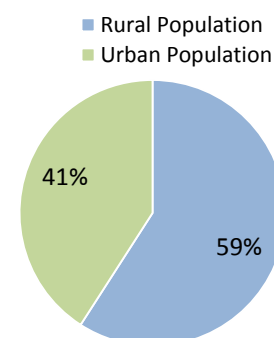


Country: Zambia



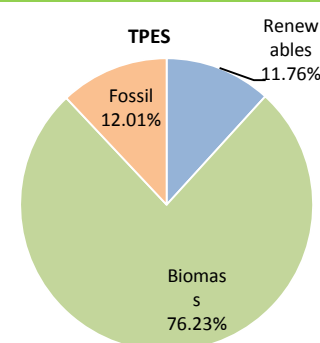
Socio- economic framework

	Year	Unit	Value
Population	2014	million	15.72 ¹
Demographic growth	2014	%	3.1% ¹
Surface	2014	km2	752618 ¹
GDP	2014	M US\$	27070 ¹
GDP per capita	2014	US\$ per cap	1722 ¹
GDP growth	2014	% /year	6.0% ¹
Fragile country status	2014	Index	No ²
Governance	2014	Index	59.5 ³
Governance variation over 5 years	2014	Index	0.5 ³
Human development	2014	Index	0.586 ⁴



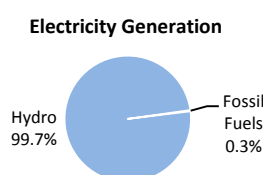
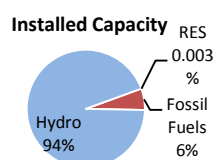
Consumed Energy (million toe=11.65 MWh)

	Year	Unit	Value
Total Primary energy Supply (TPES)	2013	Million toe	9.63 ⁵
Primary energy Supply - Biomass	2013	Million toe	7.41 ⁵
Primary energy Supply - Fossil	2013	Million toe	1.17 ⁵
Fraction of Non-Renewable Biomass	2009	%	34% ⁶
Primary energy Supply - Renewable (incl..hydro)	2013	Million toe	1.14 ⁵
Primary energy - Net Import electricity	2013	Million toe	-0.09 ⁵
Primary energy - Net import hydrocarbon	2013	Million toe	1.17 ⁵
Total Final Energy Consumption	2013	Million toe	7.68 ⁵
Final energy - Modern BLEN ^(*)	2013	Million toe	0.94 ⁵
Final Energy - Electricity	2013	TWh	10.85 ⁵



Electricity

	Year	Unit	Value
Peak demand	2013	MW	1800 ⁷
Installed connected capacity	2014	MW	2398 ⁸
Thermal installed capacity (fossil fuels)	2014	MW	141 ⁸
Hydro installed capacity	2014	MW	2258 ⁸
Renewable installed capacity (ex.hydro)	2014	MW	0.06 ⁸
IPP/installed capacity	2014	%	8% ⁹
Total Electricity production	2013	GWh	13318 ¹⁰
Electricity generation from fossil fuels	2013	GWh	38 ¹⁰
Electricity generation from hydro	2013	GWh	13280 ¹⁰
Electricity generation from renewable	2013	GWh	- ¹⁰
Electricity consumption including self-consumption and losses	2013	GWh	12308 ¹⁰
Average consumption per capita	2013	kWh per cap	783 ¹⁰
Total losses (technical and non-technical) as a production %	2013	%	23% ¹¹
Total losses (technical and non-technical)	2013	GWh	3063 ¹¹
Imports (+) exports (-)	2013	GWh	-1010 ¹⁰
Global electrification rate	2015	%	25% ¹¹
Urban electrification rate	2015	%	48% ¹¹
Rural electrification rate	2015	%	3% ¹¹
HV lines ^(**)	2009	km	3319 ¹²
MV lines ^(**)	2009	km	5131 ¹²
LV lines	2009	km	To be confirmed
Renewable energy/global electricity production (incl. hydro)	2013	%	99.7% ¹⁰
Connections to the LV network	2014	Thousands	568 ⁹
Average tariff	2015	US\$/kWh	13 ⁷
Ratio cost/tariff	2015		To be confirmed



