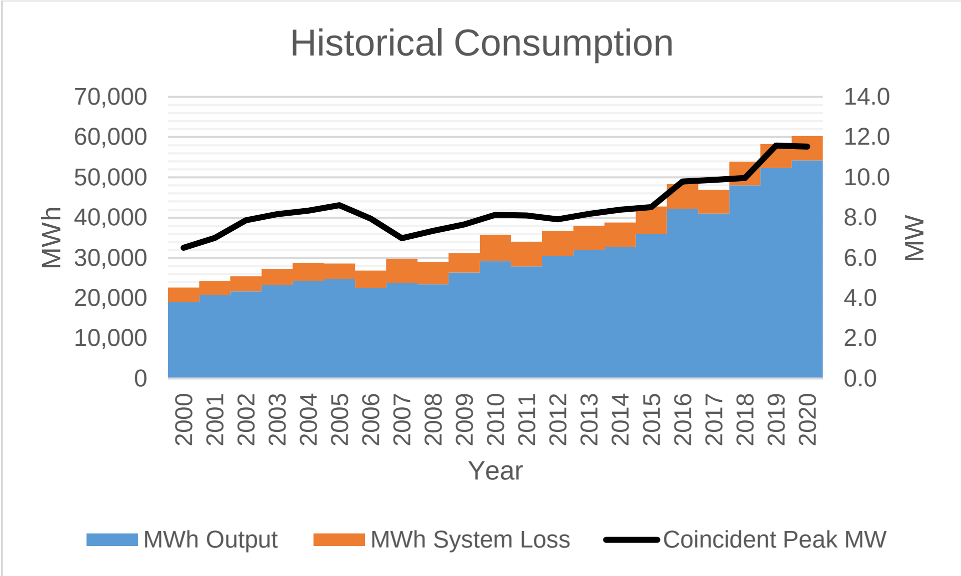
Power Supply Procurement Plan 2021

MARINDUQUE MAIN GRID

Historical Consumption Data

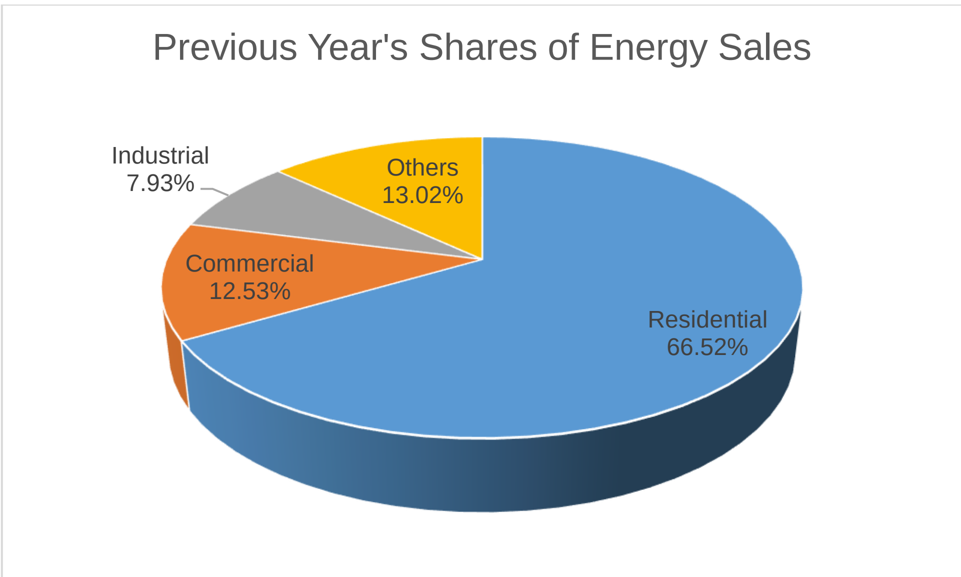
	Coincident Peak MW	MWh Offtake	MWh Input	MWh Output	MWh System Loss	Load Factor	System Loss
2000	6.50	22,578	22,578	18,988	3,590	40%	15.90%
2001	6.99	24,319	24,319	20,703	3,616	40%	14.87%
2002	7.87	25,406	25,406	21,649	3,757	37%	14.79%
2003	8.18	27,196	27,196	23,270	3,926	38%	14.44%
2004	8.34	28,717	28,717	24,200	4,517	39%	15.73%
2005	8.62	28,593	28,593	24,727	3,866	38%	13.52%
2006	7.95	26,836	26,836	22,542	4,294	39%	16.00%
2007	6.97	29,815	29,815	23,697	6,118	49%	20.52%
2008	7.33	28,977	28,977	23,398	5,579	45%	19.25%
2009	7.66	31,161	31,161	26,365	4,796	46%	15.39%
2010	8.13	35,692	35,692	29,163	6,529	50%	18.29%
2011	8.10	33,890	33,890	27,859	6,031	48%	17.80%
2012	7.92	36,723	36,723	30,460	6,264	53%	17.06%
2013	8.19	37,875	37,875	31,914	5,961	53%	15.74%
2014	8.40	38,764	38,764	32,730	6,035	53%	15.57%
2015	8.52	42,780	42,780	35,871	6,910	57%	16.15%
2016	9.79	48,296	48,296	42,218	6,078	56%	12.58%
2017	9.88	46,859	46,859	41,007	5,851	54%	12.49%
2018	9.96	53,896	53,896	48,012	5,883	62%	10.92%
2019	11.58	58,297	58,297	52,314	5,983	57%	10.26%
2020	11.53	60,261	60,261	54,220	6,041	60%	10.02%

Peak Demand increased from 7.92 MW in 2012 to 11.58 MW in 2019 at a rate of 5.76% due to additional customer connections specially commercial and industrial establishments. However, it decreased on 2020 due to community quarantine restrictions caused by the pandemic. MWh Offtake increased from 36,723 MWh in 2012 to 60,261 MWh in 2020 at a rate of 6.54% due to increase in the demand of customers and additional connections. Within the same period, Load Factor ranged from 53% to 62%. There was an abrupt change in consumption on 2019 due to increased number of customer connection and due to shifting from 11 hours to 24 hours of two Islets (Polo and Maniwaya) thru connection to Marinduque Main Grid. Pandemic caused peak demand to decrease and cause only a little increase in the MWh offtake. Historical consumption data of Polo and Maniwaya were included in this data due to their connectivity to Marinduque main grid.

