# Instituto Costarricense de Electricidad

# Generación y Demanda

## Informe Anual

## Centro Nacional de Control de Energía

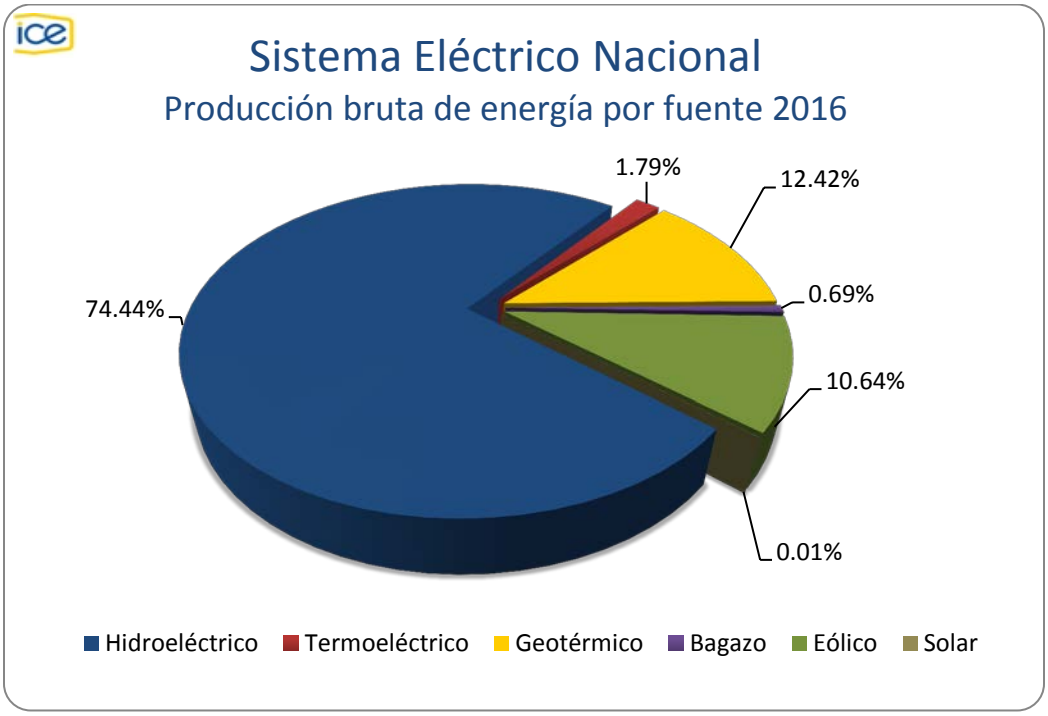
**2016**

A continuación se presentan los cuadros y los gráficos con los principales indicadores del Sistema Eléctrico Nacional (SEN) en lo referente a: la producción de energía bruta, la demanda de energía, la potencia instalada, niveles del embalse Arenal y demandas máximas.

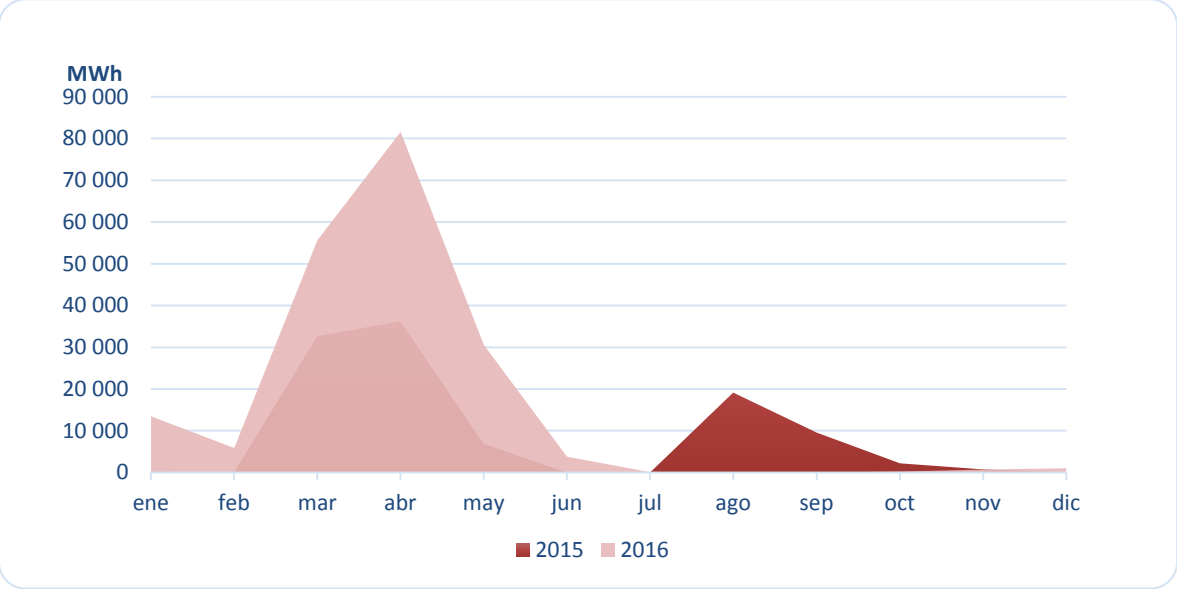
**Balance eléctrico por fuente 2016 - Acumulado a Diciembre**

| Tipo de Fuente | GWh | % | Tipo de fuente | GWh | % |
|---|---|---|---|---|---|
| Termoeléctrica | 193,03 | 1,79% | Hidroeléctrica | 8 025,95 | 74,44% |
| | | | Geotérmica | 1 339,51 | 12,42% |
| | | | Bagazo | 74,51 | 0,69% |
| | | | Eólico | 1 147,29 | 10,64% |
| | | | Solar | 1,41 | 0,01% |
| **No renovable** | 193,03 | **1,79%** | **Renovable** | 10 588,67 | **98,21%** |
| Generación bruta: 10 781.69 GWh - ↑ 0.64% | | | | | |
| Intercambio de energía: 150.38 GWh | | | | | |
| Demanda Nacional: 10 932.08 GWh - ↑ 3.06% | | | | | |

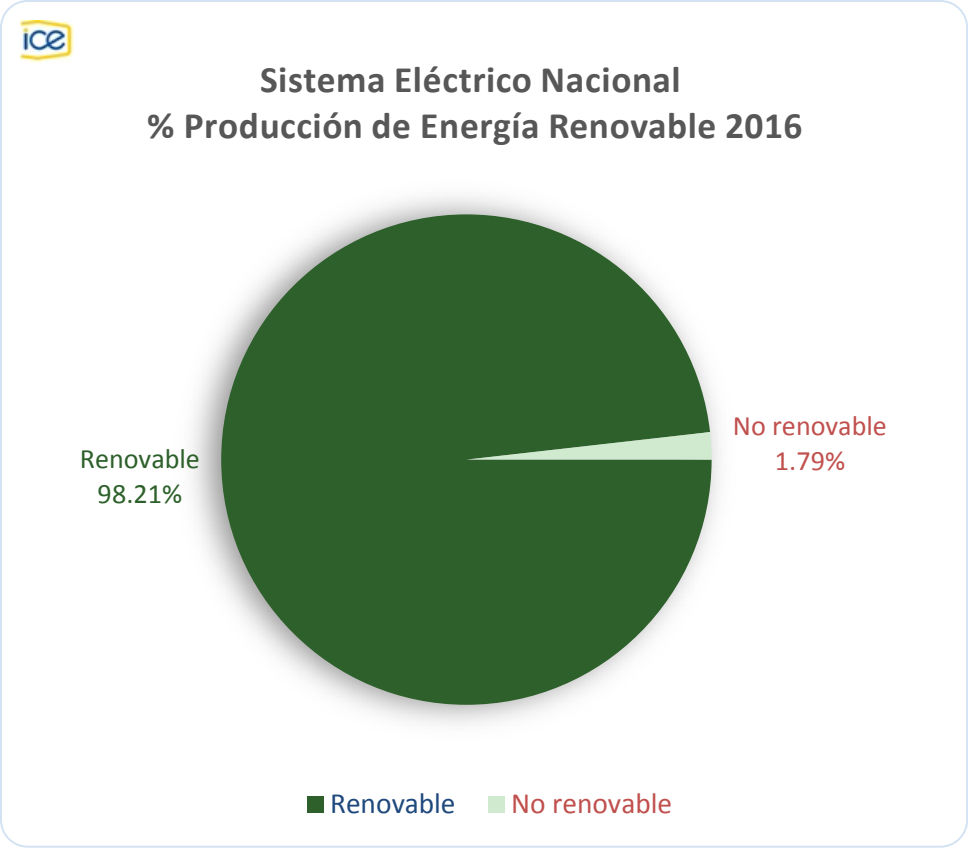
## Distribución de la producción bruta de energía 2016 por fuente



