

PESIN 2023

TOMO I

ANEXO III

CUADROS DE SOPORTE

ANEXO I -3

CUADROS SOPORTE Y DETALLE DE CÁLCULOS

CUADRO NO.1: TASA DE NATALIDAD POR MIL HABITANTES

CUADRO NO.2: TASA DE CRECIMIENTO POBLACIONAL.

CUADRO NO.3: ÍNDICE DE PRECIOS AL CONSUMIDOR.

CUADRO NO.4: PODER ADQUISITIVO.

CUADRO NO.5: PRODUCTO INTERNO BRUTO 2001-2019.

CUADRO NO.6: PRODUCTO INTERNO BRUTO Y CONSUMO EN GWH 2001-2019.

CUADRO NO.7: ESTRUCTURA DE CONSUMO

CUADRO NO.8: DEMANDA MÁXIMA DEL SISTEMA ELÉCTRICO PANAMEÑO.

CUADRO NO.9: FACTOR DE CARGA Y TARIFA MEDIA DE DISTRIBUIDORAS REAL.

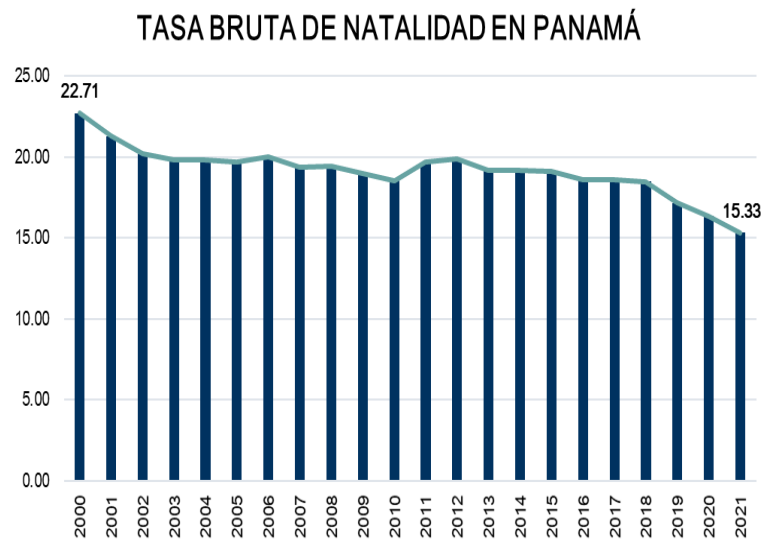
CUADRO NO.10: PÉDIDAS POR DISTRIBUIDORA Y TOTAL.

CUADRO NO.11: DEMANDA MÁXIMA DEL SISTEMA ELÉCTRICO PANAMEÑO.

CUADRO NO.12: RESULTADO DE PROYECCIONES POR ESCENARIO DEL ME - SIPRODE (ENERGÍA Y POTENCIA).

CUADRO NO.1: TASA DE NATALIDAD POR MIL HABITANTES

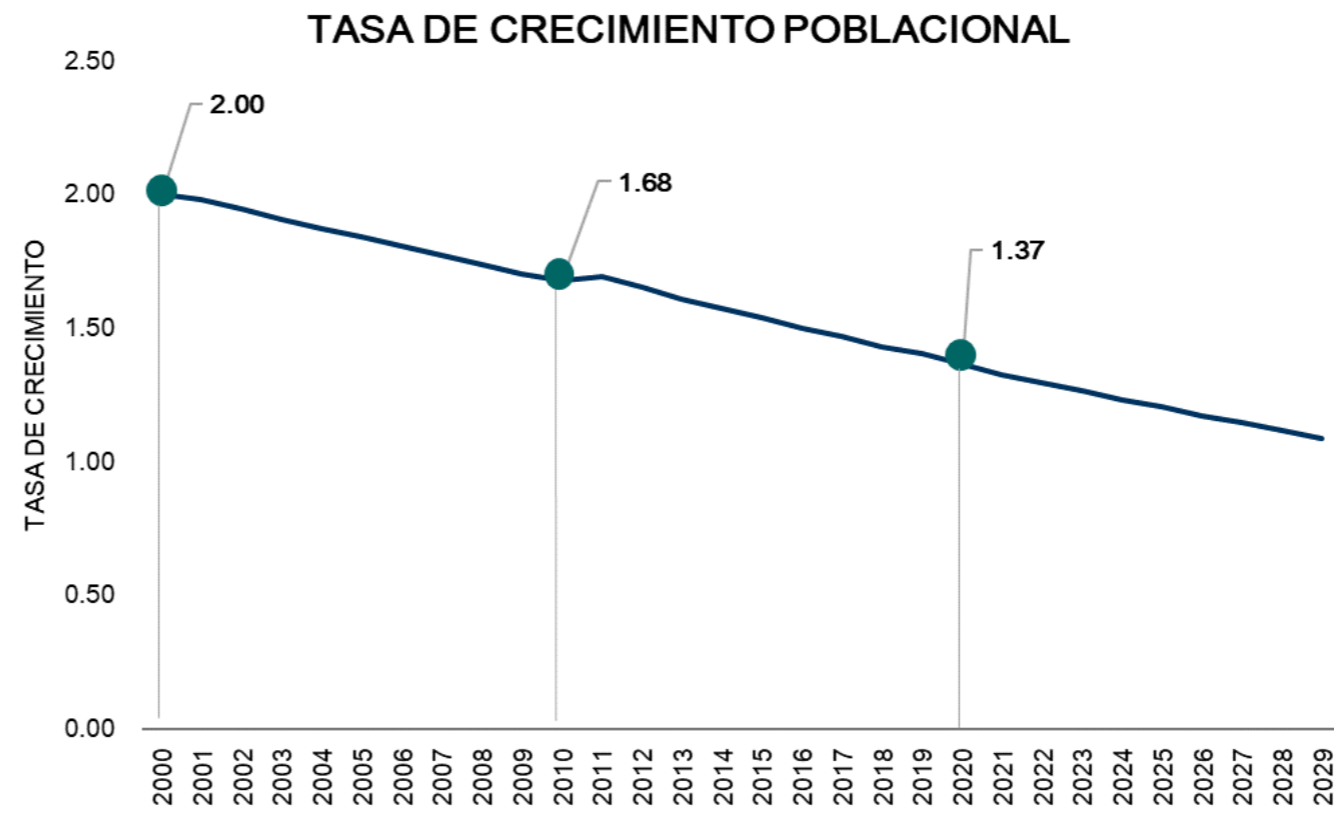
| AÑO | TASA DE NATALIDAD (por mil habitantes) |
|------|---|
| 2000 | 22.71 |
| 2001 | 21.30 |
| 2002 | 20.20 |
| 2003 | 19.82 |
| 2004 | 19.80 |
| 2005 | 19.70 |
| 2006 | 20.00 |
| 2007 | 19.38 |
| 2008 | 19.43 |
| 2009 | 18.99 |
| 2010 | 18.56 |
| 2011 | 19.68 |
| 2012 | 19.90 |
| 2013 | 19.20 |
| 2014 | 19.20 |
| 2015 | 19.10 |
| 2016 | 18.60 |
| 2017 | 18.59 |
| 2018 | 18.48 |
| 2019 | 17.17 |
| 2020 | 16.35 |
| 2021 | 15.33 |



