

BIOENERGY REPORTING AND STATISTICS

THE CASE OF THE KINGDOM OF ESWATINI

24-27 April 2023 Lome, Togo



KEY FACTS

- Population-1.1 million
- Economic growth-1.3% in 2019
- GDP-5.2 Billion USD
- Electrification rate-80% (95% Urban and 69% Rural)
- Energy Balance-1995-2018
- 45% of the country is covered by plantations, natural forests and woodlands



BIOENERGY STATISTICS COLLECTION



Central Statistical Office

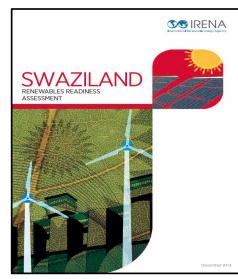
- Conducts annual household-based surveys
- Agriculture survey

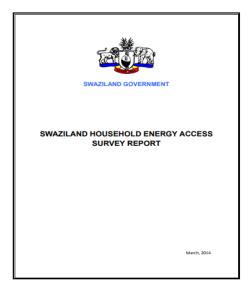
Ministry of Natural Resources and Energy

- Conducts Company surveys for collection of energy balance data
- Responsible for policy development and implementation on bioenergy

Ministry of Tourism and Environmental Affairs

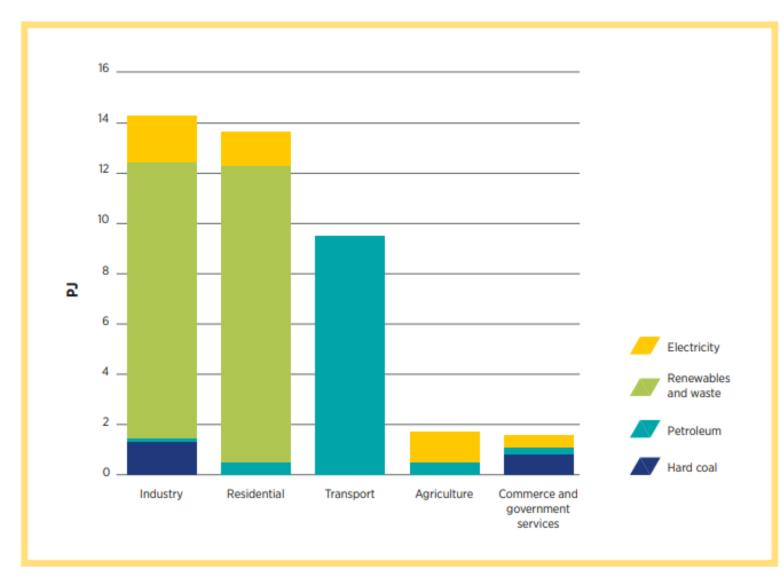
- Maintenance of forestry inventory
- Promotes tree growing and sustainable use of forests and natural resources
 - Control of invasive species and wattle management.





Final Energy Consumption (2014)



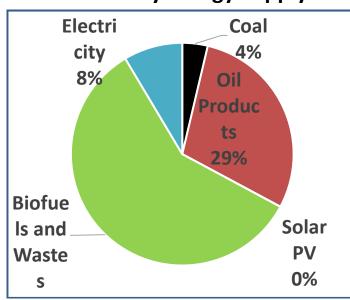


- Industry and Residential account for 2/3 of Total Final Energy Consumption
- In both sectors
 Renewables and
 Waste account for
 more than 80% of
 the consumption of
 the sector

Bioenergy Data

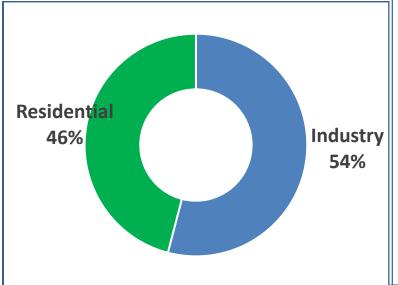


Total Primary Energy Supply



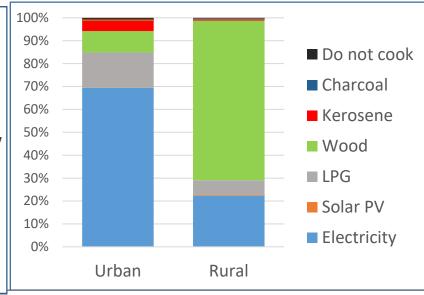
- Biofuels and wastes are the main fuel in the country's energy mix
- Local electricity is generated from hydro and biomass.
 70% of total electricity is imported

Bioenergy Total Final Energy Consumption



- For industrial heat processes and in food and beverage sector and cogeneration in sugar sector
- For cooking and heating in residential sector

Household Energy use for cooking



- Implementation of Rural Electrification project since 1992
- Target of 100% access by 2030
- High residential electricity tariffs
- Urban to rural migration

