenario” and 46759MW in the “big gas scenario”. The corresponding peak forecast for the three scenarios in 2030 are 61187MW, 51557MW and 61187MW respectively.
<i>Tariff / cost recovery / subventions</i>	
Electricity tariffs	The tariff structure is rather complicated with Eskom offering tariffs for residential customers and then different tariffs for local authorities that act as redistributors and non-local authorities, and different tariffs for commercial, industrial and agricultural customers. Redistributors on the other hand have residential tariffs that have a block structure and commercial tariffs that have a flat charge for energy and for capacity. Eskom's tariffs include Time of Use energy and demand charges for large consumers and a block structure for residential consumers. For 2015/16 NERSA approved a 12.69% increase in Eskom's tariffs. The average residential tariff until March 2015 was 95.06 cZAR/kWh (8.31USc/kWh), for commercial 89.16 cZAR/kWh (7.55USc/kWh), for industrial 56.81 cZAR/kWh (4.81USc/kWh),, and for redistributors 65.92 cZAR/kWh (5.58USc/kWh),. The weighted average overall price was 67.68 cZAR/kWh (5.73USc/kWh) <sup>28</sup> .
Social tariff	Free Basic Electricity (FBE) foreseen under the provision of Free Basic Services according to the Constitution. Up to 50kWh per month of FBE is supplied to poor households identified by the Municipalities.
Cost coverage through tariffs. Planned tariffs adjustments	The tariff increase for 2015/16 approved by NERSA covers the costs for providing electricity estimated by Eskom. Tariff adjustments are foreseen on an annual basis, after approval by the regulator within the Multiyear price determination periods.
Level and subsidies sources	To be confirmed
Financial situation of the main enterprises	The large investment expenses in new capacity by Eskom have negative effects on its financial profile. The government provided equity, subordinate loans and a guarantee framework agreement <sup>29</sup> to Eskom in order to overcome liquidity problems. Eskom faced a loss in revenues in 2015 due to lower electricity demand in the system as a result of the economic downturn.

<sup>25</sup> ESKOM tariffs description <http://www.eskom.co.za/CustomerCare/TariffsAndCharges/WhatsNew/Documents/Tariff%20brochure%20v9%20lowres.pdf>

<sup>26</sup> NERSA webpage under Electricity > Pricing and Tariffs > Tariffs > Local Authorities <http://www.nersa.org.za/>

<sup>27</sup> IRP 2010-2030, updated 2013 available at [http://www.doe-irp.co.za/content/IRP2010\\_updatea.pdf](http://www.doe-irp.co.za/content/IRP2010_updatea.pdf) [Accessed on 30/03/2016].

<sup>28</sup> <http://www.eskom.co.za/CustomerCare/TariffsAndCharges/WhatsNew/Pages/2015-16-Tariff-submission.aspx>

<sup>29</sup> <http://businesstech.co.za/news/general/76905/were-in-a-financial-crisis-eskom/>

## Country: South Africa

CRITERION	INFORMATION
<i>Performance: losses / efficiency/ service quality</i>	
Production performance	The overall thermal efficiency of Eskom's coal fired power plants (that generated 85% of the total generated electricity) was 31.4% in 2014. The Integrated Eskom system load factor was 83.4% in 2014 <sup>23</sup> .
Transport losses, evolution and objectives Distribution losses (technical and non-technical)	Transmission system energy losses were 2.5% and distribution system losses were 6.8% in 2014 <sup>23</sup> , with total energy losses over the network at 8.8%. The Transmission losses decreased from 3.3% in 2010 to 2.3% in 2013 and 2.5% in 2014 while the distribution losses increased from 5.9% in 2010 to 7.1% in 2013 and 6.8% in 2014. The targets for Eskom for 2014 were 6.54% distribution losses and 3.4% transmission losses with total losses at 9.28%.
Revenues	Total Eskom revenues were 140 billion rad from local sales of electricity in the financial year 2014/15 and 6 billion from international sales.
Shutdowns and improvement objectives	According to Eskom in 2014 the System average interruption frequency index (SAIFI) was 19.7 events; the System average interruption duration index (SAIDI) was 36.2 hours. The targets are: SAIFI equal to 17 and SAIDI equal to 39 by 2017/18. Load shedding was applied in 2015 due to shortage of capacity.
<i>Off-grid electrification and electricity access</i>	
Electrification rate (urban/rural)	According to the World Bank data in 2012 the global electrification rate was 86%, the urban electrification rate was 97% and the rural electrification rate was 67% <sup>30</sup> .
Electrification objectives	Access to electricity by 97% of households by 2030 and 300,000 households electrified with quality non-grid solutions by 2025.
Rural electrification agency	No. The Integrated National Electrification Programme (INEP) is managed by a unit within DOE.
Off-grid electrification situation and programmes	The INEP foresees that 300,000 households will be electrified with quality non-grid solutions (solar home systems) by 2025. The off-grid electrification is seen as an important contributor to universal access of electricity. The establishment of a Non-Grid electrification agency is planned.
Off-grid operators	Large mining industries turn to off-grid installations (mainly solar) in order to decrease their electricity costs. The other redistributors are connected to the network.
Isolated networks regulations	No.
BoP Policy (Bottom of the Pyramid)	Solar home systems are foreseen in the INEP for households that cannot connect to the grid. Further Information to be obtained.
<i>Energy Efficiency (EE)</i>	
Demand-side management	ESKOM has a DSM programme and municipalities are implementing their own EE strategies.
EE activities	Energy Efficiency tax incentives exist for verified energy savings in companies. The Energy Efficiency Directorate of the DoE runs an Appliance Labelling Campaign and coordinates DSM programmes. In addition, 32 large companies have joined forces with the

<sup>30</sup> World Bank; Available: <http://data.worldbank.org/country/sputh-africa>, [Accessed on 27/03/2016].