Legal, regulatory and institutional framework

Energy policy	<ul style="list-style-type: none"> - National Energy Policy initially published in 1995 and revised in 2008, Ministry of Energy and Water Development (MEWD) (May 2008). - Revised Sixth National Development Plan 2013-2016, Ministry of Finance (2014). - Zambia Vision to 2030, Republic of Zambia (2006). - Draft Renewable Energy Strategy, MEWD (2010). - The study for Power System Development Master Plan in Zambia, MEWD and JICA, 2010. - The Study for Development of the Rural Electrification Master plan in Zambia, JICA, 2008.
Energy laws	<ul style="list-style-type: none"> - The Energy Regulation Act, 1995, amended by Act no. 23 of 2003. - Electricity Act, 1995, amended by Act No. 21 of 2003. - Petroleum Act, 1994. - Petroleum Exploration and Production Act, 2008. - Rural Electrification Act No. 20 of 2003.
Enforcement texts	Zambia Grid Code (2006). Electricity Grid Code statutory instrument No. 79, 2013.
Electricity/energy regulator	The Energy Regulation Board mandated by the Energy Regulation Act to regulate the whole of the energy sector.
Electricity operators	ZESCO Limited is the public vertically integrated utility. Copperbelt Energy Corporation (CEC), Lusumbwa Electricity Company, Zengamina Hydro Power Company and North West Energy Corporation are private companies that generate and distribute electricity.
Rural electrification body	Rural Electrification Authority (REA).
Renewable energy body	REA manages off-grid RE applications in the context of rural electrification.
Energy conservation body	The Energy Management Unit in the Department of Energy of MEWD is responsible for the energy efficiency issues.
Energy objectives	Increase the levels of national electrification to 66% by 2030 with 90% in urban areas and 50% in rural areas. The Revised Sixth National Development Plan (R-SNDP) aimed to increase of power capacity to 3.1GW, rural access to electricity of at least 8% and national access of 30% by 2016 (a deadline that does not seem realistic).
Feed-in tariff policy	Feed-in tariff is not standard and is negotiated between the IPP and ZESCO/ERB.. ERB and ZESCO are working to finalise and implement the REFIT and GETFIT schemes that were developed in 2015.
Metering policy for billing	One of ZESCO KPIs is to have zero unmetered customers from October 2014 onwards; however there is still a backlog of unmetered customers. ZESCO is promoting the use of prepaid meters.
Public procurement (auctions)	No.
Unbundling	ZESCO is the public vertically integrated utility and there are four other IPPs/distribution systems operators.

Private sector environment

Sector private bodies	Zambia Association of Chambers of Commerce and Industry (ZACCI), Zambia Association of Manufacturers (ZAM), Zambia Consolidated Copper Mines (ZCCM) Biofuels Association of Zambia.
Public incentives	Tax concessions for energy projects according to the Zambia Development Agency Act.
Financial grants	The Rural Electrification Fund managed by REA fund projects of up to 10MW.
IPPs	There are four IPPs in 2016 with a total of 184MW.
PPPs	The 120MW Itezhi Tezhi hydro plant is the only PPP project in the country. The Government of Zambia is aiming towards more PPP projects in order to cover the increasing electricity demand.
Business index	Listed 97 out of 189 countries by the WB "Ease of doing business" index in 2015 ¹³

International Cooperation in the energy sector

Joint Declaration EU-country	No.
Energy as a focal sector for 11th EDF	Yes. A total of 244 million Euros are foreseen for energy sector support in the 11 th EDF.
Donors active in the country	EU, AfDB, Chinese Gov., French Gov., GIZ, JICA, KfW, Norway, SIDA USAID, UK, World Bank.
Coordination among donors	More effective donor coordination is required. The National Planning Dept. in the Ministry of Finance is responsible for aligning donor activities to the national goals.

Main issues and opportunities¹¹

- Low access to electricity (25% of the population) and high use of biomass and charcoal for cooking.
- High load shedding due to the need for investments in new electricity power plants and upgrading of the electricity grid.
- High dependence on large hydro power plants increased the problem of load shedding after a relatively dry year in 2014/15.
- Non-cost reflecting electricity tariffs.
- Urgent need of implementation of energy efficiency in the mining Industry.
- Unclear institutional legal mandates and administrative obstacles in the licensing procedures for IPPs.
- High hydro potential that can be further exploited, together with the solar energy potential.

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

(**) HV is 330kV, 220kV and 132kV, MV is 88kV and 66kV.

Sources:

- 1 World Bank; Available: <http://data.worldbank.org/country/zambia>, [Accessed on 11/03/2016]. 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/za.html> [Accessed on 11/03/2016].
- 2 Zambia 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 11/03/2016].
- 3 Ibrahim Index of African Governance (IIAG), Available: www.moiabrahamfoundation.org/interact, [Accessed on 11/03/2016].
- 4 UNDP - Human Development Reports, Available: <http://hdr.undp.org/en/countries/profiles/ZMB>, [Accessed on 11/03/2016].