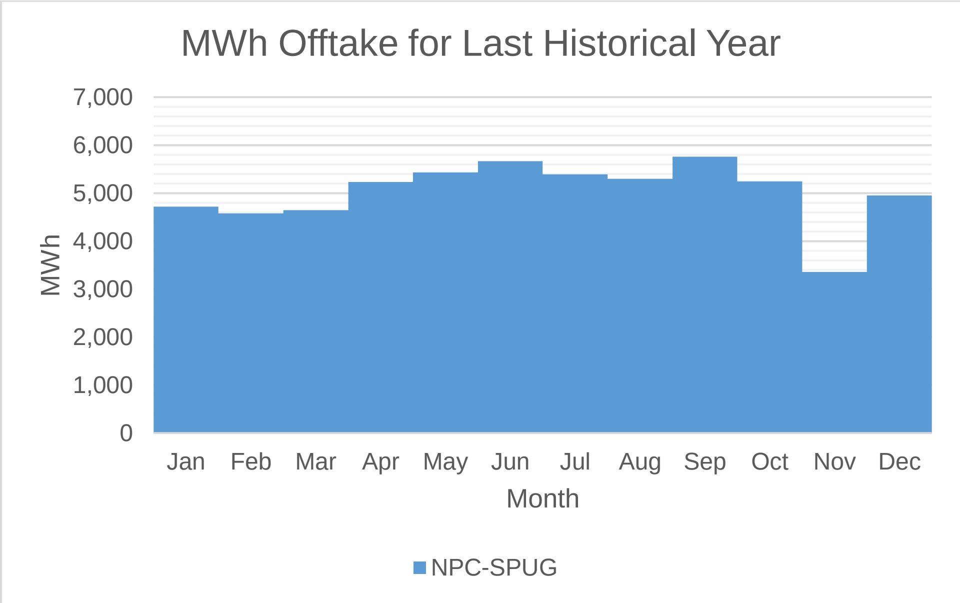


MWh Output increased from year 2019 to year 2020 at a rate of 3.37%, while MWh System Loss decreased at a rate of 2.33% within the same period.

Historically, System Loss ranged from 10.02% to 20.52%. System Loss peaked at 20.52% on year 2007 because of typhoon Reming which hit the province on November 2006.

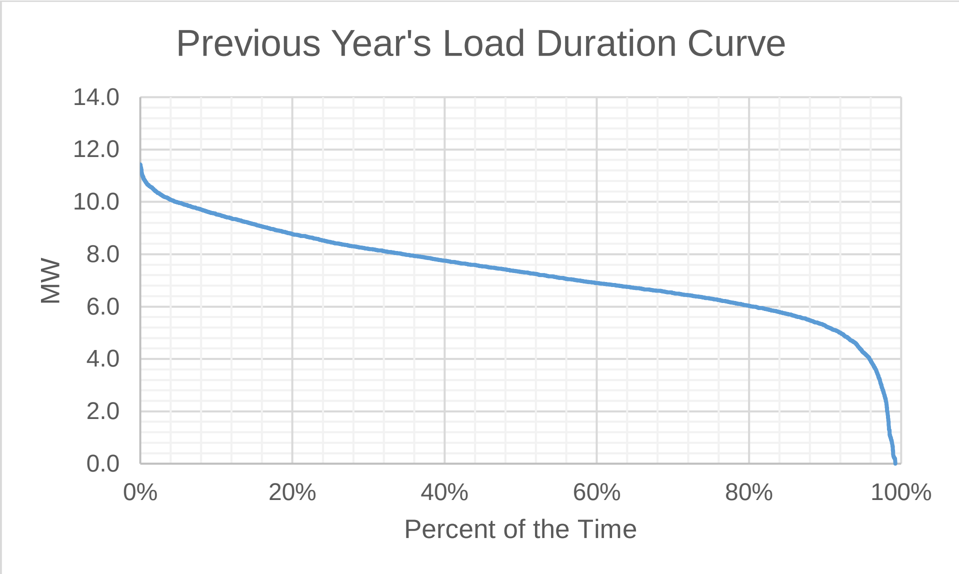


Residential customers account for the bulk of energy sales at 66.52% due to the high number of connections. In contrast, Street Light customers accounted for only 0.472% of energy sales due to the low number of connections, similarly the typical street lights are consist of low power bulbs and has limited time of use.

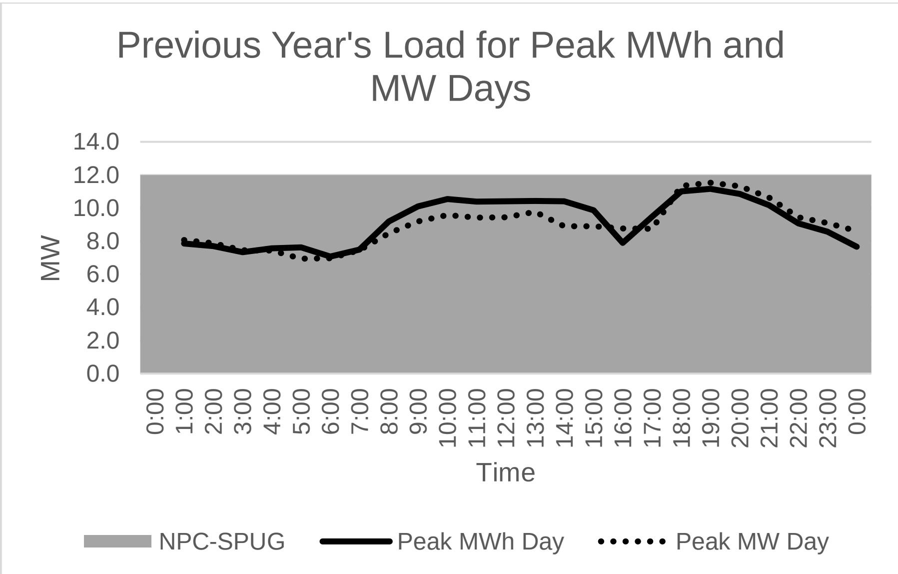


For 2020, the total Offtake for the last historical year was lower than the quantity stipulated in the PSA but still maintain or within the +/- 10% bandwidth based on the PSA with NPC-SPUG accounts for all of MWh Offtake.

