

Table 4.5 The Results of Macroscopic Load Forecast

	1998(Actual)		Case	2005		2010		Growth Rate 1999 to 2010 (% / year)	
	Energy Sales (GWh)	Max. Demand (MW)		Energy Sales (GWh)	Max. Demand (MW)	Energy Sales (GWh)	Max. Demand (MW)	Energy Sales (%)	Max. Demand (%)
Grid System	1,822.4	367.5	High	3,764.3	790.3	5,262.6	1,104.1	9.2	9.6
			Base	3,373.9	696.1	4,454.2	918.3	7.7	7.9
			Low	2,796.2	578.9	3,446.0	713.6	5.4	5.7
Dar es Salaam	1,079.2	217.6	High	1,898.5	385.6	2,639.9	535.9	7.8	7.8
			Base	1,781.1	361.9	2,339.8	475.2	6.7	6.7
			Low	1,476.2	300.3	1,808.6	367.7	4.4	4.5
Arusha	137.4	27.7	High	291.2	64.5	405.0	89.3	9.4	10.2
			Base	274.3	60.9	360.4	79.7	8.4	9.2
			Low	228.1	51.1	279.5	62.4	6.2	7.0
Moshi	96.1	19.4	High	214.5	44.5	308.1	63.9	10.1	10.4
			Base	200.7	41.7	271.8	56.4	9.0	9.3
			Base-J	170.1	35.0	255.8	53.4	8.5	8.8

4.3 Microscopic Demand Forecast

4.3.1 Method of Microscopic Demand Forecast

For Dar es Salaam, Arusha, and Moshi, the microscopic demand forecast for the future decade (2001-2010) was made by extrapolating the actual power demands for the past decade (1991-2000) for the existing substations. The actual demands in the past include not only the increases in demand due to the ordinary economic growth but also extraordinary factors such as the electrification of unelectrified villages and the expansion of large industrial plants. Looking at the 2010 demand forecast, there are unrealistic capacities for single substations. For example, in Table 4.7, City Center S/S 52.5 MVA (11 kV) are unusually large capacities. Realistic capacity of substations is described in a later chapter. With the increase in demand, feeders from existing substations shall be relocated, branched, and shared by newly installed substations. Namely, the total forecast demand including newly installed substations is regarded as equivalent to the total value obtained by extrapolation of the existing substations. With respect to New Oysterbay S/S which is to be installed in Dar es Salaam, it is expected that comparatively large demands, such as from the American Embassy under construction, will come soon, hence suitable corrections have been added to them. As for the other substations to be installed in the future, such as Kitunda, Magomeni, Mburahati, Yombo, TOL and Tandika, they are not included in the demand forecast but their values are extrapolated as mentioned above.

In the demand forecast for each individual substation, maximum power for the past ten year(1991-2000) was picked up from the operation log for each 11 kV feeder, and growth rate was calculated and extrapolated to forecast future demand. Since the operation log includes 11 kV feeder loss and low-voltage line loss, it cannot be said that the demand forecast represents a pure demand. At present, however, it is the only record of maximum power that is the closest to the receiving end. And since the value indicates the very capacity that passed through the transformer, it shows the capacity and time of installation of a new transformer at a glance. Where the records were unreliable or there were too few recorded items because the substation was put into operation in recent years, maximum power was forecast using growth rates for the three cities (annual rates of maximum power up until 2010) obtained by the macroscopic method described in 4.2. The values are shown below.

Dar es Salaam	6.7%
Arusha	9.2%
Moshi	8.8%

4.3.2 Actual and Forecast Maximum Power in Dar es Salaam

The actual and forecast maximum power obtained from the past operation logs for the substations in Dar es Salaam are shown in Table 4.6, Fig. 4.7.1, 4.7.2 and 4.7.3.

Different substations show different growth rates. Substations showing high growth rates include Kigamboni S/S(25%), Msasani S/S(15%), Mbezi S/S(11%), and FZ III S/S (9%). These substations supply new residential areas, resort hotel zones, shopping centers, industrial zones, etc. Tandale S/S shows a modest 4% growth rate, but its environs are growing.

The operation logs give maximum power in MW. The MW values converted in terms of MVA with the power factor taken into consideration are shown in Table 4.7.

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Table 4.6 (1/2) Past and Future Maximum Power at the Substation in Dar es Salaam (MW)

DAR ES SALAAM		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
1	Ubungo																							
	U1	3.4	3.2	3.0	3.3	3.2	3.3	3.0	2.4	3.0	3.5													
	U2	3.4	3.3	3.0	3.2	3.5	3.0	0.6																
	U7	3.3	3.3	3.2	3.2	3.5	3.8	2.5	3.8	3.0	2.5													
	U8	3.8	4.0	4.0	3.8	3.8	3.8	3.8	4.0	4.3	4.5													
	(Total)	13.9	13.8	13.2	13.5	14.0	13.9	9.9	10.2	10.3	10.5	6.7%	11.2	12.0	12.8	13.7	14.6	15.5	16.6	17.7	18.9	20.2		
	Alaf	10.0	8.8	9.2	9.0	8.0	7.2	3.6	7.8	5.0	12.0	1.0MW/y	10.2	11.2	12.2	13.2	14.2	15.2	16.2	17.2	18.2	19.2		
	Tazara	2.0	3.0	4.0	4.0	3.0	3.5	4.0	5.8	6.0	7.0	0.5MW/y	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0		
	Wazo Hill	13.0	12.0	12.5	12.5	10.5	9.2	3.2	6.5	4.0	3.8	0.0%	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
	Priten.Text	4.5	4.5	4.0	2.0	2.4	1.4	2.2	2.0	2.0	1.8	0.0%	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
(Total)	29.5	28.3	29.7	27.5	23.9	21.3	13.0	22.1	17.0	24.6		23.7	25.2	26.7	28.2	29.7	31.2	32.7	34.2	35.7	37.4			
Total	43.4	42.1	42.9	41.0	37.9	35.2	22.9	32.3	27.3	35.1		34.9	37.2	39.5	41.9	44.3	46.7	49.3	51.9	54.6	57.6			
2	Ihala																							
	D0	1.5	1.5	1.8	2.1	1.8	1.8	2.0	2.2	2.4	2.4													
	D1	2.1	2.3	3.8	2.6	2.4	2.3	2.7	4.1	3.4	3.4													
	D2	3.7	3.8	3.8	4.4	4.4	4.5	4.5	4.5	3.9	3.8													
	D3	3.5	2.1	4.1	4.5	4.5	3.4	4.4	4.5	4.5	3.8													
	D7	2.4	?	2.0	2.3	2.7	2.7	3.0	3.7	3.2	3.9													
	D8	2.4	3.4	4.2	2.1	2.1	2.1	2.7	4.1	2.7	3.4													
	D9	3.0	3.6	3.8	3.7	3.7	3.8	4.0	4.4	3.8	3.8													
	D10	3.8	3.8	3.8	4.5	4.5	3.8	4.4	4.5	4.5	3.7													
	D13										4.2	3.8												
	Total (Syn)	21.0	22.0	28.0	26.0	28.0	25.0	28.0	34.0	33.0	30.5	6.7%	32.5	34.7	37.1	39.5	42.2	45.0	48.0	51.2	54.7	58.3		
	3	Tegeta																						
		TG4					0	0	0	3.2	2.0	2.3												
TG5						0	8.2	8.2	8.4	8.9	9.6													
Total						12.0	11.0	6.8	21.0	21.9	21.6	6.7%	35.7	38.1	40.7	43.4	46.3	49.4	52.7	56.3	60.1	64.1		
4	City Center																							
	C2																							
	C3																							
	C4																							
	C5																							
	C6																							
	C8																							
	Total(Syn)	24.0	25.0	26.0	26.0	20.5	22.0	22.0	22.5	22.0	22.0	6.7%	23.5	25	26.7	28.5	30.4	32.5	34.6	37.0	39.4	42.0		
5	Oysterbay																							
	O2	1.1	1.0	1.2	1.2	1.2	1.3	1.4	1.4	1.4	1.6													
	O3	0.5	0.5	0.7	0.7	0.7	0.9	1.0	1.0	1.0	1.0													
	O4	2.0	2.0	2.1	2.1	2.1	2.8	3.5	3.8	3.6	3.9													
	O5	1.3	1.4	1.5	1.5	1.5	1.5	2.0	2.0	2.0	2.2													
	O6	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5													
	Total(Syn)	7.3	11.2	11.1	11.7	10.7	11.0	10.1	10.4	11.9	12.3	6.7%	13.1	14.0	15.0	15.9	17.0	18.2	19.1	20.6	22.1	23.5		
6	Factory Zone I																							
	F5				4.7	?	?	4.5	3.2	3.0	2.3													
	F4				0.2	?	?	0.2	1.5	1.0	1.1													
	Total(Syn)	8.0	9.0	12.5	12.0	10.5	11.5	8.3	9.5	7.6	5.0	6.7%	6.3	6.7	7.2	7.7	6.2	8.7	9.3	9.9	10.6	11.3		
7	Mikocheni																							
	MK1	1.0	2.5	2.5	1.1	1.9	1.9	2.3	2.5	2.5	1.6													
	MK2	3.0	3.2	3.5	3.9	3.9	3.9	3.8	3.8	3.9	4.2													
	MK3	3.0	3.1	3.1	3.2	3.2	3.5	3.5	4.0	4.1	4.5													
	Total	7.9	9.8	10.1	9.2	10.0	10.5	12.4	13.7	14.4	14.2	7.0%	15.2	16.3	17.4	18.6	19.9	21.3	22.8	24.4	26.1	27.9		
8	Mbezi																							
	K'Chi	1.5	1.5	1.6	1.6	1.6	?	3.0	3.2	2.8	2.7													
	Lugalo	0.5	0.5	0.6	1.0	1.0	1.0	0.8	1.8	1.9	1.9													
	Total	2.4	2.5	2.7	3.1	3.1	?	4.1	5.3	5.7	6.0	11.0%	6.7	7.4	8.2	9.1	10.1	11.2	12.5	13.8	15.3	17.0		
9	Factory Zone III																							
	F31																							
	F32																							
	F33																							
	Total(Syn)	5.5	5.9	6.7	7.5	8.0	9.5	10.0	10.0	10.0	12.0	9.0%	13.1	14.3	15.5	16.9	18.5	20.1	21.9	23.9	26.1	28.4		
10	Kurasini																							
	Port				3.7			2.1	2.6	2.4	3.3													
	Kilwa				2.6			3.8	3.9	2.9	2.7													
	Industrial				1.6			4.1	4.1	4.1	3.6													
	Total				3.1			2.3	1.6	1.6	0.6	6.7%	13.1	14.0	14.9	15.9	17.0	18.2	19.4	20.7	22.0	23.5		
11	Factory Zone II																							
	Total	1.5	1.8	1.9	2.0	2.5	2.5	2.6	3.0	3.0	2.9	8.0%	3.1	3.4	3.7	3.9	4.3	4.6	5.0	5.4	5.8	6.3		
12	Kigamboni																							
	Mjinwe							0.4	0.5	0.5	0.2													
	Total							0.4	0.6	0.4	1.4	25.0%	2.0	2.5	3.1	3.9	4.9	6.1	7.6	9.5	11.9	14.9		

Note: (Syn) is Synthetic total: Measured at the 11kV side of 33/11kV TRF
 8 Mbezi is included by 3 Tegeta
 Italic is modified figures at the Meeting of Oct. 1. 2001

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Table 4.6 (2/2) Past and Future Maximum Power at the Substation in Dar es Salaam (MW)

Substation	Feeder	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
13 Tandale	MG1						2.4	2.6	2.6	2.9	2.9											
	MG2						3.9	3.2	3.2	3.3	3.4											
	MG3																					
	MG4						2.8	2.6	2.7	2.9	3.1											
	MG5						2.2	3.4	3.3	3.5	3.6											
	Total						11.3	11.8	12.0	12.6	13.0	4.0%	13.5	14.1	14.6	15.2	15.8	16.4	17.1	17.8	18.5	19.2
14 Msasani	MS1	1.6	1.6	1.6	1.7	1.7	2.0	2.2	3.0	3.0	3.0											
	MS2	1.5	1.5	1.6	1.9	1.9	2.0	2.5	2.4	2.8	2.8											
	MS3	0.6	0.7	0.7	0.7	0.7	1.0	1.2	2.2	2.3	2.4											
	Total	3.7	3.8	3.9	4.3	4.3	5.0	5.9	7.6	8.1	8.2	15.0%	9.4	10.8	12.5	14.3	16.5	19.0	21.8	25.1	28.8	33.2
15 Sokoine																						
	Total(Syn)				10.0	11.0	11.5	10.5	11.5	12.0	13.0	5.0%	13.7	14.3	15.0	15.8	16.6	17.4	18.3	19.2	20.2	21.2
16 Kariakoo																						
	Total(Syn)									8.0	7.0	6.7%	8.5	9.1	9.7	10.4	11.1	11.8	12.6	13.4	14.3	15.3
17 Mbagala	MBF1																					
	MBF2																					
	MBF3																					
	MBF4																					
	Total											6.7%	11.4	12.2	13.0	13.9	14.8	15.8	16.8	18.0	19.2	20.5
18 Chang'ombe	CG2																					
	CG3																					
	CG4																					
	CG5																					
	Total											6.7%	9.5	10.1	10.8	11.5	12.3	13.1	14.0	15.0	16.0	17.0
19 TUPER (Private)																						
20																						
21 New Oysterbay (Proposed)												2.50%	8.4	8.6	8.8	9.0	9.3	9.5	9.8	10.0	10.2	10.5
22																						
23																						
24 Zanzibar											24.9	7.4%	26.7	28.7	30.8	33.1	35.6	38.2	41.0	44.1	47.3	50.8
25 Sum Total except Zanzibar											240.4		266.9	312.5	358.5	400.4	460.6	494.7				
26 Sum Total with Zanzibar											265.0		292.9	336.0	385.0	441.4	507.9	545.5				
27 Synthetic Sum Total (26X 1/1.1)											240.9		266.3	350.5	350.0	401.3	461.7	495.9				

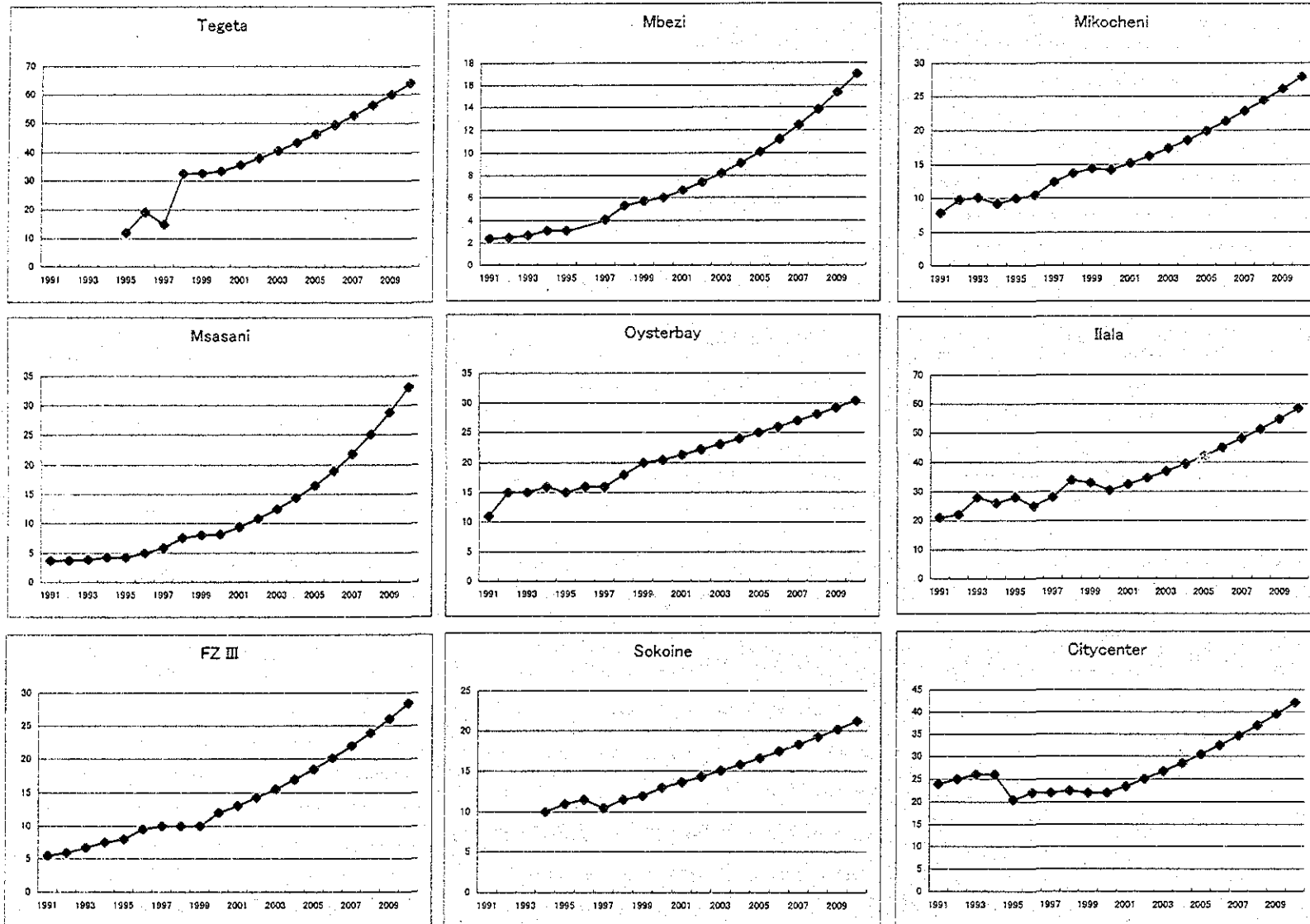


Fig. 4.7.1 Past and Future Max. Power at the Substations in Dar es Salaam (MW)