- 5 IEA Energy Balances 2013; Available at <http://www.iea.org/statistics/statisticssearch/report/?year=2013&country=ZAMBIA&product=Balances> [Accessed on 11/03/2016].
- 6 Bailis, R., Drigo, R., Ghilardi, A. & Masera, O. "The carbon footprint of traditional woodfuels", Nature Climate Change 5: 266-272, 2015.
- 7 "Zambia Renewables Readiness Assessment" IRENA, 2013
- 8 ERB Statistical Bulletin 2013-2014 available at <http://www.erb.org.zm/downloads/eregulation/statisticalbulletin/2013and2014.pdf> [Accessed on 11/03/2016].
- 9 Zambia Energy Sector Profile, Zambia Development Agency, 2014. Available at : <http://www.zda.org.zm/?q=download/file/fid/55> [Accessed on 11/03/2016].
- 10 IEA Statistics 2013; Available at <http://www.iea.org/statistics/statisticssearch/report/?year=2013&country=ZAMBIA&product=ElectricityandHeatBalances> [Accessed on 11/03/2016].
- 11 EU TAF for SE4ALL-Eastern and Southern Africa, "Formulation of the Action: Support to the Zambia Energy Sector: Increased Access to Electricity and Renewable Energy Production", Draft Report January 2016.
- 12 General Description of the Electricity System, ZESCO Ltd, Available at <http://www.erb.org.zm/downloads/eregulation/zescotariffs/DescriptionoftheZambiaElectricitySystem.pdf>. [Accessed on 16/03/2016].
- 13 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
			13	17	19	22	3	43	>66% ¹
Doubling energy efficiency	Non-solid fuels access	% of population	5	13	17	17	5	39	n.a. ²
							1990-2010	2010-2012	2030
							-0.97	-2.17	n.a
Doubling the renewable energy share	Improvement rate of Primary energy intensity	CAGR %					69	42	n.a
									n.a
									n.a
Doubling the renewable energy share	Cumulated energy savings	PJ							n.a
									n.a
									n.a
Doubling the renewable energy share	Ratios primary energy/final energy	MJ/\$2011 PPP							n.a
									n.a
									n.a
Doubling the renewable energy share	Primary energy intensity level	MJ/\$2011 PPP							n.a
									n.a
									n.a
Doubling the renewable energy share	Total final consumption	PJ							2030
									n.a
									n.a
Doubling the renewable energy share	RE share in the total consumption	%							n.a
									n.a
									n.a
Doubling the renewable energy share	RE share in the total electricity generation	%							n.a
									n.a
									n.a
Doubling the renewable energy share	RE share in the total electricity production capacity	%							n.a
									n.a
									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.

¹ EU TAF for SE4ALL-Eastern and Southern Africa, "Formulation of the Action: Support to the Zambia Energy Sector: Increased Access to Electricity and Renewable Energy Production", Draft Report January 2016.

² The Action Agenda Objectives are not available yet.

³ This indicator is not available in the GTF 2015 publication.

Country: Zambia

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	
1	Energy sector									
Political objectives Energy laws						✓			The “National Energy Policy” was initially published in 1995 and was revised in 2008 by the Ministry of Energy and Water Development (MEWD). The main directions of NEP are the “diversification of the country’s energy mix through the use of RES and ensuring availability of adequate energy supply that is dependable, with the lowest economic, social and environmental costs”. A Draft Renewable Energy Strategy was developed in 2010 setting targets for renewable electricity, solar home systems and solar water heaters deployment by 2030. The main laws in the energy sector are: Energy Regulation Act 1995, amended by Act No. 23 2003; Electricity Act 1995, amended by Act No. 21 of 2003; Petroleum Act 1994; Petroleum Exploration and Production Act, 2008; Rural Electrification Act no. 20 of 2003.	
Energy regulation authority							✓		The Electricity Regulatory Board (ERB) was established in 1997 under mandate of the Energy Regulation Act 1995. ERB regulates the whole of the energy sector (electricity, hydrocarbons and renewable energy).	
Partnership agreement with the EU						✓			The Cotonou Partnership Agreement regulates the relations between Zambia and the EU. The 11 th EDF has energy as a focal sector with a considerable budget.	
Fragile country status									No. Zambia is not included in the list of fragile countries of the World Bank Country Policy and Institutional Assessment (CPIA) Score. Zambia is classified as stable in the IMF report ⁴ on Sub-Saharan Africa and is listed in the “High Warning” group of countries in the Fragile States Index of the Fund for Peace ⁵ .	
2	Engagement and preparation for SE4ALL									
Opting-in	✓									
Gap analysis						✓			The Energy Rapid Assessment/Gap Analysis was produced in 2012 and will be updated in 2016.	
Action Agenda			✓						Action Agenda is under development.	
NREAP	✓									
NEEAP	✓									
Investment Prospectus			✓						Investment Prospectus is under development.	
SE4ALL Secretariat			✓						There is a SE4All focal point in the Ministry of Energy and Water Development.	

⁴ “Building Resilience in Sub-Saharan Africa’s Fragile States”, IMF 2015, available at <https://www.imf.org/external/pubs/ft/dp/2015/afr1505.pdf> [Accessed on 16/03/2016].

⁵ Fragile States Index 2015, Fund for Peace, available at <http://fsi.fundforpeace.org/> [Accessed on 16/03/2016].

