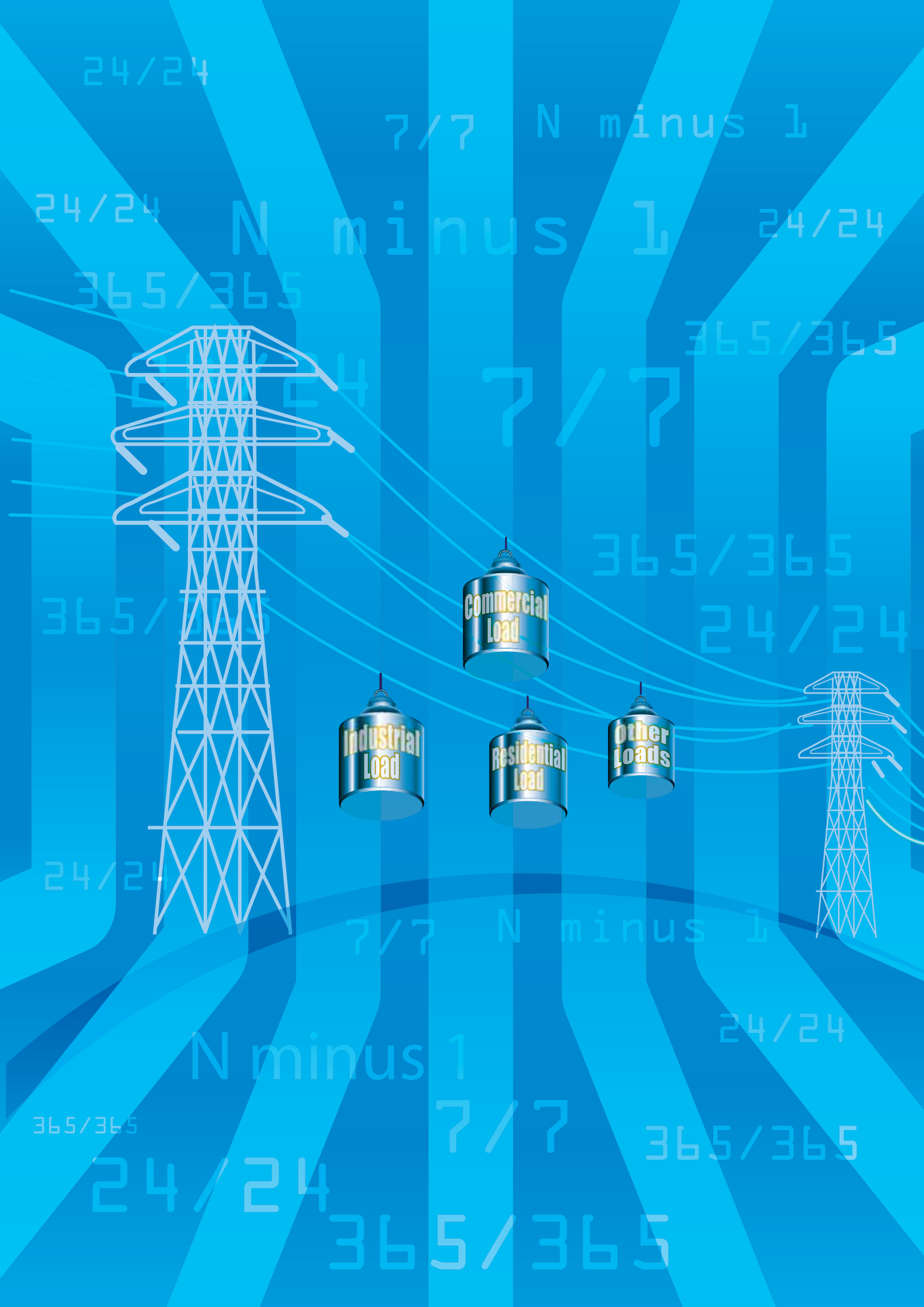

24/24
7/7
N minus 1
365/365
Commercial Load
Industrial Load
Residential Load
Other Loads

How much Reliable is a Power System?

The robustness of a power system reflects its ability to be *'omnipresent'*, irrespective of the time and size of the load imposed on it. By adopting an appropriate planning philosophy, a utility is capable of spurring such reliance.

CEB, in the same belief, shall continue to dimension its power system in anticipation to meet its customers' needs so as to ensure greater reliability!

DEMAND FORECAST FOR MAURITIUS

Chapter 4

Since Independence, demand for electricity, both in-Mauritius and Rodrigues, has followed an upward trend. Economic development supported by substantial on-going investments in electrification was, without doubt, the main factor fuelling the steady growth in demand for electricity.

The electricity markets in Mauritius and, to a lesser extent, in Rodrigues have, since then, evolved into more dynamic operating environments.

Within these established markets, CEB regularly conducts electricity demand assessments. Hereunder, an overview of the latest demand forecast for Mauritius, prepared in the context of this IEP, covering the period 2013–2022, is presented.

4.1 THE ELECTRICITY MARKET

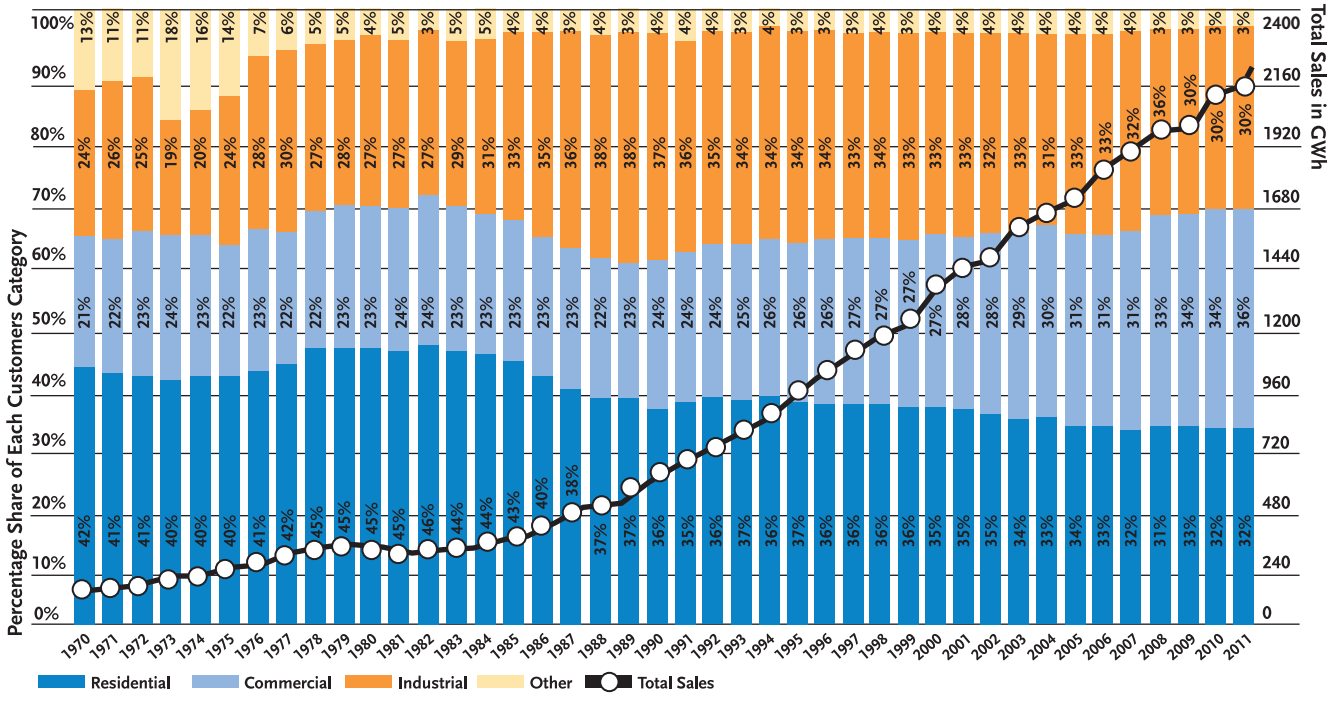
This section details the CEB's appreciation of the local electricity market.