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

CUADRO NO.2: TASA DE CRECIMIENTO POBLACIONAL.

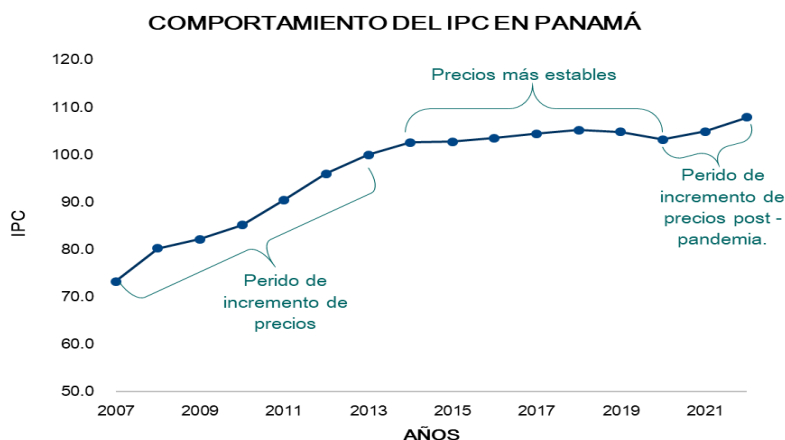
| AÑO | TASA DE CRECIMIENTO (por mil habitantes) |
|------|--|
| 2000 | 2.00 |
| 2001 | 1.98 |
| 2002 | 1.95 |
| 2003 | 1.91 |
| 2004 | 1.88 |
| 2005 | 1.84 |
| 2006 | 1.81 |
| 2007 | 1.78 |
| 2008 | 1.74 |
| 2009 | 1.70 |
| 2010 | 1.68 |
| 2011 | 1.70 |
| 2012 | 1.66 |
| 2013 | 1.61 |
| 2014 | 1.58 |
| 2015 | 1.54 |
| 2016 | 1.50 |
| 2017 | 1.47 |
| 2018 | 1.43 |
| 2019 | 1.40 |
| 2020 | 1.37 |
| 2021 | 1.33 |



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

CUADRO NO.3: ÍNDICE DE PRECIOS AL CONSUMIDOR.

| AÑO | Índice de Precios 2013=100 (a) | Tasa de Crecimiento |
|------|--------------------------------|---------------------|
| 2007 | 110.4 | |
| 2008 | 120.0 | 8.00% |
| 2009 | 122.9 | 2.36% |
| 2010 | 127.2 | 3.38% |
| 2011 | 134.7 | 5.56% |
| 2012 | 142.4 | 5.41% |
| 2013 | 100.0 | -42.40% |
| 2014 | 102.6 | 2.53% |
| 2015 | 102.8 | 0.19% |
| 2016 | 103.5 | 0.68% |
| 2017 | 104.4 | 0.89% |
| 2018 | 105.2 | 0.76% |
| 2019 | 104.9 | -0.36% |
| 2020 | 103.2 | -1.57% |
| 2021 | 104.9 | 1.60% |
| 2022 | 107.9 | 2.77% |

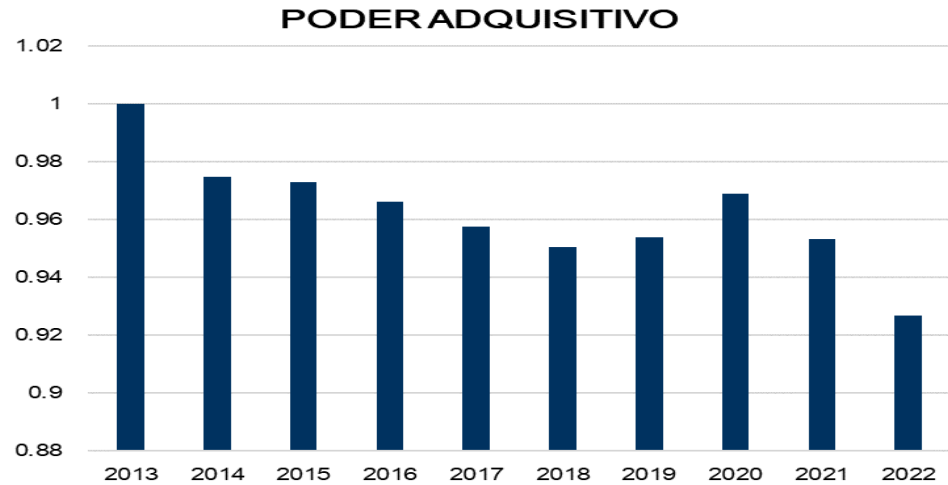


Fuente:

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

CUADRO NO.4: PODER ADQUISITIVO.