Country: Zambia

3 Private sector participation									
Investment and concession laws					✓				The Investment Act (1996) provides the framework for all investments in the country. Energy is a priority area for investments.
Private sector activities					✓				The electricity generation sector is privatized and four IPPs/private distribution system operators exist at the moment. ZESCO is the vertically integrated state owned utility in the electricity sector which covers 94% of the demand. In the petroleum sector import and distribution of products is done by licensed private sector entities.
Investors protection					✓				The country is ranked 97 out of 189 countries in the “protecting investors” topic according to the World Bank “Doing Business” analysis ⁶ for 2015.
National financial incentives					✓				The Zambia Development Agency Act has investment thresholds in order to receive fiscal (tax reduction) or non-fiscal (investment guarantees etc.) incentives for investments in power plants, bio-refineries, refineries, pipelines and rural filling stations. Through the Office for Promoting Private Power Investment (OPPPPI) the Government offers non-fiscal incentives (risk-sharing/allocation between the investor and the Government).
Institutional support to private sector					✓				The Zambia Development Agency is responsible for promoting trade and investment in all sectors including energy.
4 Energy access									
Energy access policy and targets					✓				“Zambia Vision to 2030” and the Revised Sixth National Development Plan (RSNDP) 2013-2016 aim at increasing the electrification to 66% of the population, reaching 90% in urban areas and 51% in rural areas by 2030. The National Energy Policy (2007) states as one of its aims to ensure “availability of adequate supply of energy from various sources”. The Rural Electrification Master Plan (2008) sets specific steps of achieving the rural electrification target by grid extension, mini-hydro power and solar power deployment.
Agency / Rural energy fund					✓				Rural Electrification Authority (REA) established in 2004 by the Rural Electrification Act. A Rural Electrification Fund is foreseen in order to finance the activities of REA.
Rural electrification master plan					✓				Rural Electrification Master Plan (REMP) 2008 implemented by the Rural Electrification Authority.
Increasing EA investment plan					✓				REMP foresees specific investment steps for the achievement of the electrification target of 51% in rural areas by 2030.
EA decentralized initiatives					✓				REA finances off-grid electricity generation plants (mini hydro plants and PVs).
Traditional fuels replacement		✓							Charcoal and wood are used for cooking in low income households. There are no specific targets and programs in place to replace them with modern fuels. The target in Vision 2030 is to “reduce the share of wood to 40% by 2030”.
Independent distribution networks					✓				Copperbelt Energy Corporation Plc owns and operates transmission and distribution networks that supply electricity to mining companies. Lusamefwa Electricity Company generates electricity and manages off-grid small hydro systems. NWECLtd owns and operates a distribution network for the non-mining load of Lumwana Mine and surrounding townships. ZHPC owns a 0.75MW off-grid system and supplies electricity to customers in North West province.

⁶ World Bank “Doing Business” analysis available at <http://www.doingbusiness.org/data/exploreeconomies/zambia/> [Accessed 17/03/2016].

Country: Zambia

Electricity distribution master plan			✓			The distribution master plan is part of the Study for Power System Development Master Plan in Zambia (2010) ¹⁶ .
Specific measures for the poor	✓					The residential tariff structure is based on consumption blocks. The lowest block (up to 100kWh per month) has a price of almost 50% of the average residential tariff ⁷ .
Microfinance instruments				✓		There are a number of micro-finance companies operating in Zambia and the sector is regulated by the Bank of Zambia.
Pre-electrification			✓			There is a market for Solar Lighting systems for households covered by private companies and actions like Solar-Aid.
5 Renewable energy (RE)						
RE Policy				✓		The National Energy Policy (2008) acknowledges the need to increase the share of renewable energy (apart from large hydro) in the electricity generation system. The Sixth National Development Plan 2013-2016, Ministry of Finance (2014), includes a specific target of 20MW renewable energy power stations by 2015 and a share of 10% bioethanol and 5% biodiesel (as a % of the “national fuel mix”). The Draft RE Strategy (2010) sets the target of 100MW from solar, 200MW from small hydro, 100MW from biomass by 2030. It also aims to install 500000 solar home systems and 350000 solar water heaters in order to reduce the load by 150MW by 2030.
Agency / RE Fund	✓					The Rural Electrification Authority is the only body that deals with renewable energy projects. MEWD is responsible for RE policy.
RE master plan	✓					The National Energy Policy and the National Development Plans are the only energy sector policy documents. The Renewable Energy Strategy is draft produced in 2010. The Rural Electrification Master plan includes the options of RES based electrification (mini hydro and PVs).
Biofuels regulatory frameworks			✓			The Zambia Bureau of Standards in collaboration with the ERB has published a number of “codes of practise” for blending and handling of biofuel blends and specifications for biodiesel blends and ethanol fuel blends which are in public consultation (http://www.erb.org.zm/content.php?viewpage=dstd).
Wood energy regulations			✓			The Forests Act of 2003 amended in 2013 is regulating woody biomass issues.
Solar/wind regulations	✓					
RE resources mapping		✓				There are no overall RE resource assessments and mapping to support investment promotion, decision making and energy planning. Measurements of solar potential started recently and in 2016 a measurement campaign for wind speed at six locations funded by the WB will start. Hydro potential is estimated at 6GW.
RE Promotion				✓		RE is promoted for electricity generation (large and small hydro, PVs for on-grid and off-grid applications). Projects for the installation of solar geysers for hot water are run by the MEWD and ZESCO, under their energy efficiency programmes.
RE long-term funding		✓				RE Feed-in Tariffs are not fixed, but they are negotiated between the IPP and ZESCO/ERB. ERB has recently finalised a study for a new Feed-in Tariff scheme.
Green Energy Fund	✓					The only relevant fund is the Rural Electrification Fund which is utilised by REA.
Network connection studies	✓					A RE grid connection code does not exist but it is set as a priority for the projects to be funded under TAF. Grid Connection guidelines for RES are presented in a study published in February 2016 ⁸ .