## Comparación de la producción bruta de energía termoeléctrica 2015 - 2016

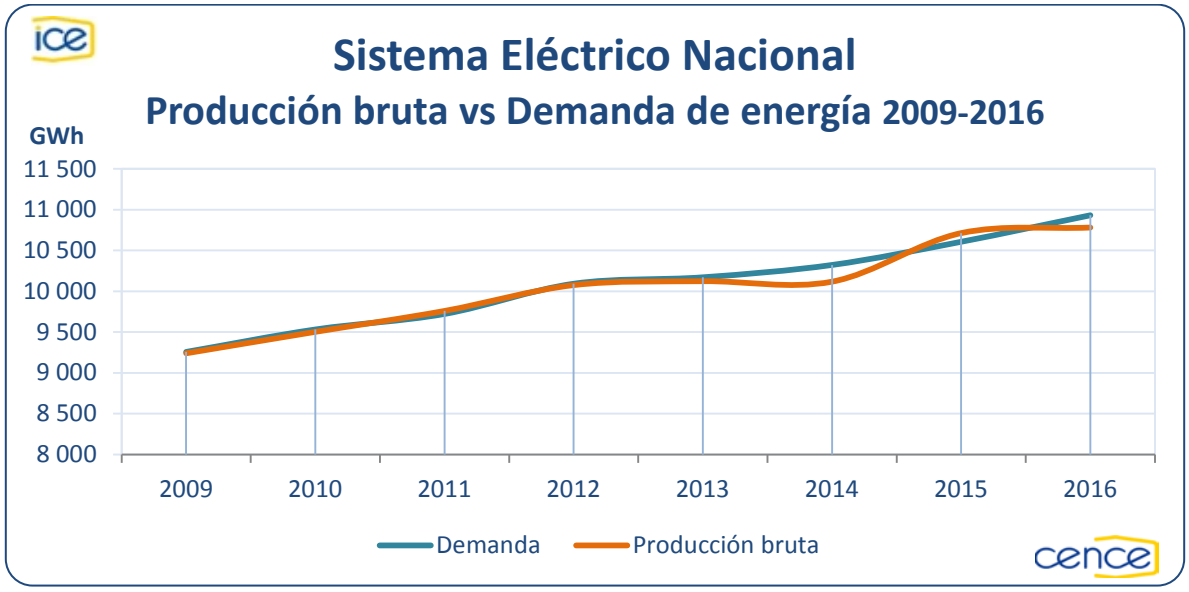



## % Producción de Energía Renovable 2016

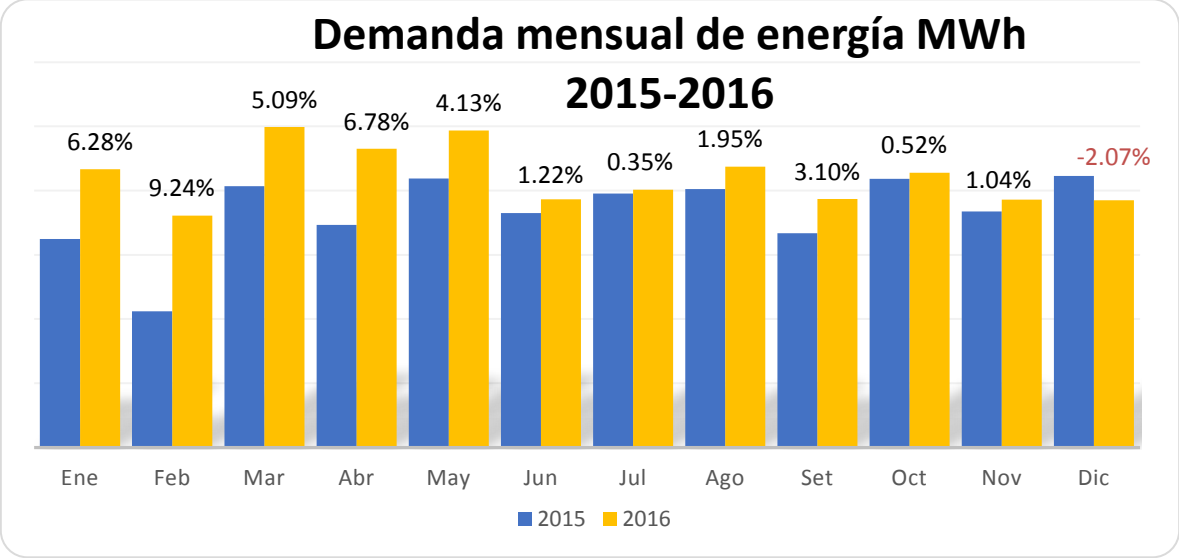


| Producción bruta de Energía MWh | | | |
|---|---|---|---|
| Fuente | 2015 | 2016 | Crecimiento |
| Hidroeléctrico | 8.066.584,89 | 8.025.945,48 | -0,50% |
| Termoeléctrico | 108.120,13 | 193.025,92 | 78,53% |
| Geotérmico | 1.375.628,94 | 1.339.514,92 | -2,63% |
| Bagazo | 82.277,93 | 74.509,87 | -9,44% |
| Eólico | 1.079.507,89 | 1.147.291,27 | 6,28% |
| Solar | 1.531,92 | 1.411,57 | -7,86% |
| **Producción bruta** | **10 713 651,71** | **10 781 699,03** | **0,64%** |
| Intercambio | - 106 345,91 | 150 385,12 | |
| **Demanda Nacional** | **10 607 305,80** | **10 932 084,16** | **3,06%** |

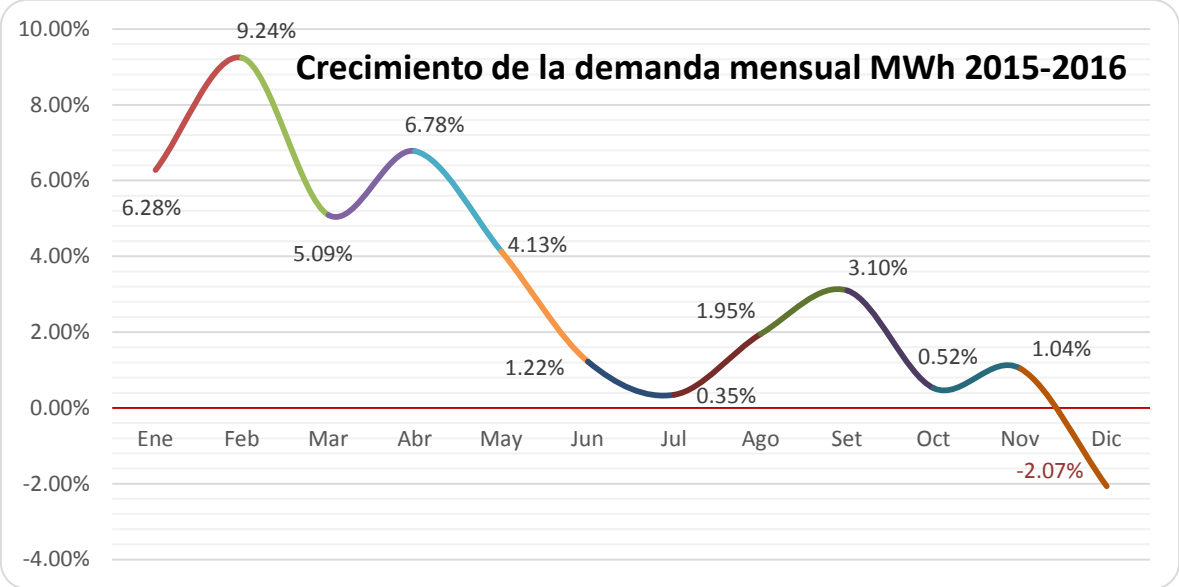
## Comportamiento de la Producción bruta y demanda de energía