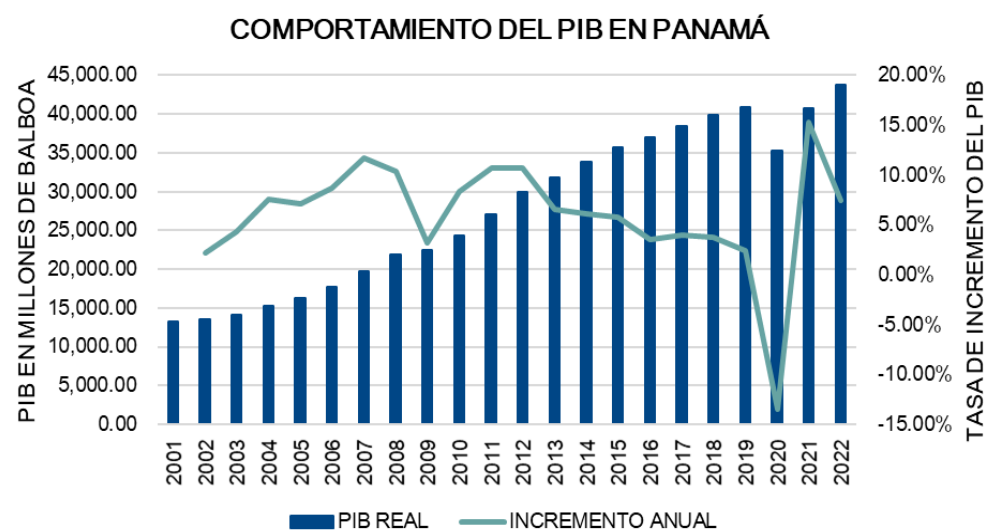
| Año | Poder adquisitivo (en balboas) |
|------|--------------------------------|
| 2013 | 1.000 |
| 2014 | 0.975 |
| 2015 | 0.973 |
| 2016 | 0.966 |
| 2017 | 0.958 |
| 2018 | 0.950 |
| 2019 | 0.954 |
| 2020 | 0.969 |
| 2021 | 0.953 |
| 2022 | 0.927 |



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

CUADRO NO.5: PRODUCTO INTERNO BRUTO 2001-2019.

| AÑO | PIB REAL | INCREMENTO ANUAL |
|-------------|-----------------|-------------------------|
| 2001 | 13,266.11 | |
| 2002 | 13,561.99 | 2.23% |
| 2003 | 14,147.55 | 4.32% |
| 2004 | 15,211.02 | 7.52% |
| 2005 | 16,287.68 | 7.08% |
| 2006 | 17,696.90 | 8.65% |
| 2007 | 19,771.90 | 11.73% |
| 2008 | 21,822.70 | 10.37% |
| 2009 | 22,520.70 | 3.20% |
| 2010 | 24,389.30 | 8.30% |
| 2011 | 26,995.40 | 10.69% |
| 2012 | 29,876.50 | 10.67% |
| 2013 | 31,851.80 | 6.61% |
| 2014 | 33,779.90 | 6.05% |
| 2015 | 35,731.70 | 5.78% |
| 2016 | 36,981.30 | 3.50% |
| 2017 | 38,457.00 | 3.99% |
| 2018 | 39,887.60 | 3.72% |
| 2019 | 40,845.10 | 2.40% |
| 2020 | 35,319.70 | -13.53% |
| 2021 | 40,736.30 | 15.34% |
| 2022 | 43,750.85 | 7.40% |

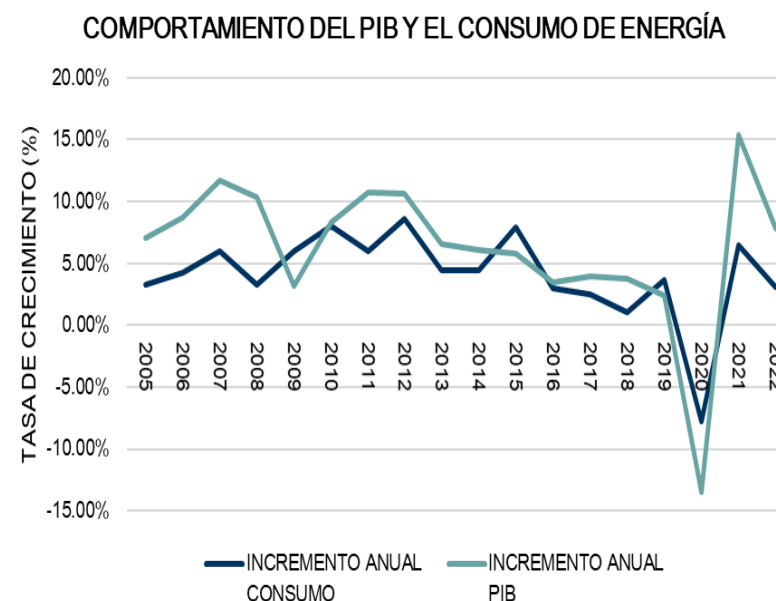


Fuente:

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

CUADRO NO.6: PRODUCTO INTERNO BRUTO Y CONSUMO EN GWh 2001-2019.