⁷ ERB “Energy Sector Report” available at <http://www.erb.org.zm/reports/EnergySectorReport2014.pdf>, [Accessed 16/03/16]

Country: Zambia

6 Energy Efficiency (EE)						
EE Policy		✓				Energy Efficiency at the production, transformation and end use level is included in the National Energy Policy (2008) as one of the guiding principles. Demonstration projects for the installation of “solar geysers” and installation of CFL lamps were coordinated by MEWD and ZESCO’s Demand Side Management Unit. There is no large scale EE programme.
EE national action plan	✓					
EE Standards and labels		✓				The Zambia Bureau of Standards is working on a limited number of standards relating to energy efficiency, i.e. on Energy Saving Bulbs, and ISO 50001.
EE Promotion			✓			ZESCO offers free energy audits which could lead to power factor correction, to its customers. ZESCO also implements a CFL exchange programme and free installation of solar geysers in public buildings.
Electricity losses reduction programme		✓				The reduction of grid losses is one of the main issues of the power sector. ZESCO’s KPIs foresee “keeping the transmission losses at 5% or less and reducing distribution losses to 12% or less by 2016” ⁹ .
Improved stoves programs		✓				A CDM project in Lusaka provided 30000 households with efficient stoves using biomass sticks from renewable sources.
Ban on non-efficient appliances	✓					
Incentives for efficient appliances	✓					
Demand-side management	✓					
7 Electricity sector						
Legal definition of the institutional players					✓	The Energy Regulation Act (1995, amended by Act No. 23 2003) gave the mandate for the establishment of the Electricity Regulatory Board (ERB) and defined the operations of the energy sector that should be licensed by the ERB. These include “production, generation, transmission, distribution and supply of energy”. Based on this the Electricity Act (1995) defines the specifics of the operation of the electricity market.
Tariff policy				✓		The electricity tariff is defined by the supplier (ZESCO being the main supplier in the country) and is submitted to ERB for approval. In the period from 2008 to 2014 five tariff reviews took place, which, despite the increase, were not cost reflective. A cost of service study in 2007 ¹⁰ defined the tariff objectives for ZESCO. According to ERB the production cost for large hydro was 0.02-0.03 USD/kWh while the cost for small and mini-hydro between 0.50-1USD/kWh and 0.35 USD/kWh for isolated diesel power plants. ZESCO submitted a proposal for updated tariffs to ERB in 2015 and they were announced on 3/12/2015. The current (2016) weighted average tariff is 0.13 USD/kWh (not including mining and export tariffs) ¹¹ .

⁸ Grid connection guidelines, USAID Southern Africa Trade Hub/ AECOM International Development, February 2016, available at http://www.erb.org.zm/downloads/eregulation/refit/finalReports/FINAL_Zambia%20REFIT%20Grid%20Connection%20Guidelines.pdf, [Accessed: 17/03/16].

⁹ Energy Sector Report, ERB 2014. Available <http://www.erb.org.zm/reports/EnergySectorReport2014.pdf>, [Accessed: 19/03/16].

¹⁰ Revised ZESCO’s Cost of Service, Report to ERB, IPA Energy Consulting, Norton Rose, PB Power, March 2007.

¹¹ “Zambia Renewables Readiness Assessment” IRENA, 2013. Available: http://www.irena.org/documentdownloads/publications/rra_zambia.pdf, [Accessed: 19/03/16].

Country: Zambia

Interconnection rules		✓				The Zambian Grid Code (2006) ¹² defines the responsibilities for the operation of the electricity network and the main technical issues. A RE grid connection code does not exist and should be developed by ZESCO. Grid Connection guidelines for RES are presented in a study published in February 2016 ¹³ . The power system of Zambia is interconnected to Zimbabwe (1400MW) and D.R. Congo (260MW). An interconnection with Tanzania (400MW) is planned.
Isolated networks rules			✓			Draft Zambian Standards for off-grid and rural grids extension and operation have been published by the Zambia Bureau of Standards (http://www.erb.org.zm/content.php?viewpage=dstd).
Feed-in tariff policy			✓			Currently feed-in tariffs are not fixed and are negotiated between the IPP and ZESCO/ERB. A recent study ¹⁴ provided an analysis for a cost based approach for the REFIT, together with model PPAs and grid connection guidelines. According to a presentation by ERB ¹⁵ “the REFIT programme is envisaged to be implemented by the first quarter of 2016”.
RE minimum % imposed to producers	✓					None
RE certificates trade	✓					No
Free access to the domestic network					✓	According to the Energy Regulation Act the access to the network is available to licensed power producers, through contracts with the system operator.
Net metering	✓					No
Unbundling	✓					ZESCO is a vertical integrated electricity producer, transmission/distribution system operator and supplier. There are four licensed IPPs and four other licensed transmission/distribution system operators.
Decentralized transport networks			✓			ZPC owns a 0.75MW off-grid system and supplies electricity to customers in North West province.
Least cost development plan					✓	The Study for Power System Development Master Plan in Zambia (2010) ¹⁶ includes a least cost capacity expansion plan.
Electricity master plan					✓	The Study for Power System Development Master Plan in Zambia (2010).
Privatization / commercialisation			✓			There are four IPPs and distribution network operators in the country apart from ZESCO (state owned). ZESCO is participating in a number of PPPs.
Utility management contract	✓					
Utility financing plan					✓	ZESCO is a state owned company whose financing plan is support by the Government of Zambia.

