



Plan de Expansión del Sistema Interconectado Nacional 2020 – 2034

Tomo I
Estudios Básicos

ANEXO TOMO I – 3

“Cuadros Soporte y Detalles
de Cálculo”

ANEXO I -3

CUADROS SOPORTE Y DETALLE DE CÁLCULOS

Cuadro No.1: Tasa de natalidad por mil habitantes.

Cuadro No.2: Precios Históricos del Crudo.

Cuadro No.2 - A: Precios Históricos del Crudo.

Cuadro No.2 - B: Precios Históricos del Crudo.

Cuadro No.2 - C: Precios Históricos del Crudo.

Cuadro No.3: Estimación y proyecciones de la población a largo plazo.1950 -2100.

Cuadro No.3 - A: Estimación y proyecciones de la población a largo plazo.1950 -2100.
Continuación.

Cuadro No.4: PIB Mundial.

Cuadro No.5: Índice de Precios al Consumidor.

Cuadro No.6: Poder Adquisitivo.

Cuadro No.7: Trabajadores Suspendidos.

Cuadro No.8: Producto Interno Bruto 2001-2019.

Cuadro No.9: Producto Interno Bruto y Consumo en GWh 2001-2019.

Cuadro No.10: Consumo por sector residencial, comercial, industrial y alumbrado.

Cuadro No.11: Demanda Máxima del Sistema Eléctrico Panameño.

Cuadro No.12: Factor de Carga, Energía Consumida y Tarifa Media de Distribuidoras Real.

Cuadro No.13: Perdidas por distribuidora.

Cuadro No.14: Demanda Máxima del Sistema Eléctrico Panameño.

Cuadro No.15: Resultado de proyecciones por escenario del ME – SiProDe (energía).

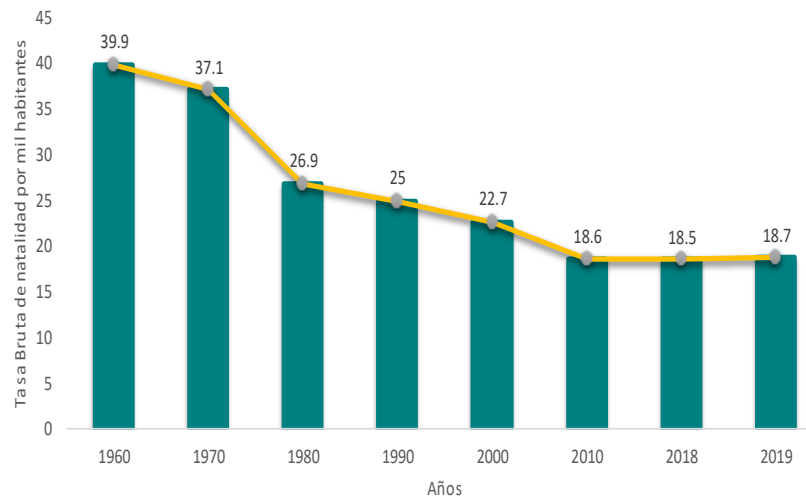
Cuadro No.16: Resultado de proyecciones por escenario del ME – SiProDe (potencia).

Cuadro No.1: Tasa de natalidad por mil habitantes.

TASA BRUTA DE NATALIDAD Y TASA DE MORTALIDAD FETAL EN LA REPÚBLICA: AÑOS 1960, 1970, 1980, 1990, 2000, 2010 Y 2017

Años	Tasa Bruta de natalidad por mil habitantes
1960	39.9
1970	37.1
1980	26.9
1990	25
2000	22.7
2010	18.6
2018	18.5
2019	18.7

TASA BRUTA DE NATALIDAD POR MIL HABITANTES

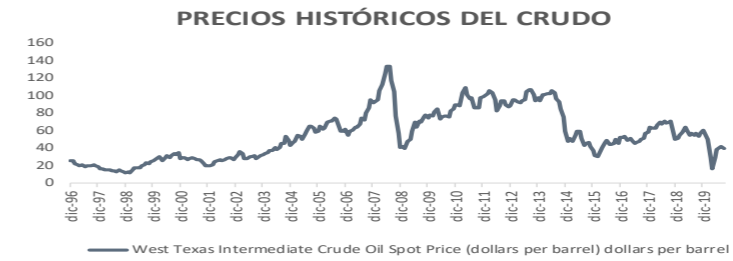


Fuente:

https://www.inec.gob.pa/publicaciones/Default3.aspx?ID_PUBLICACION=974&ID_CATEGORIA=3&ID_SUBCATEGORIA=6

Cuadro No.2: Precios Históricos del Crudo.

Mes	Precios Históricos del Crudo	
	U.S. Liquid Fuels Consumption (million barrels per day) million barrels per day	West Texas Intermediate Crude Oil Spot Price (dollars per barrel) dollars per barrel
dic-96	18.33	25.23
ene-97	18.56	25.13
feb-97	18.4	22.18
mar-97	17.86	20.96
abr-97	18.56	19.7
may-97	18.29	20.82
jun-97	18.62	19.26
jul-97	19.11	19.66
ago-97	18.57	19.95
sep-97	18.56	19.8
oct-97	19.07	21.32
nov-97	18.58	20.19
dic-97	19.25	18.33
ene-98	18.36	16.72
feb-98	18.32	16.06
mar-98	18.68	15.12
abr-98	19.05	15.35
may-98	18.37	14.91
jun-98	19.18	13.72
jul-98	19.47	14.17
ago-98	19.34	13.47
sep-98	18.9	15.03
oct-98	19.19	14.46
nov-98	18.67	13
dic-98	19.42	11.35
ene-99	19.03	12.52
feb-99	19.11	12.01
mar-99	19.5	14.68
abr-99	19.15	17.31
may-99	18.71	17.72
jun-99	19.83	17.92
jul-99	19.82	20.1
ago-99	20.09	21.28
sep-99	19.49	23.8
oct-99	19.87	22.69
nov-99	19.09	25
dic-99	20.5	26.1
ene-00	19.03	27.26
feb-00	19.63	29.37
mar-00	19.22	29.84
abr-00	18.82	25.72
may-00	19.61	28.79
jun-00	20.05	31.82
jul-00	19.7	29.7
ago-00	20.49	31.26
sep-00	19.9	33.88
oct-00	19.8	33.11
nov-00	19.33	34.42
dic-00	20.82	28.44
ene-01	20.09	29.59
feb-01	19.69	29.61
mar-01	19.87	27.25
abr-01	19.73	27.49
may-01	19.5	28.63
jun-01	19.56	27.6
jul-01	19.92	26.43
ago-01	20.15	27.37
sep-01	19.02	26.2
oct-01	19.82	22.17
nov-01	19.4	19.64
dic-01	19	19.39
ene-02	19.45	19.71
feb-02	19.44	20.72
mar-02	19.67	24.53



Fuente: [https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=.](https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=)



Cuadro No.2 - A: Precios Históricos del Crudo.