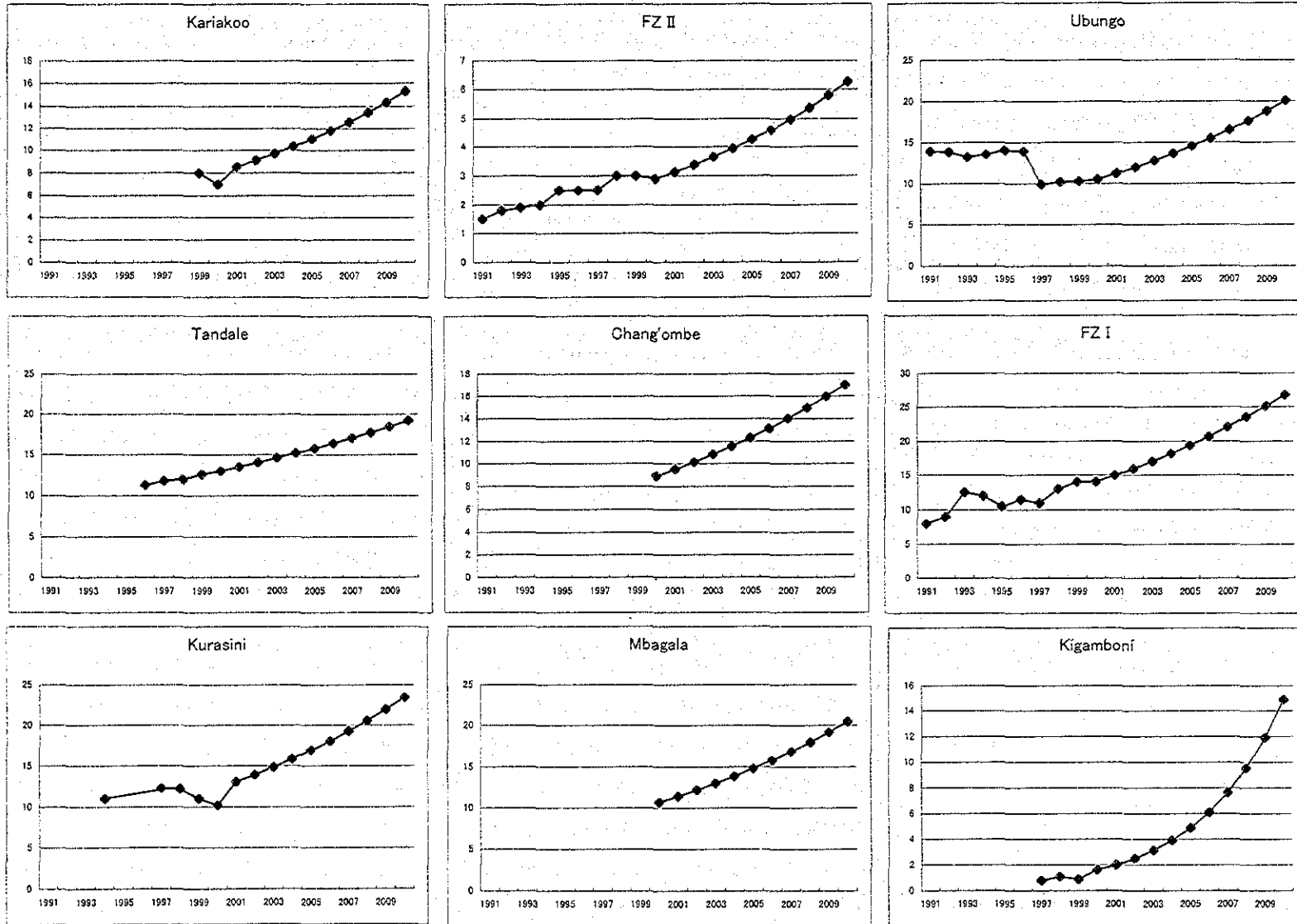


Fig. 4.7.2 Past and Future Max. Power at the Substations in Dar es Salaam (MW)

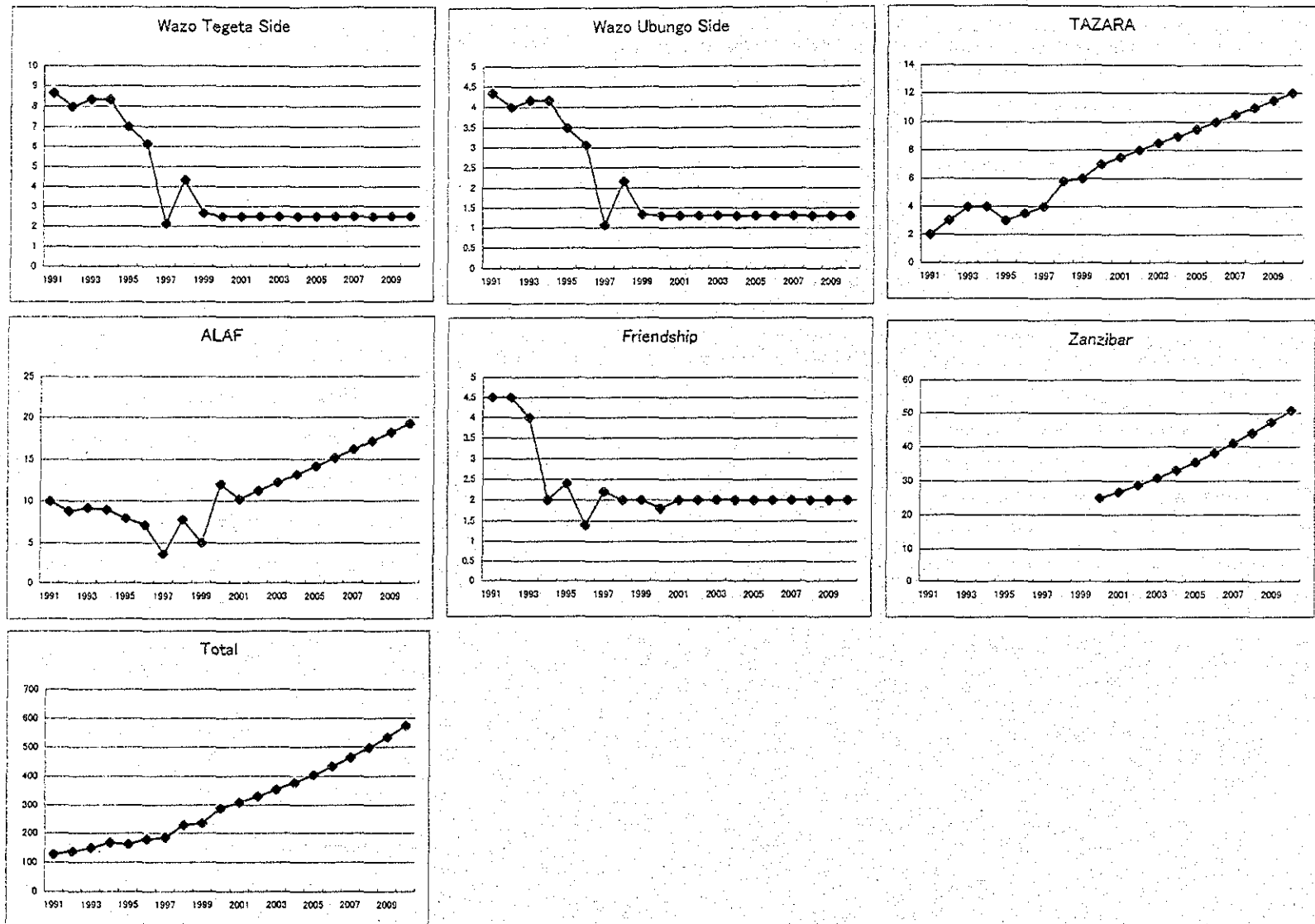


Fig. 4.7.3 Past and Future Max. Power at the Substations in Dar es Salaam (MW)

Table 4.7 Future Maximum MVA at the Substations in Dar es Salaam

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1.Ubungo	33/11kV	13.1	14.0	15.0	16.0	17.1	18.3	19.4	20.8	22.1	23.6	25.3
	33kV Lines Total	30.8	29.6	31.5	33.4	35.3	37.1	39.0	40.9	42.8	44.6	46.8
		43.9	43.6	46.7	49.6	52.4	55.4	58.4	61.7	64.9	68.2	72.1
2.Ilala	33/11kV 132/33kV	38.1	40.6	43.4	46.4	49.4	52.8	56.3	60.0	64.0	68.4	72.9
3.Tegeta	132/33kV	41.9	44.6	47.6	50.9	54.3	57.9	61.8	65.9	70.4	75.1	80.1
4.City Center	33/11kV	27.5	29.4	31.3	33.4	35.6	38.0	40.6	42.3	46.3	49.3	52.5
5.Oysterbay	33/11kV	15.4	16.4	17.5	18.8	19.9	21.3	22.8	24.3	25.8	27.6	29.4
6.FZ I	33/11kV	6.3	7.9	8.4	9.0	9.6	10.3	10.9	11.6	12.4	13.3	14.1
7.Mikocheni	33/11kV	17.8	19.0	20.4	21.8	23.3	24.9	26.6	28.5	30.5	32.6	34.9
*8.Mbezi	33/11kV	7.5	8.4	9.3	10.3	11.4	12.6	14.0	15.6	17.3	19.1	21.3
9.FZ III	33/11kV 132/33kV	15.0	16.4	17.9	19.4	21.1	23.1	25.1	27.4	29.9	32.6	35.5
10.Kurasini	33/11kV	12.8	16.4	17.5	18.6	19.9	21.3	22.8	24.3	25.9	27.5	29.4
11.FZ II	33/11kV	3.6	3.9	4.3	4.6	4.9	5.4	5.8	6.3	6.8	7.3	7.9
12.Kigamboni	33/11kV	2.0	2.5	3.1	3.9	4.9	6.1	7.6	9.5	11.9	14.8	18.6
13.Tandale	33/11kV	16.3	16.8	17.6	18.3	19.0	19.8	20.5	21.4	22.3	23.1	24.0
14.Msasani	33/11kV	10.3	11.8	13.5	15.6	17.9	20.6	23.8	27.3	31.4	36.0	41.5
15.Sokoine	33/11kV	16.3	17.1	17.9	18.8	19.8	20.8	21.8	22.9	24.0	25.3	26.5
16.Kariakoo	33/11kV	8.8	10.6	11.4	12.1	13.0	13.9	14.8	15.8	16.8	17.9	19.1
17.Mbagala	33/11kV	13.4	14.3	15.3	16.3	17.4	18.5	19.8	21.0	22.5	24.0	25.6
18.Chang'ombe	33/11kV	11.1	11.9	12.6	13.5	14.4	15.4	16.4	17.5	18.8	20.0	21.3
19.TIPER												
20.												
21.New Oysterbay (Proposed)	33/11kV		10.5	10.8	11.0	11.3	11.6	11.9	12.3	12.5	12.8	13.1
22.Zanzibar	132kV	31.1	33.4	35.9	38.5	41.4	44.5	47.8	51.3	55.1	59.1	63.5

*8 Mbezi is included by 3 Tegeta

Considerations in converting MW values in terms of MVA are as follows.

- As the power factor used for conversion, 80% was applied in all cases. This is because many substations were found operating with 80% power factor at the 11 kV feeder outlet or 33/11 kV transformer low-voltage side. At some substations, the power factor was about 90%. However, we adopted 80% to give allowance.
- The number of 11 kV feeders ranges from 3 to 8. The maximum power at a substation is smaller than the simple sum of maximum power of each feeder due to the diversity factor. However, for substations which had no overall transformer power flow data, the simple sum of feeders was adopted to be on the safe side.

4.3.3 Actual and Forecast Maximum Power in Arusha

In Arusha, 220 kV Njiro S/S meet the entire demand in Arusha.

Besides, Njiro S/S obtains power from both 220 kV and 132 kV systems. It receives 220 kV from Singida S/S and 132 kV from the power of the Pangani river system via Moshi. The forecast maximum power in 2010 is less than 100 MW. If the 132 kV transmission line between Kiyungi and Hale fails, one 220 kV transmission line and 220 kV transformer banks will be insufficient to meet the demand of Arusha and Kilimanjaro. Therefore, more transformer banks in Njiro S/S will be necessary. The towns are well planned and there are a few long-distance feeders. Therefore, the voltage problems seem not so serious as in Moshi.

From the records of maximum power in the past in Arusha, future maximum power was forecast. The results are shown in Table 4.8 and Fig. 4.8. Figures with power factor added and expressed in MVA are shown in Table 4.9. It is Mt. Meru S/S (5 MVA x 2) in city center that is the substation showing the highest growth rate -12%. The substation that shows the second highest growth rate is Themi S/S (5 MVA x 1), though the MVA value is not so large.

Table 4.8 Past and Future Maximum Power at the Substation in Arusha (MW)

ARUSHA																						
Substation	Feeder	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1 Njiro	220/132kV 2x60MVA Total(Syn)	17.0	18.0	18.0	19.0	24.0	27.0	26.0	29.0	34.0	38.0	9%	41	45	49	54	59	64	70	76	83	90
2 Unga Limited	33/11kV 2x5MVA F1 F2 F3 Total(Syn)	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	7.0%	11.1	11.9	12.7	13.6	14.6	15.6	16.7	17.9	19.1	20.5
3 Mt. Meru	33/11kV 2x5MVA M1 M2 M3 M4 Total(Syn)				2.0	3.0	3.0	3.0	3.0	3.3	3.5	12.0%	11.8	13.2	14.8	16.5	18.5	20.7	23.2	26.0	29.1	32.6
4 Themi	33/11kV 1x5MVA	0.8	0.9	0.9	0.9	1.2	1.4	1.3	1.5	1.7	2.0	11.0%	2.2	2.5	2.7	3.0	3.4	3.7	4.2	4.6	5.1	5.7
5 Kiltex	33/11kV 1x5MVA						1.5	1.5	1.7	1.9	1.6	8.0%	2.2	2.3	2.5	2.7	2.9	3.2	3.4	3.7	4.0	4.3
6 Usa River												10.0%	4.0	4.4	4.8	5.3	5.9	6.4	7.1	7.8	8.6	9.4
7 Tengeru and Others		5.2	5.5	5.5	5.7	7.2	8.3	8.0	9.0	10.0	12.0	10.0%	9.2	10.0	11.1	12.2	13.3	14.7	16.0	17.6	19.3	21.2
8 Sum Total	(2 + 3 + 4 + 5 + 6)	16.5		17.0		24.9		27.5		36.0			40.5	44.3	48.6	53.3	58.5	64.3	70.6	77.6	85.2	93.7
9 Synthetic Sum Total	(8 x 1 / 1.1)							25.0		32.7			36.8	40.3	44.2	48.5	53.2	58.5	64.2	70.5	77.5	85.2

Italic is modified figures at the Meeting of Oct. 1.2001

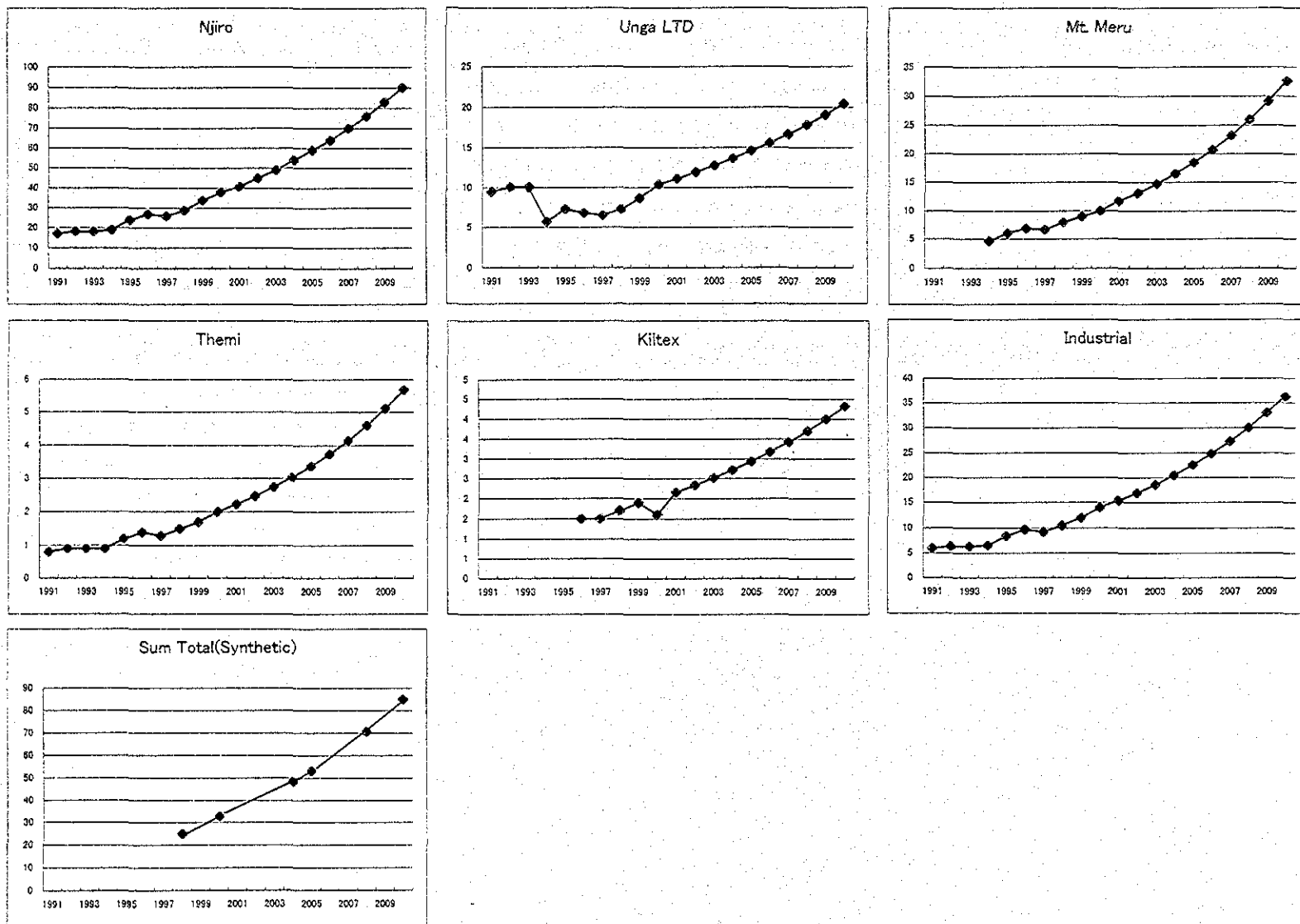


Fig. 4.8 Past and Future Max. Power at the Substations in Arusha (MW)

Table 4.9 Future Maximum MVA at the Substations in Arusha

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1.Njiro	132/33kV 220/132kV											
2.UngaLtd	33/11kV	13.0	13.9	14.9	15.9	17.0	18.3	19.5	20.9	22.4	23.9	25.6
3.Mt.Meru	33/11kV	13.1	14.8	16.5	18.5	20.6	23.1	25.9	29.0	32.5	36.4	40.8
4.Themi	33/11kV	2.5	2.8	3.1	3.4	3.8	4.3	4.6	5.3	5.8	6.4	7.1
5.Kiltex	33/11kV	2.0	2.8	2.9	3.1	3.4	3.6	4.0	4.3	4.6	5.0	5.3
6.Usa River (Proposed)	33/11kV	-	5.0	5.5	6.0	6.6	7.4	8.0	8.9	9.8	10.8	11.8
7.Tengeru and Others	33/11kV	15.0	11.5	12.5	13.9	15.3	16.6	18.4	20.0	22.0	24.1	26.5
8.Total		45.6					73.3					117.1

Note : 8 Total is sum of 2,3,4,5,6 and 7

4.3.4 Actual and Forecast Maximum Power in Moshi

The actual and forecast maximum powers are shown in Table 4.10 and Fig. 4.9. Figures with power factor added and expressed in MVA are shown in Table 4.11. In Moshi, there were substations which had no satisfactory data or indicating meters, hence many of the substations were forecast using growth rate obtained by the macroscopic forecast.