Biomass use in Industry





Woodchips/ Woodwaste

 Supplementary fuel in manufacturing industry for heat and power generation



Bagasse

 Use in sugar industry for heat and power generation

Types of Biomass in Households







Traditional biomass

- 70% of Rural and 9% of urban households use wood for cooking
- Most traditional biomass is not traded

Charcoal, Briquettes

- Only 0.13% of households use charcoal for cooking
- Burned in open fire to grill during social activities and informal street food markets

Traditional Biomass estimation



INPUT DATA

Table 4	Persons/Households
Urban Average	3.1
Rural average	4.4
Total Average	4.00

TABLE 6 % wood cons			
Area	Single	Primary	Secondary
Urban	9.36	0	0
Rural	69.72	2 0	0

Table 8		
Area	Population	Households
Urban	259 766	83 885
Rural	833 472	189 425
Total	1 093 238	273 310

RESULTS

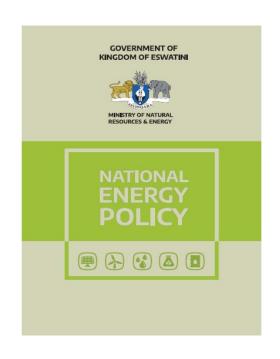
Table 3 Total Wood Consumption (kt)

		rban	l					
Single	Primary	Secondary	Subtotal	Single	Primary	Secondary	Subtotal	Total
1.2						0.0		
2.9		1.1	6.9				14.5	
4.6			10.6		17.2		35.4	46.0
2.9		1.1	6.9		7.3		14.5	21.4
4.6			10.6		17.2		35.4	46.0
5.4	4.8	1.9		34.6	30.6	0.0	65.1	77.3
5.2	4.3	1.7	11.1	52.5	43.4	0.0	95.9	107.1
4.1	3.2	1.3	8.5	66.5	51.4	0.0	117.9	126.4
2.8	2.0	0.8	5.6	72.1	52.2	0.0	124.3	129.9
1.6	1.1	0.5	3.2	68.5	46.3	0.0	114.7	118.0
0.9	0.5	0.2	1.7	57.8	36.5	0.0	94.3	95.9
0.4	0.2	0.1	0.8	43.9	25.9	0.0	69.8	70.6
0.2	0.1	0.0	0.3	30.3	16.7	0.0	47.0	47.4
0.1	0.0	0.0	0.1	19.2	9.9	0.0	29.1	29.2
0.0	0.0	0.0	0.0	11.2	5.4	0.0	16.6	16.7
0.0	0.0	0.0	0.0	6.1	2.7	0.0	8.8	8.8
0.0	0.0	0.0	0.0	3.1	1.3	0.0	4.4	4.4
0.0	0.0	0.0	0.0	1.5	0.6	0.0	2.0	2.0
0.0	0.0	0.0	0.0	0.7	0.2	0.0	0.9	0.9
0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.4	0.4
0.0			0.0		0.0	0.0	0.1	0.1
0.0					0.0		0.1	0.1
0.0					0.0		0.0	
0.0			0.0		0.0		0.0	
0.0					0.0		0.0	
-2.4							-10.3	
34.4	31.6	12.4	78.4	512.5	372.6	0.0	885.0	963.5

Energy Policy, 2018



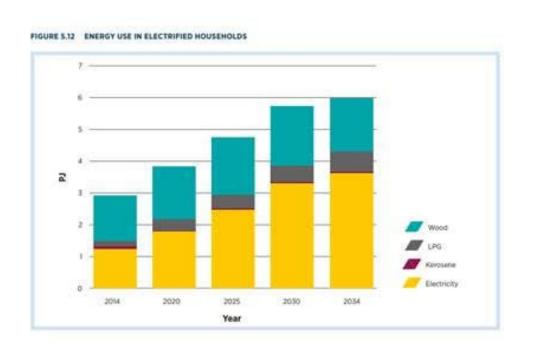
- To support the development of domestic resources for a target of 50% of the energy mix in the electricity generation
- To strive to provide all households with access to modern energy by 2022.
 - Smoke free kitchens: This includes promotion actions to build improved cook-stoves with built-in chimneys or the modern smokeless stoves

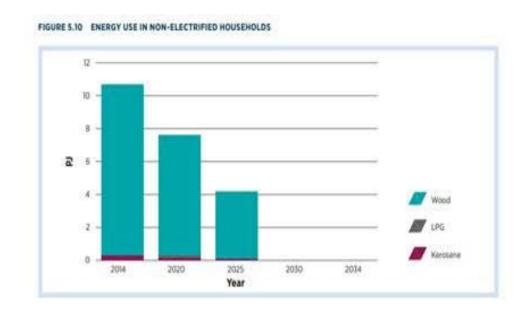




Energy Masterplan, 2020







- According to the SE4ALL targets
 - Universal access to clean energy by 2030 including electricity, LPG, solar home systems and biogas
 - Coupled with effective policy on improved bioenergy cookstoves