4.1.1 Trend in Electricity Sales

Traditionally, as in many countries, electricity consumers in Mauritius and Rodrigues are predominantly categorised into three main customer groups: Residential (households), Commercial (non-manufacturing) and Industrial categories. Other minor categories include: public lighting, traffic lights and irrigation. The minor groups account for a small, but a non-negligible, share of the total electricity sales. Figure 4.1 below shows the historical share of each customer category in the growing total electricity sales in Mauritius.

The post-1990s saw an accelerated growth in demand, as shown in Figure 4.1 below. The rapid growth, most likely, was the effect of structural changes in the domestic economy. In fact, Mauritius had moved away from a mono-crop-based economy towards diversification. Industrialisation, which followed, was accompanied by heavy investments in export-oriented sectors, especially in the textile and manufacturing

FIGURE 4.1: Evolution of Electricity Sales by Customer Categories 1970 to 2011



industries. These industries, by their very operational nature, have relatively higher electricity intensity.

The upward trend in the sale of electricity was further maintained in the years 2000. It was mainly the result of a re-engineering of the economy accompanied by bolstering strategies in the Hospitality, Commercial and Manufacturing Sectors.

With the on-going diversification, new economic sectors (ICT, Sea-Food and Financial Services) which were set up also caused the demand to grow constantly. During that period, automation, which is inextricably dependent on electricity, also started its breakthrough. All these developments jointly contributed to maintain the accelerated growth in demand.

Undoubtedly, our country's noticeable economic progress has led to a remarkable improvement in the standard of living of the population. With higher *disposable income**, households became more and more affluent. By extension, the penetration rate of electric home appliances grew rapidly leading to higher demand for electricity.

More insight into the evolution of electricity demand in Mauritius and Rodrigues are provided in Appendix A1.

4.1.2 Dynamics of the Typical Seasonal Demand Profiles

An analysis of daily demand curves reveals that electricity demand is not constant over time. It varies continuously, irrespective of the day. In Mauritius, based on seasonality, two typical demand profiles, as shown in Figure 4.2 below, are identified. The hourly values along the curves are expressed in per unit (as ratios of the highest peak).

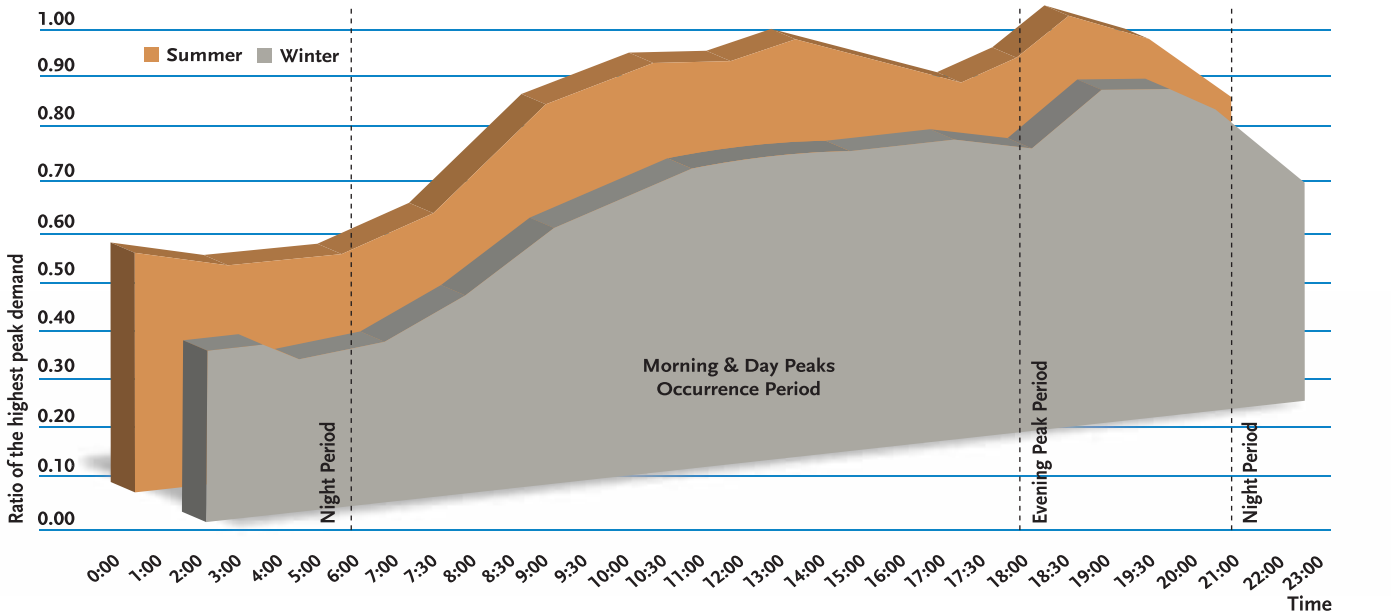
The observed uneven hourly demand, as shown in Figure 4.2, influences the unit cost of production and the inherent technical energy losses. It is estimated that the *system load factor** is, on average, around 82.8% and 68.6% during summer and winter respectively. A low load factor means that the power system assets are under-utilised.

The higher demand in summer, caused mainly by air-conditioning loads, raises the *system utilisation factor** by about 20% compared to the utilisation in winter. This change in loading has serious implications for the required availability of generation capacity; hence, the planning of electricity production capacity.

The variability in demand not only affects the planning of generation capacity, but also influences the dimensioning of the whole power system. In effect, it dictates the daily operation of the whole power system.

It is clear that insufficient or poor understanding of the demand pattern may lead to high operational inefficiencies, particularly with regard to the *dispatching order** of generating engines, which may eventually cause the costs of producing electricity to rise unnecessarily.

FIGURE 4.2: Typical Summer & Winter Demand Curves (Per Unit)



* See glossary

The overall electricity demand pattern is not static; it evolves as changes occur in the market constituents. Increasing demand of residential customers, for instance, will raise the evening peak, while rising electricity demand in the Commercial and Industrial Sectors largely contributes to shift the day-period peaks upward. Anticipating the changes in the overall demand pattern is essential for effective decision-making concerning investments, especially in capital intensive electricity generation and transport assets.