abr-02	19.55	26.18
may-02	19.73	27.04
jun-02	19.88	25.52
jul-02	20.08	26.97
ago-02	20.22	28.39
sep-02	19.46	29.66
oct-02	19.68	28.84
nov-02	20	26.35
dic-02	19.94	29.46
ene-03	20.02	32.95
feb-03	20.37	35.83
mar-03	19.71	33.51
abr-03	19.83	28.17
may-03	19.35	28.11
jun-03	19.79	30.66
jul-03	20.1	30.75
ago-03	20.59	31.57
sep-03	19.93	28.31
oct-03	20.18	30.34
nov-03	19.87	31.11
dic-03	20.68	32.13
ene-04	20.48	34.31
feb-04	20.87	34.69
mar-04	20.45	36.74
abr-04	20.55	36.75
may-04	20.31	40.27
jun-04	20.78	38.02
jul-04	20.88	40.78
ago-04	21.03	44.9
sep-04	20.53	45.94
oct-04	20.86	53.28
nov-04	20.81	48.47
dic-04	21.23	43.15
ene-05	20.69	46.84
feb-05	20.83	48.15
mar-05	21.01	54.19
abr-05	20.14	52.98
may-05	20.61	49.83
jun-05	21.2	56.35
jul-05	20.94	59
ago-05	21.67	64.98
sep-05	20.14	65.59
oct-05	20.25	62.26
nov-05	20.62	58.32
dic-05	21.5	59.41
ene-06	20.44	65.48
feb-06	20.58	61.63
mar-06	20.61	62.69
abr-06	20.2	69.44
may-06	20.46	70.84
jun-06	20.98	70.95
jul-06	20.74	74.41
ago-06	21.43	73.04
sep-06	20.56	63.8
oct-06	20.77	58.89
nov-06	20.67	59.08
dic-06	20.8	61.96
ene-07	20.57	54.51
feb-07	21.31	59.28
mar-07	20.54	60.44
abr-07	20.54	63.98
may-07	20.62	63.45
jun-07	20.72	67.49
jul-07	20.75	74.12
ago-07	21.03	72.36
sep-07	20.41	79.92
oct-07	20.48	85.8
nov-07	20.53	94.77
dic-07	20.72	91.69
ene-08	20.25	92.97
feb-08	20.03	95.39
mar-08	19.83	105.45
abr-08	19.81	112.58
may-08	19.8	125.4
jun-08	19.68	133.88
jul-08	19.56	133.37
ago-08	19.27	116.67
sep-08	17.84	104.11
oct-08	19.7	76.61
nov-08	19.05	57.31
dic-08	19.14	41.12
ene-09	19.04	41.71
feb-09	18.82	39.09
mar-09	18.72	47.94
abr-09	18.67	49.65
may-09	18.21	59.03
jun-09	18.83	69.64
jul-09	18.63	64.15
ago-09	18.95	71.05
sep-09	18.59	69.41
oct-09	18.8	75.72
nov-09	18.75	77.99
dic-09	19.24	74.47
ene-10	18.65	78.33
feb-10	18.83	76.39
mar-10	19.08	81.2
abr-10	19.07	84.29
may-10	18.87	73.74
jun-10	19.56	75.34
jul-10	19.29	76.32
ago-10	19.66	76.6
sep-10	19.46	75.24
oct-10	18.93	81.89
nov-10	18.97	84.25
dic-10	19.73	89.15

Fuente: [https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=.](https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=)

Cuadro No.2 - B: Precios Históricos del Crudo.

ene-11	18.93	89.17
feb-11	18.82	88.58
mar-11	19.19	102.86
abr-11	18.58	109.53
may-11	18.43	100.9
jun-11	19.19	96.26
jul-11	18.71	97.3
ago-11	19.36	86.33
sep-11	18.89	85.52
oct-11	18.82	86.32
nov-11	19.06	97.16
dic-11	18.77	98.56
ene-12	18.3	100.27
feb-12	18.62	102.2
mar-12	18.13	106.16
abr-12	18.16	103.32
may-12	18.57	94.66
jun-12	18.87	82.3
jul-12	18.54	87.89
ago-12	19.14	94.13
sep-12	18.08	94.51
oct-12	18.71	89.49
nov-12	18.53	86.53
dic-12	18.13	87.86
ene-13	18.74	94.76
feb-13	18.65	95.31
mar-13	18.55	92.94
abr-13	18.59	92.02
may-13	18.73	94.51
jun-13	18.82	95.77
jul-13	19.26	104.67
ago-13	19.14	106.57
sep-13	19.28	106.29
oct-13	19.32	100.54
nov-13	19.49	93.86
dic-13	19.01	97.63

Fuente: [https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=.](https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=)

Cuadro No.2 - C: Precios Históricos del Crudo.

ene-14	19.1	94.62
feb-14	18.9	100.82
mar-14	18.45	100.8
abr-14	18.83	102.07
may-14	18.6	102.18
jun-14	18.88	105.79
jul-14	19.25	103.59
ago-14	19.37	96.53
sep-14	19.2	93.21
oct-14	19.7	84.4
nov-14	19.39	75.79
dic-14	19.49	59.29
ene-15	19.27	47.22
feb-15	19.67	50.58
mar-15	19.35	47.82
abr-15	19.26	54.45
may-15	19.32	59.27
jun-15	19.85	59.82
jul-15	20.12	50.9
ago-15	19.93	42.87
sep-15	19.44	45.48
oct-15	19.47	46.22
nov-15	19.11	42.44
dic-15	19.6	37.19
ene-16	19.06	31.68
feb-16	19.84	30.32
mar-16	19.75	37.55
abr-16	19.35	40.75
may-16	19.33	46.71
jun-16	19.83	48.76
jul-16	19.75	44.65
ago-16	20.26	44.72
sep-16	19.77	45.18
oct-16	19.68	49.77
nov-16	19.69	45.66
dic-16	19.99	51.97
ene-17	19.29	52.5
feb-17	19.15	53.47
mar-17	20.06	49.33
abr-17	19.62	51.06
may-17	20.05	48.48
jun-17	20.57	45.18
jul-17	20.13	46.63
ago-17	20.27	48.04
sep-17	19.63	49.82
oct-17	19.97	51.58
nov-17	20.31	56.64
dic-17	20.32	57.88
ene-18	20.56	63.7
feb-18	19.69	62.23
mar-18	20.73	62.73
abr-18	20.04	66.25
may-18	20.25	69.98
jun-18	20.77	67.87
jul-18	20.67	70.98
ago-18	21.36	68.06
sep-18	20.08	70.23
oct-18	20.79	70.75
nov-18	20.77	56.96
dic-18	20.33	49.52
ene-19	20.61	51.38
feb-19	20.28	54.95
mar-19	20.18	58.15
abr-19	20.33	63.86
may-19	20.39	60.83
jun-19	20.65	54.66
jul-19	20.73	57.35
ago-19	21.16	54.8
sep-19	20.25	56.95
oct-19	20.71	53.96
nov-19	20.74	57.03
dic-19	20.44	59.88
ene-20	19.91	57.52
feb-20	19.84	50.54
mar-20	18.28	29.21
abr-20	14.69	16.55
may-20	16.1	28.56
jun-20	17.44	38.31
jul-20	18.32	40.71
ago-20	18.58	42.34
sep-20	17.95	39.65

Fuente: [https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=.](https://www.eia.gov/outlooks/steo/data/browser/#/?v=3&f=M&s=0&start=199701&end=202012&linechart=PATCPUSX~WTIPUUS~&ctype=linechart&maptype=0&map=)

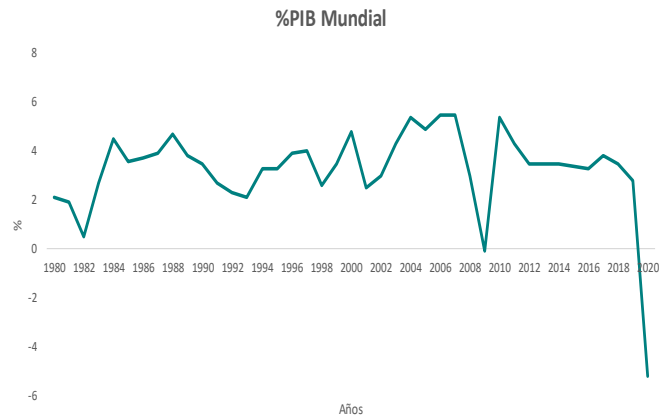
Cuadro No.3 - A: Estimación y proyecciones de la población a largo plazo.1950 -2100. Continuación.