Concerning Nymba ya Mung P/P(5 MVA x 1) and Lawate S/S(2.5 MVA x 1), accurate demand could not be grasped since they were put into operation only recently. Therefore, the growth rate of 8.8% obtained by the macroscopic forecast was used to forecast the future demand for them. Therefore, development plans for them should be formulated after actual demands in the several years are grasped. With the current load conditions, the present transformer capacity is sufficient to meet the demand for several years to come. The substations which supply city center and which had growth data were Boma Mbuji S/S(5 MVA x 2) and Trade School S/S(5 MVA x 1), which showed growth rate of less than 10%.

CHAPTER 4 POWER SUPPLY AND DEMAND

Table 4.10 Past and Future Maximum Power at the Substations in Moshi (MW)

MOSHI		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Ratio	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
1	Kiyungi Feeder 132/66kV 1x20MVA 132/33kV, 1x20MVA 66/33kV, 2x5, 1x10																						
	Total(Syn)		17.3	19.2	15.0	20.6	22.7	20.6	23.8	26.5	21.9	5.0%	23.0	24.1	25.4	26.6	27.9	29.4	30.9	32.4	34.0	35.7	
2	Boma Mbuzi 33/11kV 2x5MVA																						
	Total(Syn)		8.0	8.3	6.4	9.5	9.5	9.6	11.0	13.2	13.2	6.5%	14.1	15.0	15.9	17.0	18.1	19.3	20.5	21.8	23.3	24.8	
3	Marangu and Rombo 33/11kV 1x5MVA																						
	Total(Syn)										3.6	8.8%	3.9	4.3	4.6	5.0	5.5	6.0	6.5	7.1	7.7	8.4	
4	Trade School and Machame 33/11kV 1x2.5MVA																						
	Total(Syn)		6.6	6.4	5.7	7.2	7.5	7.2	6.6	6.2	4.4	8.8%	8.2	8.9	9.7	10.5	11.4	12.4	13.5	14.7	16.0	17.4	
5	*Mwanga 33/11kV 1x5MVA Included in 8 NYM and Mwanga																						
	Total											8.8%	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.3	
6	*Machame 33/11kV 1x2.5MVA Incl in 4 T Schoc Machame																						
	Total(Syn)										1.9	8.8%	2.1	2.2	2.4	2.7	2.9	3.2	3.4	3.7	4.1	4.4	
7	Lawate 33/11kV 1x2.5MVA																						
	Total											1.2	8.8%	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8
8	NYM and Mwanga 66/33kV 1x5MVA																						
	Total(Syn)										3.8	8.8%	4.1	4.5	4.9	5.3	5.8	6.3	6.9	7.5	8.1	8.8	
9	KIA 33/11kV 1x0.75MVA																						
	Total																						
10	Same and Gonja 132/33kV 1x5MVA 33/11kV 1x1MVA																						
	Total(Syn)		2.7	2.6	1.9	2.0	0.9	1.0	1.1	0.9	1.1	8.8%	1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.2	2.3	2.5	
11	*Gonja 33/11kV 1x1MVA Included in 10 Same and Gonja																						
	Total(Syn)											8.8%	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	
12	Sum Total (2+3+4+7+8+10)		17.3		14.0		17.9		18.7		27.3		32.8	35.4	38.0	41.0	44.3	47.8	51.6	55.7	60.0	64.8	
13	Synthetic Sum Total (11 x 1 / 1.1)		15.7		12.7		16.3		17.0		24.8		29.8	32.2	34.5	37.2	40.3	43.5	46.9	50.6	54.5	58.9	

Table 4.11 Future Maximum MVA at the Substations in Moshi

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1. Kiyungi	132/66kV 132/33kV											
2. Boma Mbuzi	33/11kV	16.5	17.6	18.8	19.9	21.2	22.6	24.1	25.6	27.3	29.1	31.0
3. Marangu and Rombo	33kV Line	4.5	4.9	5.4	5.8	6.3	6.9	7.5	8.1	8.9	9.6	10.5
4. Trade School and Machame	33kV Line	5.5	10.3	11.1	12.1	13.1	14.3	15.5	16.9	18.4	20.0	21.8
5. *Mwanga	33/11kV	-	0.8	0.9	0.9	1.0	1.0	1.1	1.3	1.4	1.5	1.6
6. *Machame	33/11kV	2.4	2.6	2.8	3.0	3.4	3.6	4.0	4.3	4.6	5.1	5.5
7. Lawate	33/11kV	1.5	1.6	1.7	1.9	2.0	2.2	2.4	2.6	2.8	3.1	3.3
8. NyM and Mwanga	66/33kV	4.8	5.1	5.6	6.1	6.6	7.3	7.9	8.6	9.4	10.1	11.0
9. KIA	33/11kV											
10. Same and Gonja	132/33kV	1.4	1.5	1.6	1.8	1.9	2.1	2.3	2.5	2.8	2.9	3.3
11. *Gonja	33/11kV	-	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5

Note : 5 Mwanga is included by 8 NyM and Mwanga
6 Machame is included by 4 Trade School and Machame
11 Gonja is included by 10 Same and Gonja

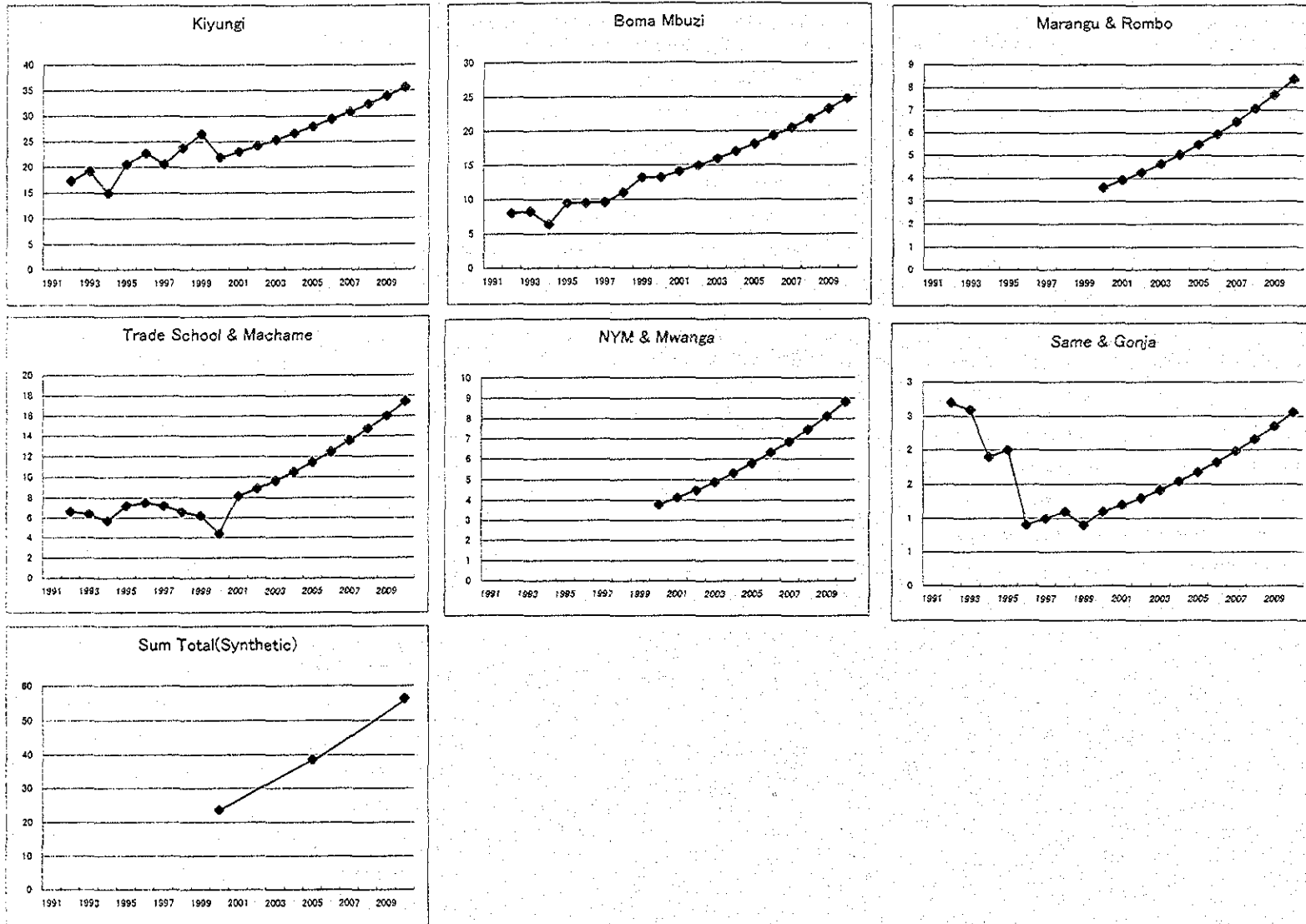


Fig. 4.9 Past and Future Max. Power at the Substations in Moshi (MW)

4.4 Summary of Demand Forecast

There are two methods of demand forecast—the macroscopic method described in 4.2 and the microscopic method described in 4.3. The results obtained by these methods are compared in Table 4.12. Values obtained by macroscopic forecast are purely values on the demand side and do not include losses. Microscopic forecast values are values measured at distribution substation, hence they include the 11 kV feeder loss and low-voltage line loss. Naturally, therefore, the latter is somewhat larger than the former. Looking at the year 2010, the difference is 4.4% for Dar es Salaam, 6.9% for Arusha, and 10.3% for Moshi in 2010. TANESCO's gross power system loss is said to be between 15% and 20%. Considering that the distribution loss is several percentage points lower than the gross power system loss, it may safely be said that the macroscopic and microscopic forecast values agree very well.

Table 4.12 Comparison by means of Forecast Methods in 2010 (MW)

	Macro Forecast (From GDP)	Micro Forecast (From Substation Load)
	Max. Demand	Max Power
Dar es Salaam	475.2	495.9
Arusha	79.7	85.2
Moshi	53.4	58.9

Source

Table 4.5

Table 4.6, 4.8 and 4.10

From the reason mentioned above, the Team used the microscopic forecast values which are several percentage points larger than the macroscopic forecast values as the forecast demand based on which to decide substation capacity in the future. The values for determining substation capacities in the three cities are as shown in Tables 4.7, 4.9, and 4.11.

CHAPTER 4 POWER SUPPLY AND DEMAND

Annex 4.1

Energy Sales and Number of Customers

Grid System (Developing Grid)

Year	Residential Commercial Lt. Industrial 1	Low Voltage Supply 2	High Voltage Supply 3	Public Lighting 4	Zanzibar 5	Total	Total Low & High Voltage 2 + 3
Energy Consumption (kW.h)							
1980	212,277,436	308,594,559	40,377,098	4,355,440	13,469,000	579,073,533	348,971,657
1981	224,236,971	304,471,462	42,187,522	4,293,397	25,180,000	600,369,352	346,658,984
1982	237,730,543	290,289,885	45,285,177	3,547,176	27,920,000	604,772,781	335,575,062
1983	214,960,000	290,431,000	47,014,000	3,363,000	32,125,000	587,893,000	337,445,000
1984	228,174,163	286,826,960	51,809,597	2,071,788	34,535,000	603,417,508	338,638,557
1985	260,852,020	332,188,151	64,843,496	3,478,372	39,266,000	700,628,039	397,031,647
1986	307,586,633	167,267,840	302,846,626	2,988,909	41,587,000	822,277,008	470,114,466
1987	347,413,030	180,092,423	288,870,734	3,466,496	48,784,700	868,627,383	468,963,157
1988	428,997,379	232,126,770	288,443,709	3,809,432	54,441,000	1,005,818,290	520,570,479
1989	471,691,914	234,683,888	333,815,727	5,071,320	64,298,000	1,109,560,849	568,499,615
1990	575,659,341	255,379,341	384,701,664	6,613,659	52,011,000	1,254,365,005	620,081,005
1991	634,224,543	279,038,624	398,488,970	7,226,373	56,829,000	1,375,807,509	677,527,594
1992	682,963,853	255,105,703	365,683,876	10,061,396	60,099,000	1,373,913,828	620,789,579
1993	710,459,406	247,220,068	336,623,032	8,698,111	68,337,000	1,371,337,617	583,843,100
1994	762,520,250	279,259,957	292,792,504	9,177,906	54,045,400	1,397,796,017	572,052,461
1995	851,437,281	268,156,088	329,845,991	6,365,423	83,560,525	1,539,365,308	590,002,079
1996	1,019,088,977	284,698,984	325,312,856	2,836,957	85,700,333	1,717,638,107	610,011,840
1997	924,805,897	343,903,737	369,697,095	2,388,229	95,004,000	1,735,788,958	713,600,832
1998	974,004,426	385,235,293	358,298,990	1,007,737	103,807,000	1,822,353,446	743,534,283
Number of Consumers							
1980	89,566	582	89	-	1	90,238	671
1981	93,342	608	96	-	1	94,047	704
1982	98,037	611	106	-	1	98,755	717
1983	103,859	634	111	-	1	104,605	745
1984	108,464	725	112	792	1	110,094	837
1985	124,788	698	154	859	1	126,500	852
1986	101,440	453	74	1,083	1	103,051	527
1987	109,490	467	78	1,157	1	111,193	545
1988	126,987	502	81	1,338	1	128,909	583
1989	142,050	549	90	1,530	1	144,220	639
1990	152,972	572	91	1,645	1	155,281	663
1991	168,783	587	90	2,007	1	171,468	677
1992	198,082	849	102	2,259	1	201,293	951
1993	222,969	1,035	105	1,930	1	226,040	1,140
1994	234,491	943	133	1,952	1	237,520	1,076
1995	232,767	983	149	107	1	234,007	1,132
1996	253,570	757	99	124	1	254,551	856
1997	326,623	1,206	126	681	1	328,637	1,332
1998	345,503	1,225	145	521	1	347,395	1,370
Consumption per Consumer (kW.h)							
1980	2,370	530,231	453,675	-	13,469,000	6,417	520,077
1981	2,402	500,775	439,453	-	25,180,000	6,384	492,413
1982	2,425	475,106	427,219	-	27,920,000	6,124	468,027
1983	2,070	458,093	423,550	-	32,125,000	5,620	452,946
1984	2,104	395,623	462,586	2,616	34,535,000	5,481	404,584
1985	2,090	475,914	421,062	4,049	39,266,000	5,539	466,000
1986	3,032	369,245	4,092,522	2,760	41,587,000	7,979	892,058
1987	3,173	385,637	3,703,471	2,996	48,784,700	7,812	860,483
1988	3,363	462,404	3,561,033	2,847	54,441,000	7,803	892,917
1989	3,321	427,475	3,709,064	3,315	64,298,000	7,694	889,671
1990	3,763	446,467	4,007,711	4,020	52,011,000	8,078	935,265
1991	3,758	475,364	4,427,655	3,601	56,829,000	8,024	1,000,779
1992	3,448	300,478	3,585,136	4,454	60,099,000	6,825	652,776
1993	3,186	238,860	3,205,934	4,507	68,337,000	6,067	512,143
1994	3,252	296,140	2,201,447	4,702	54,045,400	5,885	531,647
1995	3,658	272,794	2,213,731	59,490	83,560,525	6,578	528,270
1996	4,019	376,088	3,285,988	22,879	85,700,333	6,748	712,631
1997	2,831	285,161	2,934,104	3,507	95,004,000	5,282	535,736
1998	2,819	314,478	2,471,028	1,934	103,807,000	5,246	542,726

* - Effective March 1986 Heavy Industrial & Large Commercial are billed by Voltage Level.

** - Effective March 1995 Tariffs 1, 2 & 3 are combined as T1; Tariff 4, 4A & 8 as T2; Tariff 5 & 5A as T3, Tariff 6 as T4 and Tariff 9 as T5.