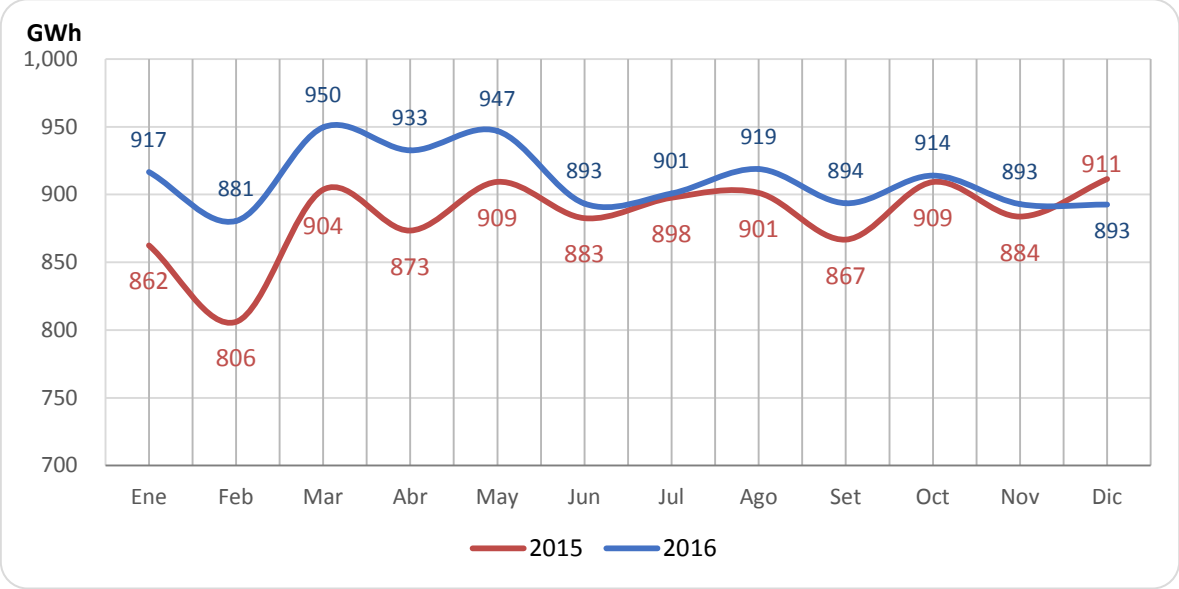
## Comparación de la demanda mensual de energía 2015 - 2016



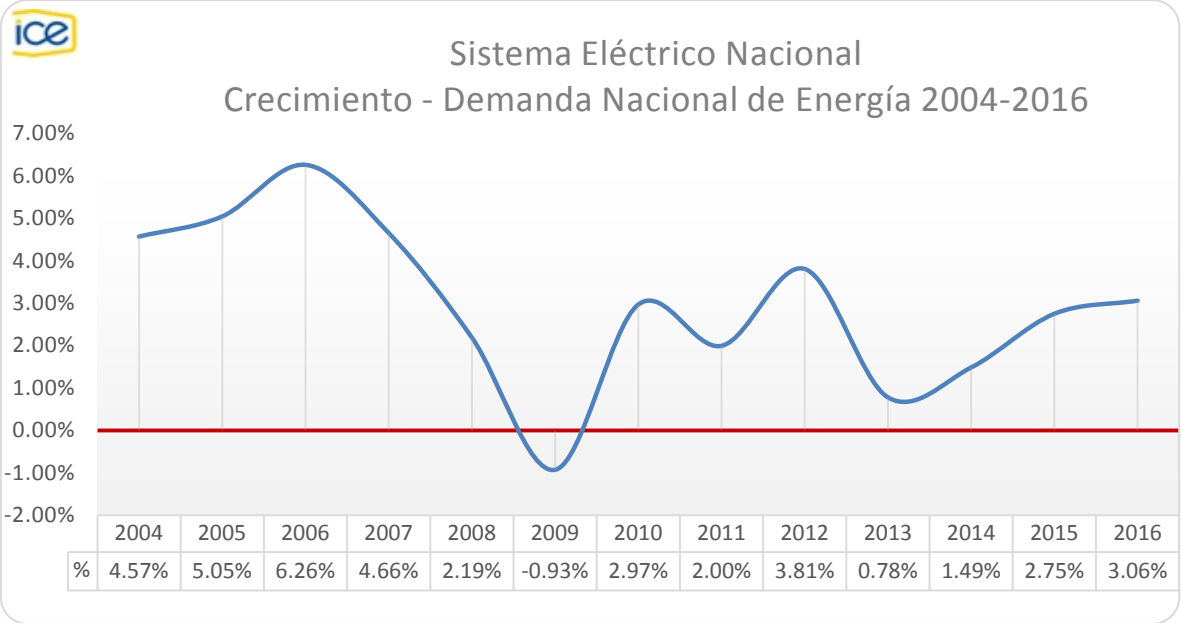

## Crecimiento mensual de la demanda de energía 2015 – 2016



## Demanda Mensual de Energía en GWh 2015 - 2016




## Crecimiento histórico de la demanda de energía



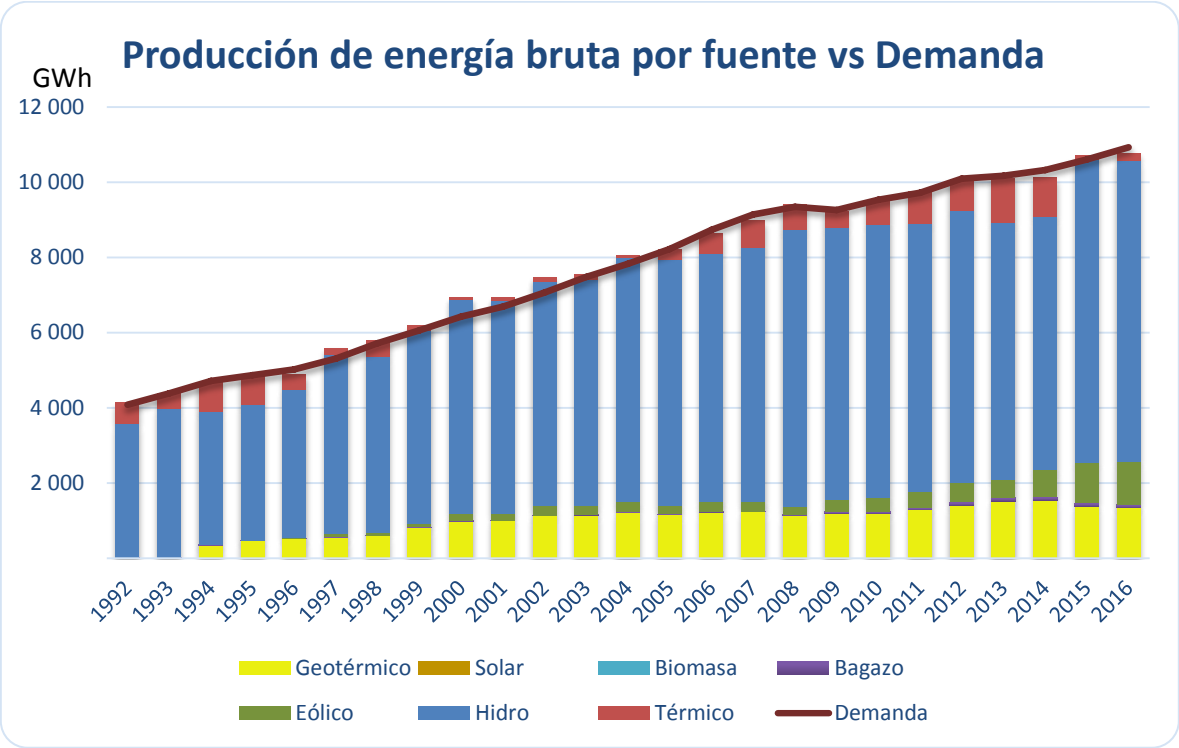

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | 4.57% | 5.05% | 6.26% | 4.66% | 2.19% | -0.93% | 2.97% | 2.00% | 3.81% | 0.78% | 1.49% | 2.75% | 3.06% |

El crecimiento de la demanda de energía del año 2016 fue de un 3,06%, con respecto al año 2015.