Household traditional Bioenergy cookstoves



1. Efficient Wood Cookstoves







Difficulties in reporting bioenergy data

- Traditional Bioenergy is mainly noncommercial
 - Quantities cannot be estimated
 - Informal sales of fuel wood is also not quantified
- Bioenergy use in commercial sector
 - Butcheries, hospitality, roadside non-formal business
- Other types of bioenergy
 - Energy crops, cow dung, wood wastes, charcoal, briquettes etc
- Measuring efficiency of the modern wood cookstoves



Way forward







- The country in cooperation with the World Bank is conducting a Mutli-tier Energy Access survey
 - quantification of bioenergy demand in all sectors,
 - Impact assessment of the rural electrification programme in all sectors
 - impacts of bioenergy on forest resources in the country,
 - GIS database for rural energy access,
- Developing strategies for fuel switching opportunities e.g. fuelwood to LPG

Sample Questionnaires: Enterprise

D. FUEL USED FOR PRODUCTIVE APPLICATIONS

First ask D.1 for all f				nformatio	n in the follow	ving ques	tions on	ly for the fuel the	at is used.								SIY	NQABA				
D. D.1	D.2	D.3	D.4	D.5	D.6	D.7	D.8	D.9	D.10			D.1	1		D.12							
Fuel Type Read Aloud	In the last 12 months, did the enterprise use this energy?			enterprise READ A definition application	t 12 months, when the use [FUEL] for LOUD the appliant below and Months the enterprise	r? ications a ark for ea e uses it f	nd their ch or.	How often does the enterprise purchase [FUEL]?	In which unit is [FUEL] of [FUEL] do you purchase each time?			How does quant [FUE	this tity of [L] las	t a: []	low mid you or the mount FUEL ou urchas	pay t of that						
	CODE: Yes1 No0 → NEXT ROW	LIGHTING	MOTIVE POWER	Cooling	TRANSPORTATION	PRODUCT HEATING/ DRYING	WATER HEATING	DAILY1 WEEKLY2 MONTHLY3 Other, specify4		Ι`	QUANTITY)→ NEXT ROW	WEEKS 0→NE		(I	OST OCAL URRENC	Y)						
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b. Wood								kg	0Kg3 Other specify	7	Wood Purchase Tinkhuni letitse Wood Collected	engiwe	<u> </u>	<u></u>	<u> </u>		X			<u> </u>	<u> </u>	
c. Charcoal / Wood									Wood wagon	d. (e. S f. H	Wood Collected Tinkhuni letitfo Charcoal Emal: Solar Kerosene Paraf longakahlutwa	ahle	 	<u>ii</u>	 	 	X		 	 		
Charcoal								Ag		g. H h. C n i. C	Piped Bio- <u>Gas</u> Gas longena ngemaphayiphi njengemanti Coal/ Lignite						X					
									Half litre (0,5 lt) j-	j. <i>I</i> k. C	Emalahle lembi Animal waste/ I Umcuba Crop Residue/ I Biomass Insalel yetinsaba	Dung Plant		<u> </u>			X			<u> </u>	<u> _ </u>	
										I. S	nemahlanga Sawdust Coal Briquette Timvutfu temal Biomass Brique	lahle			 	 	X			 		
										o. H	Insalela yemahl netinsaba Electricity Gezi Pellets/ process biomass/ wood	langa i ed	 <u> </u> 	 			X		 	 	 	

Sample Questionnaires: HH



I.1	Enumerator: Record Respondent ID for this section														
I.2	I.3	I.4	I.5	I.6 A	I.6 B	I.7	I.8	I.9	I.10	I.11	I.12	I.13	I.14	I.15	I.16
Fuel	In the last									In the	In the last 12	What unit	How often	How much	How much did
Тур	12 months,							for? Kuletii	last 12	months, in	do you	do you or a	do you	you pay for the	
e	did your	letingu 12				.] kwentani	i?		month	which	purchase/co	household	purchase	amount of	
	household	READ AL	OUD the	options be	low and				s, how	months was	llect	member	each time?	[FUEL] that	
Rea	use this	Check "√'	' for each	item the h	iousehold	uses it for	-			many	this [FUEL]	[FUEL] in?	purchase/co	Nitsenga	you purchase
d	[FUEL]?									month	scarce and	Uyitsenga	llect	lokungaka	each time?
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c.	Wood Collected	
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d.	Charcoal Emalable	I.
e.	Solar	1
f.	Kerosene Paraffin	-
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g.	Piped Bio-Gas	
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i.	Coal/ Lignite Emalahle lembiwako	1
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j-	Animal waste/ Dung Umcuba	
k.	Crop Residue/ Plant	
K.	Biomass Insalela	
	vetinsaba	I.
	nemahlanga	
1.	Sawdust	ī
m.	Coal Briquette	
	Timvutfu temalahle	I.
n.	Biomass Briquette	
	Insalela yemahlanga	I.
	netinsaba	
о.	Electricity Gezi	I.
р.	Pellets/ processed	
	biomass/ wood chips	I.
	Ema off sauta	



QUESTIONS

THANK YOU! SIYABONGA!