¹² Available at <http://www.erb.org.zm/downloads/gridcode/ZambianGridCode.pdf>, Accessed [17/03/2016]

¹³ Grid connection guidelines, USAID Southern Africa Trade Hub/ AECOM International Development, February 2016, available at http://www.erb.org.zm/downloads/eregulation/refit/finalReports/FINAL_Zambia%20REFIT%20Grid%20Connection%20Guidelines.pdf, Accessed: [17/03/16].

¹⁴ “REFIT Guidelines: Support mechanisms and draft regulations, USAID, February 2016 available at: http://www.erb.org.zm/downloads/eregulation/refit/finalReports/FINAL_Zambia%20REFIT%20Guidelines.pdf, Accessed: [17/03/2016].

¹⁵ Available at : <http://www.erb.org.zm/downloads/eregulation/refit/OVERVIEW%20OF%20THE%20ENERGY%20SECTOR%20IN%20ZAMBIA%20-%20CASE%20OF%20RENEWABLE%20ENERGY.pdf> Accessed: [17/03/2016].

¹⁶ The Study for Power System Development Master Plan in Zambia (2010), Available at: http://open_jicareport.jica.go.jp/640/640/640_533_11989118.html, Accessed: [17/03/2016].

ANNEX 3 – ELECTRICITY SECTOR ASSESSMENT

CRITERION	INFORMATION
Electricity sector policy	
Electricity sector laws	Electricity Act, 1995, amended by Act No. 21 of 2003. Rural Electrification Act No. 20 of 2003. Zambian Grid Code (2006). Electricity Grid Code statutory instrument No. 79, 2013.
Unbundling	ZESCO is a vertical integrated state owned utility and is the largest electricity supplier. There are four IPPs and four private operators of transmission/distribution networks: Copperbelt Energy Corporation Plc which owns and operates transmission and distribution networks that supply electricity to mining companies; NWECLD Ltd which owns and operated distribution network for the non-mining load of Lumwana Mine and surrounding townships; ZPC which owns a 0.75MW off-grid system and supplies electricity to customers in North West province.
Regulation of the sector	The Energy Regulation Board mandated by the Energy Regulation Act to regulate the whole of the energy sector.
Master Plans / Least cost development plans/ Capacities expansion plan	The Study for Power System Development Master Plan in Zambia (JICA, MEWD 2010) which includes generation expansion, transmission and distribution system expansion. The Study for Development of the Rural Electrification Master plan in Zambia, (JICA, MEWD 2008).
Networks and access development	Electricity Grid Code statutory instrument No. 79, 2013; Grid Connection guidelines for RES are presented in a study published in February 2016 ¹³ .
IPPs	In 2015 there were: Copperbelt Energy Corp.(80MW), Lusumbwa Hydro Corp. (54MW), Ndola Energy Corp. (50MW), ZPC (0.75MW off-grid).
RE based electricity production objectives	The Sixth National Development Plan 2013-2016, Ministry of Finance (2014), includes a specific target of 20MW renewable energy power stations by 2015. The Draft RE Strategy (2010) sets the target of 100MW from solar, 200MW from small hydro, 100MW from biomass by 2030. It also aims to install 500000 solar home systems and 350000 solar water heaters in order to reduce the load by 150MW by 2030.
Power purchase agreements, feed-in tariffs	Currently feed-in tariffs are not fixed and are negotiated between the IPP and ZESCO/ERB. A recent study ¹⁴ provided an analysis for cost based approach for the REFIT, together with model PPAs and grid connection guidelines. According to a presentation by ERB ¹⁵ “the REFIT programme is envisaged to be implemented by the first quarter of 2016”.
Access to transport networks regulations	Zambian Grid Code (2006). Electricity Grid Code statutory instrument No. 79, 2013. Grid Connection guidelines for RES are presented in a study published in February 2016 ⁸ .
Sector reforms	The last major sector reform took place with the enforcement of the Electricity Act of 1995 and the Energy Regulation Act of 1995 which established the Energy Regulation Board in 1997.