| AÑO | PIB REAL | CONSUMO (GWh) | INCREMENTO ANUAL CONSUMO | INCREMENTO ANUAL PIB |
|------|-----------|---------------|--------------------------|----------------------|
| 2001 | 13,266.09 | 4,573.99 | | |
| 2002 | 13,561.92 | 4,757.31 | 4.01% | 2.23% |
| 2003 | 14,147.48 | 4,918.01 | 3.38% | 4.32% |
| 2004 | 15,210.95 | 5,105.97 | 3.82% | 7.52% |
| 2005 | 16,287.64 | 5,274.14 | 3.29% | 7.08% |
| 2006 | 17,696.90 | 5,495.33 | 4.19% | 8.65% |
| 2007 | 19,771.90 | 5,826.42 | 6.02% | 11.73% |
| 2008 | 21,822.70 | 6,017.95 | 3.29% | 10.37% |
| 2009 | 22,520.70 | 6,376.16 | 5.95% | 3.20% |
| 2010 | 24,389.30 | 6,885.59 | 7.99% | 8.30% |
| 2011 | 26,995.40 | 7,300.86 | 6.03% | 10.69% |
| 2012 | 29,876.50 | 7,926.02 | 8.56% | 10.67% |
| 2013 | 31,851.80 | 8,280.92 | 4.48% | 6.61% |
| 2014 | 33,779.90 | 8,651.20 | 4.47% | 6.05% |
| 2015 | 35,731.70 | 9,336.86 | 7.93% | 5.78% |
| 2016 | 36,981.30 | 9,611.19 | 2.94% | 3.50% |
| 2017 | 38,457.00 | 9,848.62 | 2.47% | 3.99% |
| 2018 | 39,887.60 | 9,954.96 | 1.08% | 3.72% |
| 2019 | 40,845.10 | 10,320.22 | 3.67% | 2.40% |
| 2020 | 35,319.70 | 9,521.09 | -7.74% | -13.53% |
| 2021 | 40,736.30 | 10,139.03 | 6.49% | 15.34% |
| 2022 | 43,930.80 | 10,455.33 | 3.12% | 7.84% |



Fuente:

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

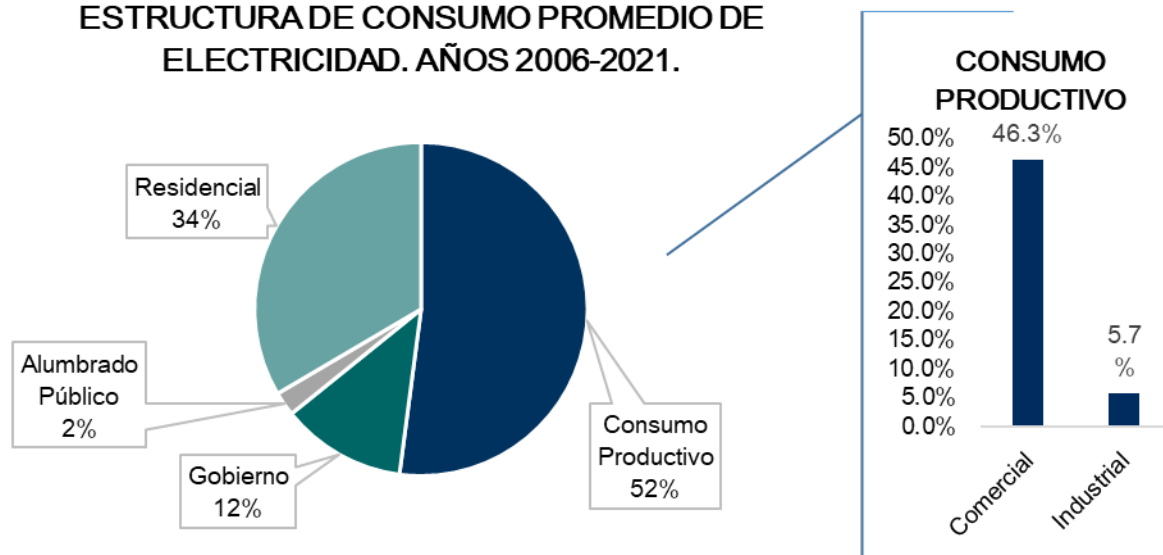
CUADRO NO.7: ESTRUCTURA DE CONSUMO

| | RESIDENCIAL | COMERCIAL | INDUSTRIAL | GOBIERNO | ALUMBRADO |
|---------------|-------------|------------|------------|-----------|-----------|
| ENSA | 93,005.19 | 98,040.95 | 17,927.98 | 32,064.64 | 4,677.72 |
| EDEMET | 93,767.54 | 167,852.11 | 13,341.56 | 36,973.99 | 7,292.04 |
| EDECHI | 21,006.12 | 22,017.09 | 4,348.93 | 6,288.14 | 2,577.57 |
| TOTAL | 207,778.84 | 287,910.16 | 35,618.47 | 75,326.76 | 14,547.34 |
| % | 33.4% | 46.3% | 5.7% | 12.1% | 2.3% |

CONSUMO PRODUCTIVO

52.1%

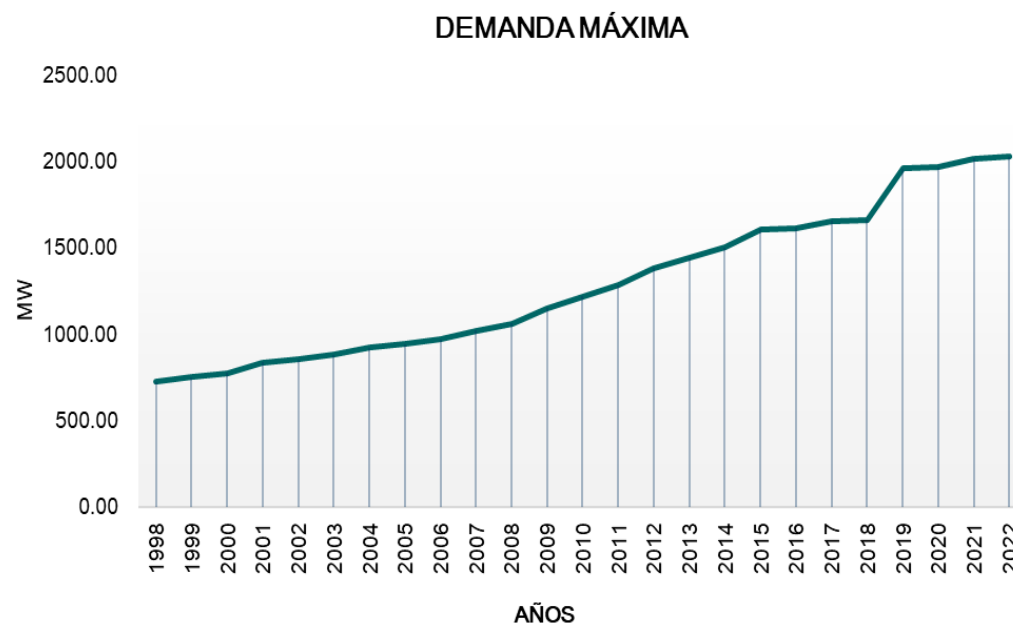
ESTRUCTURA DE CONSUMO PROMEDIO DE ELECTRICIDAD. AÑOS 2006-2021.