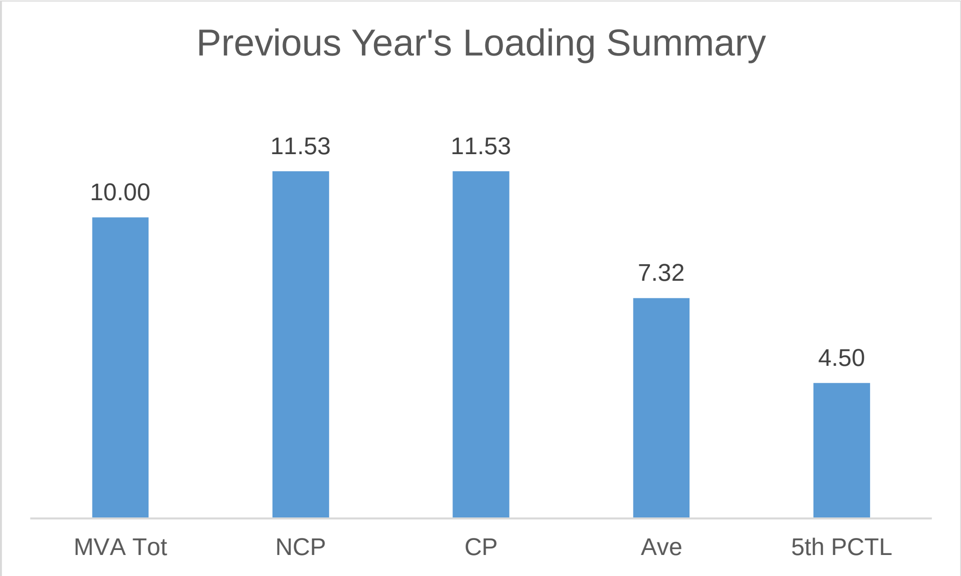
Previous Year's Load Profile



Based on the Load Duration Curve, the minimum load was 0 MW due to total power interruptions cause by plant trouble in NPC generation plant and also the calamity which was perennially experienced by the province. Since it is not in normal condition, we used the actual minimum demand of 4.5 MW occurred during normal operation as stated in Previous Year's Loading Summary whereas the maximum load is 11.53 MW for the last historical year.



Peak MW was occurred on May 11, 2020 with a recorded of 11.53 MW and peak daily MWh that was occurred on September 7, 2020 was 10.85 MWh As shown in the Load Curves, the available supply is higher than the Peak Demand but sometimes deficient due to failure of some generating units of NPC.



The Non-coincident Peak Demand was 11.53 MW, which is around 112% of the total substation capacity of 10 MVA which is not operational at a power factor of 98%. The load factor or the ratio between the Average Load of 7.32 MW and the Non-coincident Peak Demand was 63.51%. A safe estimate of the true minimum load is the fifth percentile load of 4.5 MW which is 39.03% of the Non-coincident Peak Demand.

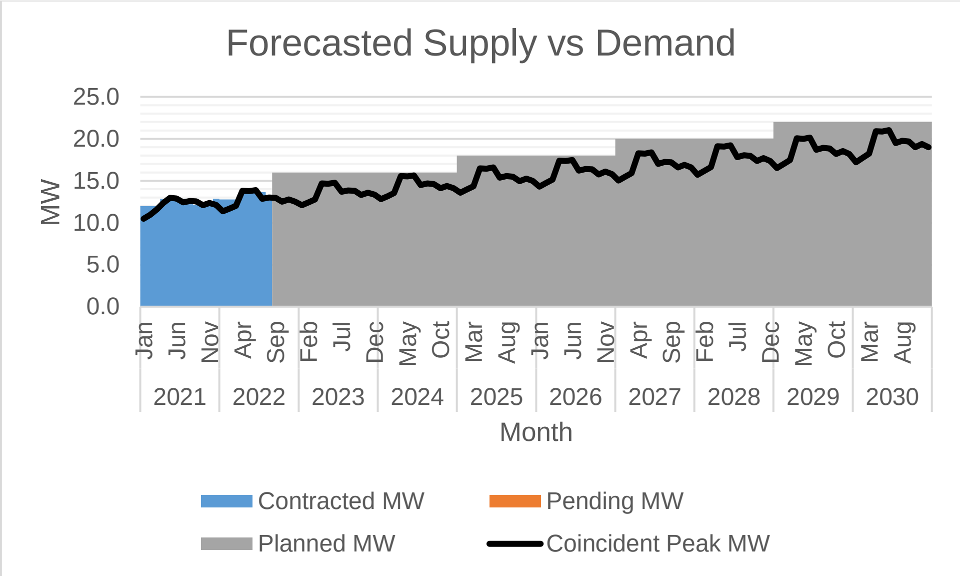
Forecasted Consumption Data

		Coincident Peak MW	Contracted MW	Pending MW	Planned MW	Existing Contracting Level	Target Contracting Level	MW Surplus / Deficit
2021	Jan	10.48	11.99	0.00	0.000	114%	114%	1.51
	Feb	10.94	11.99	0.00	0.000	110%	110%	1.05
	Mar	11.58	11.98	0.00	0.000	103%	103%	0.40
	Apr	12.37	12.86	0.00	0.000	104%	104%	0.49
	May	12.97	12.68	0.00	0.000	98%	98%	-0.29
	Jun	12.88	12.86	0.00	0.000	100%	100%	-0.02
	Jul	12.43	12.86	0.00	0.000	103%	103%	0.43
	Aug	12.59	12.21	0.00	0.000	97%	97%	-0.38
	Sep	12.54	12.08	0.00	0.000	96%	96%	-0.46
	Oct	12.11	12.01	0.00	0.000	99%	99%	-0.10
	Nov	12.35	12.01	0.00	0.000	97%	97%	-0.34
	Dec	12.12	12.86	0.00	0.000	106%	106%	0.74
2022	Jan	11.35	12.77	0.00	0.000	112%	112%	1.42
	Feb	11.68	12.76	0.00	0.000	109%	109%	1.08
	Mar	12.01	12.76	0.00	0.000	106%	106%	0.75
	Apr	13.79	13.70	0.00	0.000	99%	99%	-0.09
	May	13.76	13.48	0.00	0.000	98%	98%	-0.28
	Jun	13.87	13.67	0.00	0.000	99%	99%	-0.20
	Jul	12.85	13.66	0.00	0.000	106%	106%	0.81
	Aug	13.02	12.93	0.00	0.000	99%	99%	-0.09
	Sep	12.97	0.00	0.00	16.000	0%	123%	3.03
	Oct	12.51	0.00	0.00	16.000	0%	128%	3.49
	Nov	12.77	0.00	0.00	16.000	0%	125%	3.23
	Dec	12.53	0.00	0.00	16.000	0%	128%	3.47
2023	Jan	12.09	0.00	0.00	16.000	0%	132%	3.91
	Feb	12.44	0.00	0.00	16.000	0%	129%	3.56
	Mar	12.79	0.00	0.00	16.000	0%	125%	3.21
	Apr	14.69	0.00	0.00	16.000	0%	109%	1.31
	May	14.66	0.00	0.00	16.000	0%	109%	1.34
	Jun	14.77	0.00	0.00	16.000	0%	108%	1.23
	Jul	13.69	0.00	0.00	16.000	0%	117%	2.31
	Aug	13.87	0.00	0.00	16.000	0%	115%	2.13
	Sep	13.81	0.00	0.00	16.000	0%	116%	2.19
	Oct	13.33	0.00	0.00	16.000	0%	120%	2.67
	Nov	13.60	0.00	0.00	16.000	0%	118%	2.40
	Dec	13.34	0.00	0.00	16.000	0%	120%	2.66
2024	Jan	12.80	0.00	0.00	16.000	0%	125%	3.20
	Feb	13.17	0.00	0.00	16.000	0%	121%	2.83
	Mar	13.54	0.00	0.00	16.000	0%	118%	2.46
	Apr	15.55	0.00	0.00	16.000	0%	103%	0.45
	May	15.51	0.00	0.00	16.000	0%	103%	0.49
	Jun	15.63	0.00	0.00	16.000	0%	102%	0.37
	Jul	14.49	0.00	0.00	16.000	0%	110%	1.51
	Aug	14.67	0.00	0.00	16.000	0%	109%	1.33