## Evolución de la producción bruta y demanda de energía

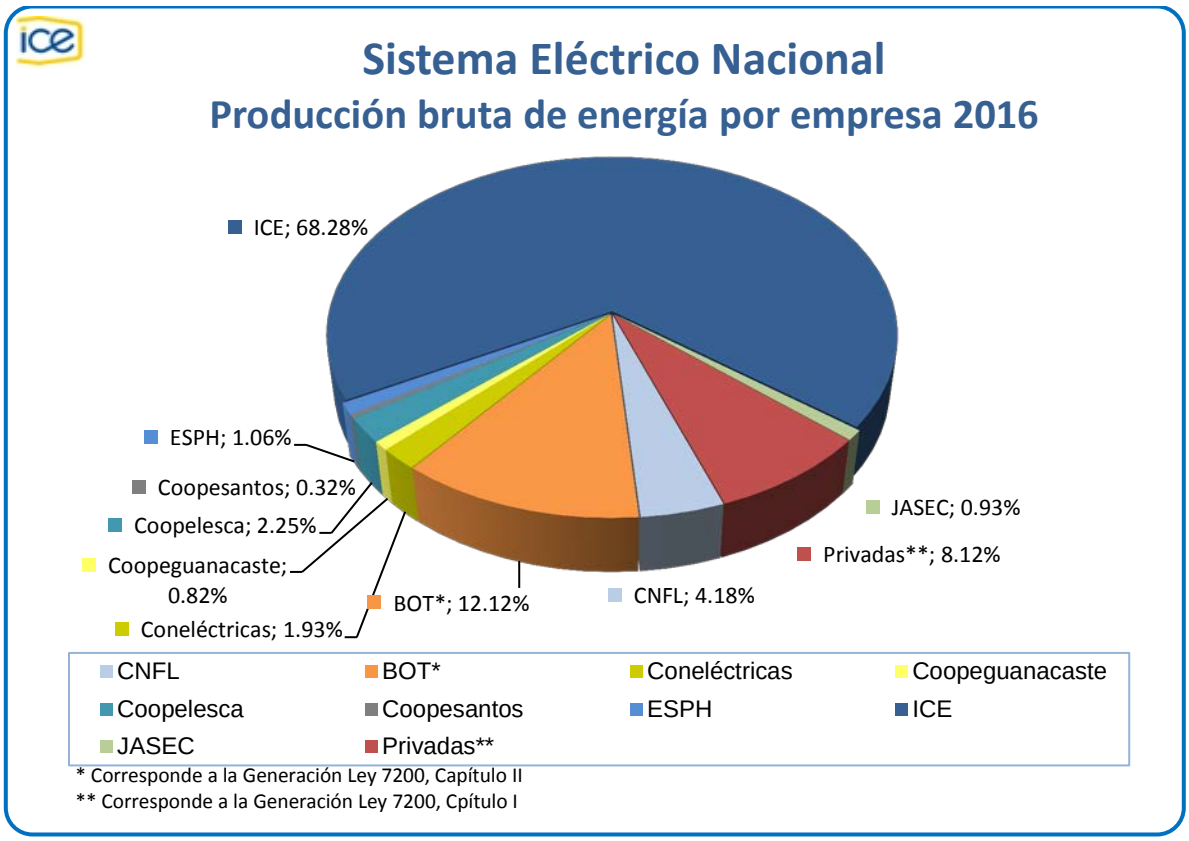
| GWh | 2 009 | 2 010 | 2 011 | 2 012 | 2 013 | 2 014 | 2 015 | 2016 |
|---|---|---|---|---|---|---|---|---|
| Producción | 9.240,65 | 9.503,59 | 9.759,61 | 10.076,40 | 10.124,10 | 10.118,33 | 10.713,65 | 10.781,70 |
| Intercambio | 16,86 | 28,94 | (36,78) | 16,74 | 47,81 | 204,76 | (106,35) | 150,39 |
| Demanda | 9.257,51 | 9.532,53 | 9.722,83 | 10.093,09 | 10.171,91 | 10.323,10 | 10.607,31 | 10.932,08 |
| % Crecimiento producción bruta | -1,84% | 2,85% | 2,69% | 3,25% | 0,47% | -0,06% | 5,88% | 0,64% |
| % Crecimiento demanda | -0,93% | 2,97% | 2,00% | 3,81% | 0,78% | 1,49% | 2,75% | 3,06% |

Centro Nacional de Control de Energía, ICE



## Producción bruta de energía por Empresa – Demanda MWh

| Empresa | Fuente | MWh | | Crecimiento | |
|---|---|---|---|---|---|
| | | 2015 | 2016 | Anual | SEN |
| CNFL | Hidro | 400.302,11 | 422.574,83 | 5,56% | 3,92% |
| | Eólica | 39.223,97 | 28.622,73 | -27,03% | 0,27% |
| | Subtotal | 439.526,08 | 451.197,56 | 2,66% | 4,18% |
| Coneléctricas | Hidro | 243.215,94 | 208.324,55 | -14,35% | 1,93% |
| Coopeguanacaste | Hidro | 78.519,77 | 88.159,67 | 12,28% | 0,82% |
| Coopelesca | Hidro | 254.034,64 | 242.278,18 | -4,63% | 2,25% |
| Coopesantos | Eólica | 43.549,41 | 34.391,91 | -21,03% | 0,32% |
| ESPH | Hidro | 111.871,69 | 114.500,53 | 2,35% | 1,06% |
| JASEC | Hidro | 143.828,99 | 100.190,33 | -30,34% | 0,93% |
| Privadas | Hidro | 582.219,64 | 460.134,50 | -20,97% | 4,27% |
| | Eólica | 288.124,84 | 340.334,32 | 18,12% | 3,16% |
| | Bagazo | 82.277,93 | 74.509,87 | -9,44% | 0,69% |
| | Subtotal | 952.622,40 | 874.978,68 | -8,15% | 8,12% |
| BOT | Hidro | 652.445,09 | 611.453,11 | -6,28% | 5,67% |
| | Geotérmica | 49.287,78 | | -100,00% | 0,00% |
| | Eólica | 643.533,18 | 694.785,14 | 7,96% | 6,44% |
| | Subtotal | 1.345.266,05 | 1.306.238,25 | -2,90% | 12,12% |
| ICE | Hidro | 5.600.147,03 | 5.778.329,80 | 3,18% | 53,59% |
| | Térmica | 108.120,13 | 193.025,92 | 78,53% | 1,79% |
| | Geotérmica | 1.326.341,16 | 1.339.514,92 | 0,99% | 12,42% |
| | Eólica | 65.076,50 | 49.157,18 | -24,46% | 0,46% |
| | Solar | 1.531,92 | 1.411,57 | -7,86% | 0,01% |
| | Subtotal | 7.101.216,75 | 7.361.439,37 | 3,66% | 68,28% |
| Sistema Eléctrico Nacional | Hidro | 8.066.584,89 | 8.025.945,50 | -0,50% | 74,44% |
| | Térmico | 108.120,13 | 193.025,92 | 78,53% | 1,79% |
| | Geotérmica | 1.375.628,94 | 1.339.514,92 | -2,63% | 12,42% |
| | Eólico | 1.079.507,89 | 1.147.291,28 | 6,28% | 10,64% |
| | Bagazo | 82.277,93 | 74.509,87 | -9,44% | 0,69% |
| | Solar | 1.531,92 | 1.411,57 | -7,86% | 0,01% |
| Producción bruta | Total | 10.713.651,71 | 10.781.699,03 | 0,64% | 100,00% |
| Intercambio | | -106.345,91 | 150.385,12 | | |
| Demanda MWh | | 10.607.305,80 | 10.932.084,16 | 3,06% | |




| Producción bruta de energía por Empresa 2016 | | |
|---|---|---|
| Empresa | MWh | % |
| C.N.F.L. | 451.197,56 | 4,18% |
| BOT* | 1.306.238,25 | 12,12% |
| Coneléctricas | 208.324,55 | 1,93% |
| Coopeguanacaste | 88.159,67 | 0,82% |
| Coopelesca | 242.278,18 | 2,25% |
| Coopesantos | 34.391,91 | 0,32% |
| ESPH | 114.500,53 | 1,06% |
| ICE | 7.361.439,37 | 68,28% |
| JASEC | 100.190,33 | 0,93% |
| Privadas** | 874.978,68 | 8,12% |
| **Total** | 10.781.699,03 | 100,00% |