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

CUADRO NO.8: DEMANDA MÁXIMA DEL SISTEMA ELÉCTRICO PANAMEÑO.

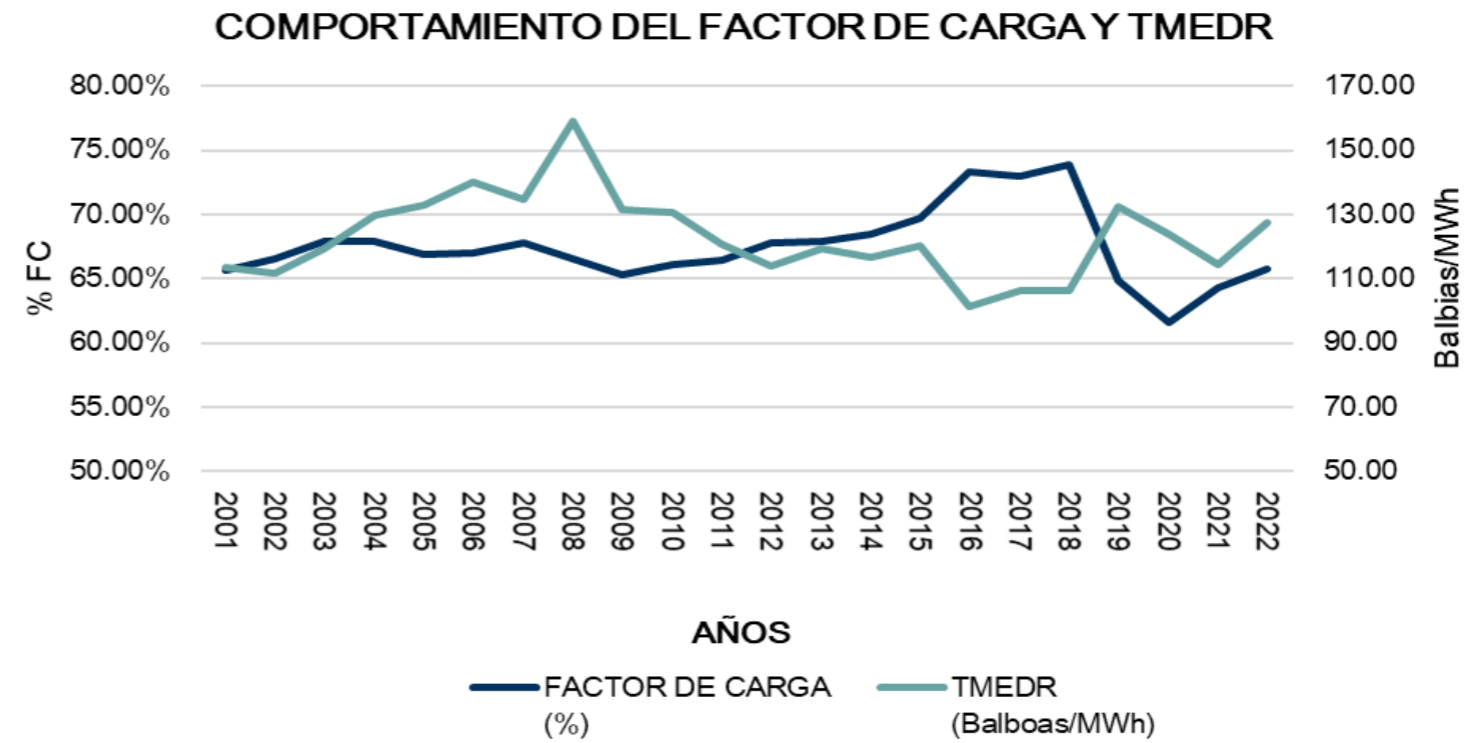
| AÑOS | DEMANDA MÁXIMA (MW) | TASA DE CRECIMIENT O |
|------|---------------------|----------------------|
| 1998 | 726.40 | |
| 1999 | 754.50 | 3.9% |
| 2000 | 777.00 | 3.0% |
| 2001 | 839.30 | 8.0% |
| 2002 | 857.35 | 2.2% |
| 2003 | 882.86 | 3.0% |
| 2004 | 924.96 | 4.8% |
| 2005 | 946.28 | 2.3% |
| 2006 | 971.34 | 2.6% |
| 2007 | 1024.16 | 5.4% |
| 2008 | 1064.25 | 3.9% |
| 2009 | 1153.99 | 8.4% |
| 2010 | 1222.40 | 5.9% |
| 2011 | 1286.46 | 5.2% |
| 2012 | 1386.27 | 7.8% |
| 2013 | 1443.94 | 4.2% |
| 2014 | 1503.46 | 4.1% |
| 2015 | 1612.00 | 7.2% |
| 2016 | 1618.00 | 0.4% |
| 2017 | 1657.00 | 2.4% |
| 2018 | 1665.00 | 0.5% |
| 2019 | 1961.00 | 17.8% |
| 2020 | 1969.00 | 0.4% |
| 2021 | 2020.00 | 2.6% |
| 2022 | 2031.00 | 0.5% |



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

CUADRO NO.9: FACTOR DE CARGA Y TARIFA MEDIA DE DISTRIBUIDORAS REAL.