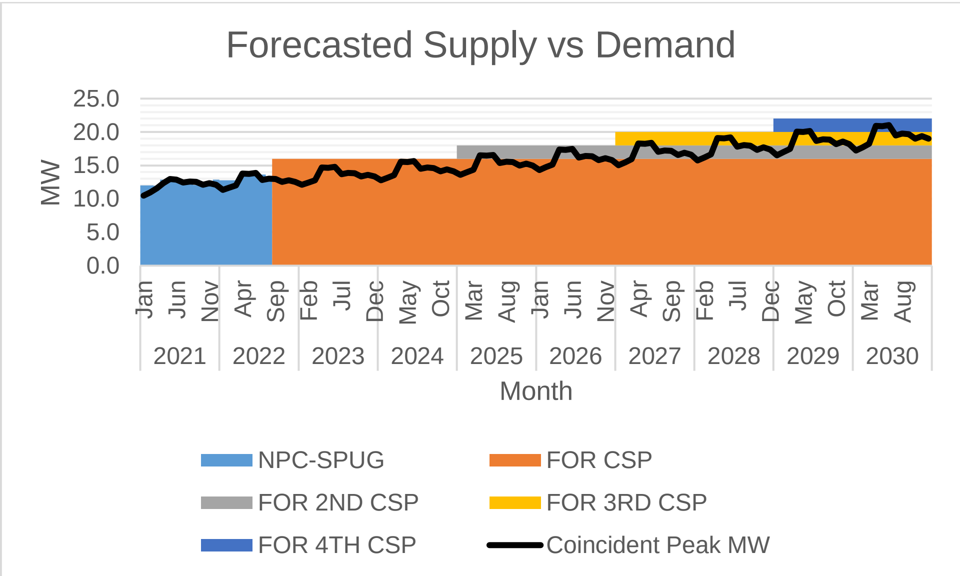
	Sep	14.62	0.00	0.00	16.000	0%	109%	1.38
	Oct	14.11	0.00	0.00	16.000	0%	113%	1.89
	Nov	14.39	0.00	0.00	16.000	0%	111%	1.61
	Dec	14.12	0.00	0.00	16.000	0%	113%	1.88
2025	Jan	13.57	0.00	0.00	18.000	0%	133%	4.43
	Feb	13.97	0.00	0.00	18.000	0%	129%	4.03
	Mar	14.36	0.00	0.00	18.000	0%	125%	3.64
	Apr	16.49	0.00	0.00	18.000	0%	109%	1.51
	May	16.45	0.00	0.00	18.000	0%	109%	1.55
	Jun	16.58	0.00	0.00	18.000	0%	109%	1.42
	Jul	15.36	0.00	0.00	18.000	0%	117%	2.64
	Aug	15.56	0.00	0.00	18.000	0%	116%	2.44
	Sep	15.51	0.00	0.00	18.000	0%	116%	2.49
	Oct	14.96	0.00	0.00	18.000	0%	120%	3.04
	Nov	15.26	0.00	0.00	18.000	0%	118%	2.74
	Dec	14.98	0.00	0.00	18.000	0%	120%	3.02
2026	Jan	14.31	0.00	0.00	18.000	0%	126%	3.69
	Feb	14.73	0.00	0.00	18.000	0%	122%	3.27
	Mar	15.14	0.00	0.00	18.000	0%	119%	2.86
	Apr	17.39	0.00	0.00	18.000	0%	104%	0.61
	May	17.34	0.00	0.00	18.000	0%	104%	0.66
	Jun	17.48	0.00	0.00	18.000	0%	103%	0.52
	Jul	16.20	0.00	0.00	18.000	0%	111%	1.80
	Aug	16.41	0.00	0.00	18.000	0%	110%	1.59
	Sep	16.35	0.00	0.00	18.000	0%	110%	1.65
	Oct	15.77	0.00	0.00	18.000	0%	114%	2.23
	Nov	16.09	0.00	0.00	18.000	0%	112%	1.91
	Dec	15.79	0.00	0.00	18.000	0%	114%	2.21
2027	Jan	15.05	0.00	0.00	20.000	0%	133%	4.95
	Feb	15.48	0.00	0.00	20.000	0%	129%	4.52
	Mar	15.92	0.00	0.00	20.000	0%	126%	4.08
	Apr	18.28	0.00	0.00	20.000	0%	109%	1.72
	May	18.23	0.00	0.00	20.000	0%	110%	1.77
	Jun	18.38	0.00	0.00	20.000	0%	109%	1.62
	Jul	17.03	0.00	0.00	20.000	0%	117%	2.97
	Aug	17.25	0.00	0.00	20.000	0%	116%	2.75
	Sep	17.19	0.00	0.00	20.000	0%	116%	2.81
	Oct	16.58	0.00	0.00	20.000	0%	121%	3.42
	Nov	16.92	0.00	0.00	20.000	0%	118%	3.08
	Dec	16.60	0.00	0.00	20.000	0%	120%	3.40
2028	Jan	15.73	0.00	0.00	20.000	0%	127%	4.27
	Feb	16.19	0.00	0.00	20.000	0%	124%	3.81
	Mar	16.65	0.00	0.00	20.000	0%	120%	3.35
	Apr	19.12	0.00	0.00	20.000	0%	105%	0.88
	May	19.07	0.00	0.00	20.000	0%	105%	0.93
	Jun	19.22	0.00	0.00	20.000	0%	104%	0.78
	Jul	17.81	0.00	0.00	20.000	0%	112%	2.19
	Aug	18.04	0.00	0.00	20.000	0%	111%	1.96
	Sep	17.97	0.00	0.00	20.000	0%	111%	2.03