2028	4.813774	1.211%	2028	3.37154	1.572%	1.442231	0.366%
2029	4.871112	1.177%	2029	3.424078	1.534%	1.447027	0.331%
2030	4.927612	1.147%	2030	3.476232	1.500%	1.45138	0.300%
2031	4.983325	1.118%	2031	3.528018	1.468%	1.455314	0.270%
2032	5.038193	1.089%	2032	3.579377	1.435%	1.458816	0.240%
2033	5.092189	1.060%	2033	3.630298	1.403%	1.461897	0.211%
2034	5.145234	1.031%	2034	3.680698	1.369%	1.464536	0.180%
2035	5.197279	1.001%	2035	3.730537	1.336%	1.466741	0.150%
2036	5.248311	0.972%	2036	3.779791	1.303%	1.468515	0.121%
2037	5.298331	0.944%	2037	3.828469	1.271%	1.469871	0.092%
2038	5.347333	0.916%	2038	3.876527	1.240%	1.47081	0.064%
2039	5.395313	0.889%	2039	3.923969	1.209%	1.471349	0.037%
2040	5.442242	0.862%	2040	3.970753	1.178%	1.471488	0.009%
2041	5.488111	0.836%	2041	4.016875	1.148%	1.471235	-0.017%
2042	5.532914	0.810%	2042	4.062314	1.119%	1.470603	-0.043%
2043	5.576652	0.784%	2043	4.107049	1.089%	1.469599	-0.068%
2044	5.619331	0.760%	2044	4.151099	1.061%	1.468235	-0.093%
2045	5.660974	0.736%	2045	4.19444	1.033%	1.46653	-0.116%
2046	5.701574	0.712%	2046	4.237083	1.006%	1.464493	-0.139%
2047	5.74111	0.689%	2047	4.278994	0.979%	1.462116	-0.163%
2048	5.779546	0.665%	2048	4.320125	0.952%	1.45942	-0.185%
2049	5.816834	0.641%	2049	4.360457	0.925%	1.456387	-0.208%
2050	5.852947	0.617%	2050	4.399919	0.897%	1.45302	-0.232%
2051	5.887855	0.593%	2051	4.438511	0.869%	1.449335	-0.254%
2052	5.921568	0.569%	2052	4.476238	0.843%	1.445329	-0.277%
2053	5.954126	0.547%	2053	4.513095	0.817%	1.441033	-0.298%
2054	5.985559	0.525%	2054	4.549101	0.791%	1.436455	-0.319%
2055	6.015892	0.504%	2055	4.584281	0.767%	1.431612	-0.338%
2056	6.04515	0.484%	2056	4.618625	0.744%	1.42652	-0.357%
2057	6.073323	0.464%	2057	4.652137	0.720%	1.421184	-0.375%
2058	6.100404	0.444%	2058	4.684786	0.697%	1.41561	-0.394%
2059	6.126378	0.424%	2059	4.716575	0.674%	1.409804	-0.412%
2060	6.151261	0.405%	2060	4.747483	0.651%	1.403776	-0.429%
2061	6.175041	0.385%	2061	4.777513	0.629%	1.397531	-0.447%
2062	6.197757	0.367%	2062	4.806666	0.607%	1.391088	-0.463%
2063	6.219409	0.348%	2063	4.834968	0.585%	1.384447	-0.480%
2064	6.240034	0.331%	2064	4.862401	0.564%	1.377625	-0.495%
2065	6.259651	0.313%	2065	4.889013	0.544%	1.370642	-0.509%
2066	6.278282	0.297%	2066	4.914784	0.524%	1.3635	-0.524%
2067	6.295942	0.280%	2067	4.939733	0.505%	1.356209	-0.538%
2068	6.312654	0.265%	2068	4.963869	0.486%	1.348784	-0.550%
2069	6.328447	0.250%	2069	4.987207	0.468%	1.341227	-0.563%
2070	6.343334	0.235%	2070	5.009764	0.450%	1.333562	-0.575%
2071	6.357347	0.220%	2071	5.031558	0.433%	1.32578	-0.587%
2072	6.370492	0.206%	2072	5.052586	0.416%	1.31791	-0.597%
2073	6.382793	0.193%	2073	5.072848	0.399%	1.309945	-0.608%
2074	6.394275	0.180%	2074	5.092381	0.384%	1.301897	-0.618%
2075	6.404964	0.167%	2075	5.111183	0.368%	1.293778	-0.628%
2076	6.414865	0.154%	2076	5.129276	0.353%	1.285597	-0.636%
2077	6.424005	0.142%	2077	5.146649	0.338%	1.27735	-0.646%
2078	6.432358	0.130%	2078	5.163316	0.323%	1.26905	-0.654%
2079	6.439934	0.118%	2079	5.179243	0.308%	1.260695	-0.663%
2080	6.446732	0.105%	2080	5.194454	0.293%	1.252282	-0.672%
2081	6.452752	0.093%	2081	5.208925	0.278%	1.243826	-0.680%
2082	6.458006	0.081%	2082	5.222676	0.263%	1.235326	-0.688%
2083	6.46253	0.070%	2083	5.235739	0.249%	1.226789	-0.696%
2084	6.466344	0.059%	2084	5.24811	0.236%	1.21823	-0.703%
2085	6.46948	0.048%	2085	5.259838	0.223%	1.209654	-0.709%
2086	6.47196	0.038%	2086	5.270904	0.210%	1.201062	-0.715%
2087	6.473782	0.028%	2087	5.28132	0.197%	1.192459	-0.721%
2088	6.474946	0.018%	2088	5.2911	0.185%	1.183851	-0.727%
2089	6.475462	0.008%	2089	5.300223	0.172%	1.175238	-0.733%
2090	6.475316	-0.002%	2090	5.308703	0.160%	1.166617	-0.739%
2091	6.474531	-0.012%	2091	5.316543	0.147%	1.157995	-0.745%
2092	6.473115	-0.022%	2092	5.323739	0.135%	1.149374	-0.750%
2093	6.471069	-0.032%	2093	5.330313	0.123%	1.140761	-0.755%
2094	6.468413	-0.041%	2094	5.33626	0.111%	1.13216	-0.760%
2095	6.465153	-0.050%	2095	5.341592	0.100%	1.123572	-0.764%
2096	6.461306	-0.060%	2096	5.346317	0.088%	1.114992	-0.770%
2097	6.456862	-0.069%	2097	5.350428	0.077%	1.106428	-0.774%
2098	6.451835	-0.078%	2098	5.353956	0.066%	1.097884	-0.778%
2099	6.446218	-0.087%	2099	5.356859	0.054%	1.089357	-0.783%
2100	6.440002	-0.097%	2100	5.359156	0.043%	1.080843	-0.788%

Fuente: CELADE – División de la Población CEPAL. Revisión 2019.

Cuadro No.4: PIB Mundial.

World GDP		
Advanced economies	Emerging market and developing economies	Mundo
1.3	3.3	2.1
2	1.7	1.9
0.2	0.9	0.5
3.2	1.9	2.7
4.9	4	4.5
3.7	3.4	3.6
3.3	4.3	3.7
3.8	4.1	3.9
4.8	4.4	4.7
4	3.5	3.8
3.1	4.2	3.5
1.6	4.4	2.7
2.3	2.4	2.3
1.3	3.1	2.1
3.4	3.1	3.3
2.9	3.9	3.3
3	5.1	3.9
3.5	4.6	4
2.9	2.3	2.6
3.6	3.4	3.5
4.1	5.8	4.8
1.6	3.6	2.5
1.7	4.5	3
2.1	6.9	4.3
3.3	7.9	5.4
2.8	7.2	4.9
3.1	7.9	5.5
2.7	8.4	5.5
0.2	5.7	3
-3.3	2.8	-0.1
3.1	7.4	5.4
1.8	6.4	4.3
1.2	5.4	3.5
1.4	5.1	3.5
2.1	4.7	3.5
2.4	4.3	3.4
1.8	4.5	3.3
2.5	4.8	3.8
2.2	4.5	3.5
1.7	3.7	2.8
-5.8	-3.3	-5.2
3.9	6	5.2
2.9	5.1	4.2
2.2	4.9	3.8
1.9	4.8	3.6
1.7	4.7	3.5



Fuente:

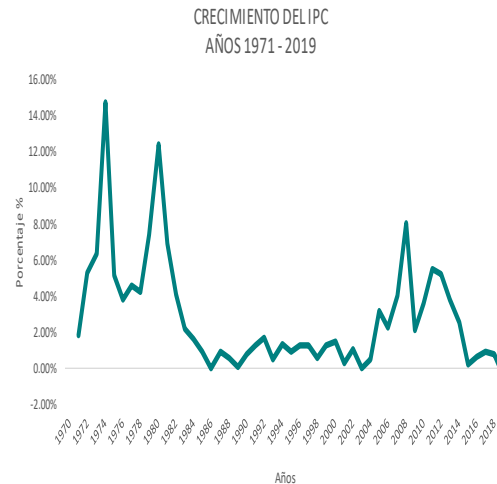
https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEO_WORLD



Cuadro No.5: Índice de Precios al Consumidor.