4.1.3 Spatial Distribution of Electricity Demand

Efforts to gain maximum knowledge of the electricity market involve examining the geographical distribution of electric load. This is essential so as to manage intelligently a utility's distributed assets associated with its transmission and distribution networks.

CEB's substations have been strategically sited around the island, as shown in Figure 4.4 on the next page, so as to be nearer to the load centres. As the load centres keep on expanding, it becomes imperative to examine the evolution of their electricity demand and forecast the future demand, which will impact on the supplying substations' capacity.

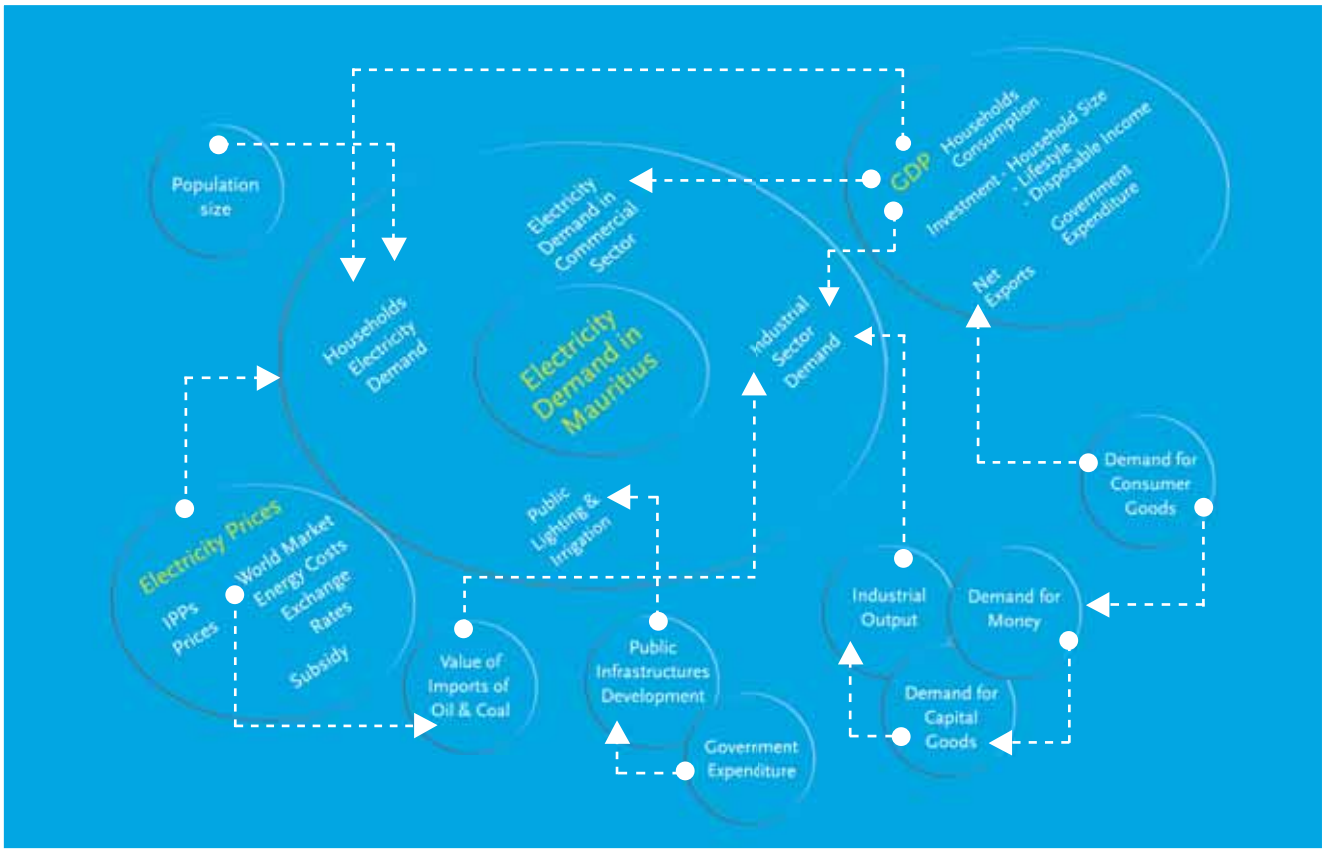
With the development of numerous infrastructural projects around Mauritius, it has become necessary for the CEB to enhance its current demand forecast methodology so as to predict demand on a geographical basis. Under the spatial forecast approach, the future loadings on the CEB's substations and associated electric feeders can be projected.

For the first time, in this IEP, an attempt has been made to present the demand forecast on a spatial base, whereby the loading evolution of each CEB's substation has been estimated. The present estimates provide pertinent input into the CEB's network expansion planning.

4.1.4 *Stochastic** Factors Influencing Electricity Demand

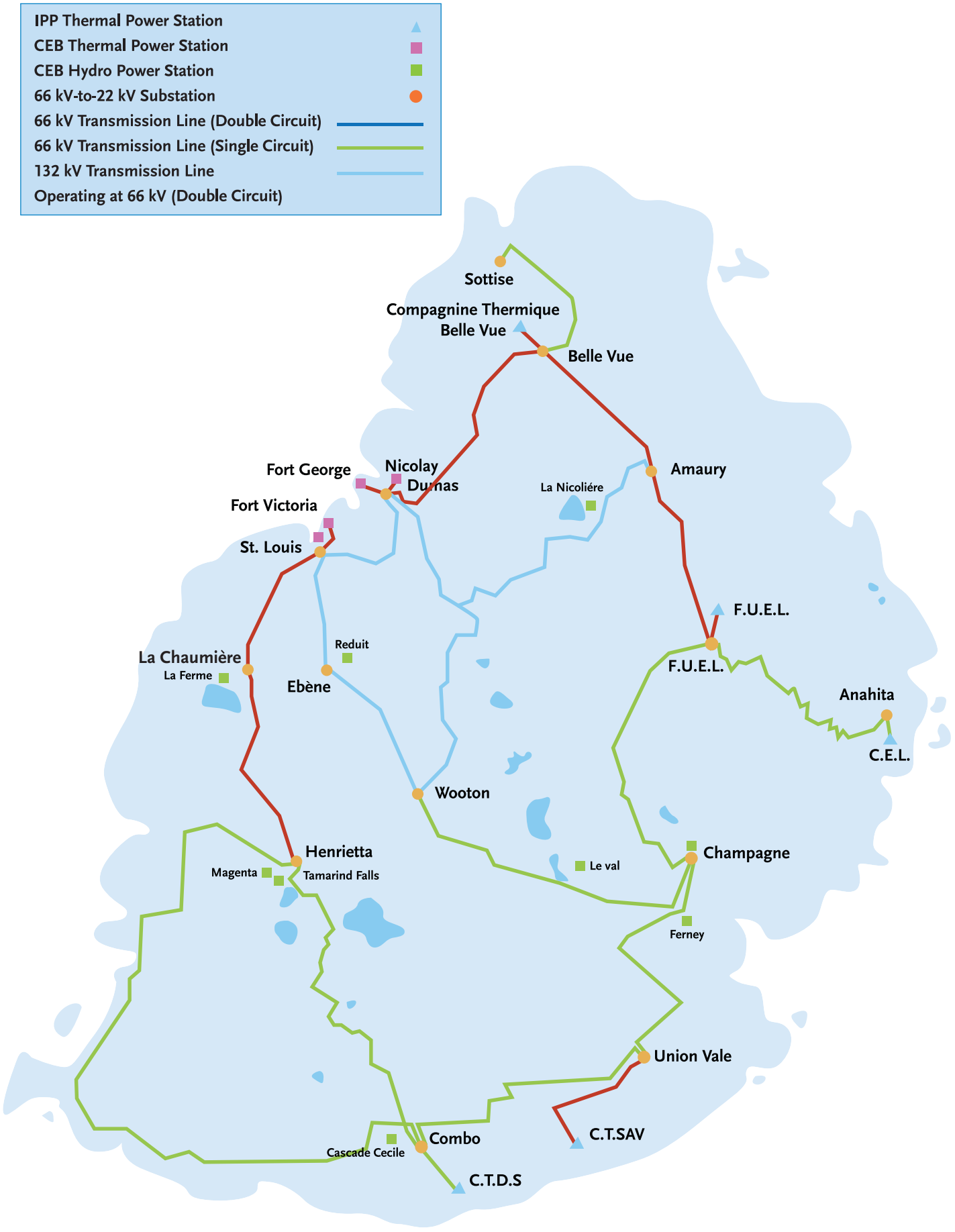
In a nutshell, a country's electricity demand is simply an aggregation of demand arising from different customer categories. However, underneath a myriad of dynamic factors stealthily and continuously stimulate the demand. Figure 4.3, hereunder, illustrates the complex interactions between some of the most critical demand-driven factors, which influence the overall demand for electricity. A brief explanation of the interactions is given in the paragraphs below.