Annex 4.2.1 - New Industry - Base Assumptions

Grid Branch	Location	Industry	Request (kW)	OnLine Date	In-Plant Coincid Factor	Load Factor	System Peak Coincid Factor	Growth Code (1=Grow)	Ignore Requests Below:			Peak at System Peak	Maximum Energy (MWh)
									Existing Plant (1=Yes)	Reduced List (1=Yes)	Effective Load (kW)		
1	Moshi	Kibo Breweries	800	2003	0.70	0.45	1.0	1	1	1	560	560	2,207.5
2	Moshi	K.C.M.C Hospital	400	2000	0.70	0.45	1.0	1	1	1	0	0	0.0
3	Tanga	Ziggi Bottlers	500	1999	0.70	0.45	1.0	1	1	1	350	350	1,379.7
4	Tanga	Pe Pee Textile (T) Ltd.	800	2000	0.70	0.45	1.0	1	1	1	560	560	2,207.5
5	Tanga	Regional Water Supply	448	2001	0.70	0.45	0.0	1	1	1	0	0	0.0
6	Tanga	Tanzania Cordage Ltd	400	2001	0.70	0.45	1.0	1	1	1	0	0	0.0
7	Arusha	Seed Oil Producing Plant	1,000	2000	0.70	0.45	1.0	1	0	1	700	700	2,759.4
8	Arusha	Milling Factory	500	1999	0.70	0.45	1.0	1	0	1	350	350	1,379.7
9	Mbeya	Mbeya Textile Mill	1,000	2002	0.70	0.45	1.0	1	1	1	700	700	2,759.4
10	Iringa	Mafinga Tansico & Kangesa Timber Saw I	800	2001	0.70	0.45	1.0	1	0	1	560	560	2,207.5
11	Iringa	Water supply - Morogoro rd.	600	2000	0.70	0.60	0.0	1	1	1	420	0	2,207.5
12	Morogoro	Morogoro Matombo	1,000	2003	0.70	0.45	1.0	1	0	1	700	700	2,759.4
13	Morogoro	Morogoro Mtibwa Sugar	860	2000	0.70	0.45	1.0	1	1	1	602	602	2,373.1
14	Iringa	Iringa Villages along Kihansi - Ir. line	2,000	2001	0.70	0.35	1.0	1	0	1	1,400	1,400	4,292.4
15	Iringa	Iringa Mafinga Sao Hill Timber	500	2000	0.70	0.45	1.0	1	1	1	350	350	1,379.7
16	Morogoro	Morogoro Mtibwa Sugar	660	2002	0.70	0.45	1.0	1	1	1	462	462	1,821.2
17	Iringa	Iringa Njombe Lupembe Estates	400	2001	0.70	0.45	1.0	1	0	1	0	0	0.0
18	Tanga	Tanga Handeni Anisha Saw Mills(Mkata)	424	2001	0.70	0.45	1.0	1	0	1	0	0	0.0
19	Iringa	Iringa Njombe Luponde Tea Estates	560	1999	0.70	0.35	1.0	1	1	1	392	392	1,201.9
20	Arusha	Arusha Babati Galapo, Dareda & Magugu Village	2,207	2000	0.70	0.35	1.0	1	0	1	1,545	1,545	4,736.7
21	Arusha	Arusha Babati Kiru Estates	1,464	2001	0.70	0.35	1.0	1	0	1	1,025	1,025	3,142.0
22	Arusha	Arusha Babati Rural Electrification	1,252	2000	0.70	0.35	1.0	1	0	1	876	876	2,687.0
23	Arusha	Arusha Mbulu Rural Electrification	600	2000	0.70	0.35	1.0	1	0	1	420	420	1,287.7
24	Tanga	Tanga Lushoto Mlako Village	778	1999	0.70	0.35	1.0	1	0	1	545	545	1,669.7
25	Arusha	Arusha Kiteto Rural Electrification	1,012	2001	0.70	0.35	1.0	1	0	1	708	708	2,172.0
26	Tanga	Tanga Lushoto Mlako Township	778	2001	0.70	0.45	1.0	1	0	1	545	545	2,146.8
27	Moshi	Moshi Hai Five Stars Hotel at KIA	1,000	2002	0.70	0.45	1.0	1	0	1	700	700	2,759.4
28	Tukuyu	Tukuyu Chunyu Demio & Mkwajuni mining centre	800	2000	0.70	0.45	1.0	1	0	1	560	560	2,207.5
29	Moshi	Moshi Moshi T.P.C. (T) Limited	500	2000	0.70	0.45	1.0	1	1	1	350	350	1,379.7
30	Musoma	Musoma Bunda Mara Lint	680	2000	0.70	0.45	1.0	1	0	1	476	476	1,876.4
31	Dar es Salaam	Dar es Salaam Low Loader Company	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
32	Dar es Salaam	Dar es Salaam Kico Limited	960	2000	0.70	0.45	1.0	1	1	1	672	672	2,649.0
33	Dar es Salaam	Dar es Salaam Tigra Plastics	1,200	2000	0.70	0.45	1.0	1	0	1	840	840	3,311.3
34	Dar es Salaam	Dar es Salaam Kunduchi Beach	500	2000	0.70	0.45	1.0	1	1	1	350	350	1,379.7
35	Dar es Salaam	Dar es Salaam Aqua Slides	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
36	Dar es Salaam	Dar es Salaam Tourist Hotel - Bagamoyo Rd.	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
37	Dar es Salaam	Dar es Salaam Loyola High School	510	2000	0.70	0.35	1.0	1	1	1	357	357	1,094.6
38	Dar es Salaam	Dar es Salaam Tanzania Cables	400	1999	0.70	0.45	1.0	1	1	1	0	0	0.0
39	Dar es Salaam	Dar es Salaam Jangwani Beach Hotel	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
40	Dar es Salaam	Dar es Salaam Tanzania Breweries	3,088	2000	0.70	0.45	1.0	1	1	1	2,162	2,162	8,521.0
41	Dar es Salaam	Dar es Salaam P.P.F & Zahra Towers	2,000	2000	0.70	0.60	1.0	1	0	1	1,400	1,400	7,358.4
42	Dar es Salaam	Dar es Salaam Noble Chemicals	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
43	Dar es Salaam	Dar es Salaam NIC - Plaza Ubungo	1,500	2000	0.70	0.60	1.0	1	0	1	1,050	1,050	5,518.8

Annex 4.2.2 New Industry - Base Assumptions

Grid Branch	Location	Industry	Request (kW)	OnLine Date	In-Plant Coincid Factor	Load Factor	System Peak Coincid Factor	Growth Code (1=Grow)	Ignore Requests below:			Peak at System Peak	Maximum Energy (MWh)
									Existing Plant (1=Yes)	Reduced List (1=Yes)	Effective Load (kW)		
44 Dar es Salaam	Dar es Salaam	Saafa Plastics Ltd	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
45 Dar es Salaam	Dar es Salaam	Bora Industries	400	2000	0.70	0.45	1.0	1	1	1	0	0	0.0
46 Dar es Salaam	Dar es Salaam	A-1 Product(JV Group)	800	2000	0.70	0.60	1.0	1	1	1	560	560	2,943.4
47 Dar es Salaam	Dar es Salaam	Mapato & Mafuta Houses	1,440	2000	0.70	0.45	1.0	1	0	1	1,008	1,008	3,973.5
48 Dar es Salaam	Dar es Salaam	Bandari	1,600	2000	0.70	0.45	1.0	1	1	1	1,120	1,120	4,415.0
49 Dar es Salaam	Dar es Salaam	S.S Bakharesa	4,000	2000	0.70	0.45	1.0	1	0	1	2,800	2,800	11,037.6
50 Dar es Salaam	Dar es Salaam	Gapco (T) Ltd	400	2000	0.70	0.45	1.0	1	1	1	0	0	0.0
51 Dar es Salaam	Dar es Salaam	Meridian Shipping Co.	400	2000	0.70	0.60	1.0	1	1	1	0	0	0.0
52 Dar es Salaam	Dar es Salaam	Oilcom (T) Ltd & Natoil Co. Ltd	800	2000	0.70	0.35	1.0	1	0	1	560	560	1,717.0
53 Dar es Salaam	Dar es Salaam	Amadori - Vikindu	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
54 Shinyanga	Maswa	Cargil Cotton Ginners	950	2000	0.70	0.45	1.0	1	1	1	665	665	2,621.4
55 Shinyanga	Shinyanga	Kahama Cotton Ginners	459	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
56 Shinyanga	Bariadi	Bariadi Water Supply	1,680	2000	0.70	0.45	0.0	1	1	1	1,176	0	4,635.8
57 Shinyanga	Bariadi	Somaia Group Ginners	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
58 Shinyanga	Shinyanga	Industrial Area	492	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
59 Shinyanga	Kahama	Oil Mill	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
60 Shinyanga	Kahama	Cargil Cotton Ginners	418	2001	0.70	0.45	1.0	1	0	1	0	0	0.0
61 Shinyanga	Meatu	Rural Electrification	1,330	2000	0.70	0.35	1.0	1	0	1	931	931	2,854.4
62 Arusha	Arusha	New Impala	1,500	2000	0.70	0.45	1.0	1	0	1	1,050	1,050	4,139.1
63 Arusha	Simanjiro	Mererani (Domestic)	1,750	2002	0.70	0.45	1.0	1	0	1	1,225	1,225	4,829.0
64 Arusha	Simanjiro	Mererani (Mining)	2,000	2005	0.70	0.45	1.0	1	0	1	1,400	1,400	5,518.8
65 Arusha	Simanjiro	Mererani - Mbuguni	1,000	2000	0.70	0.45	1.0	1	0	1	700	700	2,759.4
66 Arusha	Monduli	Namanga Township -Tz Side	714	2000	0.70	0.45	1.0	1	0	1	500	500	1,970.2
67 Arusha	Monduli	Namanga Township - Kenya side	900	2001	0.70	0.45	1.0	1	0	1	630	630	2,483.5
68 Arusha	Karatu	Rural Electrification	1,584	2000	0.70	0.45	1.0	1	0	1	1,109	1,109	4,370.9
69 Arusha	Karatu	Serena Hotel	483	1999	0.70	0.45	1.0	1	0	1	0	0	0.0
70 Dodoma	Dodoma	Water Supply and Sewerage	4,000	2001	0.70	0.60	0.0	1	1	1	2,800	0	14,716.8
71 Dodoma	Dodoma	Gairo Township	640	2000	0.70	0.45	1.0	1	0	1	448	448	1,766.0
72 Dodoma	Kondoa	Rural Electrification	952	2000	0.70	0.45	1.0	1	0	1	666	666	2,626.9
73 Mbeya	Mbeya	Mbalali Rice Farm	1,000	2002	0.70	0.45	1.0	1	0	1	700	700	2,759.4
74 Mbeya	Kyela	Ipinda village	400	2000	0.70	0.35	1.0	1	0	1	0	0	0.0
75 Mbeya	Lujewa	Lujewa Township & settlements	400	2002	0.70	0.35	1.0	1	0	1	0	0	0.0
76 Mbeya	Mbeya	New forest area	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
77 Musoma	Musoma	Fish Processing	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
78 Musoma	Musoma	Musoma Diary	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
79 Musoma	Musoma	Musoma Textile	1,600	2002	0.70	0.45	1.0	1	1	1	1,120	1,120	4,415.0
80 Musoma	Musoma	Prime catch Ltd(Fish)	1,200	2000	0.70	0.45	1.0	1	0	1	840	840	3,311.3
81 Musoma	Bunda	Bulamba Ginners	480	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
82 Musoma	Bunda	Virian (T) Ginners & Oil Mills	1,600	2000	0.70	0.45	1.0	1	0	1	1,120	1,120	4,415.0
83 Musoma	Bunda	Ushashi Ginners	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
84 Musoma	Bunda	Township	800	2000	0.70	0.45	1.0	1	0	1	560	560	2,207.5
85 Musoma	Musoma	Musoma Water Supply	600	2003	0.70	0.60	0.0	1	1	1	420	0	2,207.5
86 Musoma	Bunda	Kibara Township	960	2000	0.70	0.45	1.0	1	0	1	672	672	2,649.0

Annex 4.2.3 New Industry - Base Assumptions

Grid Branch	Location	Industry	Request (kW)	OnLine Date	In-Plant Coincid Factor	Load Factor	System Peak Coincid Factor	Ignore Requests Below: 1000 kW					Maximum Energy (MWh)
								Growth Code (1=Grow)	Existing Plant (1=Yes)	Reduced List (1=Yes)	Effective Load (kW)	Peak at System Peak	
87 Musoma	Tarime	Sirari To Kenya	1,600	2000	0.70	0.45	1.0	1	0	1	1,120	1,120	4,415.0
88 Musoma	Bunda	Rural Electrification	770	2000	0.70	0.35	1.0	1	0	1	539	539	1,652.6
89 Musoma	Bunda	Bunda Hospital	0	1999	0.70	0.45	1.0	1	1	1	0	0	0.0
90 Musoma	Bunda	Bunda Booster Pump	412	2000	0.70	0.45	0.0	1	0	1	0	0	0.0
91 Musoma	Bunda	Butiama Irrigation	400	2001	0.70	0.45	0.0	1	1	1	0	0	0.0
92 Musoma	Bunda	Manyamanyama Hospital	460	2001	0.70	0.45	1.0	1	1	1	0	0	0.0
93 Musoma	Serengeti	Mugumu Electrification	1,200	2005	0.70	0.35	1.0	1	0	1	840	840	2,575.4
94 Musoma	Tarime	Nyangoto Village	510	2001	0.70	0.35	1.0	1	0	1	357	357	1,094.6
95 Musoma	Bunda	Ecofish Ltd	1,200	2000	0.70	0.45	1.0	1	1	1	840	840	3,311.3
96 Musoma	Butiama	Butiama Expansion	1,000	2000	0.70	0.45	1.0	1	1	1	700	700	2,759.4
97 Mwanza	Mwanza	Beach Hotel- Nyegezi	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
98 Mwanza	Mwanza	Majige Hotel	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
99 Mwanza	Mwanza	Mwanza Water Supply	2,800	2002	0.70	0.60	0.0	1	1	1	1,960	0	10,301.8
100 Mwanza	Mwanza	Tanganyika Bus Oil Mill	400	2000	0.70	0.45	1.0	1	0	1	0	0	0.0
101 Mwanza	Magu	Aquva Ginnery And Oil Mills	400	1999	0.70	0.45	1.0	1	1	1	0	0	0.0
102 Mwanza	Magu	Aquva Sugar & Irrigation Projects	2,400	2004	0.70	0.45	1.0	1	0	1	1,680	1,680	6,622.6
103 Mwanza	Ukerewe	Rural Electrification	1,200	2001	0.70	0.35	1.0	1	0	1	840	840	2,575.4
104 Mwanza	Geita	Cop Kot Ginnery	504	2001	0.70	0.45	1.0	1	0	1	353	353	1,390.7
105 Mwanza	Geita	Kasamwa Ginnery	504	2001	0.70	0.45	1.0	1	0	1	353	353	1,390.7
106 Mwanza	Magu	Bun-Luge stone quarry	576	2002	0.70	0.45	1.0	1	0	1	403	403	1,589.4
107 Mwanza	Geita	Rural Electrification	640	2001	0.70	0.35	1.0	1	0	1	448	448	1,373.6
108 Mwanza	Mwanza	Mwanza Municipal Distr. Expan.	2,880	1999	0.70	0.35	1.0	1	1	1	2,016	2,016	6,181.1
109 Mwanza	Magu	Ngasamo ginnery	504	2001	0.70	0.45	1.0	1	0	1	353	353	1,390.7
110 Mwanza	Magu	Aquva Ginnery and Oil Mill	400	2001	0.70	0.45	1.0	1	0	1	0	0	0.0
111 Tabora	Nzega	Manonga Ginnery	1,000	2001	0.70	0.45	1.0	1	0	1	700	700	2,759.4
112 Tabora	Igunga	Township	1,200	2001	0.70	0.45	1.0	1	0	1	840	840	3,311.3
113 Tabora	Nzega	Lusu (Golden Pride) Mine	3,000	1999	0.70	0.45	1.0	0	1	1	2,100	2,100	8,278.2
114 Shinyanga	Kahama	Kahama Gold Mine-Bulyanhulu	15,000	2001	0.70	0.45	1.0	0	0	1	10,500	10,500	41,391.0
115 Musoma	Tarime	Nyabirama & Nyabigena Mine	12,800	2002	0.70	0.45	1.0	0	0	0	8,960	8,960	35,320.3
116 Shinyanga	Shinyanga	Nyaligongo (Golden Ridge) Mine	6,000	2004	0.70	0.45	1.0	0	0	0	4,200	4,200	16,556.4
117 Shinyanga	Ngara	Kabanga Nickel	35,000	2005	0.70	0.45	1.0	0	0	0	24,500	24,500	96,579.0
118 Mwanza	Geita	Buckreef, Rwamagaza Mine	8,000	2003	0.70	0.45	1.0	0	0	0	5,600	5,600	22,075.2
119 Mwanza	Geita	Nyankanga mine (Ashanti)	35,000	2002	0.70	0.45	1.0	0	0	0	24,500	24,500	96,579.0
120 Shinyanga	Kahama	Mwime (Chocolate Reef) Mine	13,000	2005	0.70	0.45	1.0	0	0	0	9,100	9,100	35,872.2
121 Shinyanga	Mwadi	Williamson Diamond	1,000	2000	0.70	0.45	1.0	1	1	0	700	700	2,759.4
122 Tabora	Tabora	AFRITAN Minerals	400	2001	0.70	0.45	1.0	1	0	0	0	0	0.0
123 Morogoro	Morogoro	Mtibwa Sugar	660	2004	0.70	0.45	1.0	1	1	1	462	462	1,821.2
124 Morogoro	Morogoro	Fruit Canning Factory	400	2002	0.70	0.45	1.0	1	0	1	0	0	0.0
999 XXXX	XXXX	End of List -- Do Not Erase											
Gross Total			125	233,833							152,430	145,654	600,104

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Annex 4.3
Grid System (MW.h)