Años	Crecimiento del IPC	IPC 2013=100	
1970		24.64	3.31%
1971	1.86%	25.10	3.35%
1972	5.29%	26.51	3.29%
1973	6.39%	28.32	3.20%
1974	14.76%	33.22	2.87%
1975	5.17%	35.03	2.80%
1976	3.85%	36.43	2.77%
1977	4.59%	38.18	2.71%
1978	4.25%	39.87	2.66%
1979	7.45%	43.09	2.51%
1980	12.46%	49.22	2.17%
1981	6.95%	52.89	2.01%
1982	4.13%	55.17	1.94%
1983	2.17%	56.40	1.93%
1984	1.63%	57.33	1.94%
1985	0.91%	57.86	1.97%
1986	0.00%	57.86	2.05%
1987	0.90%	58.38	2.09%
1988	0.60%	58.73	2.15%
1989	0.10%	58.79	2.24%
1990	0.79%	59.26	2.30%
1991	1.26%	60.02	2.35%
1992	1.72%	61.07	2.38%
1993	0.48%	61.36	2.47%
1994	1.31%	62.18	2.53%
1995	0.93%	62.76	2.62%
1996	1.29%	63.58	2.70%
1997	1.27%	64.40	2.79%
1998	0.54%	64.75	2.94%
1999	1.25%	65.56	3.06%
2000	1.49%	66.56	3.18%
2001	0.26%	66.73	3.43%
2002	1.04%	67.43	3.65%
2003	0.00%	67.43	4.02%
2004	0.50%	67.77	4.42%
2005	3.18%	69.99	4.56%
2006	2.26%	71.61	4.89%
2007	4.07%	74.65	4.99%
2008	8.06%	81.19	4.26%
2009	2.11%	82.94	4.79%
2010	3.61%	86.04	5.14%
2011	5.55%	91.10	4.77%
2012	5.26%	96.16	4.00%
2013	3.84%	100.00	1.00%
2014	2.53%	102.60	2.60%
2015	0.19%	102.80	1.39%
2016	0.68%	103.50	1.15%
2017	0.89%	104.43	1.09%
2018	0.76%	105.228675	1.02%
2019	-0.31%	104.9	0.80%

B/104.90

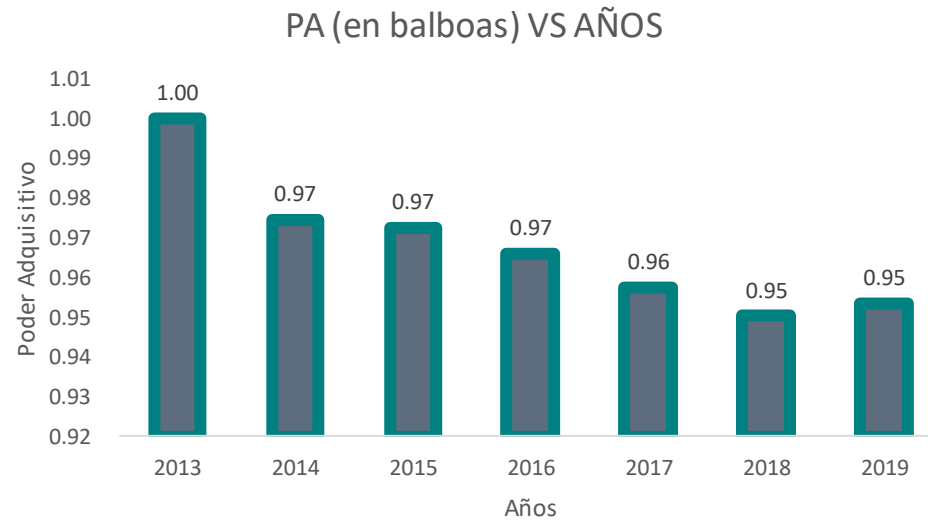


Fuente:

https://www.inec.gob.pa/avance/Default2.aspx?ID_CATEGORIA=2&ID_CIFRAS=10&ID_IDIOMA=1

Cuadro No.6: Poder Adquisitivo.

Años	PA (en balboas)
2013	1.00
2014	0.97
2015	0.97
2016	0.97
2017	0.96
2018	0.95
2019	0.95



Fuente: https://www.inec.gob.pa/avance/Default2.aspx?ID_CATEGORIA=2&ID_CIFRAS=10&ID_IDIOMA=1

Cuadro No.7: Trabajadores Suspendidos.

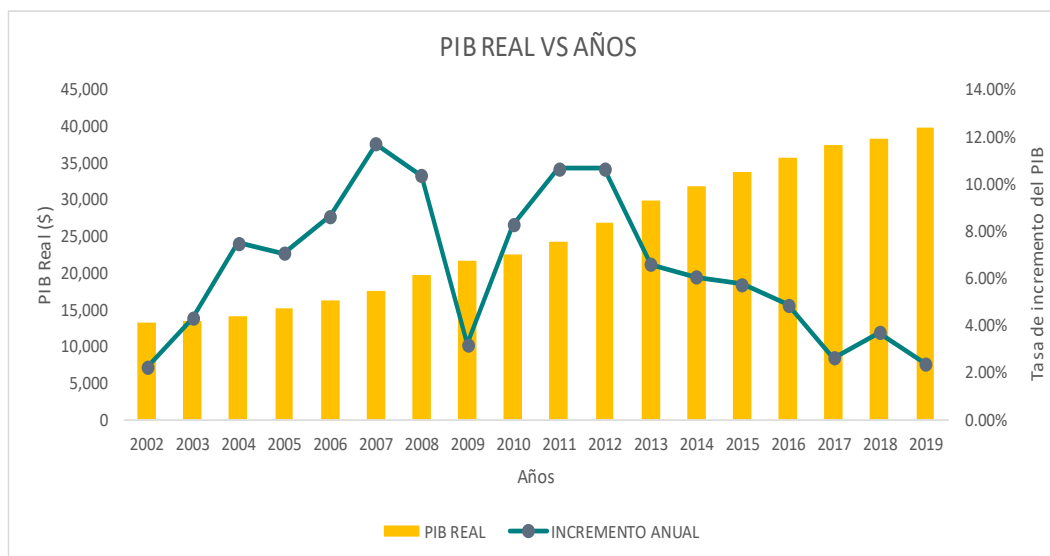
Provincia	Trabajadores
Darién	97
Bocas del Toro	2,318
Los Santos	2,598
Herrera	5,151
Veraguas	5,973
Colcé	9,059
Panamá Oeste	15,742
Colón	24,271
Chiriquí	187,578
Panamá	197,723
Total	450,510



Fuente: <https://www.mitradel.gob.pa/estudio-y-analisis-de-resultados-de-solicitudes-de-suspension-y-reactivacion-de-contratos-de-empresas-y-trabajadores-en-la-republica-de-panama-3/>.

Cuadro No.8: Producto Interno Bruto 2001-2019.