*Corresponde a la Generación Ley 7200, Capítulo II

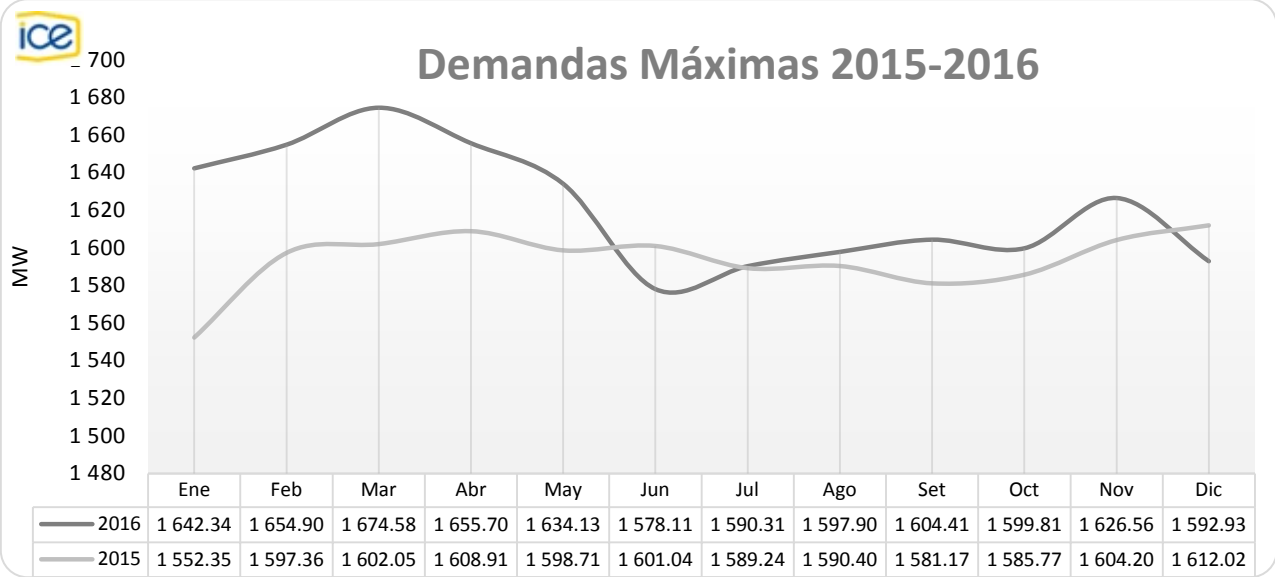
**Corresponde a la Generación Ley 7200, Capítulo I

C.N.F.L. Compañía Nacional de Fuerza y Luz * B.O.T. Modalidad Build Operate Transfer *
E.S.P.H. Empresa de Servicios Públicos de Heredia * I.C.E. Instituto Costarricense de Electricidad *
J.A.S.E.C. Junta Administrativa de Servicios Eléctricos de Cartago

## Demanda de potencia:

El mes donde se presentó la mayor demanda de potencia fue marzo llegando a 1 674.58 MW (según el registro del 09 de marzo a las 18:30 horas). Con relación al 2015, hubo un crecimiento del 3.88%.

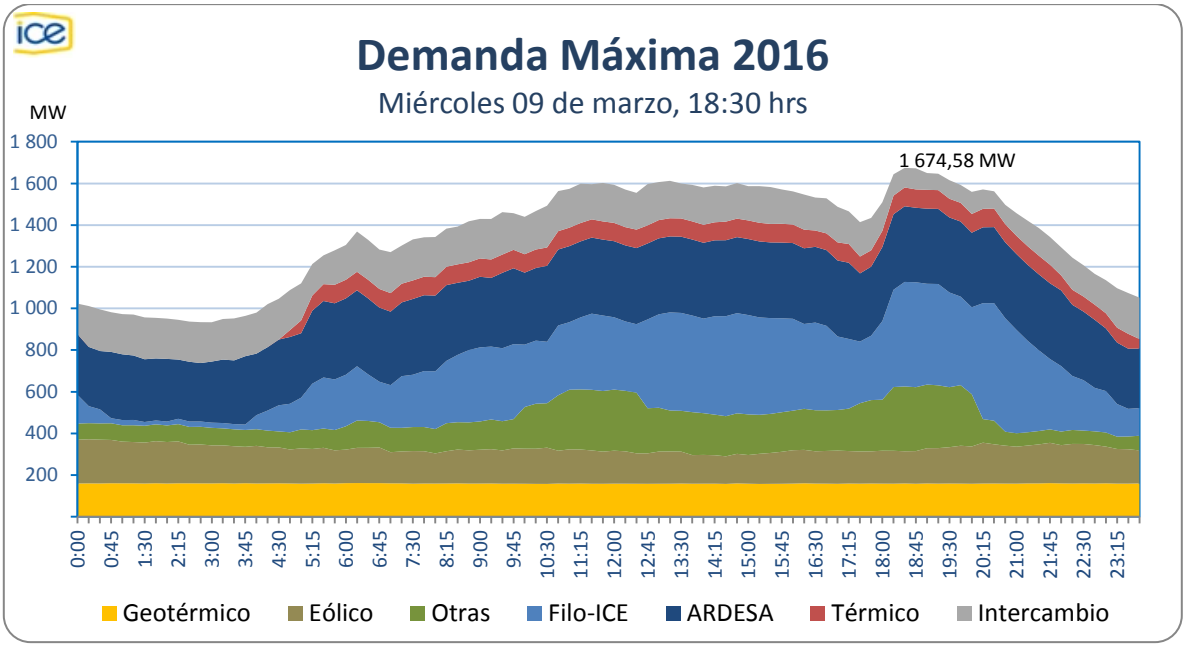
| MW | Ene | Feb | Mar | Abr | May | Jun | Jul | Ago | Set | Oct | Nov | Dic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 1 475,12 | 1 515,79 | 1 545,60 | 1 512,41 | 1 530,89 | 1 492,90 | 1 476,55 | 1 502,05 | 1 481,02 | 1 481,72 | 1 500,48 | 1 503,70 |
| 2012 | 1 534,66 | 1 549,88 | 1 593,11 | 1 532,15 | 1 527,41 | 1 529,51 | 1 505,99 | 1 514,16 | 1 512,50 | 1 511,82 | 1 572,82 | 1 570,28 |
| 2013 | 1 543,80 | 1 592,90 | 1 580,99 | 1 584,57 | 1 550,64 | 1 543,51 | 1 510,22 | 1 490,63 | 1 582,64 | 1 527,42 | 1 559,36 | 1 551,48 |
| 2014 | 1 571,51 | 1 594,77 | 1 611,21 | 1 631,65 | 1 570,76 | 1 536,28 | 1 552,00 | 1 527,62 | 1 522,05 | 1 528,21 | 1 587,64 | 1 555,83 |
| 2015 | 1 552,35 | 1 597,36 | 1 602,05 | 1 608,91 | 1 598,71 | 1 601,04 | 1 589,24 | 1 590,40 | 1 581,17 | 1 585,77 | 1 604,20 | 1 612,02 |
| 2016 | 1 642,34 | 1 654,90 | 1 674,58 | 1 655,70 | 1 634,13 | 1 578,11 | 1 590,31 | 1 597,90 | 1 604,41 | 1 599,81 | 1 626,56 | 1 592,93 |