Reference Case

	Actual 1998	[Reduced Industrial List]															
	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	
GENERAL USE ENERGY																	
Residential, Small Comm & Lt Indust	974,004	1,082,510	1,137,262	1,302,088	1,427,721	1,566,133	1,715,437	1,867,355	2,008,918	2,139,081	2,273,625	2,413,772	2,559,759	3,386,240	4,400,285	5,844,890	7,172,996
Identified Rural Electrification	0	0	4,254	4,685	5,116	5,609	6,148	6,891	7,202	7,864	8,148	8,849	9,172	12,133	15,786	20,226	25,701
TOTAL GENERAL USE (MWh)	974,004	1,082,510	1,191,516	1,306,763	1,432,838	1,570,741	1,721,583	1,874,246	2,017,117	2,146,945	2,281,772	2,422,421	2,568,930	3,398,373	4,416,051	5,865,116	7,198,697
Annual Growth Rate		11.1%	10.1%	9.7%	9.8%	9.6%	9.6%	8.9%	7.9%	6.4%	6.3%	6.2%	6.0%	5.8%	5.4%	5.1%	4.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	743,422	771,404	806,248	842,539	880,337	919,707	960,712	1,003,424	1,047,912	1,094,282	1,142,521	1,192,800	1,245,174	1,541,883	1,905,482	2,351,957	2,900,220
Miscellaneous Industrial	112	112	112	112	112	112	112	117	122	128	133	139	145	160	222	275	339
New Industrial Loads - Full Growth	0	9,779	53,877	139,390	202,978	230,219	262,332	263,590	275,235	287,406	300,084	313,290	327,048	404,924	500,476	617,753	761,745
New Industrial Loads - Low Growth	0	8,278	8,278	22,975	36,872	49,869	49,869	49,719	49,967	65,964	71,074	71,074	71,074	71,074	71,074	71,074	71,074
TOTAL INDUSTRIAL (MWh)	743,534	789,573	898,516	1,004,116	1,119,298	1,199,707	1,282,825	1,316,810	1,373,236	1,437,749	1,513,811	1,577,302	1,643,439	2,017,860	2,477,254	3,041,068	3,733,577
Annual Growth Rate		6.2%	13.8%	11.8%	11.5%	7.2%	6.3%	4.3%	4.3%	4.7%	5.3%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
PUBLIC LIGHTING																	
	1,008	1,478	1,945	2,413	2,882	3,351	3,819	4,288	4,756	5,225	5,693	6,000	6,319	8,124	10,340	13,059	16,398
Annual Growth Rate		48.5%	31.7%	24.1%	19.4%	16.3%	14.0%	12.3%	10.9%	9.9%	9.0%	8.4%	8.2%	5.2%	4.3%	4.3%	4.7%
BULK SALES																	
	103,807	111,708	123,134	133,456	144,712	156,732	167,252	178,732	189,921	200,835	211,795	223,420	235,829	304,082	388,194	491,428	618,179
Annual Growth Rate		7.8%	10.2%	8.4%	8.4%	7.6%	7.4%	6.9%	6.3%	5.8%	5.8%	5.9%	5.4%	5.2%	5.0%	4.8%	4.7%
TOTAL CONSUMPTION																	
	1,822,353	1,985,268	2,216,110	2,446,748	2,699,727	2,929,528	3,156,480	3,373,876	3,685,031	3,790,355	4,013,072	4,229,143	4,454,217	5,728,440	7,291,638	9,210,703	11,586,652
Annual Growth Rate		8.9%	11.6%	10.2%	10.3%	8.5%	7.7%	6.9%	6.3%	5.7%	5.9%	5.4%	-5.3%	5.2%	4.9%	4.8%	4.7%
LOSSES																	
Technical Losses*	-	199,230	206,778	211,856	215,486	233,828	251,863	269,285	286,148	302,837	320,314	337,580	355,825	457,230	582,017	735,178	923,222
Loss Rate (%)	-	8.5%	8.0%	7.9%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	158,384	182,838	183,651	183,153	177,041	190,898	203,894	216,835	229,064	242,323	255,581	269,183	348,189	440,670	556,533	699,011
Loss Rate (%)	-	8.8%	8.3%	6.8%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
TOTAL LOSSES	270,225	358,614	390,818	375,337	378,639	410,869	442,859	473,188	502,804	531,800	562,837	593,141	624,708	803,419	1,022,687	1,291,509	1,622,233
Total Loss Rate (%)	12.9%	15.3%	14.3%	13.5%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
	2,092,579	2,343,882	2,584,725	2,822,085	3,078,367	3,340,398	3,598,039	3,847,083	4,087,834	4,321,955	4,575,908	4,822,284	5,078,924	6,531,859	8,314,525	10,502,512	13,188,885
Annual Growth Rate		12.0%	10.3%	9.2%	9.1%	8.6%	7.7%	6.9%	6.3%	5.7%	5.9%	5.4%	5.3%	5.2%	4.9%	4.8%	4.7%
CONTRIBUTION TO SYSTEM PEAK (MW) (including losses)																	
General Use @ 65.0%	196.4	224.5	243.3	263.8	283.9	313.4	343.8	374.0	402.5	428.4	455.3	483.4	512.6	678.1	881.2	1130.5	1436.5
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.9	1.7	1.8	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.9	5.1	6.6	8.4
Identified Existing Industrial @ 60.0%	149.9	160.0	165.2	170.7	176.3	184.2	192.4	200.9	209.9	219.1	228.8	238.9	249.4	308.7	381.5	471.0	580.8
Miscellaneous Industrial @ 60.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	
New Industrial Loads - Full Growth		3.6	23.5	35.7	51.3	68.9	88.1	88.0	71.0	74.1	77.4	80.8	84.3	104.4	129.1	159.2	195.5
New Industrial Loads - Low Growth		2.5	2.5	6.5	10.4	14.4	14.4	14.4	14.5	18.2	20.6	20.6	20.6	20.6	20.6	20.6	20.6
Public Lighting @ 65.0%	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	1.6	2.1	2.8	3.3
Bulk Sales @ 65.0%	20.9	23.2	25.2	27.0	29.0	31.2	33.5	35.8	38.0	40.2	42.4	44.7	47.2	60.9	77.7	98.4	123.8
TOTAL PEAKLOAD	367.5	414.0	451.8	505.7	555.1	604.8	661.7	696.1	739.2	781.6	828.3	872.4	918.3	1178.4	1497.4	1889.0	2369.8
EFFECTIVE LOAD FACTOR	0.660	0.648	0.639	0.637	0.633	0.631	0.630	0.631	0.631	0.631	0.631	0.631	0.631	0.631	0.633	0.634	0.635

Annex 4.4 Grid System (MW.h)

High Case	[Full Industrial List]																
	Actual 1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & LI Indust	974,004	1,082,000	1,196,815	1,328,215	1,472,279	1,632,454	1,810,556	1,999,945	2,178,992	2,346,926	2,523,803	2,710,478	2,907,027	4,053,393	5,529,072	7,428,915	9,575,161
Identified Rural Electrification	0	0	4,254	4,714	5,225	5,794	6,428	7,087	7,726	8,326	8,957	9,620	10,317	14,366	19,623	26,365	35,048
TOTAL GENERAL USE (MWh)	974,004	1,082,000	1,202,889	1,333,929	1,477,504	1,638,247	1,816,984	2,004,035	2,184,718	2,354,252	2,532,760	2,720,098	2,917,344	4,067,779	5,548,695	7,455,281	9,910,209
Annual Growth Rate		11.1%	11.2%	10.8%	10.8%	10.9%	10.9%	10.3%	8.0%	7.6%	7.6%	7.4%	7.3%	6.3%	6.4%	6.1%	5.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	743,422	771,404	815,186	861,192	909,599	960,509	1,014,054	1,070,389	1,129,598	1,191,882	1,257,411	1,326,321	1,398,798	1,821,519	2,365,675	3,063,240	3,968,292
Miscellaneous Industrial	112	112	112	112	112	112	112	118	123	132	139	147	155	201	262	339	439
New Industrial Loads - Full Growth	0	9,779	86,836	142,149	205,889	234,892	259,481	273,670	289,025	304,964	321,727	339,359	357,903	466,063	605,293	784,544	1,015,347
New Industrial Loads - Low Growth	0	8,278	8,278	22,076	79,839	152,319	220,200	220,420	221,522	248,106	315,093	315,093	315,093	315,093	315,093	315,093	315,093
TOTAL INDUSTRIAL (MWh)	743,534	789,573	910,193	1,025,529	1,195,419	1,347,833	1,493,827	1,594,778	1,640,270	1,745,093	1,894,371	1,980,820	2,071,950	2,602,877	3,286,323	4,168,216	5,299,171
Annual Growth Rate		6.2%	15.3%	12.7%	16.6%	12.7%	10.8%	4.7%	4.5%	6.4%	8.8%	4.6%	4.7%	4.7%	4.8%	4.9%	4.9%
PUBLIC LIGHTING																	
Annual Growth Rate	1,008	1,571	2,134	2,698	3,261	3,824	4,387	4,951	5,514	6,077	6,640	7,082	7,484	10,006	13,253	17,432	22,814
		65.9%	35.9%	28.4%	20.9%	17.3%	14.7%	12.8%	11.4%	10.2%	9.3%	8.2%	7.48%	6.0%	5.3%	5.6%	5.5%
BULK SALES																	
Annual Growth Rate	103,807	141,878	124,348	138,120	149,088	162,184	176,131	190,808	204,833	218,957	233,791	249,393	265,803	361,513	484,716	643,333	847,568
		7.6%	11.3%	9.5%	9.3%	8.8%	8.6%	8.2%	7.5%	6.9%	6.8%	6.7%	6.6%	6.3%	6.0%	5.8%	5.7%
TOTAL CONSUMPTION																	
Annual Growth Rate	1,822,353	1,964,823	2,239,541	2,497,278	2,825,272	3,152,085	3,491,327	3,764,271	4,035,356	4,324,379	4,667,363	4,967,463	5,262,581	7,042,174	9,332,987	12,282,262	16,079,762
		8.9%	12.8%	11.5%	13.1%	11.8%	10.8%	7.8%	7.2%	7.2%	7.9%	6.2%	6.2%	6.0%	5.8%	5.8%	5.5%
LOSSES																	
Technical Losses*	-	199,183	209,059	216,027	225,508	231,592	278,689	300,455	322,082	345,161	372,537	395,853	420,046	562,089	744,935	990,340	1,283,447
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	159,348	184,534	167,061	170,741	190,491	210,962	227,487	243,870	261,336	282,064	299,596	318,035	425,582	564,023	742,258	971,753
Loss Rate (%)	-	6.8%	6.3%	5.8%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	270,225	358,534	373,692	383,088	396,247	442,083	489,682	527,942	568,962	606,498	654,602	695,288	738,082	987,671	1,308,959	1,722,598	2,255,200
Total Loss Rate (%)	12.9%	18.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	2,092,679	2,343,356	2,813,234	2,880,364	3,221,519	3,594,171	3,980,989	4,292,214	4,601,317	4,930,877	5,321,964	5,652,751	6,000,663	8,029,845	10,641,947	14,004,860	18,334,963
		12.0%	11.5%	10.2%	11.8%	11.6%	10.8%	7.6%	7.2%	7.2%	7.9%	6.2%	6.2%	6.0%	6.3%	5.6%	5.5%
CONTRIBUTION TO SYSTEM PEAK (MW) (including losses)																	
General Use @ 65.0%	196.4	224.4	245.6	269.1	294.8	328.9	362.6	399.9	436.0	469.8	506.4	542.3	582.2	811.7	1107.3	1487.7	1977.6
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.6	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	3.4	4.7	6.4	8.5	11.4
Identified Existing Industrial @ 65.0%	149.9	160.0	167.1	174.5	182.2	192.4	203.1	214.4	226.2	238.7	251.8	265.6	280.1	364.8	473.8	614.1	794.7
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth		3.6	24.3	36.5	52.1	60.2	67.1	70.8	74.7	78.9	83.2	87.8	92.5	120.5	156.5	202.9	262.6
New Industrial Loads - Low Growth		2.5	2.5	6.5	23.1	44.1	63.7	63.6	64.1	71.8	91.1	91.1	91.1	91.1	91.1	91.1	91.1
Public Lighting @ 65.0%	0.2	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	2.0	2.7	3.5	4.6
Bulk Sales @ 65.0%	20.9	23.2	25.5	27.8	29.9	32.5	35.3	38.2	41.0	43.8	46.8	49.9	53.2	72.4	97.1	128.8	169.7
TOTAL PEAK LOAD	367.5	413.9	463.6	516.2	584.4	658.7	734.7	790.3	843.7	898.9	952.8	1041.3	1104.7	1467.3	1934.8	2536.8	3311.8
EFFECTIVE LOAD FACTOR	0.650	0.648	0.639	0.637	0.629	0.623	0.619	0.620	0.621	0.621	0.618	0.619	0.620	0.625	0.628	0.630	0.632

Annex 4.5 Grid System (MW.h)

Low Case

	Actual 1999	[Reduced Industrial List]															
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	
GENERAL USE ENERGY																	
Residential, Small Comm & Lt Indust	974,004	1,040,875	1,097,351	1,156,090	1,217,179	1,280,705	1,348,773	1,418,099	1,491,065	1,565,637	1,642,599	1,722,030	1,804,014	2,255,270	2,784,324	3,405,058	4,133,857
Identified Rural Electrification	0	0	4,254	4,482	4,719	4,965	5,221	5,497	5,790	6,069	6,358	6,676	6,953	8,743	10,794	13,200	16,025
TOTAL GENERAL USE (MWh)	974,004	1,040,875	1,101,605	1,160,571	1,221,897	1,285,671	1,351,993	1,423,597	1,496,845	1,571,706	1,648,957	1,728,706	1,811,007	2,264,013	2,795,118	3,418,258	4,149,913
Annual Growth Rate		6.9%	5.8%	5.4%	5.3%	5.2%	5.2%	5.3%	5.1%	5.0%	4.9%	4.8%	4.8%	4.6%	4.3%	4.1%	4.0%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	743,422	762,486	787,806	813,930	840,885	868,700	897,403	927,022	957,589	989,134	1,021,691	1,055,292	1,089,973	1,280,665	1,504,667	1,767,252	2,075,563
Miscellaneous Industrial	112	112	112	112	112	112	112	116	120	124	128	132	138	158	188	221	259
New Industrial Loads - Full Growth	0	9,373	71,382	116,923	167,660	201,348	236,990	244,812	252,854	261,214	269,812	278,686	287,844	338,256	397,258	466,703	548,123
New Industrial Loads - Low Growth	0	8,278	8,278	24,835	33,113	41,391	49,669	49,719	49,967	55,964	71,074	71,074	71,074	71,074	71,074	71,074	71,074
TOTAL INDUSTRIAL (MWh)	743,534	780,251	867,579	955,800	1,041,671	1,111,552	1,184,173	1,221,668	1,260,560	1,306,436	1,362,705	1,405,184	1,449,027	1,690,355	1,973,287	2,305,249	2,695,019
Annual Growth Rate		4.9%	11.2%	10.2%	9.0%	6.7%	6.5%	3.2%	3.2%	3.6%	4.3%	3.1%	3.1%	3.1%	3.1%	3.2%	3.2%
PUBLIC LIGHTING																	
Annual Growth Rate	1,008	1,359	1,710	2,061	2,412	2,763	3,114	3,465	3,816	4,167	4,518	4,701	4,890	5,832	7,153	8,585	10,267
Annual Growth Rate		34.8%	25.8%	20.3%	17.0%	14.6%	12.7%	11.3%	10.1%	9.2%	8.4%	4.1%	4.0%	3.9%	3.8%	3.7%	3.6%
BULK SALES																	
Annual Growth Rate	103,807	108,666	116,084	121,984	128,382	134,929	141,481	147,468	153,717	160,245	166,962	173,935	181,152	220,613	268,925	321,262	385,062
Annual Growth Rate		4.7%	6.8%	5.1%	5.2%	5.1%	4.9%	4.2%	4.2%	4.2%	4.2%	4.2%	4.1%	4.0%	3.9%	3.8%	3.7%
TOTAL CONSUMPTION																	
Annual Growth Rate	1,822,353	1,931,150	2,066,978	2,240,416	2,394,681	2,534,914	2,680,761	2,796,198	2,914,938	3,042,654	3,183,171	3,312,526	3,446,036	4,180,913	5,042,483	6,053,355	7,240,261
Annual Growth Rate		6.0%	6.1%	7.4%	6.9%	5.9%	5.8%	4.3%	4.2%	4.4%	4.6%	4.1%	4.0%	3.9%	3.8%	3.7%	3.6%
LOSSES																	
Technical Losses*	-	193,799	194,617	193,808	191,136	202,331	213,972	223,168	232,663	242,849	254,073	264,398	275,054	333,710	402,479	483,164	577,900
Loss Rate (%)	-	6.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	155,039	183,416	149,878	144,717	153,183	162,007	168,963	176,159	183,672	192,369	200,187	208,255	252,666	304,734	365,824	437,553
Loss Rate (%)	-	6.8%	6.3%	6.8%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	270,225	348,838	348,236	343,685	335,853	355,524	376,979	392,129	408,823	426,521	446,442	464,585	483,310	586,377	707,213	848,988	1,015,453
Total Loss Rate (%)	12.9%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	2,092,579	2,279,988	2,435,214	2,584,101	2,730,515	2,890,438	3,056,740	3,188,367	3,323,761	3,469,275	3,629,613	3,777,111	3,929,348	4,767,290	5,749,695	6,902,343	8,255,714
Annual Growth Rate		9.0%	6.8%	6.1%	5.7%	5.9%	5.8%	4.3%	4.2%	4.4%	4.6%	4.1%	4.0%	3.9%	3.8%	3.7%	3.6%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
(Including losses)																	
General Use @ 65.0%	196.4	215.8	224.9	234.2	243.8	255.5	269.7	284.0	298.8	313.5	329.0	344.9	361.3	451.6	557.6	681.9	827.9
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.5	1.5	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.8	3.5	4.3	5.2
Identified Existing Industrial @ 65.0%	149.9	158.1	161.4	164.9	168.4	174.0	179.7	185.6	191.8	198.1	204.6	211.3	218.3	258.5	301.3	353.9	415.7
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
New Industrial Loads - Full Growth	3.6	19.7	29.1	40.8	50.2	60.9	62.9	64.9	67.1	69.3	71.6	73.9	76.9	88.9	102.0	119.9	140.8
New Industrial Loads - Low Growth	2.6	2.6	7.3	9.8	12.0	14.4	14.4	14.5	15.2	20.6	20.6	20.6	20.6	20.6	20.6	20.6	20.6
Public Lighting @ 65.0%	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.2	1.4	1.7	2.1
Bulk Sales @ 65.0%	20.9	22.5	23.8	24.7	25.7	27.0	28.3	29.5	30.8	32.1	33.4	34.8	36.3	44.2	53.5	64.3	77.1
TOTAL PEAKLOAD	367.5	402.7	434.1	462.1	490.3	521.9	556.3	578.9	603.2	629.8	659.8	689.3	713.6	863.8	1,040.0	1,246.6	1,489.3
EFFECTIVE LOAD FACTOR	0.699	0.648	0.640	0.638	0.636	0.632	0.628	0.626	0.629	0.629	0.628	0.628	0.629	0.630	0.631	0.632	0.633