AÑO	PIB REAL	INCREMENTO ANUAL
2001	13266.09	
2002	13561.92	2.23%
2003	14147.48	4.32%
2004	15210.95	7.52%
2005	16287.64	7.08%
2006	17696.85	8.65%
2007	19771.78	11.72%
2008	21822.64	10.37%
2009	22520.68	3.20%
2010	24389.27	8.30%
2011	26995.3	10.69%
2012	29876.28	10.67%
2013	31851.88	6.61%
2014	33779.92	6.05%
2015	35731.55	5.78%
2016	37471.72	4.87%
2017	38456.83	2.63%
2018	39887.62	3.72%
2019	40845.02	2.40%

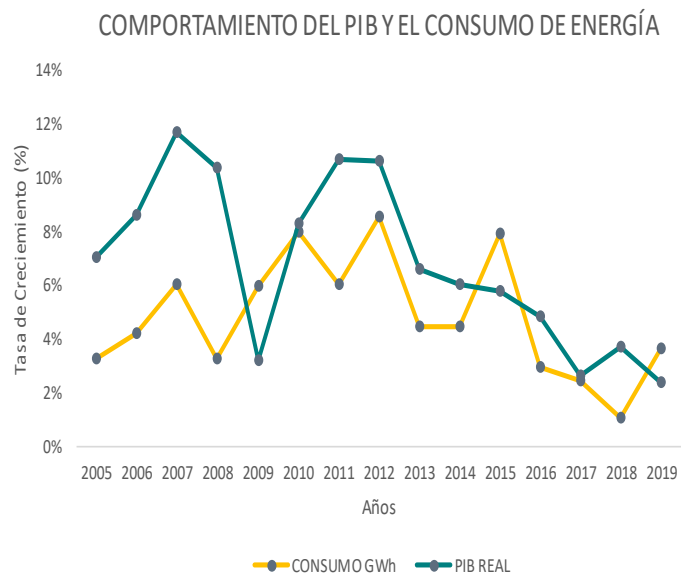


Fuente:

https://www.contraloria.gob.pa/inec/Publicaciones/Publicaciones.aspx?ID_SUBCATEGORIA=26&ID_PUBLICACION=923&ID_IDIOMA=1&ID_CATEGORIA=4

Cuadro No.9: Producto Interno Bruto y Consumo en GWh 2001-2019.

AÑO	PIB REAL	CONSUMO GWh	INCREMENTO ANUAL	INCREMENTO ANUAL PIB
2001	13266.09			
2002	13561.92	4757.313372		2.23%
2003	14147.48	4918.006873	3.38%	4.32%
2004	15210.95	5105.971954	3.82%	7.52%
2005	16287.64	5274.14329	3.29%	7.08%
2006	17696.85	5495.325114	4.19%	8.65%
2007	19771.78	5826.41679	6.02%	11.72%
2008	21822.64	6017.948701	3.29%	10.37%
2009	22520.68	6376.160163	5.95%	3.20%
2010	24389.27	6885.594484	7.99%	8.30%
2011	26995.3	7300.859511	6.03%	10.69%
2012	29876.28	7926.02306	8.56%	10.67%
2013	31851.88	8280.919119	4.48%	6.61%
2014	33779.92	8651.202054	4.47%	6.05%
2015	35731.55	9336.859604	7.93%	5.78%
2016	37471.72	9611.190328	2.94%	4.87%
2017	38456.83	9848.73009	2.47%	2.63%
2018	39887.62	9954.956821	1.08%	3.72%
2019	40845.02	10320.2182	3.67%	2.40%



Fuente:

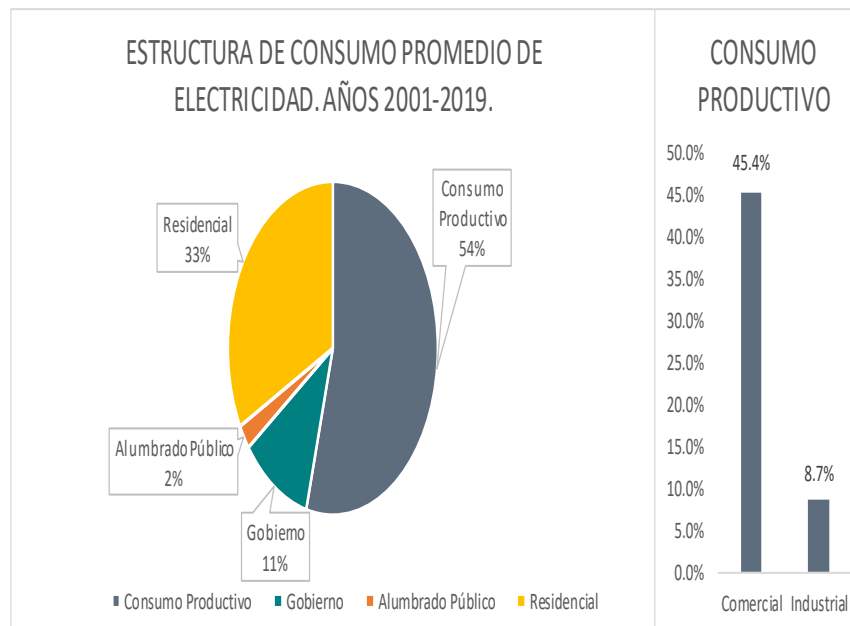
https://www.contraloria.gob.pa/inec/Publicaciones/Publicaciones.aspx?ID_SUBCATEGORIA=26&ID_PUBLICACION=923&ID_IDIOMA=1&ID_CATEGORIA=4

Cuadro No.10: Consumo por sector residencial, comercial, industrial y alumbrado.

CRES	CCOM	CIND	CGOB	CALP
3121.29	4327.35	830.941966	1028.58669	227.11
32.7%	45.4%	8.7%	10.8%	2.4%

Comercial	Industrial	Consumo Productivo	Gobierno	Alumbrado Público	Residencial
45.4%	8.7%	54.1%	10.8%	2.4%	32.7%

Residencial	3121.28565
Comercial	3756.56909
Industrial	260.158048
Gobierno	1028.58669
Alumbrado	227.110372
Grandes Usuarios	1141.56783

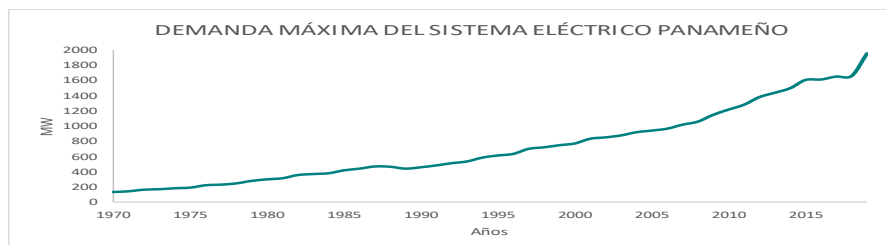


Fuente: <https://www.asep.gob.pa>

Cuadro No.11: Demanda Máxima del Sistema Eléctrico Panameño.

Años	DMG	
1970	138.9	
1971	148.6	
1972	169.6	
1973	175.7	
1974	188.3	
1975	196.6	
1976	227.6	
1977	235.7	
1978	252.1	
1979	285.4	
1980	305.5	
1981	319.9	
1982	362.2	
1983	375	
1984	385.8	
1985	424	
1986	445.9	
1987	474.8	
1988	470.9	
1989	446.2	
1990	464.4	
1991	488.5	
1992	518	
1993	541.2	
1994	591.5	
1995	619.2	
1996	639.9	
1997	706.6	
1998	726.4	
1999	754.5	
2000	777	
2001	839.3	
2002	857.35	
2003	882.86	
2004	924.96	
2005	946.28	
2006	971.34	
2007	1024	
2008	1064.25	
2009	1153.99	
2010	1222.4	
2011	1286.46	
2012	1386.27	8%
2013	1443.94	
2014	1503.46	
2015	1612	7.22%
2016	1618	
2017	1657	
2018	1665	
2019	1961	

Demanda Máxima del Sistema Eléctrico Panameño				
Periodos	Max (MW)	Total (MW)	Incremento	
			Promedio (MW)	Anual (%)
1970 - 1979	285.4	147	16	8.33%
1980 - 1989	474.8	141	16	4.30%
1990 - 1999	754.5	290	32	5.54%
2000 - 2009	1153.99	377	42	4.49%
2010 - 2018	1665	443	49	3.94%
2018 - 2019	1961	296	296	17.78%