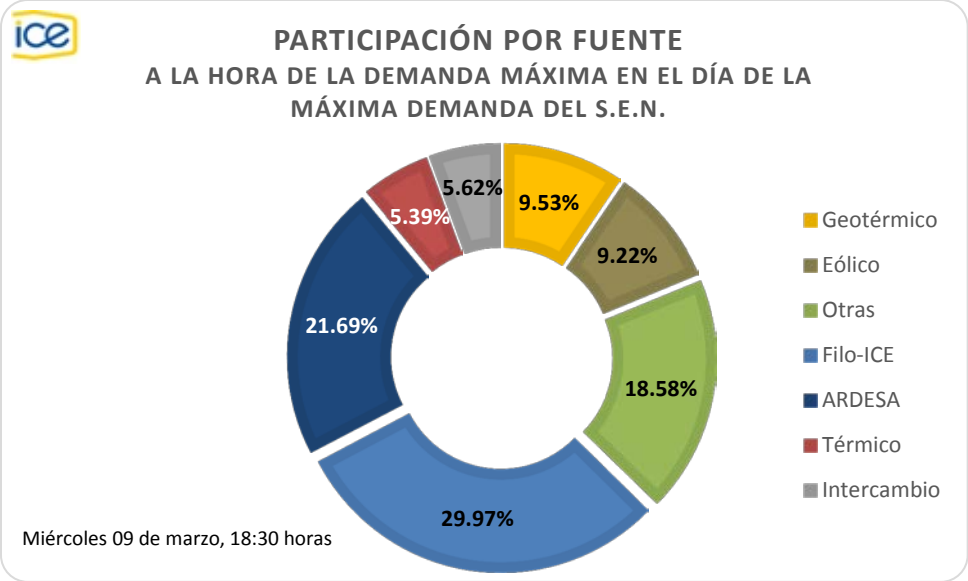
**Máximos Potencia y Demanda 2016**

| Potencia | | Demanda | |
|---|---|---|---|
| Fecha | MW | Fecha | kWh |
| 18-ene | 1 642,34 | 14-ene | 31 344,63 |
| 17-feb | 1 654,90 | 24-feb | 32 280,55 |
| 09-mar | 1 674,58 | 31-mar | 32 903,04 |
| 12-abr | 1 655,70 | 01-abr | 32 717,64 |
| 24-may | 1 634,13 | 04-may | 32 303,99 |
| 07-jun | 1 578,11 | 08-jun | 32 962,30 |
| 28-jul | 1 590,31 | 27-jul | 31 009,44 |
| 17-ago | 1 597,90 | 10-ago | 31 082,35 |
| 19-sep | 1 604,41 | 30-sep | 32 051,07 |
| 24-oct | 1 599,81 | 27-oct | 30 919,27 |
| 09-nov | 1 626,56 | 09-nov | 31 267,78 |
| 07-dic | 1 592,93 | 07-dic | 30 889,36 |

## Día de la máxima demanda:

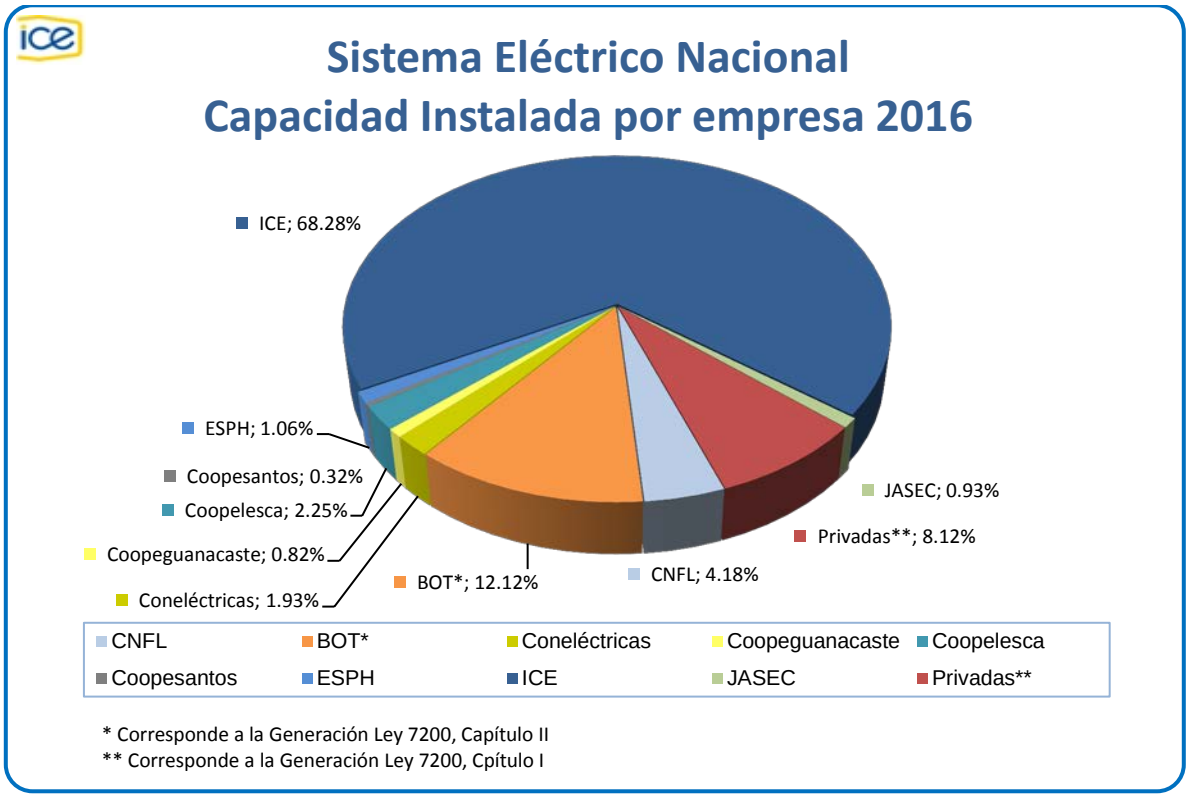


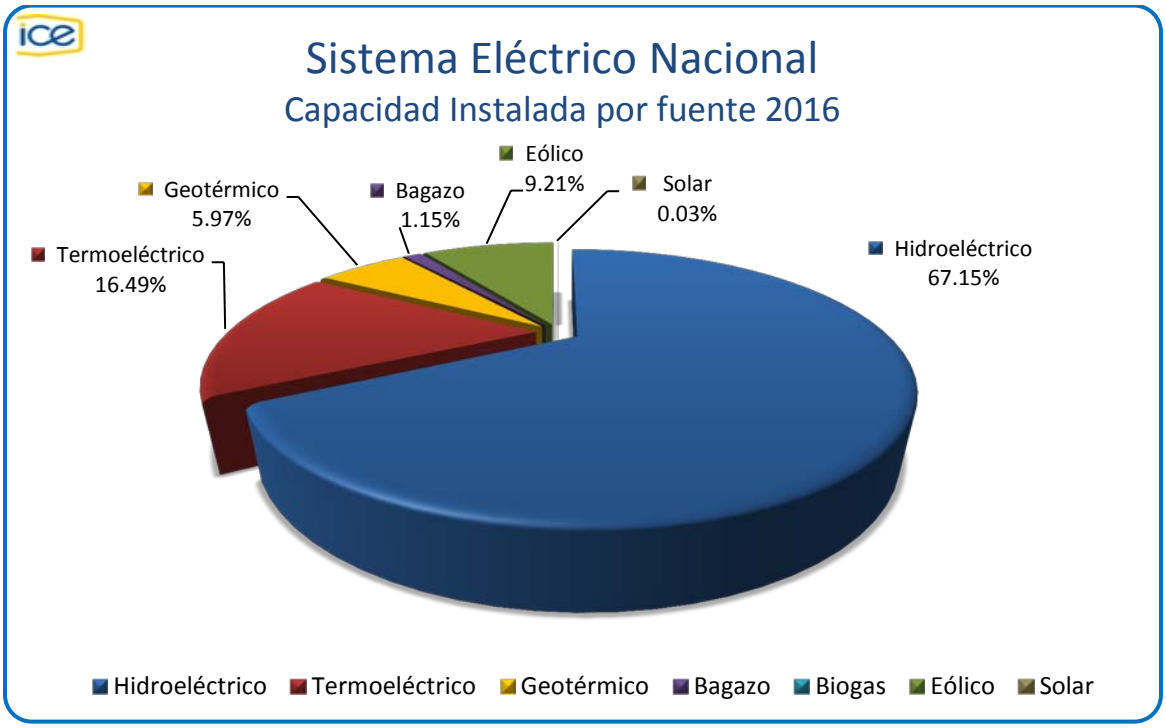

| Fecha - Hora | Geotérmico | Eólico | Otras | Filo-ICE | ARDESA | Térmico | Intercambio | MW |
|---|---|---|---|---|---|---|---|---|
| 09/03/2016 | 159,58 | 154,48 | 311,22 | 501,86 | 363,20 | 90,21 | 94,04 | 1 674,58 |
| 06:30 p.m. | 9,53% | 9,22% | 18,58% | 29,97% | 21,69% | 5,39% | 5,62% | |