| AÑOS | FACTOR DE CARGA (%) | TMEDR (Balboas/MWh) |
|-------------|----------------------------|----------------------------|
| 2001 | 65.59% | 113.29 |
| 2002 | 66.56% | 111.85 |
| 2003 | 67.93% | 119.14 |
| 2004 | 67.92% | 129.52 |
| 2005 | 66.83% | 132.99 |
| 2006 | 66.95% | 140.31 |
| 2007 | 67.75% | 134.53 |
| 2008 | 66.57% | 159.20 |
| 2009 | 65.34% | 131.53 |
| 2010 | 66.15% | 130.66 |
| 2011 | 66.46% | 120.60 |
| 2012 | 67.74% | 113.88 |
| 2013 | 67.86% | 119.57 |
| 2014 | 68.50% | 116.60 |
| 2015 | 69.75% | 120.18 |
| 2016 | 73.32% | 101.25 |
| 2017 | 73.01% | 106.15 |
| 2018 | 73.93% | 106.28 |
| 2019 | 64.86% | 132.38 |
| 2020 | 61.59% | 123.89 |
| 2021 | 64.32% | 114.57 |
| 2022 | 65.77% | 127.41 |

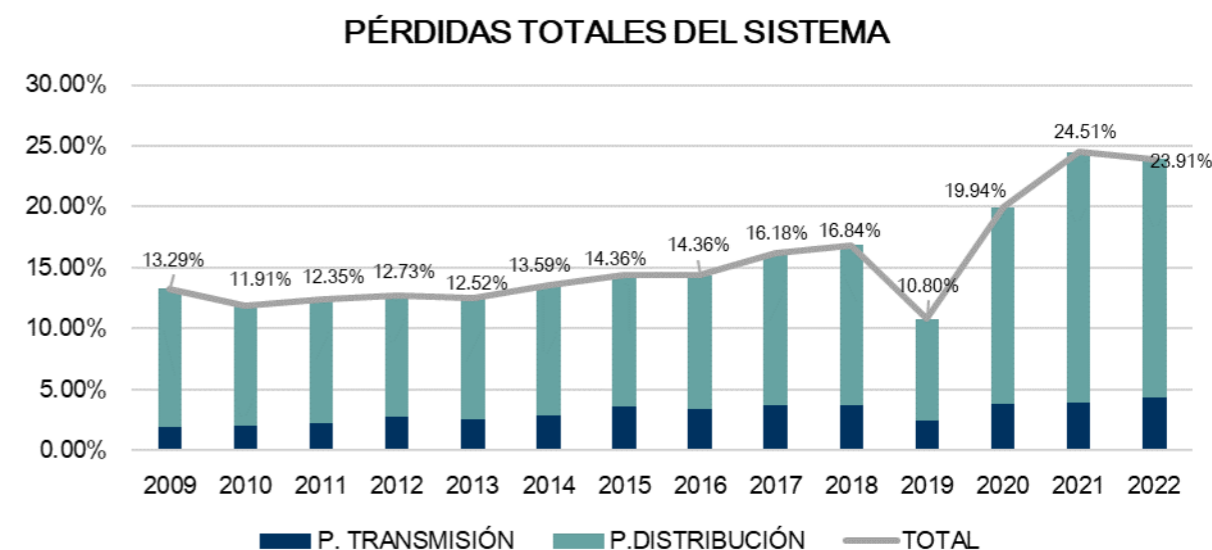
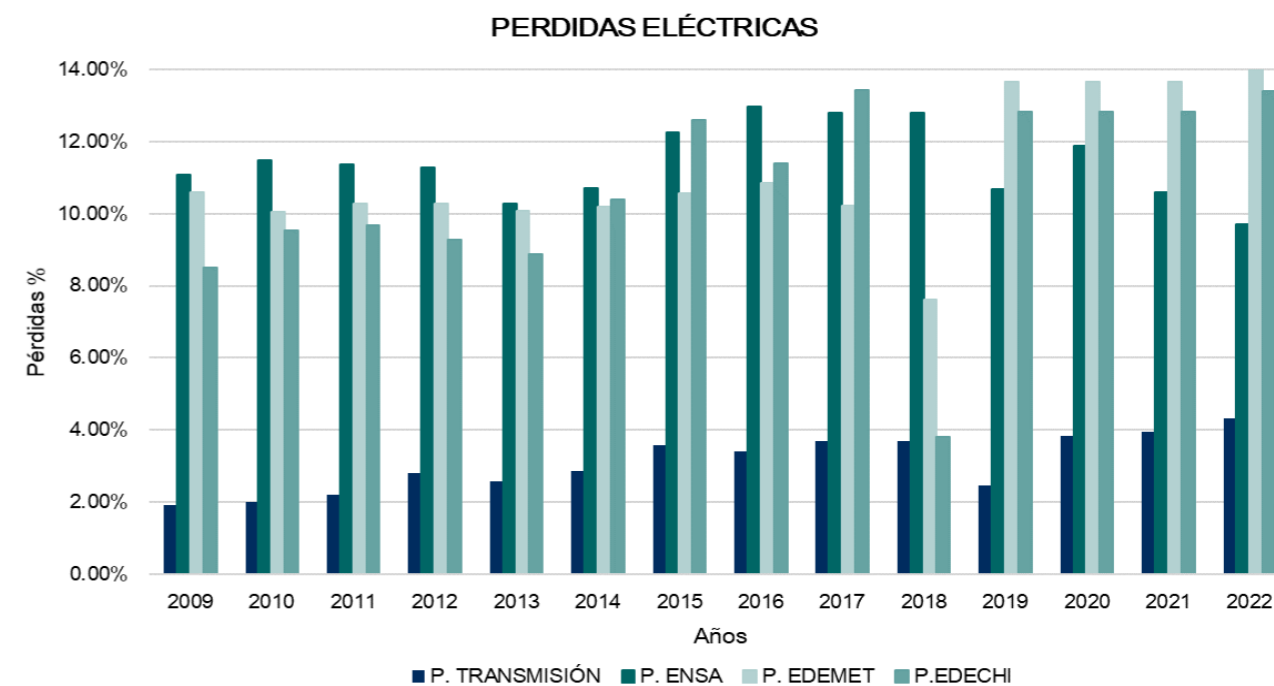


Fuente: <http://www.cnd.com.pa>

CUADRO NO.10: PÉRDIDAS POR DISTRIBUIDORA Y TOTAL.