FIGURE 4.3: Key Factors Influencing Electricity Demand Causal-Loop Diagram



* *See glossary*

FIGURE 4.4: Mauritius Generation Stations and Transmission System



In general, demand for electricity in households is a function of disposable income and household size. A rise in disposable income usually improves households' standard of living, which subsequently influences lifestyle. A change in lifestyle, to some extent, is reflected in more spending of disposable income on durable goods, such as home appliances. Higher penetration rates of home appliances, in turn, result in higher electricity demand. This natural tendency is also observed in Mauritius, where improvements in national wealth lead to rising demand for electricity in households. Disposable income is not the only factor explaining growth in households' electricity demand. Growth in population, and by extension households' size, also influences households' demand for electricity.

In the Industrial Sector, critics do not support the theory that relative price change is necessarily an important determinant of growth in electricity consumption. In fact, the main determinants are growth in output, changes in technology and value of inputs (energy, materials and labour). Industrial output is basically a function of investment in capital goods (plant, machinery, equipment, etc.), which itself is influenced by the demand for consumer goods and the cost of capital. At a much deeper level, factors such as the exchange rate, global inflation and interest rates and world market energy costs also affect the electricity demand of the Industrial Sector.

*Gross Domestic Product (GDP)**, which is a measure of the value of output produced by an economy, is a statistic made up of four components, namely: Consumption, Investment, Expenditure, and Net Exports. A change in any of these components has a direct spill-over effect on the local economy and, hence, affects the performance of economic players, such as commercial entities focusing on the local market.

The main causal factor driving electricity demand for public lighting and irrigation is public infrastructural development, triggered by government expenditure on roads, airport, schools, hospitals, etc.

As shown in the causal-loop diagram (Figure 4.3 on page 33), the price of electricity is another key factor influencing aggregate electricity demand. Electricity price is generally a function of world market energy costs, the price of electricity charged by *Independent Power Producers (IPPs)** and any subsidies provided by the Government.

For this IEP, the most relevant causal elements, besides weather conditions, impacting on the local electricity demand were selected for the forecast model. Based on the above conceptual causal-loop relationships, the modelling of the independent factors influencing the annual electricity demand of the three CEB's major customer categories was developed. Details of the forecast model are provided in Appendix A1, as part of the forecast methodology.

4.2. THE UPCOMING 10-YEARS DEMAND OUTLOOK

Based on the methodology detailed in Appendix A1, a 10-year demand forecast for the period 2013–2022 has been prepared for the purpose of this IEP and is elaborated in the following sub-sections.

4.2.1 The Forecast Methodology Adopted

While there are different forecast methods, each having its own merits and limitations, for this particular IEP, the load forecast was based on the causal effect of some basic influential factors. Factors, such as end-users consumption behaviours, economic conditions, demographic and technological evolution, which affect the utilization of electrical energy, were taken into account. Energy efficiency and demand-side management, the two emerging challenges, were also given due consideration. In short, the forecast model was primarily constructed, using some fundamental *econometric** and statistical techniques. More details on the demand (load) forecast methodology are provided in Appendix A1.

4.2.2 Energy Forecast Scenarios

Given the inherent unpredictability in the forecast assumptions, the demand forecast has been prepared for three possible scenarios (Low, Base and High). The assumptions for each scenario are as follows:

(1) In the Low Scenario, the economy will be sluggish and may even stagnate until the end of the medium-term.
(2) For the Base Scenario, the growth rate of the economic sectors/sub-sectors will reflect the trend of the last decade.
(3) The High Scenario assumed a rapid economic recovery in the short term, which will impact on the economic growth in the medium to long term.

* *See glossary*

The final results of the overall energy forecast for the period 2013–2022, under each scenario, is given in Table 4.2 in Section 4.2.4.

4.2.3 Energy Forecast of each Customer Category

In this sub-section the energy forecast, which forms the basis for developing the IEP, for the different CEB customer categories is provided.

Residential (Households) Electricity Demand

Electricity sales to the residential category represent around 32% of the CEB total sales. Although this category will remain one of the major customer groups, its share of the total electricity sales will remain almost constant, at around 30% by the end of the forecast period.

In the Base Scenario, the forecast estimates showed that the specific consumption of a typical Mauritian household will be relatively moderate. If compared to a household in Réunion Island, in 2011, while on average a household in Mauritius had consumed 1965 kWh, in Réunion Island it was 3578 kWh†. Taking in account the difference of around 82% in the consumption level and the similarities of the two sister islands, it will not be exaggerated to assume that there is a potential for higher demand for electricity in the residential sector in Mauritius.

Figure 4.5 below depicts the historical and expected future trend of electricity demand in the 'households sector' in Mauritius.

The line graph (Base Scenario) in Figure 4.5 shows that the residential category demand will grow by 3.01% annually over the planning period. However, under the High Scenario, the demand may reach 1285 GWh by 2022, that is, approximately 1.8 times the demand recorded in 2011.