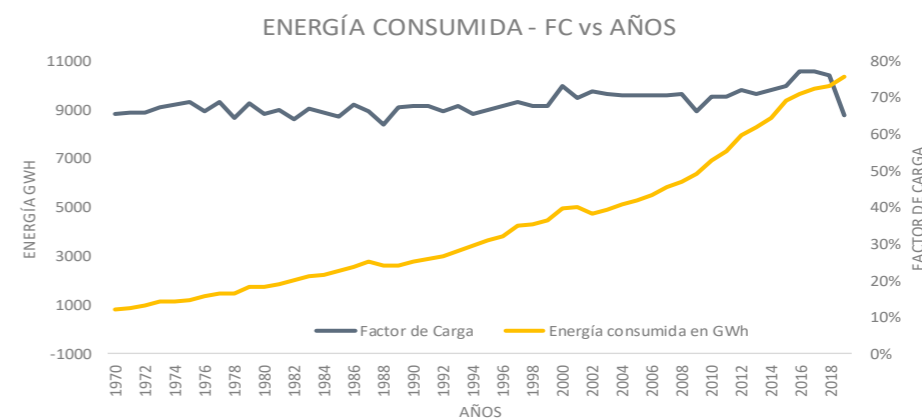
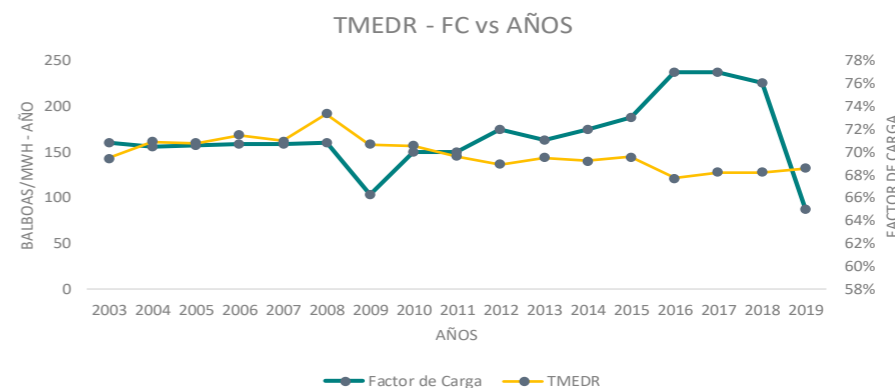
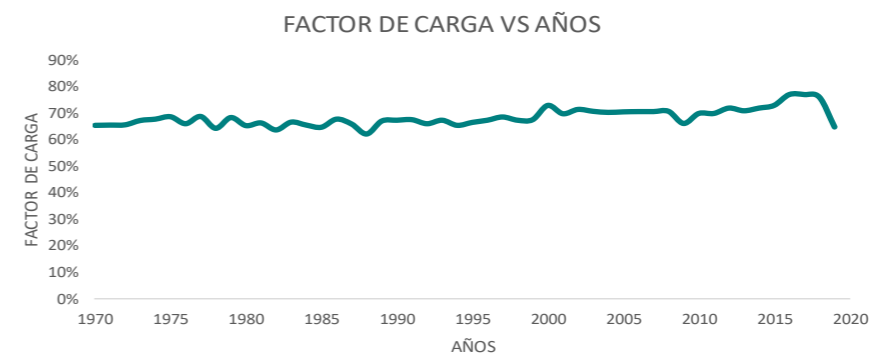
Fuente: <http://www.cnd.com.pa>



Cuadro No.12: Factor de Carga, Energía Consumida y Tarifa Media de Distribuidoras Real.



Año	TMEDR	Año	Factor de Carga	Año	Energía consumida en GWh
2003	143.092828	1970	66%	1970	801.7
2004	161.100709	1971	66%	1971	859.4
2005	159.750597	1972	66%	1972	980.4
2006	168.539419	1973	67%	1973	1139.9
2007	161.602082	1974	68%	1974	1148
2008	191.232846	1975	69%	1975	1214.3
2009	157.989866	1976	66%	1976	1348.7
2010	156.947304	1977	69%	1977	1450.3
2011	144.867581	1978	65%	1978	1469.1
2012	136.795025	1979	69%	1979	1724
2013	143.622778	1980	66%	1980	1756.5
2014	140.059801	1981	67%	1981	1863.5
2015	144.36575	1982	64%	1982	2030.5
2016	121.62317	1983	67%	1983	2193.5
2017	127.50341	1984	66%	1984	2225.9
2018	127.541515	1985	65%	1985	2412.9
2019	131.866969	1986	68%	1986	2565.7
		1987	66%	1987	2748.3
		1988	62%	1988	2579.9
		1989	67%	1989	2624.7
		1990	68%	1990	2746.1
		1991	68%	1991	2896.6
		1992	66%	1992	3011.6
		1993	68%	1993	3199.1
		1994	66%	1994	3400
		1995	67%	1995	3619.4
		1996	68%	1996	3795.8
		1997	69%	1997	4254.4
		1998	68%	1998	4295.8
		1999	68%	1999	4474.5
		2000	73%	2000	4967.5
		2001	70%	2001	4999.9
		2002	72%	2002	4757.313372
		2003	71%	2003	4918.006873
		2004	70%	2004	5105.971954
		2005	71%	2005	5274.14329
		2006	71%	2006	5495.325114
		2007	71%	2007	5826.41679
		2008	71%	2008	6017.948701
		2009	66%	2009	6376.160163
		2010	70%	2010	6885.594484
		2011	70%	2011	7300.859511
		2012	72%	2012	7926.02306
		2013	71%	2013	8280.919119
		2014	72%	2014	8651.202054
		2015	73%	2015	9336.859604
		2016	77%	2016	9611.190328
		2017	77%	2017	9848.73009
		2018	76%	2018	9954.956821
		2019	65%	2019	10320.2182



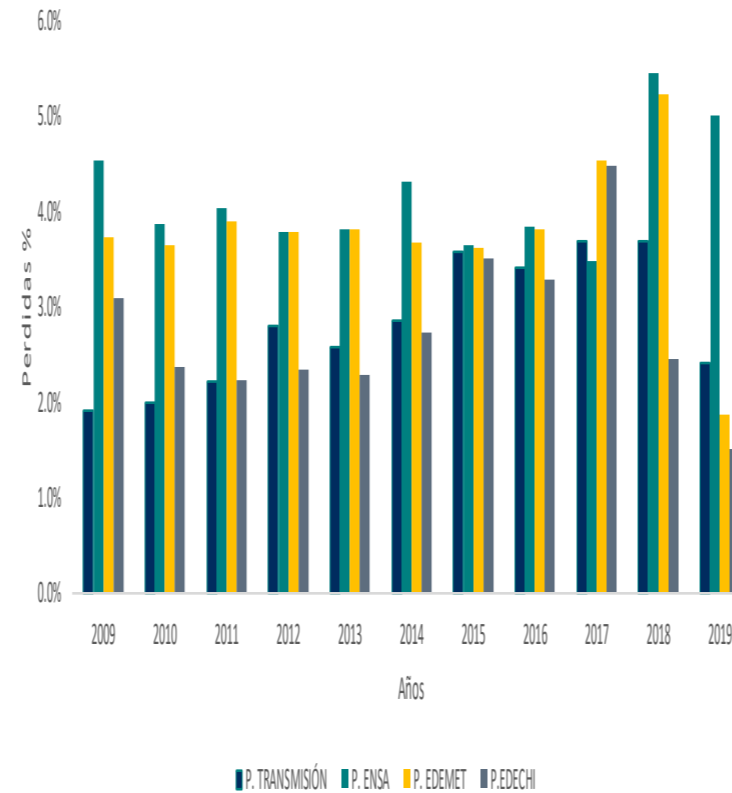
Fuente: <http://www.cnd.com.pa>

Cuadro No.13: Perdidas por distribuidora.

Perdidas de distribución por distribuidora.