Country: Zambia

CRITERION	INFORMATION
<i>Enterprises and services</i>	
PRODUCTION	
Main companies and shareholders	ZESCO Ltd owns 92% of the installed capacity in Zambia (mainly large hydro plants 2202MW in 2014). Copperbelt Energy Corp.(80MW), Lusumfwa Hydro Corp. (54MW) and Ndola Energy Corp. (50MW). ZHPC owns a 0.75MW off-grid system.
Production (GWh)	13318 GWh in 2013 ¹⁷ .
Installed capacity (MW)	In 2014 the total installed capacity was 2398MW of which 2258MW hydro, 141MW oil fired power plants and 0.06MW renewable energy plants (PVs and mini hydro) ¹⁸ .
Production mix (GWh)	In 2013 38GWh (0.3%) were generated from fossil fuels, 13280 GWh (99.7%) from hydro ¹⁷ .
Peak demand (MW)	In 2009 1600MW ¹⁹ is the last recorded demand available in the statistics. The estimated peak for 2013 was 1800MW.
TRANSPORT	
Enterprises	ZESCO Ltd and Copperbelt Energy Corp. which provides electricity to mining enterprises.
HV lines length and capacity	In 2009 there were 2310km of 330kV, 807.7km of 220kV and 201.6km of 132kV lines ²⁰ .
Exports/Imports	In 2013: total exports 1083GWh and total imports 73GWh ¹⁷ .
DISTRIBUTION	
Enterprises (s)	ZESCO Ltd. (state owned). Copperbelt Energy Corporation Plc owns and operates transmission and distribution networks that supply electricity to mining companies. NVEC Ltd owns and operated distribution network for the non-mining load of Lumwana Mine and surrounding townships. ZPC owns a 0.75MW off-grid system and supplies electricity to customers in North West province.
MV and LV lines length and capacity	In 2009 Medium Voltage: 788km of 88kV and 4343km of 66kV lines ²⁰ . Low voltage: to be confirmed.
Clients	In 2013 there were 611302 consumers. Out of these 568699 were residential consumers, 31514 commercial, 6448 small power and the remaining 4641 were large power and mining industry consumers ¹⁸ .
Total sales and tariff categories	The total sales of electricity in 2013 were 10846GWh. The tariffs are divided into residential, social services, commercial and maximum demand consumers (industrial).
Demand forecast on the interconnected	According to the Study for Power System Development Master Plan in Zambia (2010) ¹⁶ in the base case the demand will reach

¹⁷ IEA Statistics 2013; Available at <http://www.iea.org/statistics/statisticssearch/report/?year=2013&country=ZAMBIA&product=ElectricityandHeatBalances> [Accessed on 11/03/2016].

¹⁸ ERB Statistical Bulletin 2013-2014 available at <http://www.erb.org.zm/downloads/eregulation/statisticalbulletin/2013and2014.pdf> [Accessed on 11/03/2016]

¹⁹ Zambia Energy Sector Profile, Zambia Development Agency, 2014.

²⁰ General Description of the Electricity System, ZESCO Ltd, Available: <http://www.erb.org.zm/downloads/eregulation/zescotariffs/DescriptionoftheZambiaElectricitySystem.pdf>, [Accessed on 16/03/2016].

Country: Zambia

CRITERION	INFORMATION
network (MW)	2800MW by 2020 and 4066MW by 2030 (average annual growth rate 4.3% until 2030). In the low scenario the demand will reach 2670MW by 2020 and 3544MW by 2030 (average annual growth 3.7% until 2030). In the high scenario the demand will reach 3300MW by 2020 and 5406MW by 2030 (average annual growth rate 5.7% until 2030).
<i>Tariff / cost recovery / subventions</i>	
Electricity tariffs	The tariffs are divided into: Residential Sector tariffs that have a fixed charge per month and an energy charge following a block type (0-100kWh 15 ngwee/kWh, 101-300kWh 31 ngwee /kWh, above 300kWh 51 ngwee /kWh); Commercial Tariffs that have a fixed monthly charge and an energy charge of 31 ngwee/kWh; Social service tariffs(schools hospitals etc.) with a fixed monthly charge and an energy charge of 28 ngwee/kWh; Maximum Demand tariffs for industrial consumers depending on the installed capacity of the consumer where there is a fixed monthly charge, a capacity charge and an energy charge ²¹ .
Social tariff	The residential tariff is based on blocks. The first block corresponds to 100kWh per month and the tariff is of almost 50% of the average residential tariff. There is also a special tariff for social services (schools, hospitals etc.).
Cost coverage through tariffs Planned tariffs adjustments	In the existing tariff setting approach ZESCO submits the proposed tariffs to ERB which are then approved or amended. The current tariffs have been updated six times since 2008. The last update in December 2015 was based on a cost of service study commissioned by ERB. There is no planned schedule for tariffs adjustment.
Level and subsidies sources	To be confirmed
Financial situation of the main enterprises	To be confirmed.
<i>Performance: losses / efficiency/ service quality</i>	
Production performance	Almost all electricity in Zambia (99.7% in 2013) is produced by hydro power plants many of which were initially built in 1960s and 1970s. The plants are upgraded and are undergoing rehabilitation to improve their performance.
Transport losses, evolution and objectives Distribution losses (technical and non-technical)	Total grid losses amounted for 22% in 2013 and 20% in 2014 for ZESCO. Out of this 6% were losses in the transmission and 14% in the distribution in 2014. The objective is to maintain transmission losses at 5% or less and reduce distribution losses at 12% or lower until the end of 2016.
Revenues	To be confirmed
Shutdowns and improvement objectives	ZESCO recorded an average annual SAIDI (System Average Interruption Index) of 25 hours in 2014 (26 hours in 2013) and an average annual SAIFI (System Average Interruption Frequency Index) of 3 times in 2014 (improved from 7 times in 2013). The annual Customer Average Interruption Duration Index (CAIDI) was 8 hours in 2014 (5 hours in 2013). The Average System Availability Index (ASAI) was 97% in 2014 (96% in 2013). However in the calculation of these indices outage hours related to load shedding were excluded ⁹ . Load shedding average 6-10 hours per day according to the TAF mission report ²² which affects considerably the operation of industry and commercial activities

²¹ Available at: www.erb.org.zm/press/statements/ZESCOTariffs2014.pdf [Accessed on 17/03/2016].