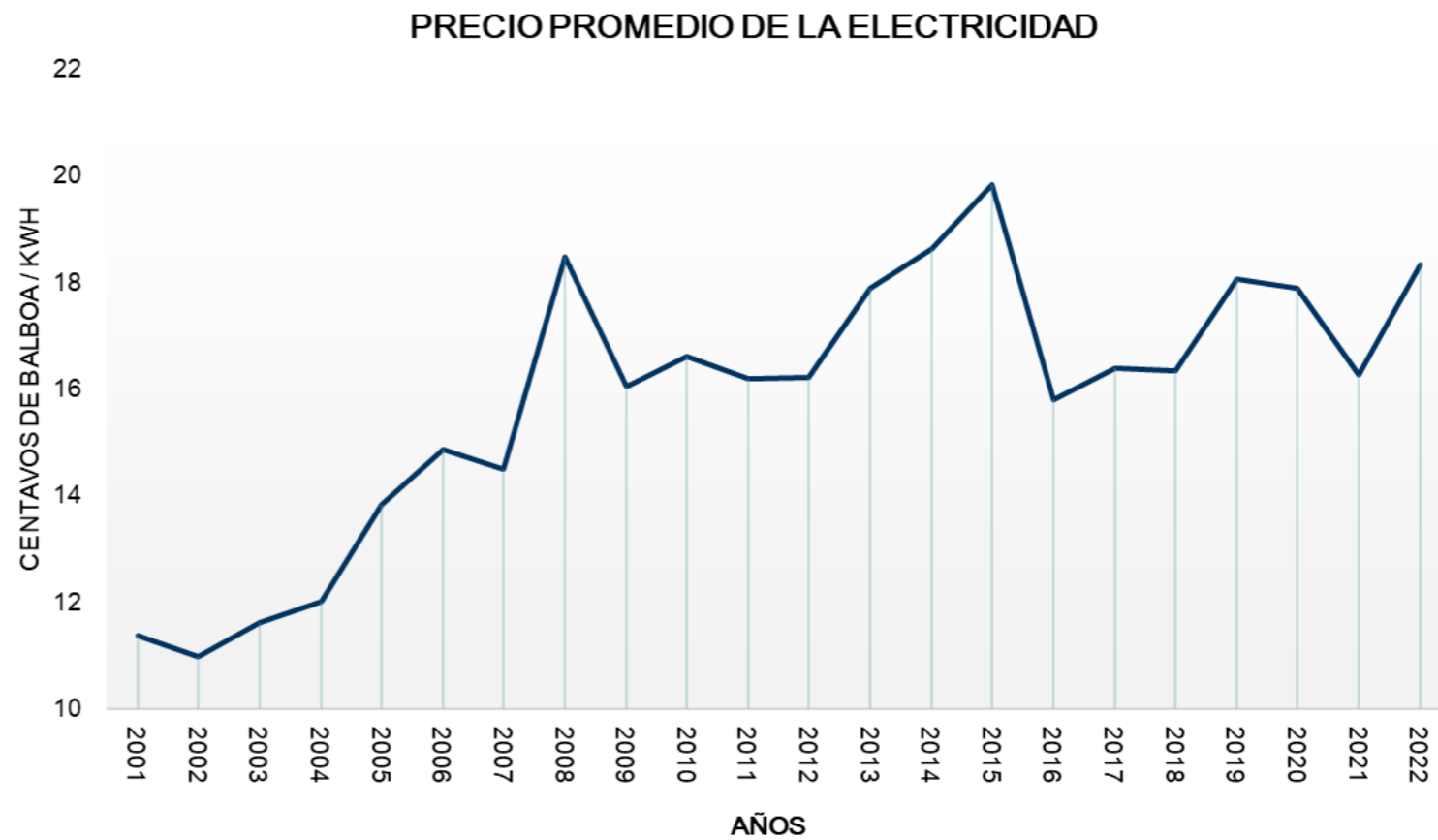
| AÑOS | P. TRANSMISIÓN | P. ENSA | P. EDEMET | P.EDECHI | P.DISTRIBUCIÓN | TOTAL | TASA DE VARIACIÓN |
|------|----------------|---------|-----------|----------|----------------|--------|-------------------|
| 2008 | 2.41% | 11.08% | 10.59% | 8.50% | 10.84% | 12.47% | 0.00% |
| 2009 | 1.92% | 11.08% | 10.59% | 8.50% | 11.37% | 13.29% | 6.62% |
| 2010 | 2.01% | 11.48% | 10.06% | 9.54% | 9.90% | 11.91% | -10.43% |
| 2011 | 2.20% | 11.37% | 10.29% | 9.67% | 10.15% | 12.35% | 3.78% |
| 2012 | 2.80% | 11.28% | 10.29% | 9.28% | 9.93% | 12.73% | 3.04% |
| 2013 | 2.59% | 10.29% | 10.09% | 8.89% | 9.93% | 12.52% | -1.69% |
| 2014 | 2.85% | 10.72% | 10.18% | 10.39% | 10.74% | 13.59% | 8.59% |
| 2015 | 3.59% | 12.26% | 10.57% | 12.59% | 10.77% | 14.36% | 5.65% |
| 2016 | 3.41% | 12.98% | 10.87% | 11.40% | 10.95% | 14.36% | 0.00% |
| 2017 | 3.69% | 12.81% | 10.22% | 13.43% | 12.49% | 16.18% | 12.67% |
| 2018 | 3.69% | 12.80% | 7.61% | 3.82% | 13.15% | 16.84% | 4.10% |
| 2019 | 2.46% | 10.70% | 13.67% | 12.82% | 8.34% | 10.80% | -35.87% |
| 2020 | 3.84% | 11.89% | 13.67% | 12.82% | 16.10% | 19.94% | 84.63% |
| 2021 | 3.96% | 10.61% | 13.67% | 12.82% | 20.55% | 24.51% | 22.92% |
| 2022 | 4.31% | 9.70% | 14.58% | 13.41% | 19.60% | 23.91% | -2.45% |

Fuente: ASEP, Informes Semestrales.