Años	P. TRANSMISIÓN	P. ENSA	P. EDEMET	P. EDECHI	P. DISTRIBUCIÓN	TOTAL	TASA DE VARIACIÓN
2009	1.9%	4.5%	3.7%	3.1%	11.4%	13.3%	11.4%
2010	2.0%	3.9%	3.6%	2.4%	9.9%	11.9%	9.9%
2011	2.2%	4.0%	3.9%	2.2%	10.2%	12.4%	10.2%
2012	2.8%	3.8%	3.8%	2.4%	9.9%	12.7%	9.9%
2013	2.6%	3.8%	3.8%	2.3%	9.9%	12.5%	9.9%
2014	2.9%	4.3%	3.7%	2.7%	10.7%	13.6%	10.7%
2015	3.6%	3.6%	3.6%	3.5%	10.8%	14.36%	10.8%
2016	3.4%	3.8%	3.8%	3.3%	11.0%	14.36%	11.0%
2017	3.7%	3.5%	4.5%	4.5%	12.5%	16.2%	12.5%
2018	3.7%	5.5%	5.2%	2.5%	13.2%	16.8%	13.2%
2019	2.4%	5.0%	1.9%	1.5%	8.4%	10.8%	8.4%
2020	2.5%	3.2%	2.8%	1.8%	7.8%	10.3%	7.8%

PERDIDAS DE ENERGÍA TOTALES



PERDIDAS DE ENERGÍA TOTALES

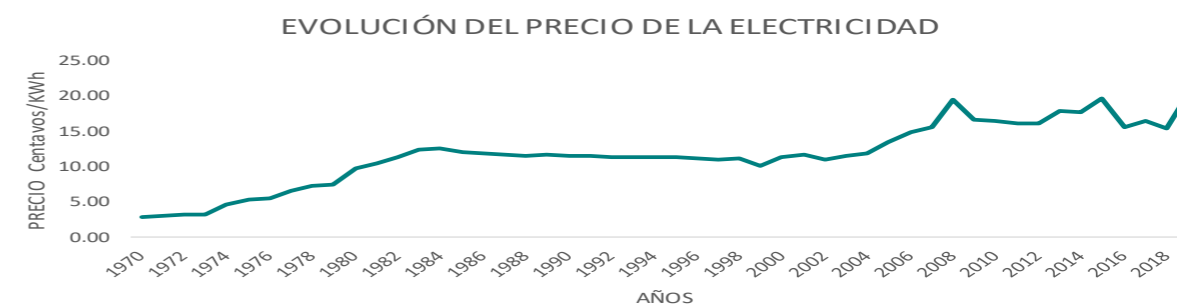


Fuente: ASEP, Informes Semestrales.



Cuadro No.14: Demanda Máxima del Sistema Eléctrico Panameño.

AÑO	FACTOT	GWHTOT	Precio de la energía eléctrica	
	Facturación Millones B/.	Ventas Totales GWh	Centavos/KWh	
1970	20.8	710.3	2.93	100.00%
1971	24.4	775.4	3.15	6.94%
1972	28.4	869.8	3.27	3.62%
1973	31.6	984.0	3.21	-1.67%
1974	45.6	980.7	4.65	30.93%
1975	56.4	1,041.0	5.42	14.18%
1976	63	1,143.1	5.51	1.70%
1977	83.7	1,260.1	6.64	17.03%
1978	92.5	1,268.2	7.29	8.93%
1979	111.1	1,480.9	7.50	2.78%
1980	143.4	1,472.3	9.74	22.97%
1981	164.3	1,554.3	10.57	7.86%
1982	191.7	1,674.8	11.45	7.65%
1983	230.3	1,850.6	12.44	8.02%
1984	228.4	1,816.5	12.57	1.03%
1985	235.1	1,944.1	12.09	-3.97%
1986	242	2,045.1	11.83	-2.20%
1987	255.2	2,191.1	11.65	-1.60%
1988	238.3	2,063.1	11.55	-0.84%
1989	231.8	1,983.6	11.69	1.16%
1990	238.8	2,053.0	11.63	-0.46%
1991	254	2,185.9	11.62	-0.10%
1992	263.8	2,311.4	11.41	-1.81%
1993	281.7	2,486.2	11.33	-0.73%
1994	304.2	2,671.9	11.39	0.48%
1995	324.3	2,869.6	11.30	-0.74%
1996	333.9	2,984.0	11.19	-1.00%
1997	362.9	3,302.1	10.99	-1.82%
1998	377.3	3,392.3	11.12	1.19%
1999	362.8	3,578.0	10.14	-9.69%
2000	429.4	3,801.1	11.30	10.24%
2001	459.9	3,933.9	11.69	3.37%
2002	450.2	4,113.0	10.95	-6.81%
2003	499.2	4,306.8	11.59	5.57%
2004	544.3	4,594.6	11.85	2.16%
2005	643.28098	4,781.1	13.45	11.95%
2006	735.902737	4,933.5	14.92	9.80%
2007	826.547345	5,297.9	15.60	4.39%
2008	1061.132	5,462.1	19.43	19.69%
2009	955.46	5,737.9	16.65	-16.67%
2010	1027.3649	6,232.7	16.48	-1.02%
2011	1066.6	6,599.6	16.16	-1.99%
2012	1162.395	7,170.1	16.21	0.31%
2013	1338.825363	7,501.7	17.85	9.16%
2014	1391.348562	7,822.5	17.79	-0.34%
2015	1641.654558	8,368.7	19.62	9.33%
2016	1349.090993	8,588.5	15.71	-24.88%
2017	1465.948298	8,894.7	16.48	4.69%
2018	1494.216639	9,625.8	15.52	-6.17%
2019	1645.131336	8,133.8	20.23	23.25%



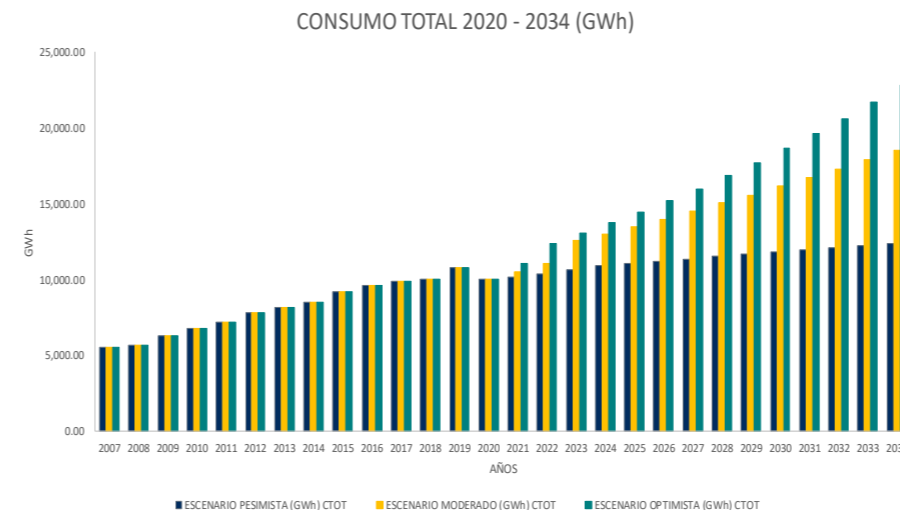
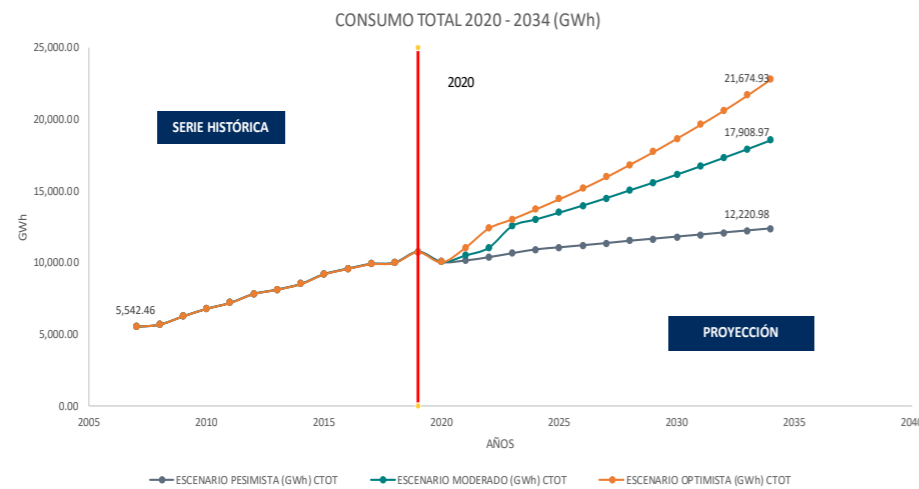
Fuente: PESIN 2019 y ASEP, Informes Semestrales.