	Oct	17.34	0.00	0.00	20.000	0%	115%	2.66
	Nov	17.69	0.00	0.00	20.000	0%	113%	2.31
	Dec	17.36	0.00	0.00	20.000	0%	115%	2.64
2029	Jan	16.50	0.00	0.00	22.000	0%	133%	5.50
	Feb	16.98	0.00	0.00	22.000	0%	130%	5.02
	Mar	17.46	0.00	0.00	22.000	0%	126%	4.54
	Apr	20.05	0.00	0.00	22.000	0%	110%	1.95
	May	20.00	0.00	0.00	22.000	0%	110%	2.00
	Jun	20.16	0.00	0.00	22.000	0%	109%	1.84
	Jul	18.68	0.00	0.00	22.000	0%	118%	3.32
	Aug	18.92	0.00	0.00	22.000	0%	116%	3.08
	Sep	18.85	0.00	0.00	22.000	0%	117%	3.15
	Oct	18.19	0.00	0.00	22.000	0%	121%	3.81
	Nov	18.56	0.00	0.00	22.000	0%	119%	3.44
	Dec	18.21	0.00	0.00	22.000	0%	121%	3.79
2030	Jan	17.22	0.00	0.00	22.000	0%	128%	4.78
	Feb	17.72	0.00	0.00	22.000	0%	124%	4.28
	Mar	18.22	0.00	0.00	22.000	0%	121%	3.78
	Apr	20.93	0.00	0.00	22.000	0%	105%	1.07
	May	20.87	0.00	0.00	22.000	0%	105%	1.13
	Jun	21.04	0.00	0.00	22.000	0%	105%	0.96
	Jul	19.49	0.00	0.00	22.000	0%	113%	2.51
	Aug	19.75	0.00	0.00	22.000	0%	111%	2.25
	Sep	19.67	0.00	0.00	22.000	0%	112%	2.33
	Oct	18.98	0.00	0.00	22.000	0%	116%	3.02
	Nov	19.37	0.00	0.00	22.000	0%	114%	2.63
	Dec	19.00	0.00	0.00	22.000	0%	116%	3.00

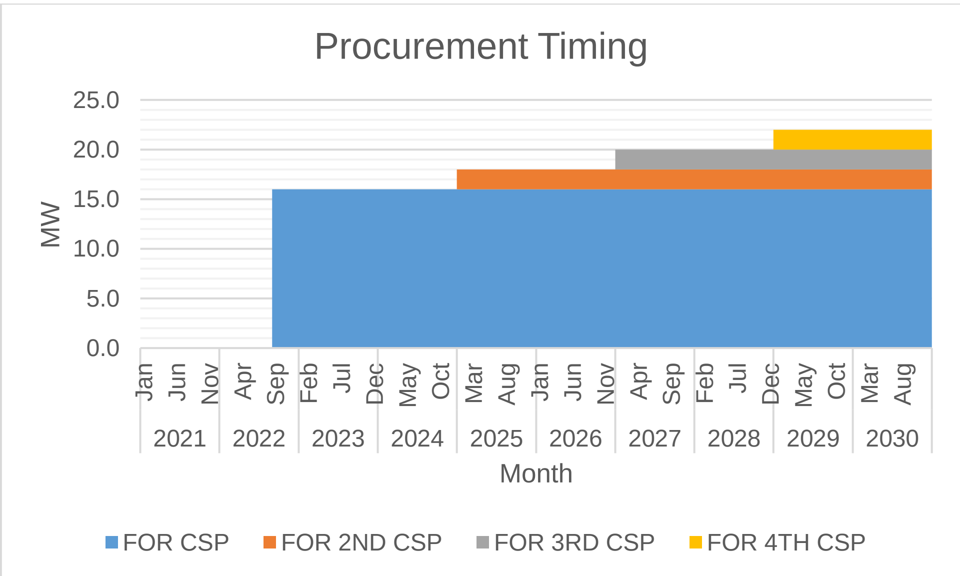
The Peak Demand was forecasted using the historical data and forecasting models developed and was assumed to occur on the month of April to June due to celebration of Holy Week where many tourist visits Marinduque and due to summer vacation. Monthly Peak Demand is at its lowest on the month of January due to reduced load because of the cold weather. In general, Peak Demand is expected to grow at a rate of 6.22% annually.



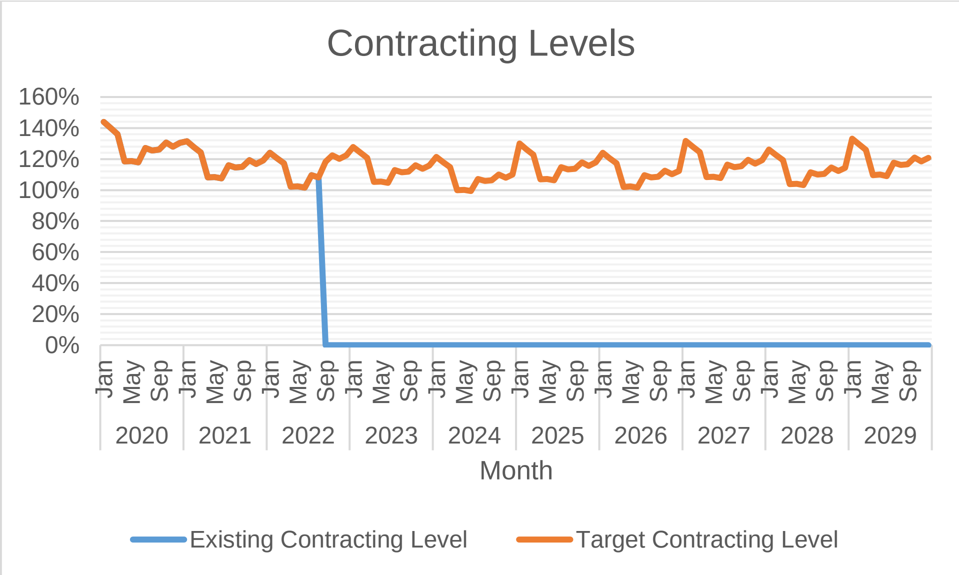
The available supply is generally above the Peak Demand. This is because of N-1 requirements to ensure continuous supply of power to the main grid.