Electricity Demand in the Commercial Category

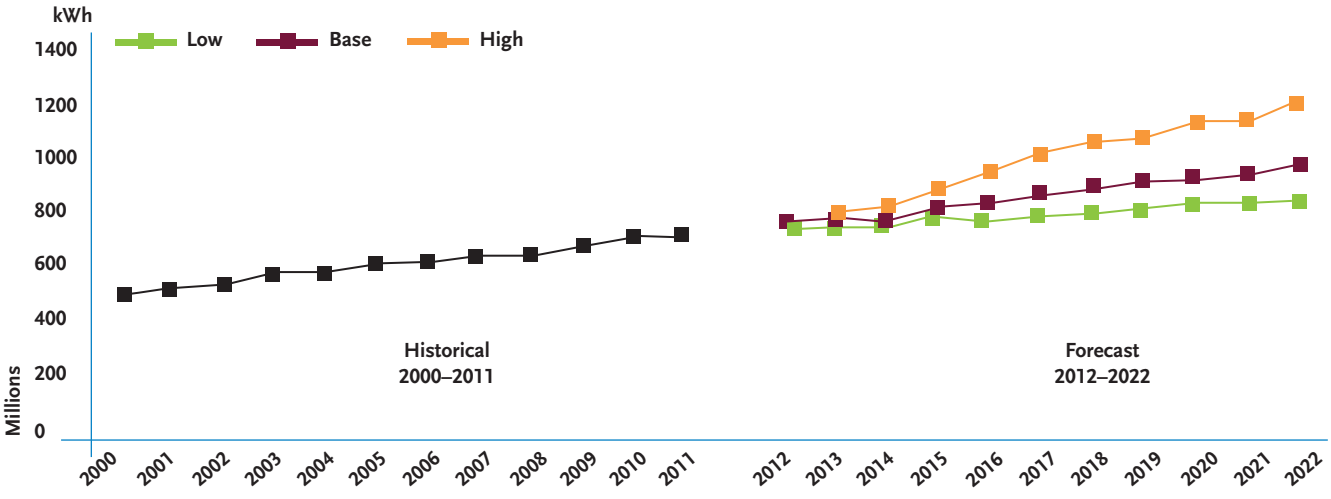
Over the recent years, the Commercial Sector has taken the lead in the share of total electricity sales in Mauritius. The share has grown from 27% in the year 2000 to reach 36% in 2011.

The growth in total demand, partly fuelled by commercial activities, has resulted in important changes in the overall system demand profile, where the peak demand occurring during the day is now of almost the same magnitude as that of the evening peak.

Today, the CEB is not only concerned about the growth of the evening peak, but also about the daytime peaks, which are intrinsically and largely dependent on commercial and industrial activities.

Since the domestic economy will, most likely, continue to be dominated by the Service (Commercial) Sector, which includes the Tourism, ICT, Financial Services, commercial complexes, Public Services and other non-manufacturing entities, the demand forecast for the commercial category was thus been built on the premise that the sector will continue to represent the largest share in the total electricity demand of the country.

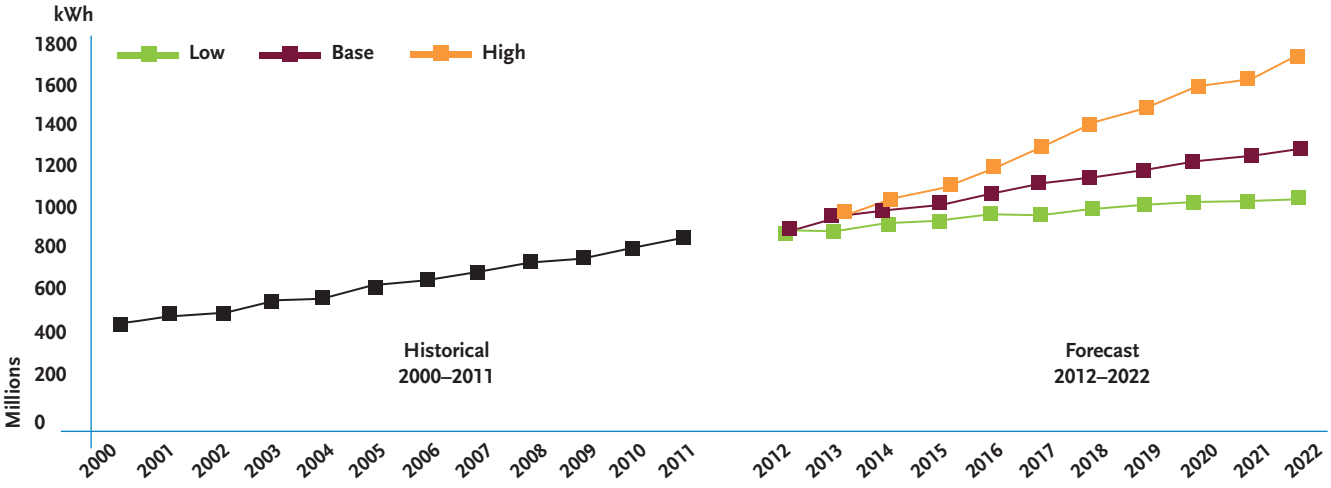
FIGURE 4.5: Energy Sales to Residential Customer Category



† Bilan énergétique 2011, Ile de la Réunion

Almost all, not to say all, commercial activities are carried out through capital intensive immovable infrastructures. Therefore, given the heavy investment injected in the construction of the floor spaces, it is fairly logical to assume that the investment will need to be salvaged through home-based activities. In brief, the future demand for electricity in the Commercial Sector will follow an upward trend, as depicted in Figure 4.6.

FIGURE 4.6: Energy Sales to Commercial Customer Category



In working out the forecast, the influences of the different commercial sub-sectors, some of which drive our economic performance (Tourism, Financial Services, ICT) and others, which depend on the performance of the domestic economy (Retail, Government Services, Real Estate), were distinctively analysed. The outcomes of the analysis, in terms of the sub-categories' electricity demand growth rates reflecting inferences made, are shown in Table 4.1 hereunder.

TABLE 4.1: Electricity Demand Growth Rate of Commercial Sub-categories

	COMMERCIAL CUSTOMERS SUB-CATEGORIES		
PERIOD	*SMALL LOCAL-MARKET FOCUSED FIRMS**	*MEDIUM & LARGE DOMESTIC-MARKET FOCUSED FIRMS**	*MEDIUM & LARGE INTERNATIONAL-MARKET FOCUSED FIRMS**
2005-2011	5.0%	3.1%	12.7%
2011-2017	3.5%	1.8%	7.8%
2017-2022	2.9%	1.1%	5.5%

Industrial Sector Electricity Demand

With 33% of the total electricity sales in the year 2000, the industrial category was indeed the most energy intensive sector. This influence, however, has shrunk over the years. Today, the sector accounts for only 30% of the total electricity sales.