Annex 4.6

Energy Sales and Number of Customers

Dar es Salaam

Year	Residential Commercial Lt. Industrial 1	Low Voltage Supply 2	High Voltage Supply 3	Public Lighting 4	Zanzibar 5	Total 6	Total Low & High Voltage 2 + 3
Energy Consumption (kW.h)							
1980	149,571,700	194,524,298	32,680,000	3,054,229	13,469,000	393,299,227	227,204,298
1981	158,659,854	189,470,238	34,720,700	2,572,964	25,180,000	410,603,756	224,190,938
1982	167,216,808	184,673,500	35,379,175	2,429,675	27,920,000	417,619,158	220,052,675
1983	146,269,000	175,719,000	36,927,000	2,177,000	32,125,000	393,217,000	212,646,000
1984	155,085,000	175,059,077	37,317,825	698,658	34,535,000	402,695,560	212,376,902
1985	159,904,455	188,887,529	41,757,033	1,893,622	39,266,000	431,708,639	230,644,562
1986	187,662,415	83,552,076	142,676,276	1,220,069	41,587,000	456,697,836	226,228,352
1987	203,238,906	116,485,614	132,332,323	1,495,478	48,784,700	502,337,019	248,817,937
1988	239,924,500	118,192,119	132,379,556	1,430,484	54,441,000	546,367,659	250,571,675
1989	247,528,988	121,348,968	135,824,774	1,934,537	64,298,000	570,933,267	257,171,742
1990	298,857,792	126,986,658	158,596,971	2,644,524	52,011,000	642,096,845	288,583,529
1991	326,635,079	142,028,992	173,269,979	2,889,522	56,829,000	701,722,571	315,318,970
1992	348,458,768	116,004,711	147,200,711	6,106,609	60,099,000	677,959,799	263,205,422
1993	361,430,608	103,544,976	128,099,825	4,386,517	69,337,000	663,798,926	229,644,801
1994	401,903,420	116,252,796	120,928,550	3,852,187	54,045,400	696,982,353	237,181,346
1995	403,625,922	106,718,516	131,037,481	1,674,378	83,560,525	726,616,822	237,755,997
1996	492,821,224	135,170,870	129,057,578	555,650	85,700,333	843,305,655	284,228,448
1997	452,445,995	190,031,285	171,901,894	576,237	95,004,000	915,959,411	367,833,179
1998	518,768,302	243,002,412	213,121,841	508,583	103,807,000	1,079,208,138	456,124,253
Number of Consumers							
1980	62,944	132	80	-	1	63,157	212
1981	65,707	136	85	-	1	65,929	221
1982	69,076	144	87	-	1	69,308	231
1983	71,942	154	90	-	1	72,187	244
1984	73,571	156	90	451	1	74,269	246
1985	75,370	159	94	457	1	76,081	253
1986	55,337	240	34	387	1	56,007	282
1987	57,607	264	37	394	1	58,303	301
1988	63,166	273	37	453	1	63,930	310
1989	66,289	289	43	509	1	67,131	332
1990	68,784	285	41	522	1	69,613	328
1991	77,774	291	40	879	1	78,985	331
1992	79,885	271	45	577	1	80,779	316
1993	90,349	300	49	607	1	91,306	349
1994	98,137	314	48	561	1	99,061	362
1995	100,588	404	62	21	1	101,076	466
1996	107,259	153	7	14	1	107,434	160
1997	138,291	453	66	38	1	138,849	519
1998	145,674	505	80	42	1	146,302	585
Consumption per Consumer (kW.h)							
1980	2,376	1,473,669	408,500	-	13,469,000	6,227	1,071,718
1981	2,415	1,393,184	408,479	-	25,180,000	6,228	1,014,439
1982	2,421	1,282,455	406,657	-	27,920,000	6,026	952,609
1983	2,033	1,141,032	410,300	-	32,125,000	5,447	871,500
1984	2,108	1,122,174	414,643	1,549	34,535,000	5,422	863,321
1985	2,122	1,187,972	444,224	4,144	39,266,000	5,674	911,639
1986	3,391	336,904	4,196,361	3,153	41,587,000	8,154	802,228
1987	3,528	441,233	3,578,549	3,796	48,784,700	8,616	828,638
1988	3,798	432,938	3,577,828	3,158	54,441,000	8,548	808,296
1989	3,734	419,886	3,158,716	3,801	64,298,000	8,505	774,614
1990	4,346	456,093	3,868,219	5,066	52,011,000	9,224	885,228
1991	4,200	488,072	4,332,249	3,287	56,829,000	8,884	952,625
1992	4,362	428,062	3,271,127	10,739	60,099,000	8,393	832,929
1993	4,000	345,150	2,573,466	7,227	68,337,000	7,270	658,008
1994	4,095	370,232	2,519,345	6,867	54,045,400	7,036	655,197
1995	4,013	264,155	2,113,508	79,732	83,560,525	7,189	510,206
1996	4,595	883,470	18,436,797	39,689	85,700,333	7,850	1,651,428
1997	3,272	432,740	2,604,574	15,184	95,004,000	6,597	708,927
1998	3,581	481,193	2,684,023	12,109	103,807,000	7,377	779,700

* - Effective March 1986 Heavy Industrial & Large Commercial are billed by Voltage Level.

** - Effective March 1995 Tariffs 1, 2 & 3 are combined as T1; Tariff 4, 4A & 8 as T2; Tariff 5 & 5A as T3, Tariff 6 as T4 and Tariff 9 as T5.

Annex 4.7

Dar es Sajaam (MW.h)

Reference Case	[Reduced Industrial List]																
	Actual 1998	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	618,783	667,131	814,215	665,822	721,340	782,077	848,179	916,785	983,257	1,048,448	1,112,255	1,180,826	1,252,243	1,656,560	2,152,634	2,781,469	3,509,054
Identified Rural Electrification	0	0	4,254	4,609	4,998	5,417	5,874	6,350	6,810	7,248	7,703	8,178	8,673	11,473	14,909	19,126	24,303
TOTAL GENERAL USE (MWh)	618,783	667,131	818,469	670,431	726,338	787,493	854,054	923,134	990,067	1,055,696	1,119,958	1,189,004	1,260,915	1,668,033	2,167,543	2,780,625	3,533,357
Annual Growth Rate		9.3%	9.1%	8.4%	8.4%	8.4%	8.6%	8.1%	7.3%	6.4%	6.3%	6.2%	6.0%	5.8%	5.4%	5.1%	4.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	456,124	473,292	494,671	516,937	540,128	564,283	589,442	615,647	642,943	671,375	700,990	731,839	763,973	945,894	1,169,102	1,443,060	1,779,421
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	0	31,975	42,947	53,919	56,331	58,842	61,458	64,183	67,021	69,978	73,057	76,265	94,426	116,708	144,056	177,634
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	456,124	473,292	526,646	559,884	594,047	620,614	648,284	677,106	707,126	738,396	770,967	804,896	840,237	1,040,320	1,285,810	1,587,116	1,957,055
Annual Growth Rate		3.8%	11.3%	8.3%	6.1%	4.5%	4.5%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.3%	4.3%	4.3%
PUBLIC LIGHTING	509	741	974	1,207	1,440	1,672	1,905	2,138	2,371	2,604	2,836	2,991	3,152	4,063	5,180	6,532	8,236
Annual Growth Rate		45.8%	31.4%	23.9%	19.3%	16.2%	13.9%	12.2%	10.9%	9.8%	8.9%	8.4%	8.0%	6.4%	5.0%	4.6%	4.7%
BULK SALES	103,807	111,708	123,134	133,455	144,712	156,732	167,262	178,732	189,921	200,636	211,795	223,420	235,529	304,082	388,194	491,429	618,179
Annual Growth Rate		7.6%	10.2%	8.4%	8.4%	7.6%	7.4%	6.9%	6.3%	6.6%	6.6%	6.5%	6.4%	5.2%	5.0%	4.8%	4.7%
TOTAL CONSUMPTION	1,079,208	1,132,873	1,289,222	1,364,577	1,466,635	1,585,511	1,671,495	1,791,110	1,889,485	1,985,328	2,105,568	2,220,310	2,339,634	3,016,436	3,846,727	4,865,722	6,116,827
Annual Growth Rate		6.8%	10.1%	7.5%	7.5%	6.7%	6.8%	6.6%	6.1%	6.6%	6.5%	6.4%	6.4%	5.4%	5.0%	4.8%	4.7%
LOSSES																	
Technical Losses*	-	115,896	118,480	116,052	117,055	124,955	133,415	142,164	150,614	159,262	168,061	177,220	186,760	240,770	307,036	388,370	488,230
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	92,567	93,303	91,293	88,528	94,609	101,014	107,638	114,188	120,884	127,248	134,181	141,404	182,257	232,470	294,052	369,680
Loss Rate (%)	-	6.8%	6.3%	6.8%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
TOTAL LOSSES	161,428	208,252	211,784	209,345	205,683	219,564	234,429	249,802	264,802	279,846	295,308	311,400	328,164	423,027	539,507	682,422	857,910
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION	1,240,634	1,381,125	1,481,006	1,574,022	1,672,217	1,785,075	1,905,923	2,050,912	2,154,487	2,275,174	2,400,875	2,531,711	2,667,997	3,439,565	4,386,233	5,548,143	6,974,717
Annual Growth Rate		9.7%	8.8%	6.3%	6.2%	6.7%	6.8%	6.6%	6.1%	6.6%	6.5%	6.4%	6.4%	5.2%	5.0%	4.8%	4.7%
CONTRIBUTION TO SYSTEM PEAK (MW) (including losses)																	
General Use @ 65.0%	104.8	117.8	125.9	134.8	144.5	156.8	169.9	183.6	196.9	209.6	222.7	236.5	250.8	331.7	431.1	553.0	702.7
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.6	1.8	1.9	2.1	2.2	2.4	2.5	2.7	2.8	3.7	4.9	6.2	7.9
Identified Existing Industrial @ 65.0%	82.0	98.1	101.4	104.7	108.2	113.0	118.0	123.3	128.8	134.5	140.4	146.6	153.0	189.4	234.1	289.0	358.4
Miscellaneous Industrial @ 66.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.0	0.0	9.1	11.9	14.7	15.3	15.0	15.7	17.5	18.3	19.1	19.9	20.8	25.7	31.8	39.2	48.4
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public Lighting @ 65.0%	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.8	1.0	1.3	1.6
Bulk Sales @ 95.0%	20.9	23.2	25.2	27.0	29.0	31.2	33.5	35.8	38.0	40.2	42.4	44.7	47.2	60.9	77.7	98.4	123.8
TOTAL PEAKLOAD	217.8	239.1	253.2	260.2	268.2	278.3	289.7	301.9	313.9	325.3	337.7	350.9	365.2	452.3	567.2	711.2	894.8
EFFECTIVE LOAD FACTOR	0.861	0.860	0.842	0.841	0.840	0.840	0.840	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.841	0.842	0.842

Annex 4.8

Dares Salaam (MW.h)

High Case	Actual 1998	[Full Industrial List]															
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	518,768	566,864	619,989	678,622	743,370	814,905	893,968	978,800	1,063,107	1,148,604	1,232,371	1,323,629	1,418,611	1,579,425	2,700,054	3,627,818	4,822,414
Identified Rural Electrification	0	0	4,254	4,656	5,101	5,591	6,134	6,716	7,294	7,890	8,456	9,062	9,741	13,582	18,625	24,892	33,089
TOTAL GENERAL USE (MWh)	518,768	566,864	624,243	683,279	748,471	820,496	900,102	985,516	1,070,402	1,153,494	1,240,827	1,332,711	1,429,352	1,993,006	2,718,581	3,652,711	4,855,502
Annual Growth Rate		9.3%	10.1%	8.5%	8.5%	8.6%	8.7%	8.5%	8.6%	7.8%	7.6%	7.4%	7.3%	8.9%	6.4%	6.1%	5.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	456,124	473,292	500,143	528,382	558,081	589,317	622,170	656,721	693,061	731,282	771,480	813,760	856,228	1,117,587	1,451,452	1,881,282	2,434,733
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	0	31,975	42,947	53,919	56,937	60,111	63,449	66,960	70,553	74,537	78,622	82,918	107,976	140,233	181,761	235,233
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	456,124	473,292	532,118	571,329	612,001	646,255	682,281	720,171	760,022	801,835	846,017	892,382	941,146	1,225,564	1,591,685	2,063,043	2,669,965
Annual Growth Rate		3.8%	12.4%	7.4%	7.1%	5.8%	5.6%	5.6%	5.6%	5.5%	5.5%	5.5%	5.5%	5.4%	5.4%	5.3%	5.3%
PUBLIC LIGHTING																	
Annual Growth Rate	509	771	1,033	1,295	1,557	1,819	2,082	2,344	2,606	2,868	3,130	3,392	3,556	4,828	6,465	8,574	11,288
Annual Growth Rate		51.5%	34.0%	25.4%	20.2%	16.8%	14.4%	12.6%	12.0%	11.2%	10.1%	9.1%	8.6%	6.5%	6.3%	6.0%	5.8%
BULK SALES																	
Annual Growth Rate	103,807	111,678	124,348	138,120	149,088	162,184	176,131	190,506	204,853	218,957	233,791	249,393	265,803	361,513	484,716	643,333	847,568
Annual Growth Rate		7.6%	11.3%	9.6%	9.5%	8.8%	8.6%	8.2%	7.5%	6.9%	6.6%	6.7%	6.6%	6.3%	6.0%	5.8%	5.7%
TOTAL CONSUMPTION																	
Annual Growth Rate	1,079,208	1,152,665	1,281,739	1,392,023	1,511,117	1,630,754	1,760,895	1,898,536	2,037,882	2,177,225	2,323,765	2,477,623	2,639,857	3,584,910	4,801,447	6,367,660	8,384,324
Annual Growth Rate		6.8%	11.2%	8.6%	8.6%	7.9%	8.0%	7.5%	7.3%	6.8%	6.7%	6.6%	6.5%	6.3%	6.0%	5.8%	5.7%
LOSSES																	
Technical Losses*	-	115,669	119,649	120,417	120,614	130,163	140,626	151,537	162,659	173,781	185,477	197,774	210,707	286,139	383,240	508,251	669,216
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	92,535	94,224	93,123	91,322	98,652	106,399	114,735	123,156	131,577	140,433	149,743	159,535	216,648	290,167	384,819	506,692
Loss Rate (%)	-	6.8%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
TOTAL LOSSES	161,426	208,204	213,872	213,540	211,935	228,715	248,925	266,272	285,816	305,358	325,910	347,517	370,242	502,787	673,407	893,070	1,175,909
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	1,240,634	1,360,809	1,496,811	1,605,563	1,723,052	1,859,468	2,007,820	2,164,810	2,323,897	2,482,562	2,649,676	2,825,340	3,010,099	4,067,697	5,474,854	7,260,730	9,560,232
Annual Growth Rate		9.7%	9.9%	7.4%	7.3%	7.9%	8.0%	7.5%	7.3%	6.8%	6.7%	6.5%	6.5%	6.3%	6.0%	5.8%	5.7%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
<i>(Including losses)</i>																	
General Use @ 65.0%	104.6	117.5	127.1	137.3	148.9	163.2	179.0	196.0	212.9	229.4	246.8	265.1	284.3	396.4	540.7	726.5	965.7
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.6	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	4.4	6.0	8.1	10.8
Identified Existing Industrial @ 65.0%	92.0	98.1	102.5	107.0	111.8	118.0	124.8	131.5	138.8	146.4	154.8	163.0	171.9	223.8	290.7	376.8	487.6
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
New Industrial Loads - Full Growth	0.0	0.0	9.1	11.9	14.7	15.5	16.4	17.3	18.2	19.2	20.3	21.4	22.6	29.4	38.2	49.5	64.1
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Public Lighting @ 65.0%	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	1.0	1.3	1.7	2.3
Bulk Sales @ 65.0%	20.9	23.2	25.5	27.8	29.9	32.5	35.3	38.2	41.0	43.8	46.8	49.9	53.2	72.4	97.1	128.8	169.7
TOTAL PEAKLOAD	217.6	239.0	265.7	285.6	307.1	331.4	357.7	385.6	413.9	442.1	471.8	503.0	535.9	727.4	974.0	1291.4	1700.2
EFFECTIVE LOAD FACTOR																	
	0.651	0.660	0.642	0.641	0.640	0.641	0.641	0.641	0.641	0.641	0.641	0.641	0.641	0.642	0.642	0.642	0.642

Annex 4.9

Dar es Salaam (MW.h)