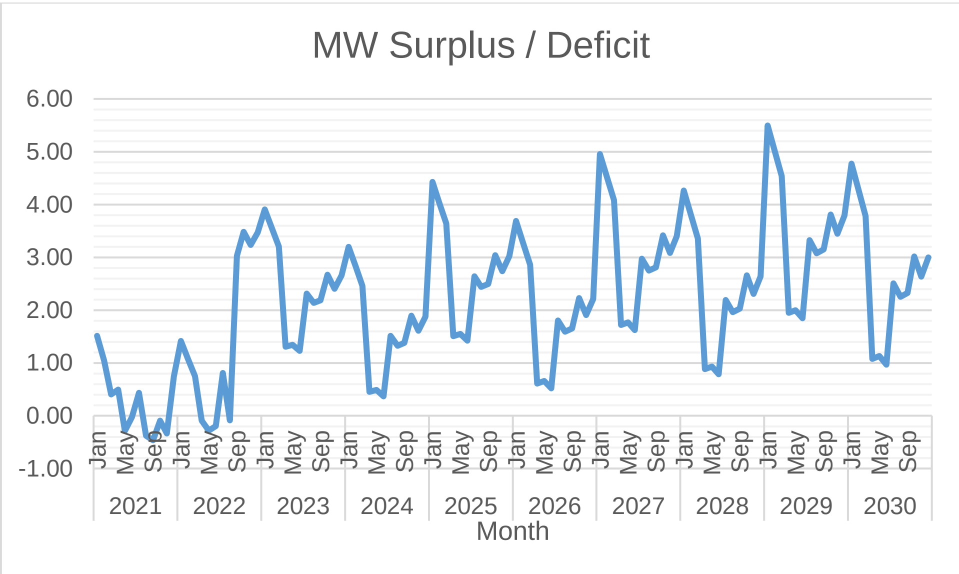
Of the available supply, the largest is 22 MW from January 2029. This is followed by 20 MW from January 2027.



The first wave of supply procurement will be for 16 MW planned to be available by the month of September 2022. This will be followed by additional 2 MW on January 2025.



Currently, the actual demand is within the bandwidth of +/- 10% of the contracted demand. The highest target contracting level is 133% which is expected to occur on January 2025. The lowest target contracting level is 96% which is expected to occur on September 2021.



Currently, the actual demand is within the bandwidth of +/- 10% of the contracted demand. The highest surplus is 5.5 MW which is expected to occur on the month of January 2029. The highest deficit is 0.46 MW which is expected to occur on the month of September 2021.

		MWh Offtake	**MWh Output**	**MWh System Loss**	**System Loss**
2021	Jan	4,693	4,224	469	10.00%
	Feb	4,704	4,233	470	10.00%
	Mar	4,644	4,179	464	10.00%
	Apr	6,180	5,562	618	10.00%

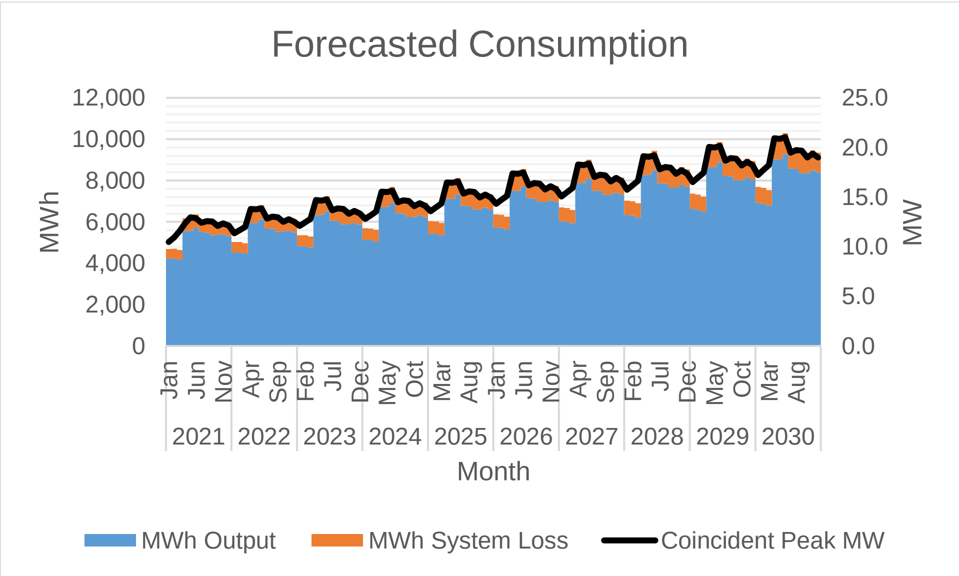
	May	6,187	5,568	619	10.00%
	Jun	6,366	5,730	637	10.00%
	Jul	6,121	5,509	612	10.00%
	Aug	6,088	5,480	609	10.00%
	Sep	5,949	5,354	595	10.00%
	Oct	5,973	5,376	597	10.00%
	Nov	5,997	5,397	600	10.00%
	Dec	5,899	5,309	590	10.00%
2022	Jan	5,026	4,524	503	10.00%
	Feb	5,030	4,527	503	10.00%
	Mar	4,965	4,469	497	10.00%
	Apr	6,609	5,948	661	10.00%
	May	6,618	5,956	662	10.00%
	Jun	6,807	6,126	681	10.00%
	Jul	6,318	5,686	632	10.00%
	Aug	6,291	5,662	629	10.00%
	Sep	6,144	5,530	614	10.00%
	Oct	6,157	5,541	616	10.00%
	Nov	6,199	5,579	620	10.00%
	Dec	6,110	5,499	611	10.00%
2023	Jan	5,361	4,825	536	10.00%
	Feb	5,358	4,822	536	10.00%
	Mar	5,289	4,760	529	10.00%
	Apr	7,038	6,334	704	10.00%
	May	7,051	6,346	705	10.00%
	Jun	7,248	6,523	725	10.00%
	Jul	6,725	6,052	672	10.00%
	Aug	6,698	6,028	670	10.00%
	Sep	6,542	5,888	654	10.00%
	Oct	6,553	5,897	655	10.00%
	Nov	6,606	5,946	661	10.00%
	Dec	6,515	5,864	652	10.00%
2024	Jan	5,697	5,127	570	10.00%
	Feb	5,686	5,118	569	10.00%
	Mar	5,613	5,052	561	10.00%
	Apr	7,467	6,720	747	10.00%
	May	7,483	6,735	748	10.00%
	Jun	7,689	6,920	769	10.00%
	Jul	7,131	6,418	713	10.00%
	Aug	7,105	6,395	711	10.00%
	Sep	6,939	6,245	694	10.00%
	Oct	6,949	6,254	695	10.00%
	Nov	7,015	6,314	702	10.00%
	Dec	6,922	6,230	692	10.00%
2025	Jan	6,032	5,429	603	10.00%
	Feb	6,015	5,414	602	10.00%
	Mar	5,937	5,343	594	10.00%
	Apr	7,896	7,106	790	10.00%
	May	7,915	7,123	791	10.00%