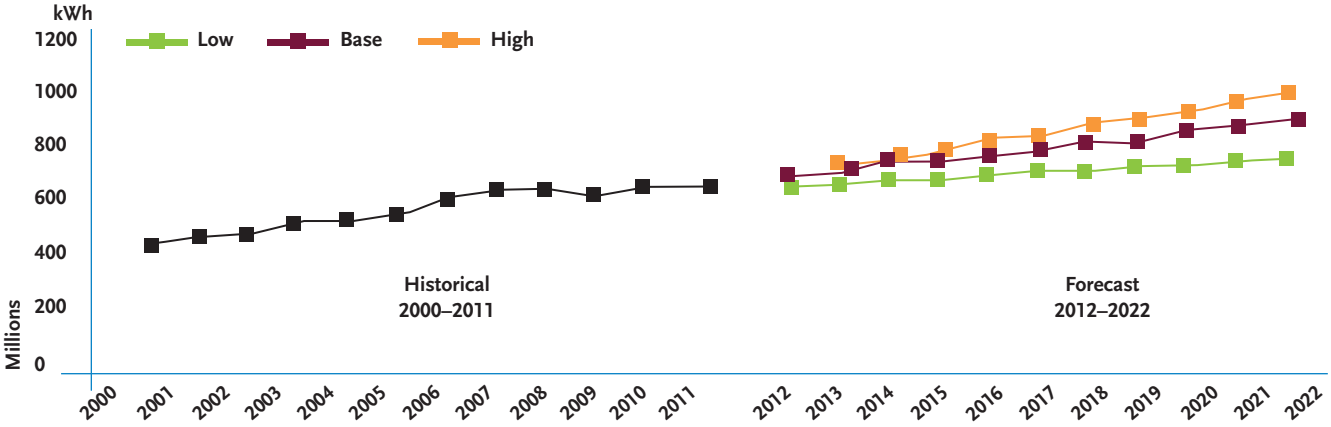
Relatively lower capital injection, as reflected in the recent Industrial Sector's *Gross Domestic Fixed Capital Formation (GDFCF)**, and international pressures, noted over the recent years, have had serious ramifications for the demand for electricity in the Industrial Sector. Based on observed trends and considering other driving factors, CEB forecasted that, unless the sector undergoes major changes, the relative demand of the sector will be further lowered to 28% of the total electricity sales by the end of the planning period.

It is necessary to point out that the effect of the phasing-out of the *AGOA** Treaty by 2015 has not been considered at this stage. Necessary adjustments will be made in time over the forecast period, as and when there is more clarity on the sector's development.

As depicted in Figure 4.7 on the next page, the compounded annual demand growth rate in the Industrial Sector will be around 2.60% for the period 2012–2022, lower than the historical annual growth rate of 3.36%. The 2.60% growth rate can however, rise up to 3.35% under the high-case scenario.

** See glossary*

FIGURE 4.7: Energy Sales to Industrial Customer Category



Electricity Demand From Minor Customer Groups

The minor customer category includes sugar factories, street lighting accounts, pumping for irrigation purposes and CEB's own consumption. These electricity end-users account for approximately 3% of the total electricity sales.

Based on factors mentioned in the forecast methodology (Appendix A1, Section: Sales Forecast of Minor Customer Categories), CEB estimated that the share of electricity sales for the minor customer category will not be higher than the 3% for the future. Over the planning period, the electricity demand of the minor customer categories will, therefore, grow negligibly, as illustrated in Figure 4.8.

4.2.4 Summary of the Electricity Forecast 2013–2022

Table 4.2 summarises the 2013–2022 electricity forecast for Mauritius under the three scenarios (Low, Base and High).

Considering the Base scenario, as shown in Table 4.3, on page 39 contrary to the annual compounded growth of 4.28% for the period 2001–2011, it has been estimated that the demand for electricity will grow on average by 3.43% (compounded growth) annually for the period 2011–2022.

TABLE 4.2: Electricity (GWh) Forecast 2013–2022

	SCENARIOS		
YEAR	LOW	BASE	HIGH
2013	2313	2416	2505
2014	2362	2497	2613
2015	2408	2587	2775
2016	2452	2686	2990
2017	2495	2787	3180
2018	2538	2869	3390
2019	2580	2951	3543
2020	2618	3033	3703
2021	2656	3113	3826
2022	2694	3196	3994

FIGURE 4.8: Energy Sales to Minor Customers Category

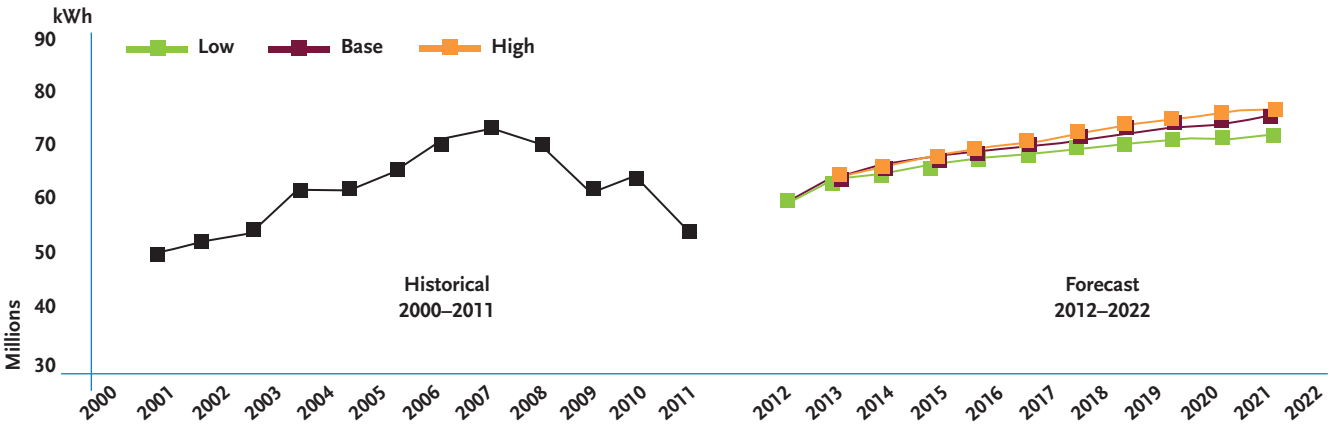


TABLE 4.3: Historical Versus Forecast Growth Rate in Total Electricity Demand

Annual Growth Rate (Historical)	
PERIOD	**RATE OF GROWTH**
2001–2006	5.05%
2006–2011	3.51%
2001–2011	4.28%

Annual Growth Rate (Forecast)			
PERIOD	**LOW**	**BASE**	**HIGH**
2011–2016	2.15%	4.03%	6.29%
2016–2022	1.58%	2.94%	4.94%
2011–2022	1.84%	3.43%	5.55%

The estimated comparative lower growth rate of 3.43% can be explained by a number of factors, such as:

- The heightened importance attached to energy efficiency and savings;
- The penetration of substitutes (Solar Water Heaters & SSDGs);
- The reduction in the *marginal propensity to consume** of households;
- The saturation in the development of commercial complexes;
- The potential increase in prices of energy sources;
- The structural changes in economic activities, where investments will be more concentrated in less energy intensive sectors.