Low Case	Actual 1998	[Reduced Industrial List]															
		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	518,768	545,318	587,741	591,062	615,317	640,539	666,770	697,356	730,765	767,312	805,031	843,980	884,139	1,105,298	1,384,585	1,666,805	2,026,001
Identified Rural Electrification:	0	0	4,254	4,429	4,610	4,799	4,986	5,225	5,476	5,749	6,032	6,324	6,625	8,282	10,225	12,504	15,181
TOTAL GENERAL USE (MWh)	518,768	545,318	571,995	595,491	619,927	645,339	671,756	702,581	736,240	773,061	811,063	850,283	890,764	1,113,580	1,374,810	1,681,309	2,041,181
Annual Growth Rate		5.1%	4.9%	4.1%	4.1%	4.1%	4.1%	4.6%	4.6%	5.0%	4.9%	4.8%	4.8%	4.6%	4.3%	4.1%	4.0%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	456,124	467,822	483,358	499,384	515,923	532,988	550,598	568,771	587,528	606,880	626,855	647,471	668,750	785,871	923,184	1,084,292	1,273,455
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	0	27,566	34,169	40,753	47,336	53,919	55,699	57,538	59,431	61,387	63,406	65,490	76,959	90,406	106,183	124,708
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	456,124	467,822	510,942	533,553	556,675	580,324	604,518	624,470	645,061	666,311	688,242	710,877	734,239	862,830	1,013,590	1,190,475	1,298,163
Annual Growth Rate		2.6%	9.2%	4.4%	4.3%	4.2%	4.2%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
PUBLIC LIGHTING																	
	609	683	857	1,031	1,205	1,379	1,553	1,727	1,901	2,075	2,249	2,342	2,438	2,965	3,583	4,308	5,159
Annual Growth Rate		34.2%	25.0%	20.3%	18.9%	14.4%	12.6%	11.2%	10.1%	9.2%	8.4%	4.1%	4.1%	4.0%	3.9%	3.8%	3.7%
BULK SALES																	
	103,807	108,899	118,064	121,984	128,382	134,929	141,481	147,488	153,717	160,245	166,982	173,935	181,112	220,613	266,925	321,262	385,062
Annual Growth Rate		4.7%	6.8%	5.1%	5.2%	5.1%	4.9%	4.2%	4.2%	4.2%	4.2%	4.2%	4.1%	4.0%	3.9%	3.8%	3.7%
TOTAL CONSUMPTION																	
	1,079,208	1,122,489	1,199,878	1,252,059	1,308,189	1,361,971	1,419,317	1,478,248	1,536,919	1,601,692	1,668,535	1,737,436	1,808,553	2,199,988	2,658,907	3,197,353	3,829,565
Annual Growth Rate		4.0%	6.9%	4.3%	4.3%	4.3%	4.2%	4.0%	4.1%	4.2%	4.2%	4.1%	4.1%	4.0%	3.9%	3.8%	3.7%
LOSSES																	
Technical Losses*	-	112,545	112,007	106,310	104,257	108,709	113,286	117,830	122,673	127,843	133,178	138,678	144,354	175,588	212,228	255,205	305,566
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	90,117	88,206	83,759	78,937	82,308	85,774	89,214	92,881	96,796	100,835	104,999	109,297	132,953	160,587	193,227	231,433
Loss Rate (%)	-	6.8%	6.3%	6.8%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
TOTAL LOSSES	161,426	202,764	200,213	192,069	183,194	191,018	199,060	207,045	215,564	224,639	234,014	243,677	253,651	308,550	372,814	448,432	537,000
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
	1,240,034	1,325,252	1,400,091	1,444,129	1,489,363	1,552,968	1,618,378	1,683,291	1,752,474	1,826,331	1,902,560	1,981,115	2,062,204	2,508,538	3,031,821	3,645,785	4,266,664
Annual Growth Rate		6.8%	5.6%	3.1%	3.1%	4.3%	4.2%	4.0%	4.1%	4.2%	4.2%	4.1%	4.1%	4.0%	3.9%	3.8%	3.7%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
(Including losses)																	
General Use @ 65.0%	104.8	113.1	116.4	119.7	123.2	128.3	133.5	139.7	145.3	153.7	161.2	169.0	177.1	221.3	273.3	334.2	405.7
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.6	1.6	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.7	3.3	4.1	4.9
Identified Existing Industrial @ 65.0%	92.0	97.0	99.1	101.2	103.3	108.7	110.3	113.9	117.7	121.5	125.5	129.7	133.9	157.4	184.9	217.1	255.0
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.0	0.0	7.9	9.6	11.2	12.9	14.7	15.2	15.7	16.2	16.7	17.3	17.8	21.0	24.5	28.9	34.0
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public Lighting @ 65.0%	0.1	0.4	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.9	1.0
Bulk Sales @ 65.0%	20.9	22.5	23.3	24.7	25.7	27.0	28.3	29.5	30.8	32.1	33.4	34.8	36.3	44.2	53.5	64.3	77.1
TOTAL PEAKLOAD	217.8	232.8	248.7	259.8	268.2	276.8	288.7	300.3	312.8	325.9	339.4	353.3	367.7	447.2	540.3	649.5	777.8
EFFECTIVE LOAD FACTOR																	
	0.651	0.650	0.643	0.642	0.641	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.640	0.641	0.641	0.641

Annex 4.10

Energy Sales and Number of Customers

Arusha							
Year	Residential Commercial L.I. Industrial 1	Low Voltage Supply 2	High Voltage Supply 3	Public Lighting 4	Zanzibar 5	Total	Total Low & High Voltage 2 + 3
Energy Consumption (kW.h)							
1980	18,362,484	27,864,498	3,083,822	321,491	-	49,632,295	30,948,320
1981	18,523,459	28,774,648	3,126,056	339,902	-	50,764,065	31,900,704
1982	22,659,598	26,598,228	3,684,538	411,282	-	53,353,646	30,282,766
1983	18,706,000	34,608,000	3,926,000	173,000	-	57,413,000	38,534,000
1984	22,723,728	30,636,283	4,138,970	386,493	-	57,885,474	34,775,253
1985	24,548,957	26,991,144	4,286,305	313,728	-	56,140,134	31,277,449
1986	27,748,409	14,015,866	21,916,282	345,141	-	64,025,708	35,932,158
1987	31,579,286	9,879,247	25,107,853	306,011	-	66,872,397	34,987,100
1988	36,466,177	8,489,663	25,051,590	378,290	-	70,383,720	33,541,253
1989	35,296,361	9,868,644	28,976,955	470,821	-	74,612,781	38,845,599
1990	49,161,301	10,191,291	27,215,168	890,979	-	87,458,739	37,406,459
1991	54,786,785	11,135,450	29,736,481	973,523	-	96,632,239	40,871,931
1992	52,094,381	15,827,509	15,320,935	838,910	-	84,081,735	31,148,444
1993	50,219,149	11,772,995	20,824,130	978,762	-	83,795,038	32,597,125
1994	52,814,485	18,338,338	26,148,809	1,050,266	-	98,351,898	44,487,147
1995	72,079,548	16,975,596	23,371,327	887,194	-	113,313,665	40,346,923
1996	117,498,501	23,181,531	25,507,952	372,069	-	166,560,053	48,689,483
1997	92,809,437	19,102,293	26,136,665	146,010	-	138,194,405	45,238,958
1998	82,813,747	21,928,930	32,675,024	-	-	137,417,701	54,603,954
Number of Consumers							
1980	5,425	22	3	-	-	5,460	25
1981	5,571	22	5	-	-	5,598	27
1982	5,768	22	5	-	-	5,795	27
1983	6,943	25	7	-	-	6,975	32
1984	6,887	26	7	70	-	6,990	33
1985	7,229	29	7	76	-	7,341	36
1986	7,314	31	9	79	-	7,433	40
1987	7,694	29	9	82	-	7,814	38
1988	8,249	29	7	98	-	8,383	36
1989	9,010	32	9	94	-	9,145	41
1990	9,944	31	9	104	-	10,088	40
1991	10,867	26	9	107	-	11,009	35
1992	13,874	43	9	126	-	14,052	52
1993	17,470	51	9	158	-	17,688	60
1994	15,443	47	9	135	-	15,634	56
1995	15,110	51	13	9	-	15,183	64
1996	16,409	64	25	9	-	16,507	89
1997	23,721	116	6	66	-	23,909	122
1998	25,575	117	7	70	-	25,769	124
Consumption per Consumer (kW.h)							
1980	3,385	1,268,568	1,027,941	-	-	9,107	1,237,933
1981	3,325	1,307,839	625,211	-	-	9,068	1,181,508
1982	3,929	1,209,010	738,908	-	-	9,207	1,121,584
1983	2,694	1,384,320	560,857	-	-	8,231	1,204,188
1984	3,300	1,178,319	591,281	5,521	-	8,281	1,053,796
1985	3,396	930,729	612,329	4,128	-	7,647	868,818
1986	3,794	452,125	2,435,144	4,369	-	8,614	898,304
1987	4,104	340,664	2,789,761	3,732	-	8,558	920,713
1988	4,421	292,747	3,578,799	3,840	-	8,396	931,701
1989	3,917	306,395	3,219,662	5,009	-	8,159	947,454
1990	4,944	328,751	3,023,908	8,567	-	8,670	935,161
1991	5,042	428,287	3,304,053	9,098	-	8,778	1,167,769
1992	3,755	368,082	1,702,326	6,658	-	5,984	599,009
1993	2,875	230,843	2,313,792	6,195	-	4,737	543,285
1994	3,420	390,177	2,905,423	7,780	-	6,291	794,413
1995	4,770	332,855	1,797,794	98,577	-	7,463	630,421
1996	7,161	362,211	1,020,318	41,341	-	10,090	547,073
1997	3,913	164,675	4,356,111	2,212	-	5,780	370,811
1998	3,238	187,427	4,687,861	-	-	5,333	440,354

* - Effective March 1986 Heavy Industrial & Large Commercial are billed by Voltage Level.

** - Effective March 1995 Tariffs 1, 2 & 3 are combined as T1; Tariff 4, 4A & 8 as T2; Tariff 5 & 5A as T3, Tariff 6 as T4 and Tariff 9 as T5.

**Annex 4.11
Arusha (MW.h)**

Reference Case

		[Reduced Industrial List]															
	Actual 1988	1989	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	82,814	91,035	99,014	107,727	117,227	127,584	138,877	150,480	161,581	171,975	182,792	194,060	205,796	222,243	353,769	453,831	575,686
Identified Rural Electrification	0	0	4,254	4,628	5,037	5,481	5,967	6,465	6,943	7,389	7,853	8,338	8,842	11,697	15,199	19,498	24,777
TOTAL GENERAL USE (MWh)	82,814	91,035	103,268	112,356	122,263	133,065	144,844	156,945	168,533	179,364	190,645	202,397	214,638	283,940	368,958	473,330	601,463
Annual Growth Rate		9.2%	13.4%	8.8%	8.8%	8.8%	8.9%	8.4%	7.4%	6.4%	6.3%	6.2%	6.0%	5.8%	5.4%	5.1%	4.3%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	54,504	66,659	69,218	61,884	64,360	57,552	70,564	73,701	76,989	80,372	83,918	87,611	91,457	113,236	139,957	172,753	213,020
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	480	2,157	20,452	32,960	38,308	41,514	43,359	45,282	47,284	49,370	51,543	53,806	68,618	82,339	101,633	125,323
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	54,504	67,139	69,375	62,336	64,820	57,552	70,564	73,701	76,989	80,372	83,918	87,611	91,457	113,236	139,957	172,753	213,020
Annual Growth Rate		4.8%	19.7%	20.4%	18.8%	8.5%	8.8%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.4%	4.3%	4.3%	4.3%
PUBLIC LIGHTING																	
Annual Growth Rate	0	49	97	148	184	243	282	340	389	437	486	512	540	696	887	1,122	1,410
Annual Growth Rate		100.0%	50.0%	33.3%	25.0%	20.0%	16.7%	14.3%	12.5%	11.1%	9.4%	8.4%	7.5%	6.4%	5.4%	4.5%	3.7%
BULK SALES																	
Annual Growth Rate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CONSUMPTION																	
Annual Growth Rate	137,418	148,203	171,740	194,838	220,078	239,198	257,213	274,343	291,172	307,458	324,419	342,063	360,441	464,489	592,150	748,837	941,215
Annual Growth Rate		7.8%	15.9%	13.4%	13.0%	8.7%	7.8%	6.7%	6.1%	5.6%	5.5%	5.4%	5.4%	5.2%	5.0%	4.8%	4.7%
LOSSES																	
Technical Losses*	-	14,873	16,032	16,854	17,568	19,092	20,630	21,898	23,241	24,541	25,894	27,303	28,770	37,074	47,264	59,770	75,125
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	11,898	12,625	13,034	13,300	14,456	15,544	16,580	17,567	18,581	19,606	20,672	21,783	28,071	35,786	45,255	56,881
Loss Rate (%)	-	6.8%	6.3%	5.8%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	26,771	26,771	28,657	29,889	30,868	33,548	36,074	38,477	40,837	43,121	45,500	47,975	50,552	65,145	83,050	105,025	132,006
Total Loss Rate (%)	32.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	157,972	174,973	200,396	224,727	250,944	272,746	293,287	312,823	332,010	350,979	369,919	390,037	410,993	529,634	675,200	853,862	1,073,221
Annual Growth Rate		10.8%	14.5%	12.1%	11.7%	8.7%	7.5%	6.7%	6.1%	5.6%	5.5%	5.4%	5.4%	5.2%	5.0%	4.8%	4.7%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
<i>(Including losses)</i>																	
General Use @ 65.0%	16.7	18.9	20.3	21.8	23.5	25.8	27.8	30.1	32.4	34.4	36.8	38.9	41.2	64.5	70.8	90.9	115.5
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.8	1.8	1.9	2.1	2.3	2.4	2.5	2.7	2.9	3.8	4.9	6.3	8.1
Identified Existing Industrial @ 65.0%	11.0	11.7	12.1	12.5	12.9	13.5	14.1	14.8	15.4	16.1	16.8	17.6	18.3	22.7	28.0	34.8	42.7
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.0	0.1	3.0	8.8	10.5	12.3	13.3	13.8	14.5	15.1	15.8	16.5	17.2	21.3	26.3	32.4	40.0
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public Lighting @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Bulk Sales @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL PEAK LOAD	27.7	30.8	36.8	42.5	48.8	53.2	57.2	60.9	64.6	68.1	71.8	75.7	79.7	102.4	130.3	164.5	206.5
EFFECTIVE LOAD FACTOR																	
	0.851	0.849	0.821	0.803	0.809	0.808	0.806	0.806	0.807	0.807	0.808	0.808	0.809	0.809	0.809	0.803	0.803

**Annex 4.12
Arusha (MW.h)**

High Case

		[Full Industrial List]															
	Actual 1988	1989	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2023	2030
GENERAL USE ENERGY																	
Identified Rural Electrification	0	0	4,254	4,876	5,143	6,660	6,233	6,842	7,441	8,018	8,625	9,264	9,936	13,854	18,838	25,391	33,762
TOTAL GENERAL USE (MWh)	52,814	90,992	104,204	114,538	125,977	138,645	152,678	167,593	182,283	196,408	211,282	226,927	243,383	339,359	462,907	621,965	826,771
Annual Growth Rate		9.3%	14.5%	9.2%	10.0%	10.1%	10.1%	9.8%	8.8%	7.8%	7.6%	7.4%	7.3%	6.9%	6.4%	6.1%	5.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	54,604	66,659	59,874	63,254	66,810	70,549	74,482	78,618	82,968	87,544	92,356	97,418	102,741	133,790	173,758	225,214	291,468
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	480	9,157	20,452	32,976	38,649	42,234	44,879	47,048	49,540	52,369	55,239	58,258	75,863	98,527	127,704	165,273
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	54,604	57,119	69,030	83,707	99,785	109,198	116,716	123,197	130,014	137,184	144,725	152,657	160,999	209,653	272,284	352,918	456,742
Annual Growth Rate		4.6%	20.9%	21.3%	19.2%	9.4%	6.9%	5.6%	5.5%	5.0%	5.0%	5.0%	5.0%	5.4%	5.4%	5.3%	5.3%
PUBLIC LIGHTING																	
Annual Growth Rate	0	53	107	160	214	267	320	374	427	481	534	589	607	824	1,103	1,452	1,925
Annual Growth Rate			100.0%	50.0%	33.3%	25.0%	20.0%	16.7%	14.3%	12.6%	11.1%	6.6%	6.6%	6.3%	6.0%	5.8%	5.7%
BULK SALES																	
Annual Growth Rate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CONSUMPTION																	
Annual Growth Rate	137,418	148,154	173,341	198,404	225,975	248,110	269,714	291,164	312,704	334,071	356,541	380,154	404,988	549,836	736,294	976,346	1,285,438
Annual Growth Rate		7.8%	17.0%	14.5%	13.9%	9.8%	8.7%	8.0%	7.4%	6.8%	6.7%	6.6%	6.5%	6.3%	6.0%	5.8%	5.7%
LOSSES																	
Technical Losses*	-	14,869	16,181	17,163	18,037	19,504	21,528	23,240	24,959	26,665	28,458	30,343	32,325	43,887	58,769	77,930	102,601
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	11,895	12,743	13,273	13,856	14,994	16,300	17,596	18,898	20,189	21,547	22,974	24,475	33,228	44,497	59,004	77,683
Loss Rate (%)	-	6.8%	6.3%	5.8%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	20,555	26,764	28,924	30,436	31,893	34,798	37,828	40,836	43,857	46,854	50,005	53,317	56,800	77,115	103,266	136,933	180,284
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	157,972	174,929	202,264	228,840	257,669	282,908	307,542	332,000	356,561	380,925	406,546	433,470	461,788	626,951	839,559	1,113,279	1,465,722
Annual Growth Rate		10.7%	15.6%	13.1%	12.6%	9.8%	8.7%	8.0%	7.4%	6.8%	6.7%	6.6%	6.5%	6.3%	6.0%	5.8%	5.7%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
(including losses)																	
General Use @ 65.0%	16.7	18.9	20.5	22.3	24.2	26.6	29.3	32.2	35.0	37.7	40.6	43.6	46.8	65.2	88.9	119.5	158.8
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.7	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	4.5	6.1	8.3	11.0
Identified Existing Industrial @ 65.0%	11.0	11.7	12.3	12.8	13.4	14.1	14.9	15.7	16.6	17.5	18.5	19.5	20.6	26.8	34.8	45.1	58.4
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.1	3.0	6.8	10.8	12.4	13.6	14.2	15.0	15.8	16.7	17.6	18.6	24.2	31.5	40.8	52.5	
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Public Lighting @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4
Bulk Sales @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL PEAK LOAD	27.7	30.8	37.1	43.3	49.8	55.0	59.8	64.6	69.2	73.8	78.7	83.9	89.3	120.9	161.5	213.9	281.3
EFFECTIVE LOAD FACTOR																	
	0.851	0.849	0.822	0.804	0.590	0.587	0.587	0.588	0.589	0.589	0.590	0.590	0.590	0.592	0.593	0.594	0.595

Annex 4.13
Arusha (MW.h)