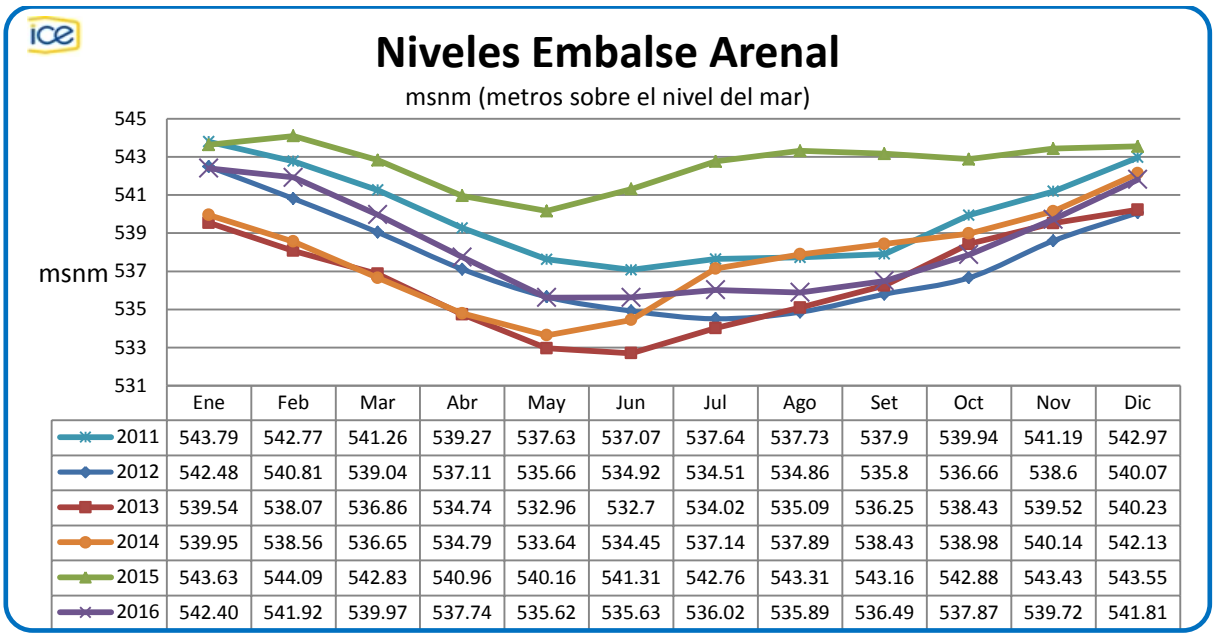
## Potencia Instalada al 31 diciembre 2016:

| Sistema Eléctrico Nacional<br>Instalado en Placa | | | |
|---|---|---|---|
| ICE | kW | Unidades | % |
| Hidro | 1 683 818 | 43 | 67,85% |
| Térmico | 571 691 | 25 | 23,03% |
| Geotérmico | 206 860 | 7 | 8,33% |
| Eólico | 18 480 | 28 | 0,74% |
| Solar | 1 000 | 10 | 0,04% |
| Total ICE | 2 481 849 | 113 | 71,59% |
| Otras Empresas | kW | Unidades | % |
| Hidro | 329 442 | 53 | 92,15% |
| Biogás | | | |
| Eólico | 28 050 | 32 | 7,85% |
| Total Ot.Empresas | 357 492 | 85 | 10,31% |
| Generación Ley 7200, capítulo I | kW | Unidades | % |
| Hidro | 104 593 | 46 | 39,03% |
| Eólico | 123 410 | 124 | 46,05% |
| Bagazo | 40 000 | 4 | 14,93% |
| Total Generación Ley 7200, capítulo I | 268 003 | 174 | 7,73% |
| Generación Ley 7200, capítulo II | kW | Unidades | % |
| Hidro | 210 200 | 9 | 58,49% |
| Geotérmico | | | |
| Eólico | 149 200 | 113 | 41,51% |
| Total Generación Ley 7200, capítulo II | 359 400 | 122 | 10,37% |
| Total instalado | 3 466 744 | 494 | 100,00% |

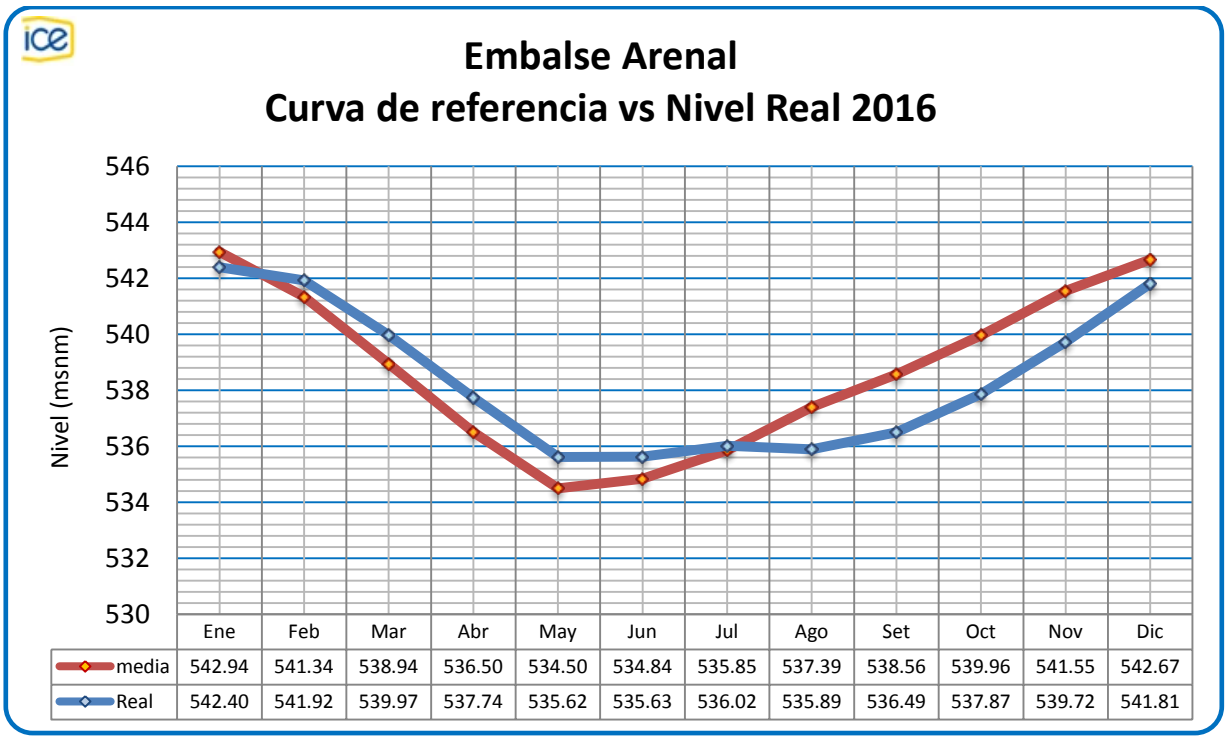

Sistema Eléctrico Nacional
Capacidad Instalada por empresa 2016
ICE; 68.28%
ESPH; 1.06%
Coopesantos; 0.32%
Coopelesca; 2.25%
Coopeguanacaste; 0.82%
Coneléctricas; 1.93%
BOT*; 12.12%
CNFL; 4.18%
Privadas**; 8.12%
JASEC; 0.93%
CNFL
BOT*
Coneléctricas
Coopeguanacaste
Coopelesca
Coopesantos
ESPH
ICE
JASEC
Privadas**
* Corresponde a la Generación Ley 7200, Capítulo II
** Corresponde a la Generación Ley 7200, Cpítulo I


Sistema Eléctrico Nacional
Capacidad Instalada por fuente 2016
Eólico 9.21%
Geotérmico 5.97%
Bagazo 1.15%
Solar 0.03%
Termoeléctrico 16.49%
Hidroeléctrico 67.15%
Hidroeléctrico
Termoeléctrico
Geotérmico
Bagazo
Biogas
Eólico
Solar