It would not be unrealistic, in fact, to assume that the very inertia in the prevailing and expected economic conditions by itself, coupled with changes in lifestyles, may trigger the above influences.

The above-mentioned compounded annual growth rate of 3.43% represents the combined forecasted growth in the electricity demand of the different customer categories, as shown in Table 4.4 below.

In a more favourable scenario, arrived at on the assumptions that the international economy may experience a greater acceleration in its expansion and a re-engineering of the local economic pillars would follow, the demand for electricity annually may grow by 5.55% (compounded growth rate under the High-Case Scenario) during the planning period.

4.2.5 Peak Demand (MW) Forecast

Peak demand forecast is usually very problematic. It is even more challenging for small-sized power system, such as the CEB. A degree of accuracy of 95% in the estimation may not be sufficient, given the relatively high investment risks implied in power generation and power transport projects. Peak demand evolution is, in fact, the key factor which guides the kind, and size, of investments (base, semi-base or peak) in power generation and the dimensioning of the whole transmission network.

Several methods can be used to estimate the peak demand. However, whichever method is used, the most important concern for the CEB is to ensure the highest accuracy possible.

Using loadings data on electric feeders obtained from measurement exercises, estimated typical customer consumption profiles, information on the electricity market size and estimated overall losses; the annual peak demand for the period 2013-2022 has been calculated. Table 4.5, on next page, shows the resulting peak demand estimates for the planning period.

TABLE 4.4: Compounded Annual Growth Rate

PERIOD		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHERS	TOTAL
Historical	2001–2006	3.34%	6.91%	5.07%	5.97%	5.05%
	2006–2011	3.31%	6.50%	1.46%	-4.78%	3.51%
	2001–2011	3.32%	6.71%	3.25%	0.45%	4.28%
Forecast	2011–2016	3.44%	5.23%	3.16%	4.35%	4.03%
	2016–2022	2.66%	3.56%	2.51%	1.54%	2.94%
	2011–2022	3.01%	4.31%	2.81%	2.80%	3.43%

** See glossary*

TABLE 4.5: Estimated Peak Demand (MW)

	SCENARIOS		
YEAR	LOW	BASE	HIGH
2012	422	430	444
2013	431	447	462
2014	439	461	480
2015	446	475	506
2016	453	492	541
2017	460	508	571
2018	467	521	605
2019	474	534	630
2020	480	548	655
2021	487	561	675
2022	493	574	702

As shown in Figure 4.9 below, over the recent past, the peak demand in the system has occurred during the summer period extending from November to March of the next year.

Given the trend in economic activities and weather conditions, future system peak demand will continue to occur in the summer season. It is rather obvious that in the event of a new higher peak demand **not** being recorded in November or December in the current year, it will, with a high probability, occur early the following year.

The variation in the peak power demand is not only a matter of weather conditions, but is equally dependent on the level of activity of the different electricity end-users. CEB, for a long time, has been seriously concerned about the growth in the peak power demand. A DSM strategy was even formulated to control the growth of the peak demand.

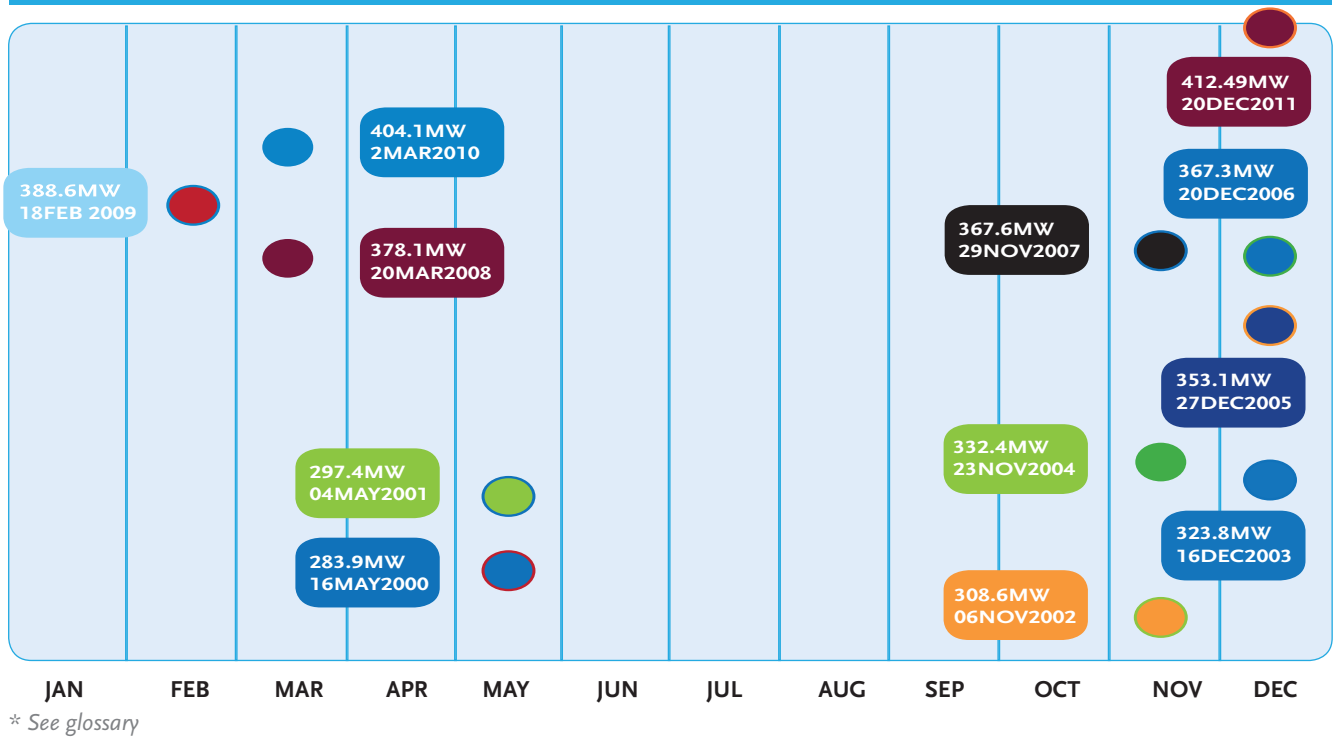
For planning purposes, the peak demand forecasted is not only assumed to be equivalent to the energy forecast (active demand), but more specifically, a function of the cumulated loads in the system and the *latent demand**.

Being strongly dependent on weather conditions, the latter requires an effective long-term weather forecast, which unfortunately is difficult to make with high accuracy.

4.2.6 CEB's Substations' Loadings

Unlike previous demand forecast exercises, the forecast, which has been prepared for this IEP, includes a geographical distribution of the future growth in electricity demand in Mauritius. Using available information and data, a typical summer load profile for each CEB substation has been developed. It is projected that the future loadings on the CEB's substations will be as shown in Table 4.10 on next page. The trend in the substations' loadings reflects only the normal growth. Loadings of upcoming major projects, which may impact on the substations' capacities, have been worked out outside the model. The reason is simply that the peak demand of a particular major project may not necessarily coincide with the supplying substation's peak loading.