## Country: South Africa

CRITERION	INFORMATION
	Department of Energy and Eskom by signing an energy-efficiency accord, committing themselves to targets contained in the Department of Energy's strategy. The Private Sector EE programme by DoE aims to improve EE in commercial and industrial companies.
<i>Other aspects</i>	
Regional electricity market	South Africa is a member of the Southern Africa Power Pool. The power system of South Africa is interconnected to Namibia, Botswana, Zimbabwe and Mozambique (2000MW) as well as Lesotho and Swaziland.

## ANNEX 4 - NATIONAL TARGETS FOR ENERGY ACCESS, RENEWABLE ENERGY AND ENERGY EFFICIENCY

Country	Sector	Policies and objectives	Source
SADC - Southern African Development Community <sup>31</sup>	Access	At the high level SADC Regional Energy Access workshop held in Maseru on November 4, 2009, the following SADC Energy Access goals were agreed: <ul style="list-style-type: none"> <li>Member States have as a strategic goal the harnessing of regional energy resources to ensure, through national and regional action, that all the people of the SADC Region have access to adequate, reliable, least cost, environmentally sustainable energy services.</li> </ul> The operational goal is to endeavor to halve the proportion of people without such access within 10 years for each end use and halve again in successive 5 year periods until there is universal access for all end uses.	SADC Regional Energy Access Strategy and Action Plan (March 2010) <sup>32</sup>
	Renewable Energy	The draft Renewable Energy Strategy and Action Plan (February 2012- it is not approved yet) included ambitious targets for the deployment of renewable energy technologies : <ul style="list-style-type: none"> <li>RE grid connected share: 21% in 2015, 33% in 2020, 39% in 2030.</li> <li>Off-grid share of renewable energy: 2.5% in 2015, 5% in 2020 and 7.5% in 2030.</li> </ul> Biofuels: Ethanol 10% share of total fuels in 2020 and 20% in 2030; Biodiesel 5% in 2020 and 10% in 2030.	Regional Infrastructure Development Master Plan: Energy Sector Plan. (August 2012) <sup>33</sup>
	Energy efficiency	The draft Renewable Energy Strategy and Action Plan (February 2012- it is not approved yet) included ambitious targets for the Energy Efficiency: <ul style="list-style-type: none"> <li>Energy efficiency savings achieved of grid use: 5% in 2015, 10% in 2020 and 15% in 2030.</li> <li>Penetration of efficient cooking/heating devices: 5% in 2015, 10% in 2020 and 15% in 2030.</li> </ul> Efficient charcoal production share 5% in 2020 and 5% in 2030.	Regional Infrastructure Development Master Plan: Energy Sector Plan. (August 2012).
South Africa	Oil and gas	Use of LPG in 1.2 million households over 5 years.	LPG Strategy (2013)
	RE	A target of 17.8GW of RE of electricity capacity by 2030. The NDP has a long-term vision of 5 million SWH installations by 2030. 2% penetration level of biofuels in the national liquid fuel supply by 2013.	Integrated Resource Plan for Electricity (2010, 2013). National Development Plan (2010). Biofuels Industrial Strategy (2007).
	Access	Access to electricity by 97% of households by 2030 and 300,000 households electrified with quality non-grid solutions by 2025.	New Household Electrification Strategy (2013).
	Energy efficiency	Voluntary target of reducing final energy demand by 12% by 2015 (sectoral targets ranging from 9% for transport, through to 15% for Industry, commerce and the public sector).	National Energy Efficiency Strategy (2005)

<sup>31</sup> South Africa is a member state of the Southern African Development Community (SADC). The SADC objectives are presented for comparison with the objectives of South Africa.

<sup>32</sup> Available at [http://www.sadc.int/files/5713/5791/7436/EUEI\\_PDF\\_SADC\\_Regional\\_Energy\\_Access\\_Strategy\\_Mar\\_2010\\_EN.pdf](http://www.sadc.int/files/5713/5791/7436/EUEI_PDF_SADC_Regional_Energy_Access_Strategy_Mar_2010_EN.pdf) [Accessed on 16/03/2016]

<sup>33</sup> Available at [http://www.sadc.int/files/5413/5293/3528/Regional\\_Infrastructure\\_Development\\_Master\\_Plan\\_Energy\\_Sector\\_Plan.pdf](http://www.sadc.int/files/5413/5293/3528/Regional_Infrastructure_Development_Master_Plan_Energy_Sector_Plan.pdf) [Accessed on 16/03/2016]