²² "Formulation of the Action Support to the Zambia Energy Sector: Increased access to electricity and Renewable energy production" report of the EU TAF for the SE4ALL Eastern-Southern Africa January 2016,

Country: Zambia

CRITERION	INFORMATION
	and leads to increased cost of production due to the need of using diesel generators. The reasons for the intensification of load shedding over the last years are the insufficient capacity to meet the demand and the “below average” rainfall experienced during the 2014/15 rainy season ²² .
<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 22%, the urban electrification rate was 47% and the rural electrification rate was 6% ²³ . According to the ERB Statistical Bulletin 2013-2014 the electrification rate in 2013 was 25% ¹⁸ .
Electrification objectives	The Rural Electrification Plan has the target of 51% rural electrification by 2030. “Zambia Vision to 2030” and the Revised Sixth National Development Plan (RSNDP) 2013-2016 aim at increasing the electrification to 66% of the population, reaching 90% in urban areas and 51% in rural areas.
Rural electrification agency	Rural Electrification Authority (REA) established in 2004 by the Rural Electrification Act. A Rural Electrification Fund is foreseen in order to finance the activities of REA.
Off-grid electrification situation and programmes	REA aims to achieve the electrification target partly through the installation of off-grid PV systems and mini-hydro systems.
Off-grid operators	ZPC owns a 0.75MW off-grid system and supplies electricity to customers in North West province.
Isolated networks regulations	ZPC owns a 0.75MW off-grid system and supplies electricity to customers in North West province.
BoP Policy (Bottom of the Pyramid)	Information to be obtained.
<i>Energy Efficiency (EE)</i>	
Demand-side management	Currently the Demand Side Management unit in ZESCO offers a CFL exchange programme, a programme for the installation of “solar geysers” for hot water production and a programme of free energy audits aiming at the improvement of power factor.
EE activities	Apart from the activities of ZESCO, MEWD has performed similar demonstration actions mainly for solar “geysers”.
<i>Other aspects</i>	
Regional electricity market	The power system of Zambia is interconnected to Zimbabwe (1400MW) and D.R. Congo (260MW). An interconnection with Tanzania (400MW) is planned. Zambia is a member of the South Africa Power Pool.

²³ World Bank; Available: <http://data.worldbank.org/country/zambia>, [Accessed on 16/03/2016].

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

Country	Sector	Policies and objectives	Source
SADC - Southern African Development Community ²⁴	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"> 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. The operational goal is to endeavour 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) ²⁵
	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"> RE grid connected share: 21% in 2015, 33% in 2020, 39% in 2030. Off-grid share of renewable energy: 2.5% in 2015, 5% in 2020 and 7.5% in 2030. 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) ²⁶
	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"> Energy efficiency savings achieved of grid use: 5% in 2015, 10% in 2020 and 15% in 2030. Penetration of efficient cooking/heating devices: 5% in 2015, 10% in 2020 and 15% in 2030. Efficient charcoal production share 5% in 2020 and 5% in 2030.	Regional Infrastructure Development Master Plan: Energy Sector Plan. (August 2012).
Zambia	Oil and gas	Increase storage capacity of oil products to achieve 30 days strategic stock.	Sixth National Development Plan 2013-2016, Ministry of Finance (2014)
	RE	A target of 20MW renewable energy power stations by 2015 and a share of 10% bioethanol and 5% biodiesel (as a % of the “national fuel mix”). The Draft RE Strategy (2010) sets the target of 100MW from solar, 200MW from small hydro, 100MW from biomass by 2030.	Sixth National Development Plan 2013-2016, (2014). Draft RE Strategy (2010).
	Access	Increase the levels of national electrification to 66% by 2030 with 90% in urban areas and 51% in rural areas	Zambia Vision to 2030, Republic of Zambia (2006).
	Energy efficiency	Keep the electricity transmission losses at 5% or less and reducing distribution losses to 12% or less by 2016. The Draft RE Strategy (2010) aims to install 500000 solar home systems and 350000 solar water heaters in order to reduce the load by 150MW by 2030.	Energy Sector Report, ERB 2014. Draft RE Strategy (2010).

²⁴ Zambia is a member state of the Southern African Development Community (SADC). The SADC objectives are presented for comparison with the objectives of Zambia.

²⁵ Available at http://www.sadc.int/files/5713/5791/7436/EUEI_PDF_SADC_Regional_Energy_Access_Strategy_Mar_2010_EN.pdf [Accessed on 16/03/2016]

²⁶ Available at http://www.sadc.int/files/5413/5293/3528/Regional_Infrastructure_Development_Master_Plan_Energy_Sector_Plan.pdf [Accessed on 16/03/2016]