CUADRO NO.11: DEMANDA MÁXIMA DEL SISTEMA ELÉCTRICO PANAMEÑO.

| AÑOS | CENTAVOS/ KWh | TASA DE CRECIMIENTO |
|-------------|----------------------|----------------------------|
| 2001 | 11.37 | |
| 2002 | 10.98 | -3.55% |
| 2003 | 11.63 | 5.59% |
| 2004 | 12.03 | 3.33% |
| 2005 | 13.83 | 13.02% |
| 2006 | 14.87 | 6.99% |
| 2007 | 14.5 | -2.55% |
| 2008 | 18.5 | 21.62% |
| 2009 | 16.06 | -15.19% |
| 2010 | 16.61 | 3.31% |
| 2011 | 16.19 | -2.59% |
| 2012 | 16.22 | 0.18% |
| 2013 | 17.91 | 9.44% |
| 2014 | 18.64 | 3.92% |
| 2015 | 19.85 | 6.10% |
| 2016 | 15.8 | -25.63% |
| 2017 | 16.4 | 3.66% |
| 2018 | 16.35 | -0.31% |
| 2019 | 18.08 | 9.57% |
| 2020 | 17.9 | -1.01% |
| 2021 | 16.27 | -10.02% |
| 2022 | 18.35 | 11.34% |



Fuente: PESIN 2019 y ASEP, Informes Semestrales.

CUADRO NO.12: RESULTADO DE PROYECCIONES POR ESCENARIO DEL ME - SIPRODE (ENERGÍA Y POTENCIA).

**PRONOSTICOS DE LA GENERACIÓN Y POTENCIA
PLAN DE EXPANSIÓN DEL SISTEMA INTECONECTADO NACIONAL
2023 - 2037**

| AÑO | Pesimista - Bajo | | | | Moderado - Medio | | | | Optimista - Alto | | | |
|------|------------------|-------|----------|-------|------------------|-------|----------|-------|------------------|-------|----------|-------|
| | GENERACIÓN | | POTENCIA | | GENERACIÓN | | POTENCIA | | GENERACIÓN | | POTENCIA | |
| | GWh | Δ%GWh | MW | Δ%MW | GWh | Δ%GWh | MW | Δ%MW | GWh | Δ%GWh | MW | Δ%MW |
| 2023 | 10,174.09 | | 1,698.53 | | 11,253.99 | | 1,829.78 | | 12,069.35 | | 1,961.04 | |
| 2024 | 10,689.34 | 5.06% | 1,749.49 | 3.00% | 11,823.92 | 5.06% | 1,941.43 | 6.10% | 12,733.16 | 5.50% | 2,088.51 | 6.50% |
| 2025 | 11,213.12 | 4.90% | 1,828.21 | 4.50% | 12,366.71 | 4.59% | 2,051.59 | 5.67% | 13,357.09 | 4.90% | 2,213.82 | 6.00% |
| 2026 | 11,650.43 | 3.90% | 1,901.34 | 4.00% | 12,779.49 | 3.34% | 2,150.06 | 4.80% | 13,904.73 | 4.10% | 2,353.29 | 6.30% |
| 2027 | 11,968.47 | 2.73% | 1,981.20 | 4.20% | 13,387.11 | 4.75% | 2,278.59 | 5.98% | 14,391.40 | 3.50% | 2,508.60 | 6.60% |
| 2028 | 12,289.78 | 2.68% | 2,058.47 | 3.90% | 13,828.55 | 3.30% | 2,399.35 | 5.30% | 14,909.49 | 3.60% | 2,656.61 | 5.90% |
| 2029 | 12,656.06 | 2.98% | 2,142.86 | 4.10% | 14,321.69 | 3.57% | 2,509.72 | 4.60% | 15,392.34 | 3.24% | 2,808.04 | 5.70% |
| 2030 | 12,989.97 | 2.64% | 2,241.43 | 4.60% | 14,795.00 | 3.30% | 2,630.19 | 4.80% | 16,134.81 | 4.82% | 2,965.29 | 5.60% |
| 2031 | 13,344.98 | 2.73% | 2,328.85 | 3.90% | 15,295.12 | 3.38% | 2,732.77 | 3.90% | 16,911.48 | 4.81% | 3,110.59 | 4.90% |
| 2032 | 13,690.56 | 2.59% | 2,415.02 | 3.70% | 15,806.89 | 3.35% | 2,818.80 | 3.15% | 17,708.58 | 4.71% | 3,253.67 | 4.60% |
| 2033 | 14,183.40 | 3.60% | 2,498.00 | 3.44% | 16,464.18 | 4.16% | 2,915.67 | 3.44% | 18,669.68 | 5.43% | 3,390.33 | 4.20% |
| 2034 | 14,529.74 | 2.44% | 2,575.44 | 3.10% | 17,009.59 | 3.31% | 3,006.05 | 3.10% | 19,519.21 | 4.55% | 3,546.28 | 4.60% |
| 2035 | 14,737.28 | 1.43% | 2,677.01 | 3.94% | 17,432.10 | 2.48% | 3,124.61 | 3.94% | 20,257.37 | 3.78% | 3,720.05 | 4.90% |
| 2036 | 15,087.18 | 2.37% | 2,766.26 | 3.33% | 18,021.86 | 3.38% | 3,228.78 | 3.33% | 21,169.30 | 4.50% | 3,876.81 | 4.21% |
| 2037 | 15,456.95 | 2.45% | 2,839.69 | 2.65% | 18,645.99 | 3.46% | 3,314.49 | 2.65% | 22,126.56 | 4.52% | 4,060.17 | 4.73% |

PRONÓSTICO DE DEMANDA 2023-2037