	Jun	8,129	7,316	813	10.00%
	Jul	7,537	6,783	754	10.00%
	Aug	7,511	6,760	751	10.00%
	Sep	7,336	6,603	734	10.00%
	Oct	7,344	6,610	734	10.00%
	Nov	7,425	6,682	742	10.00%
	Dec	7,329	6,596	733	10.00%
2026	Jan	6,367	5,730	637	10.00%
	Feb	6,344	5,709	634	10.00%
	Mar	6,261	5,635	626	10.00%
	Apr	8,323	7,490	832	10.00%
	May	8,344	7,510	834	10.00%
	Jun	8,568	7,711	857	10.00%
	Jul	7,941	7,147	794	10.00%
	Aug	7,916	7,125	792	10.00%
	Sep	7,732	6,959	773	10.00%
	Oct	7,738	6,965	774	10.00%
	Nov	7,834	7,050	783	10.00%
	Dec	7,736	6,963	774	10.00%
2027	Jan	6,700	6,030	670	10.00%
	Feb	6,671	6,004	667	10.00%
	Mar	6,584	5,925	658	10.00%
	Apr	8,748	7,873	875	10.00%
	May	8,772	7,895	877	10.00%
	Jun	9,004	8,103	900	10.00%
	Jul	8,343	7,509	834	10.00%
	Aug	8,320	7,488	832	10.00%
	Sep	8,126	7,313	813	10.00%
	Oct	8,131	7,318	813	10.00%
	Nov	8,241	7,417	824	10.00%
	Dec	8,142	7,328	814	10.00%
2028	Jan	7,032	6,329	703	10.00%
	Feb	6,997	6,298	700	10.00%
	Mar	6,905	6,215	691	10.00%
	Apr	9,171	8,253	917	10.00%
	May	9,197	8,277	920	10.00%
	Jun	9,437	8,493	944	10.00%
	Jul	8,744	7,869	874	10.00%
	Aug	8,720	7,848	872	10.00%
	Sep	8,518	7,666	852	10.00%
	Oct	8,522	7,670	852	10.00%
	Nov	8,647	7,783	865	10.00%
	Dec	8,545	7,691	855	10.00%
2029	Jan	7,361	6,625	736	10.00%
	Feb	7,321	6,589	732	10.00%
	Mar	7,225	6,502	722	10.00%
	Apr	9,590	8,631	959	10.00%
	May	9,618	8,656	962	10.00%
	Jun	9,868	8,881	987	10.00%

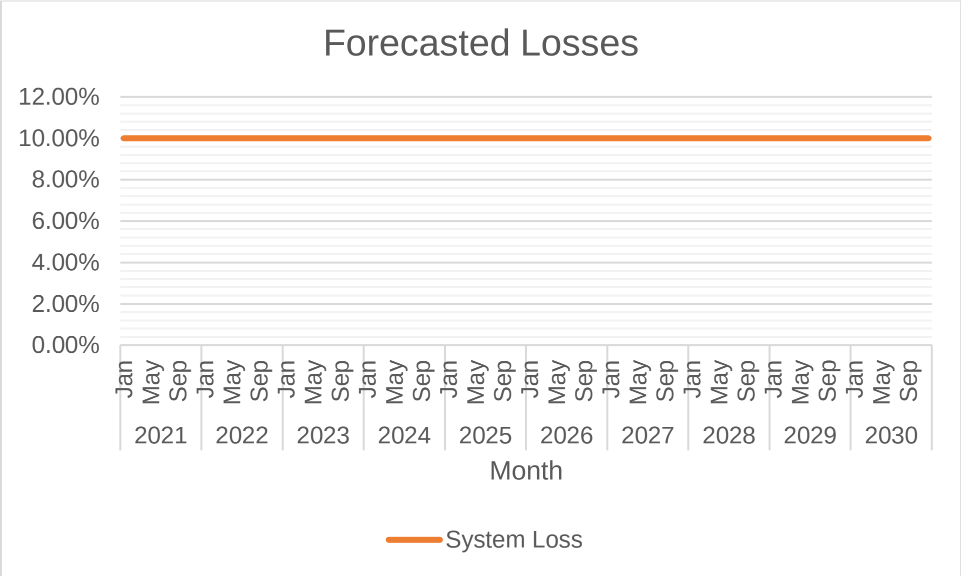
	Jul	9,141	8,227	914	10.00%
	Aug	9,118	8,207	912	10.00%
	Sep	8,907	8,016	891	10.00%
	Oct	8,911	8,020	891	10.00%
	Nov	9,051	8,145	905	10.00%
	Dec	8,946	8,052	895	10.00%
2030	Jan	7,687	6,918	769	10.00%
	Feb	7,643	6,878	764	10.00%
	Mar	7,542	6,787	754	10.00%
	Apr	10,007	9,006	1,001	10.00%
	May	10,036	9,033	1,004	10.00%
	Jun	10,294	9,265	1,029	10.00%
	Jul	9,535	8,582	954	10.00%
	Aug	9,513	8,562	951	10.00%
	Sep	9,293	8,364	929	10.00%
	Oct	9,296	8,366	930	10.00%
	Nov	9,451	8,505	945	10.00%
	Dec	9,344	8,409	934	10.00%

MWh Offtake was forecasted using the forecasting models and the historical data. The assumed load factor is 59.50% based on 2020 system load factor.