Cuadro No.15: Resultado de proyecciones por escenario del ME – SiProDe (energía).

AÑO	ESCENARIO PESIMISTA (GWh)					ESCENARIO MODERADO (GWh)					ESCENARIO OPTIMISTA (GWh)				
	EDECHI	EDEMET	ENSA	GU	CTOT	EDECHI	EDEMET	ENSA	GU	CTOT	EDECHI	EDEMET	ENSA	GU	CTOT
2007	460.56	2,902.78	2,179.12	0.00	5,542.46	460.56	2,902.78	2,179.12	0.00	5,542.46	460.56	2,902.78	2,179.12	0.00	5,542.46
2008	474.40	2,967.83	2,249.72	0.00	5,691.95	474.40	2,967.83	2,249.72	0.00	5,691.95	474.40	2,967.83	2,249.72	0.00	5,691.95
2009	500.33	3,148.07	2,614.04	0.00	6,262.44	500.33	3,148.07	2,614.04	0.00	6,262.44	500.33	3,148.07	2,614.04	0.00	6,262.44
2010	548.70	3,328.06	2,695.49	219.15	6,791.40	548.70	3,328.06	2,695.49	219.15	6,791.40	548.70	3,328.06	2,695.49	219.15	6,791.40
2011	591.40	3,526.34	2,814.23	270.71	7,202.68	591.40	3,526.34	2,814.23	270.71	7,202.68	591.40	3,526.34	2,814.23	270.71	7,202.68
2012	648.03	3,833.24	3,034.67	301.75	7,817.69	648.03	3,833.24	3,034.67	301.75	7,817.69	648.03	3,833.24	3,034.67	301.75	7,817.69
2013	668.30	3,982.24	3,152.12	324.68	8,127.34	668.30	3,982.24	3,152.12	324.68	8,127.34	668.30	3,982.24	3,152.12	324.68	8,127.34
2014	702.76	4,168.73	3,297.92	343.15	8,512.57	702.76	4,168.73	3,297.92	343.15	8,512.57	702.76	4,168.73	3,297.92	343.15	8,512.57
2015	825.89	4,508.41	3,602.59	256.68	9,193.57	825.89	4,508.41	3,602.59	256.68	9,193.57	825.89	4,508.41	3,602.59	256.68	9,193.57
2016	889.10	4,633.19	3,777.01	275.89	9,575.20	889.10	4,633.19	3,777.01	275.89	9,575.20	889.10	4,633.19	3,777.01	275.89	9,575.20
2017	944.21	4,678.21	3,836.73	445.37	9,904.51	944.21	4,678.21	3,836.73	445.37	9,904.51	944.21	4,678.21	3,836.73	445.37	9,904.51
2018	882.31	4,599.44	3,726.29	781.25	9,989.30	882.31	4,599.44	3,726.29	781.25	9,989.30	882.31	4,599.44	3,726.29	781.25	9,989.30
2019	1,130.13	4,561.47	3,689.17	1,368.78	10,749.56	1,130.13	4,561.47	3,689.17	1,368.78	10,749.56	1,130.13	4,561.47	3,689.17	1,368.78	10,749.56
2020	818.35	4,268.53	3,380.46	1,573.60	10,040.94	818.35	4,268.53	3,380.46	1,573.60	10,040.94	818.35	4,268.53	3,380.46	1,573.60	10,040.94
2021	793.57	4,520.15	3,318.29	1,504.60	10,136.61	830.89	4,521.28	3,608.09	1,541.47	10,501.72	876.38	4,701.39	3,878.16	1,586.69	11,042.62
2022	822.57	4,434.32	3,574.64	1,535.58	10,367.11	876.38	4,701.39	3,878.16	1,586.69	11,042.62	1,653.56	4,895.83	4,131.52	1,717.00	12,397.91
2023	828.75	4,607.83	3,650.32	1,554.95	10,641.85	910.02	5,949.59	4,044.52	1,652.29	12,556.42	1,770.07	5,080.31	4,321.53	1,866.45	13,038.36
2024	846.78	4,701.13	3,776.75	1,584.45	10,909.11	948.84	6,122.86	4,202.26	1,743.89	13,017.85	1,886.67	5,274.22	4,518.58	2,048.07	13,727.54
2025	859.39	4,769.37	3,822.72	1,598.62	11,050.10	989.46	6,299.98	4,365.97	1,836.78	13,492.19	2,011.22	5,474.50	4,724.76	2,229.48	14,439.95
2026	871.42	4,833.13	3,865.03	1,626.15	11,195.72	1,031.95	6,475.82	4,532.48	1,944.95	13,985.20	2,144.26	5,676.70	4,936.86	2,417.47	15,175.29
2027	882.92	4,900.03	3,909.31	1,653.73	11,346.00	1,076.41	6,660.60	4,708.72	2,054.42	14,500.14	2,286.40	5,889.83	5,162.39	2,635.60	15,974.22
2028	894.65	4,970.28	3,961.78	1,681.38	11,508.09	1,123.82	6,854.69	4,902.72	2,165.16	15,046.39	2,440.24	6,114.69	5,410.62	2,875.54	16,841.09
2029	905.98	5,032.49	4,001.83	1,709.07	11,649.38	1,173.44	7,042.31	5,089.58	2,277.20	15,582.53	2,604.68	6,337.57	5,654.08	3,126.65	17,722.99
2030	916.97	5,094.30	4,047.05	1,736.83	11,795.15	1,225.42	7,234.00	5,291.38	2,390.53	16,141.32	2,780.49	6,567.86	5,917.28	3,398.35	18,663.98
2031	926.85	5,155.79	4,094.73	1,759.89	11,937.27	1,278.80	7,429.87	5,505.28	2,500.14	16,714.09	2,966.21	6,805.96	6,197.42	3,652.22	19,621.81
2032	937.16	5,221.01	4,141.84	1,783.01	12,083.03	1,335.72	7,635.94	5,727.74	2,611.04	17,310.44	3,167.23	7,057.62	6,490.87	3,898.15	20,613.88
2033	946.44	5,285.94	4,182.40	1,806.19	12,220.98	1,394.19	7,840.76	5,950.79	2,723.24	17,908.97	3,379.50	7,318.11	6,788.50	4,188.82	21,674.93
2034	955.45	5,359.18	4,222.38	1,829.43	12,366.43	1,455.36	8,056.56	6,182.81	2,836.72	18,531.45	3,606.36	7,599.92	7,099.89	4,495.48	22,801.65

2020

AÑO	ESCENARIO PESIMISTA (ΔGWh - %)	ESCENARIO MODERADO (ΔGWh - %)	ESCENARIO OPTIMISTA (ΔGWh - %)
2020-2024	CTOT 2.05%	CTOT 6.29%	CTOT 7.52%
2024-2034	1.25%	3.47%	4.95%
2020-2034	1.48%	4.28%	5.69%





Cuadro No.16: Resultado de proyecciones por escenario del ME – SiProDe (potencia).



AÑO	POTENCIA (MW)		
	PESIMISTA	MODERADO	OPTIMISTA
2020	1,688.72	1,688.72	1,688.72
2021	1,614.96	1,640.90	1,703.36
2022	1,633.65	1,703.36	1,920.10
2023	1,703.36	1,915.70	2,013.20
2024	1,847.60	1,984.66	2,109.73
2025	1,885.27	2,053.72	2,207.48
2026	1,922.11	2,110.62	2,310.38
2027	1,960.77	2,179.18	2,418.38
2028	2,001.43	2,250.67	2,532.67
2029	2,044.39	2,325.19	2,644.15
2030	2,087.81	2,402.87	2,762.16
2031	2,134.56	2,466.83	2,884.64
2032	2,179.43	2,550.78	3,012.28
2033	2,227.83	2,606.56	3,139.67
2034	2,276.53	2,679.11	3,275.17