FIGURE 4.9: Peak Power Demand (MW) Recorded (2000 to 2011)



* *See glossary*

TABLE 4.10: Historical and Estimated Substations' Loadings (MW)

YEAR	AMAURY	BELLE-VUE	LA CHAUMIÈRE	COMBO	EBÈNE	FORT GEORGE	FUEL*	HENRIETTA	NICOLAY	SOTTISE	SAINT-LOUIS	UNION VALE*	WOOTON
2005	11	30	28	11	32	56	22	33	29	13	37	17	28
2006	12	26	28	11	35	52	23	41	31	15	39	15	33
2007	11	26	24	8	34	51	24	36	30	16	44	16	40
2008	12	30	24	7	36	49	23	37	31	17	49	21	34
2009	13	33	31	12	36	63	24	34	31	15	42	18	30
2010	13	30	30	12	39	58	25	41	34	17	45	18	34
2011	12	30	25	10	40	56	27	38	33	20	52	19	41
2012	13	36	26	9	44	56	26	39	35	21	56	25	37
2013	14	36	30	13	45	63	28	41	36	20	53	22	39
2014	14	38	31	13	46	65	28	41	36	21	55	23	40
2015	15	39	32	14	48	67	29	42	37	21	56	24	41
2016	15	41	33	14	50	69	30	44	38	22	58	25	42
2017	16	43	34	15	53	71	31	45	39	23	60	26	44
2018	16	44	34	16	55	73	32	46	40	23	62	27	45
2019	16	46	35	16	57	74	32	46	41	24	63	28	46
2020	17	47	36	17	58	76	33	47	42	24	65	29	47
2021	17	49	37	17	60	78	34	48	43	25	66	30	48
2022	17	50	37	18	62	79	35	49	44	25	67	31	48

* The figures for the Union Vale and FUEL substations include the loading on the Ferney and Anahita substations, respectively.
The table will be updated as and when new information becomes available.

KEY STATISTICS: Electricity (kWh) Sales Per Tariff 2002 to 2011

CATEGORY	CODE	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	110/111	155 380 507	164 251 149	167 945 042	175 394 811	176 833 335	183 219 436	183 620 858	188 290 805	194 054 333	196 295 708
	120/121	279 437 725	295 944 395	300 651 931	317 874 082	324 076 476	336 518 172	340 799 730	356 228 479	372 488 661	382 187 780
	140/141	86 319 248	92 453 727	93 776 038	99 967 524	102 528 855	108 668 402	113 114 389	120 818 242	128 769 114	131 512 846
Domestic	**S/Total**	**521 137 480**	**552 649 271**	**562 373 011**	**593 236 417**	**603 438 666**	**628 406 010**	**637 534 977**	**665 337 526**	**695 312 108**	**709 996 334**
	209/210/215	112 774 786	120 955 747	123 349 367	128 173 353	134 994 679	141 782 150	148 771 677	156 682 954	165 190 210	171 297 446
	211/212/213/217	229 667 876	249 853 781	268 486 021	294 279 218	309 609 336	326 428 263	341 358 626	345 155 938	351 774 154	354 106 814
	221/223/225	77 245 034	102 223 854	117 323 826	124 465 164	127 419 209	139 885 527	171 561 185	190 535 666	218 429 411	255 369 420
	245	-	-	-	637 313	1 000 888	870 132	720 967	610 405	575 561	485 351
	250	-	-	-	644 755	1 066 803	1 166 605	2 119 401	2 672 928	3 614 383	5 422 608
Commercial	**S/Total**	**419 687 696**	**473 033 382**	**509 159 214**	**548 199 803**	**574 090 915**	**610 132 677**	**664 531 856**	**695 657 891**	**739 583 719**	**786 681 639**
	309/310/315	29 200 218	30 246 135	30 718 264	28 513 151	28 628 597	29 262 090	29 994 055	29 415 788	29 775 877	28 934 729
	311/313/341	181 866 412	191 234 778	202 713 958	188 243 326	207 843 899	213 991 175	219 142 884	221 458 832	242 898 421	247 542 144
	312/317	159 457 203	156 819 896	152 874 036	151 705 278	152 394 000	146 944 199	126 677 003	95 035 081	85 202 457	82 134 103
	320	2 146 515	5 938 941	6 534 770	6 633 483	10 885 470	13 269 854	6 883 153	1 587 638	1 222 407	1 409 209
	321/323/351	25 088 383	25 983 241	34 866 024	24 179 128	28 132 890	42 877 217	71 331 350	78 014 085	85 822 069	92 233 327
	322/325	92 324 845	95 643 504	105 066 538	117 991 348	142 640 327	153 262 042	160 903 691	151 449 328	156 972 316	146 502 036
	330	-	-	83 643	6 653 141	11 395 285	11 315 330	10 798 446	11 568 086	12 465 746	13 605 445
	340	803 558	1 625 662	1 960 589	3 695 081	4 933 649	6 099 986	7 732 269	6 750 914	7 149 621	7 800 242
	350	4 657 010	12 434 643	13 346 481	17 279 505	19 133 112	21 592 960	22 179 760	24 380 449	26 208 116	31 383 875
	411/421	2 736 168	3 436 435	4 080 646	4 048 069	4 966 457	2 518 625	1 993 228	2 930 994	4 096 240	3 361 103
	412/422	950 346	306 694	135 884	137 441	-	1 905 000	3 511 000	894 000	-	-
Industrial	**S/Total**	**499 230 658**	**523 669 929**	**552 380 833**	**549 078 951**	**610 953 686**	**643 038 478**	**661 146 839**	**623 485 195**	**651 813 270**	**654 906 213**
	511/515	27 447 489	26 930 954	23 662 450	26 754 142	28 706 528	28 170 230	25 806 116	20 447 412	23 814 590	22 490 994
Irrigation	**S/Total**	**27 447 489**	**26 930 954**	**23 662 450**	**26 754 142**	**28 706 528**	**28 170 230**	**25 806 116**	**20 447 412**	**23 814 590**	**22 490 994**
St. Lighting	510	21 841 034	27 610 698	30 566 442	31 603 845	32 615 970	33 147 726	33 979 768	33 303 230	30 901 976	24 359 470
Temporary	610/615	104 453	122 945	146 617	386 202	404 162	218 492	207 721	214 987	220 445	220 882
Miscellaneous		-	-	554 099	-	1 874 969	4 909 322	2 546 574	1 906 534	2 974 888	2 696 359
	S/Total	**21 945 487**	**27 733 643**	**31 267 158**	**31 990 047**	**34 895 101**	**38 275 540**	**36 734 063**	**35 424 751**	**34 097 310**	**27 276 711**
CEB		2 220 081	3 028 407	3 203 174	2 963 669	3 063 854	2 523 712	2 641 021	2 768 508	2 841 667	2 952 524
GRAND TOTAL		**1 491 668 891**	**1 607 045 586**	**1 682 045 840**	**1 752 223 029**	**1 855 148 750**	**1 950 546 647**	**2 028 394 872**	**2 043 121 283**	**2 147 462 664**	**2 204 304 415**