System Loss was calculated through a Load Flow Study conducted on 2017 using Synergee software. Based on the same study, the Distribution System can adequately convey electricity to customers.



MWh Output was expected to grow at a rate of 6.20% annually.



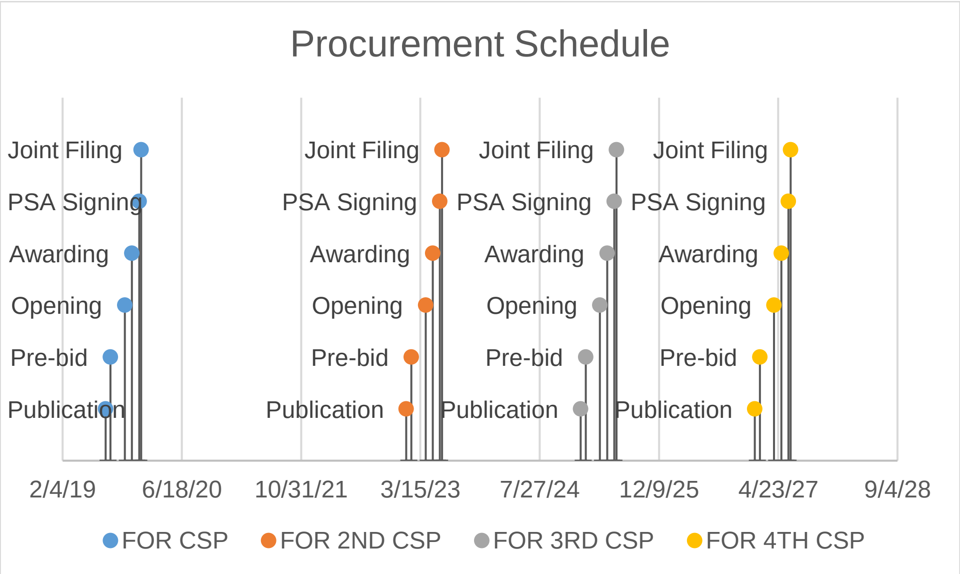
System Loss is expected to maintain or decrease to 10% if the proposed CAPEX projects will be approved and fully implemented.

Power Supply

Case No.	Type	GenCo	Minimum MW	Minimum MWh/yr	PSA Start	PSA End
NPC-SPUG	Base	National Power Corporation	10.16	58,978	8/26/2019	8/25/2022

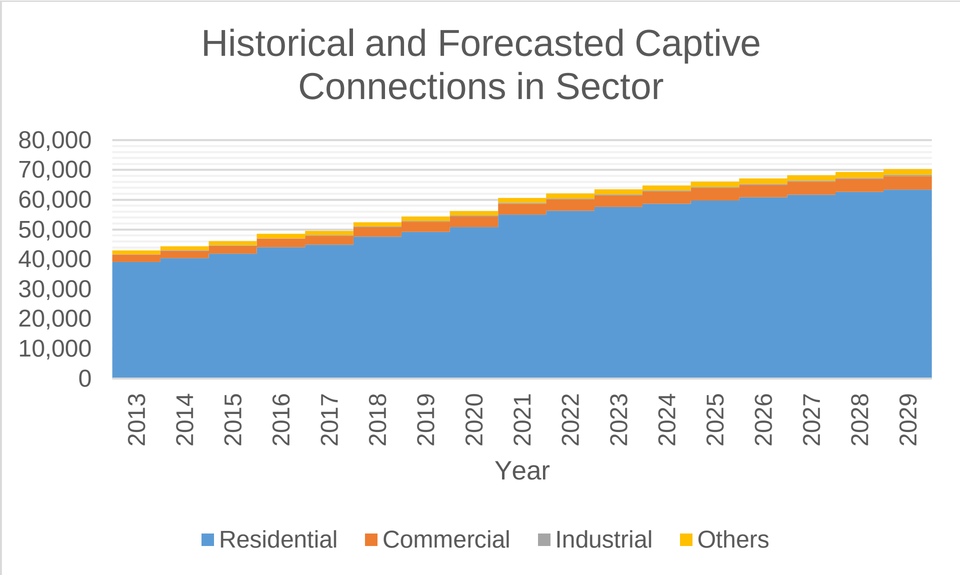
The 2019-2022 PSA with NPC through Missionary Electrification Program was an extension of the previous PSA to give an ample time to the conduct of CSP which is expected to be completed/put on operation on September 2022.

	FOR CSP	FOR 2ND CSP	FOR 3RD CSP	FOR 4TH CSP
Type	Base	Intermediate	Intermediate	Intermediate
Minimum MW	16.00	2.00	2.00	2.00
Minimum MWh/yr	50,038	3,060	3,040	3,003
PSA Start	9/1/2022	1/1/2025	1/1/2027	1/1/2029
PSA End	12/31/2037	12/31/2039	12/31/2041	12/31/2043
Publication	8/3/2019	1/15/2023	1/15/2025	1/15/2027
Pre-bid	8/24/2019	2/5/2023	2/5/2025	2/5/2027
Opening	10/23/2019	4/6/2023	4/6/2025	4/6/2027
Awarding	11/22/2019	5/6/2023	5/6/2025	5/6/2027
PSA Signing	12/22/2019	6/5/2023	6/5/2025	6/5/2027
Joint Filing	12/31/2019	6/14/2023	6/14/2025	6/14/2027



For the procurement of 16 MW of supply which was planned to be available on September 2022, the first publication or launch of CSP was held last August 28, 2019. The schedule was deferred due to pandemic and issue on UCME graduation. As of now, Marelco is now waiting for the DOE's advice since there's an interconnection proposal of Marinduque Grid to Luzon Grid which was a result of Power Summit conducted in Marinduque. On the other hand, NGCP is now on its rate application to ERC for the said interconnection of Marinduque to the Luzon Grid. Marelco is now preparing requirements for the renewal of the PSA with NPC to secure power supply while the proposed interconnection was on process or if the CSP will be continued.

Captive Customer Connections



The number of Residential connections which has greater contribution on the kWh consumption is expected to grow at a rate of 2.43% annually. Said customer class is expected to account 67.49% of the total consumption.