Low Case

	Actual 1998	[Reduced Industrial List]															
	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	82,814	87,534	91,520	95,665	99,977	104,461	109,124	114,398	120,019	126,021	132,216	138,610	145,209	151,531	157,416	163,745	
Identified Rural Electrification	0	0	4,264	4,447	4,647	4,856	5,072	5,317	5,579	5,858	6,146	6,443	6,750	7,078	7,427	7,797	
TOTAL GENERAL USE (MWh)	82,814	87,534	95,774	100,112	104,624	109,316	114,196	119,715	125,598	131,879	138,362	146,053	151,958	158,969	164,843	171,542	
Annual Growth Rate		5.7%	8.4%	4.5%	4.5%	4.5%	4.5%	4.5%	4.9%	5.0%	4.9%	4.8%	4.8%	4.6%	4.3%	4.1%	
INDUSTRIAL ENERGY																	
Identified Existing Industrial	54,804	56,004	57,854	59,783	61,763	63,806	65,914	68,089	70,334	72,651	75,043	77,511	80,058	84,079	110,517	129,804	152,449
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
New Industrial Loads - Full Growth	0	276	5,494	13,631	23,508	31,249	38,782	46,041	53,362	60,724	68,131	75,582	83,080	90,625	98,217	105,856	
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL INDUSTRIAL (MWh)	54,804	56,280	63,358	73,614	85,268	95,055	104,676	108,131	111,696	115,378	119,173	123,093	127,138	149,404	175,509	206,138	
Annual Growth Rate		3.1%	12.8%	16.2%	15.8%	11.5%	10.1%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	
PUBLIC LIGHTING																	
Annual Growth Rate	0	39	77	116	155	193	232	270	309	348	385	422	459	509	615	739	885
Annual Growth Rate		100.0%	50.0%	33.3%	25.0%	20.0%	16.7%	14.3%	12.5%	11.1%	10.0%	9.1%	8.3%	7.7%	7.2%	6.8%	
BULK SALES																	
Annual Growth Rate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Annual Growth Rate		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
TOTAL CONSUMPTION																	
Annual Growth Rate	137,418	143,832	159,209	173,842	190,047	204,564	219,104	228,116	237,603	247,603	257,921	268,648	279,515	339,883	410,858	493,697	591,198
Annual Growth Rate		4.7%	10.7%	9.2%	9.3%	7.6%	7.1%	4.1%	4.2%	4.2%	4.2%	4.1%	4.1%	4.0%	3.9%	3.6%	3.7%
LOSSES																	
Technical Losses*	-	14,436	14,862	15,038	15,169	16,328	17,488	18,208	18,965	19,763	20,567	21,435	22,310	27,129	32,778	39,406	47,183
Loss Rate (%)	-	8.5%	8.0%	7.9%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	11,549	11,704	11,630	11,485	12,362	13,241	13,788	14,359	14,963	15,587	16,229	16,892	20,540	24,817	29,836	35,728
Loss Rate (%)	-	6.9%	6.3%	5.8%	5.3%	6.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	20,555	25,985	26,566	26,668	26,654	28,690	30,729	31,994	33,324	34,726	36,174	37,864	39,202	47,669	57,595	69,241	82,916
Total Loss Rate (%)	13.0%	16.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
Annual Growth Rate	157,972	169,836	185,775	200,509	216,701	233,255	249,633	260,110	270,927	282,329	294,095	306,212	318,717	387,551	468,253	562,939	674,114
Annual Growth Rate		7.5%	9.4%	7.9%	8.1%	7.6%	7.1%	4.1%	4.2%	4.2%	4.2%	4.1%	4.1%	4.0%	3.9%	3.8%	3.7%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
(Including losses)																	
General Use @ 65.0%	16.7	18.2	18.8	19.4	20.0	20.9	21.9	22.9	24.0	25.2	26.5	27.8	29.1	36.4	44.9	54.9	66.6
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.7	3.4	4.1	5.0
Identified Existing Industrial @ 65.0%	11.0	11.5	11.9	12.1	12.4	12.8	13.2	13.6	14.1	14.5	15.0	15.5	16.0	18.8	22.1	26.0	30.5
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
New Industrial Loads - Full Growth	0.0	0.1	1.6	4.5	7.5	10.0	12.4	12.8	13.2	13.8	14.1	14.5	15.0	17.7	20.7	24.4	28.6
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Public Lighting @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Bulk Sales @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL PEAK LOAD	27.7	29.9	33.8	37.5	41.4	45.3	49.1	51.1	53.2	55.4	57.7	60.0	62.4	75.7	91.3	109.5	131.0
EFFECTIVE LOAD FACTOR																	
	0.651	0.546	0.627	0.611	0.597	0.588	0.581	0.581	0.581	0.581	0.582	0.582	0.583	0.583	0.584	0.586	0.587

Annex 4.14 Energy Sales and Number of Customers

Moshi

Year	Residential Commercial LL Industrial 1	Low Voltage Supply 2	High Voltage Supply 3	Public Lighting 4	Zanzibar 5	Total	Total Low & High Voltage 2 + 3
Energy Consumption (kW.h)							
1980	11,853,263	6,532,223	3,747,303	248,643	-	22,381,432	10,279,528
1981	12,601,267	6,683,057	3,204,468	546,570	-	23,035,362	9,887,525
1982	12,701,287	5,310,587	3,521,838	190,889	-	21,724,601	8,832,425
1983	14,963,000	14,625,000	3,825,000	205,000	-	33,638,000	18,450,000
1984	16,803,866	16,265,705	2,878,149	502,019	-	36,449,739	19,143,854
1985	18,407,762	17,359,243	3,257,012	381,025	-	39,405,042	20,616,255
1986	19,991,319	9,573,507	13,833,115	389,356	-	43,787,297	23,406,622
1987	24,279,220	11,631,978	13,144,419	488,307	-	49,543,924	24,776,397
1988	27,433,007	23,971,295	13,628,187	231,854	-	65,264,343	37,599,482
1989	30,579,668	26,297,692	8,272,972	538,684	-	65,689,016	34,570,664
1990	39,960,942	21,999,918	12,733,576	881,109	-	75,575,545	34,733,494
1991	43,663,071	24,038,071	13,913,261	962,738	-	82,577,142	37,951,333
1992	49,240,835	23,438,071	14,222,319	797,491	-	87,698,716	37,660,390
1993	44,350,352	24,428,368	8,631,637	847,195	-	78,257,552	33,060,005
1994	43,288,316	17,480,753	8,119,496	860,852	-	69,849,417	25,600,249
1995	61,309,769	16,742,946	8,195,900	750,103	-	86,998,718	24,938,848
1996	73,420,938	9,769,725	27,832,242	1,229,149	-	112,252,054	37,601,967
1997	79,022,735	20,103,783	45,394,882	511,400	-	145,032,800	65,498,665
1998	76,834,921	8,953,951	10,169,527	136,194	-	96,094,593	19,123,478
Number of Consumers							
1980	6,377	32	5	-	-	6,414	37
1981	6,368	33	5	-	-	6,404	38
1982	6,894	36	5	-	-	6,935	41
1983	7,437	41	5	-	-	7,483	46
1984	8,805	41	6	111	-	8,963	47
1985	9,659	43	7	129	-	9,838	50
1986	9,592	22	8	158	-	9,780	30
1987	10,754	19	8	190	-	10,971	27
1988	12,725	20	9	218	-	12,872	29
1989	14,396	27	7	245	-	14,675	34
1990	16,269	28	6	263	-	16,566	34
1991	17,856	31	7	274	-	18,168	38
1992	22,271	35	8	799	-	23,113	43
1993	23,987	49	6	303	-	24,345	55
1994	26,011	47	4	352	-	26,414	51
1995	24,024	102	15	15	-	24,156	117
1996	26,215	103	17	23	-	26,358	120
1997	37,881	186	10	105	-	38,182	196
1998	39,825	183	11	109	-	40,128	194
Consumption per Consumer (kW.h)							
1980	1,859	204,132	749,461	-	-	3,489	277,825
1981	1,979	202,517	640,894	-	-	3,597	260,198
1982	1,842	147,516	704,368	-	-	3,133	215,425
1983	2,015	356,707	765,000	-	-	4,495	401,087
1984	1,908	396,725	479,692	4,523	-	4,067	407,316
1985	1,906	403,703	465,287	2,954	-	4,005	412,325
1986	2,084	435,159	1,729,139	2,464	-	4,477	780,221
1987	2,258	612,209	1,643,052	2,570	-	4,516	917,644
1988	2,156	1,198,565	1,514,243	1,064	-	5,031	1,296,534
1989	2,124	973,989	1,181,853	2,199	-	4,476	1,016,784
1990	2,456	785,711	2,122,263	3,350	-	4,562	1,021,573
1991	2,445	775,422	1,987,609	3,514	-	4,545	998,719
1992	2,211	669,659	1,777,790	998	-	3,794	875,823
1993	1,849	498,538	1,438,608	2,796	-	3,215	601,091
1994	1,684	371,931	2,029,874	2,730	-	2,844	501,966
1995	2,552	164,147	546,393	50,007	-	3,602	213,153
1996	2,801	94,852	1,637,191	53,441	-	4,259	313,350
1997	2,086	108,085	4,539,488	4,870	-	3,798	334,177
1998	1,929	48,929	924,502	1,249	-	2,395	98,575

* - Effective March 1986 Heavy Industrial & Large Commercial are billed by Voltage Level.

** - Effective March 1995 Tariffs 1, 2 & 3 are combined as T1; Tariff 4, 4A & 8 as T2; Tariff 5 & 5A as T3, Tariff 6 as T4 and Tariff 9 as T5.

Annex 4.15
Moshi (MW.h)

Reference Case

		[Reduced Industrial List]															
	Actual 1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	76,835	87,028	96,800	107,567	118,398	132,395	146,669	160,810	173,718	184,882	196,510	208,623	221,241	232,674	380,318	487,890	619,965
Identified Rural Electrification	0	0	4,254	4,727	5,247	5,816	6,448	7,087	7,834	8,125	8,898	9,188	9,723	12,662	16,714	21,441	27,245
TOTAL GENERAL USE (MWh)	76,835	87,028	101,054	112,294	124,645	138,213	153,114	167,877	181,362	193,008	205,146	217,791	230,964	305,536	397,032	509,331	647,210
Annual Growth Rate		13.3%	16.1%	11.1%	11.0%	10.2%	10.8%	8.6%	8.0%	6.4%	6.3%	6.2%	6.0%	5.8%	5.4%	5.1%	4.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	19,123	19,843	20,740	21,673	22,645	23,658	24,713	25,812	26,956	28,148	29,390	30,683	32,030	39,858	49,018	60,502	74,604
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	0	1,360	1,380	2,300	5,489	6,473	6,760	7,060	7,372	7,697	8,036	8,389	10,387	12,828	15,846	19,540
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	19,123	19,843	22,119	23,053	24,945	29,147	31,188	32,572	34,016	35,520	37,087	38,719	40,419	50,044	61,854	76,348	94,144
Annual Growth Rate		3.8%	11.6%	4.2%	8.2%	16.8%	7.0%	4.4%	4.6%	4.4%	4.4%	4.4%	4.4%	4.4%	4.3%	4.3%	4.3%
PUBLIC LIGHTING																	
	136	169	182	204	227	260	272	295	318	341	363	385	407	533	668	879	1,112
Annual Growth Rate		16.7%	14.3%	12.5%	11.1%	10.0%	9.1%	8.3%	7.7%	7.1%	6.7%	6.9%	6.8%	6.8%	6.2%	5.0%	4.8%
BULK SALES																	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate																	
TOTAL CONSUMPTION																	
	96,065	107,030	123,355	135,551	149,817	167,609	184,572	200,744	215,686	228,887	242,597	258,896	271,790	356,114	459,574	588,557	742,465
Annual Growth Rate		11.4%	15.3%	9.9%	10.5%	11.9%	10.1%	8.8%	7.4%	6.1%	6.0%	6.9%	6.8%	6.6%	5.2%	5.0%	4.8%
LOSSES																	
Technical Losses*	-	10,741	11,515	11,726	11,958	13,378	14,732	16,023	17,216	18,268	19,363	20,505	21,694	28,424	36,682	46,818	59,262
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	8,593	9,068	9,068	9,054	10,129	11,164	12,132	13,035	13,831	14,661	15,525	16,425	21,521	27,774	35,446	44,870
Loss Rate (%)	-	6.8%	6.3%	6.8%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
TOTAL LOSSES	14,374	19,334	20,583	20,794	21,012	23,507	25,896	28,154	30,250	32,099	34,024	36,030	38,119	49,945	64,456	82,265	104,131
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION																	
	110,468	126,364	143,938	156,345	170,829	191,117	210,459	228,898	245,936	260,968	278,621	292,925	309,909	406,059	524,029	658,822	846,597
Annual Growth Rate		14.4%	13.9%	8.6%	9.3%	11.9%	10.1%	8.8%	7.4%	6.1%	6.0%	6.9%	6.8%	6.6%	5.2%	5.0%	4.8%
CONTRIBUTION TO SYSTEM PEAK (MW) (Including losses)																	
General Use @ 85.0%	15.5	18.0	19.8	21.8	23.9	26.5	29.4	32.2	34.8	37.0	39.4	41.8	44.3	56.6	76.2	97.7	124.2
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.6	1.7	1.9	2.1	2.3	2.5	2.6	2.8	3.0	3.2	4.2	5.4	7.0	8.9
Identified Existing Industrial @ 65.0%	3.9	4.1	4.3	4.4	4.5	4.7	4.9	5.2	5.4	5.6	5.8	6.1	6.4	7.9	9.8	12.1	14.9
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.0	0.0	0.4	0.4	0.7	1.6	1.9	2.0	2.0	2.1	2.2	2.3	2.4	3.0	3.7	4.8	5.7
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public Lighting @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Bulk Sales @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL PEAKLOAD	19.4	22.2	26.0	28.2	30.9	34.8	38.3	41.7	44.8	47.8	50.3	53.3	56.4	73.9	95.3	121.6	153.8
EFFECTIVE LOAD FACTOR																	
	0.651	0.660	0.633	0.633	0.632	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.627	0.628	0.628	0.628	0.628

**Annex 4.16
Moshi (MW.h)**

High Case

	Actual 1998	[Full Industrial List]															
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2015	2020	2025	2030	
GENERAL USE ENERGY																	
Residential, Small Comm & Lt. Indust	76,835	86,987	97,743	109,767	123,208	138,230	155,017	172,250	188,488	203,115	218,499	234,879	251,896	360,951	478,718	643,211	855,012
Identified Rural Electrification	0	0	4,254	4,777	6,362	8,016	8,747	7,497	8,203	8,840	8,610	10,214	10,954	15,274	20,835	27,984	37,212
TOTAL GENERAL USE (MWh)	76,835	86,987	101,997	114,545	128,570	144,246	161,763	179,747	196,692	211,955	228,008	244,893	262,651	366,225	499,553	671,205	892,224
Annual Growth Rate		13.2%	17.3%	12.3%	12.2%	12.2%	12.1%	11.1%	8.4%	7.8%	7.8%	7.4%	7.3%	6.9%	6.4%	6.1%	5.9%
INDUSTRIAL ENERGY																	
Identified Existing Industrial	19,123	19,843	20,969	22,153	23,398	24,708	26,085	27,534	29,057	30,660	32,345	34,118	35,982	46,856	60,854	78,875	102,079
Miscellaneous Industrial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Industrial Loads - Full Growth	0	0	1,380	1,380	2,300	5,504	6,505	6,868	7,248	7,848	8,068	8,508	8,973	11,685	15,176	19,670	25,456
New Industrial Loads - Low Growth	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INDUSTRIAL (MWh)	19,123	19,843	22,349	23,533	25,698	30,212	32,690	34,400	36,304	38,308	40,411	42,628	44,956	58,541	76,029	98,546	127,535
Annual Growth Rate		3.8%	12.6%	5.3%	9.2%	17.6%	7.9%	5.6%	6.0%	5.5%	6.6%	5.5%	5.5%	5.4%	5.4%	5.3%	5.3%
PUBLIC LIGHTING	136	163	189	216	243	269	296	323	349	376	403	431	461	637	863	1,155	1,530
Annual Growth Rate		19.6%	16.4%	14.1%	12.3%	11.0%	9.9%	9.0%	8.3%	7.8%	7.1%	7.1%	7.0%	6.7%	6.3%	6.0%	5.8%
BULK SALES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate																	
TOTAL CONSUMPTION	96,095	106,993	124,535	138,293	154,511	174,727	194,649	214,670	233,345	250,837	268,822	287,950	308,067	425,403	576,446	770,904	1,021,268
Annual Growth Rate		11.3%	16.4%	11.0%	11.7%	13.1%	11.4%	10.2%	8.8%	7.4%	7.3%	7.1%	7.0%	6.7%	6.3%	6.0%	5.8%
LOSSES																	
Technical Losses*	-	10,737	11,625	11,963	12,333	13,946	15,538	17,118	18,825	20,005	21,457	22,983	24,569	33,955	43,011	51,532	61,517
Loss Rate (%)	-	8.5%	8.0%	7.5%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Non-Technical Losses*	-	8,590	9,155	9,251	9,338	10,559	11,763	12,961	14,102	15,147	16,246	17,402	18,618	25,709	34,837	46,588	61,720
Loss Rate (%)	-	6.8%	6.3%	5.8%	6.3%	5.3%	6.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
TOTAL LOSSES	14,374	19,327	20,780	21,215	21,670	24,506	27,300	30,080	32,727	35,152	37,703	40,385	43,207	59,663	80,847	108,120	143,237
Total Loss Rate (%)	13.0%	15.3%	14.3%	13.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%	12.3%
REQUIRED TOTAL GENERATION	110,468	126,320	145,315	159,508	176,181	199,233	221,949	244,549	266,072	285,789	306,525	328,335	351,274	485,066	657,293	879,024	1,164,525
Annual Growth Rate		14.3%	15.0%	9.8%	10.5%	13.1%	11.4%	10.2%	8.8%	7.4%	7.3%	7.1%	7.0%	6.7%	6.3%	6.0%	5.8%
CONTRIBUTION TO SYSTEM PEAK (MW)																	
(Including losses)																	
General Use @ 65.0%	15.5	18.0	20.0	22.2	24.7	27.7	31.0	34.5	37.7	40.7	43.8	47.0	50.4	70.3	95.9	129.8	171.2
Rural Electrification @ 40.0%	0.0	0.0	1.4	1.6	1.7	2.0	2.2	2.4	2.7	2.9	3.1	3.3	3.8	5.0	6.6	9.1	12.1
Identified Existing Industrial @ 65.0%	3.9	4.1	4.3	4.5	4.7	4.9	5.2	5.5	5.8	6.1	6.5	6.8	7.2	9.4	12.2	15.8	20.4
Miscellaneous Industrial @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
New Industrial Loads - Full Growth	0.0	0.0	0.4	0.4	0.7	1.6	1.9	2.0	2.1	2.2	2.3	2.5	2.6	3.4	4.4	5.7	7.4
New Industrial Loads - Low Growth	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Public Lighting @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Bulk Sales @ 65.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL PEAKLOAD	19.4	22.2	26.2	28.7	31.8	36.2	40.4	44.5	48.4	52.0	55.7	59.7	63.9	83.1	119.4	159.6	211.4
EFFECTIVE LOAD FACTOR	0.651	0.650	0.633	0.633	0.632	0.628	0.627	0.627	0.628	0.628	0.628	0.628	0.628	0.628	0.628	0.629	0.629