## Niveles del Embalse Arenal:




| | Ene | Feb | Mar | Abr | May | Jun | Jul | Ago | Set | Oct | Nov | Dic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | 543.79 | 542.77 | 541.26 | 539.27 | 537.63 | 537.07 | 537.64 | 537.73 | 537.9 | 539.94 | 541.19 | 542.97 |
| 2012 | 542.48 | 540.81 | 539.04 | 537.11 | 535.66 | 534.92 | 534.51 | 534.86 | 535.8 | 536.66 | 538.6 | 540.07 |
| 2013 | 539.54 | 538.07 | 536.86 | 534.74 | 532.96 | 532.7 | 534.02 | 535.09 | 536.25 | 538.43 | 539.52 | 540.23 |
| 2014 | 539.95 | 538.56 | 536.65 | 534.79 | 533.64 | 534.45 | 537.14 | 537.89 | 538.43 | 538.98 | 540.14 | 542.13 |
| 2015 | 543.63 | 544.09 | 542.83 | 540.96 | 540.16 | 541.31 | 542.76 | 543.31 | 543.16 | 542.88 | 543.43 | 543.55 |
| 2016 | 542.40 | 541.92 | 539.97 | 537.74 | 535.62 | 535.63 | 536.02 | 535.89 | 536.49 | 537.87 | 539.72 | 541.81 |




| | Ene | Feb | Mar | Abr | May | Jun | Jul | Ago | Set | Oct | Nov | Dic |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| media | 542.94 | 541.34 | 538.94 | 536.50 | 534.50 | 534.84 | 535.85 | 537.39 | 538.56 | 539.96 | 541.55 | 542.67 |
| Real | 542.40 | 541.92 | 539.97 | 537.74 | 535.62 | 535.63 | 536.02 | 535.89 | 536.49 | 537.87 | 539.72 | 541.81 |

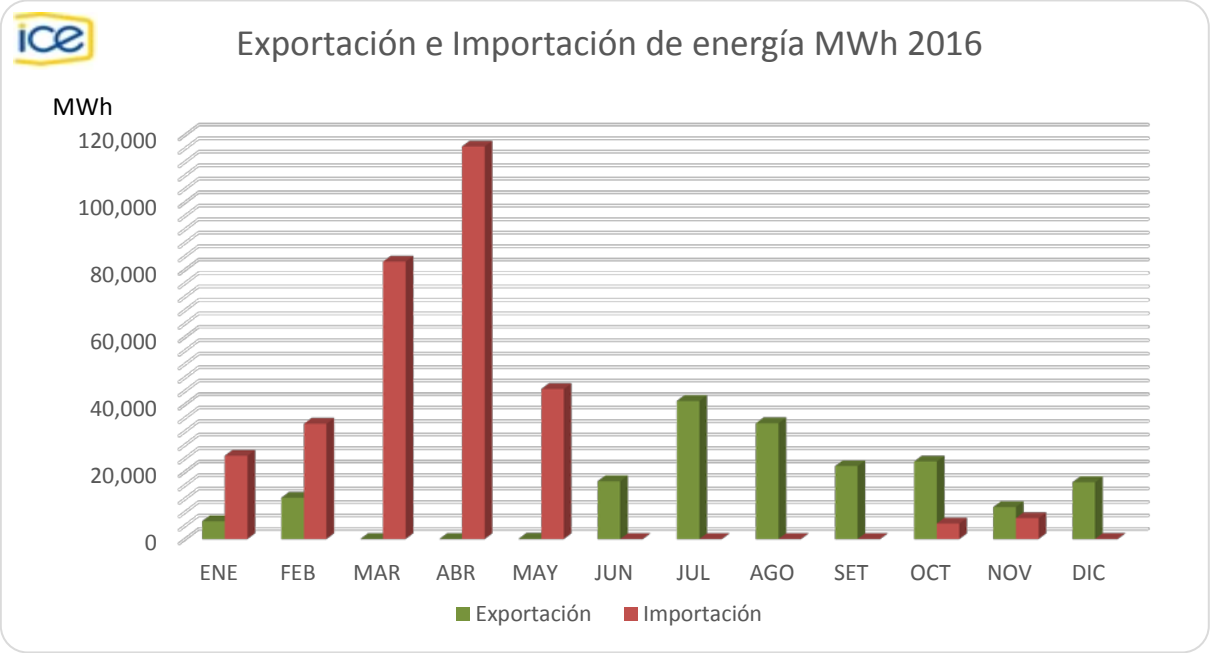
## Operador de Mercado:

Durante el año 2016 se exportó 181,230.73 MWh de los cuales el 76% fue a través del mercado de oportunidad que opera el corto plazo; respecto al mercado de contratos, durante los meses de julio a diciembre 2016 se exportaron 43,807.73 MWh por medio de la precontratación de transacciones con agentes del norte de la región (Comercializadora San Diego, Excelergy, Cenergica y Mercados Eléctricos). Por otro lado, durante el mismo periodo se importó un total de 313,362.82 MWh de los cuales el 38% provenía del mercado de contratos (119,958.99 MWh) utilizando primordialmente como estratégia de mercado una precontratación en el mes de marzo para comprar en el mes de abril en la que participaron agentes del norte (Comer, Cenergica, Edecsa, Excelergy, Mercados Eléctricos y Origem), es importante hacer notar que además alguna energía comprada al norte fué retiraba en Panamá. Del MOR se importó 193,403.83 MWh a través de transacciones de corto plazo. La brecha entre lo que se importó y exportó de energía durante el año 2016 ascendió a -132,132.09 MWh.

| EXPORTACIÓN DEL ICE AL MERCADO REGIONAL 2016 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Contrato Sur | | Contrato Norte | | Oportunidad | | Total Contrato y Oportunidad | |
| MES | MWh | USD | MWh | USD | MWh | USD | MWh | USD |
| ENE | 0,00 | $0,00 | 0,00 | $0,00 | 5.320,36 | $209.376,34 | 5.320,36 | $209.376,34 |
| FEB | 0,00 | $0,00 | 0,00 | $0,00 | 12.239,58 | $338.470,44 | 12.239,58 | $338.470,44 |
| MAR | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| ABR | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| MAY | 0,00 | $0,00 | 0,00 | $0,00 | 35,26 | $2.538,58 | 35,26 | $2.538,58 |
| JUN | 0,00 | $0,00 | 0,00 | $0,00 | 17.179,94 | $981.406,15 | 17.179,94 | $981.406,15 |
| JUL | 0,00 | $0,00 | 6.130,24 | $262.043,67 | 34.893,06 | $1.550.109,52 | 41.023,30 | $1.812.153,19 |
| AGO | 0,00 | $0,00 | 18.262,61 | $668.751,80 | 16.126,56 | $763.925,04 | 34.389,17 | $1.432.676,84 |
| SET | 0,00 | $0,00 | 12.467,12 | $451.741,82 | 9.171,58 | $389.630,66 | 21.638,70 | $841.372,48 |
| OCT | 0,00 | $0,00 | 3.786,07 | $188.007,45 | 19.244,83 | $1.040.623,58 | 23.030,90 | $1.228.631,03 |
| NOV | 0,00 | $0,00 | 2.332,47 | $120.452,23 | 7.181,90 | $338.857,23 | 9.514,37 | $459.309,46 |
| DIC | 0,00 | $0,00 | 829,21 | $37.057,95 | 16.029,94 | $297.596,70 | 16.859,15 | $334.654,65 |
| TOTALES | 0,00 | $0,00 | 43.807,73 | $1.728.054,93 | 137.423,00 | $5.912.534,22 | 181.230,73 | $7.640.589,15 |

| IMPORTACIÓN DEL ICE AL MERCADO REGIONAL 2016 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Contrato Sur | | Contrato Norte | | Oportunidad | | Total Contrato y Oportunidad | | CMORC | |
| MES | MWh | USD | MWh | USD | MWh | USD | MWh | USD | MWh | USD |
| ENE | 0,00 | $0,00 | 7.503,32 | $538.895,23 | 17.248,57 | $1.248.326,71 | 24.751,89 | $1.787.221,94 | 7.503,32 | $95.519,84 |
| FEB | 0,00 | $0,00 | 8.384,52 | $552.342,97 | 25.854,50 | $1.647.438,97 | 34.239,02 | $2.199.781,94 | 8.384,52 | $45.854,74 |
| MAR | 245,00 | $18.186,00 | 16.640,49 | $1.114.706,06 | 65.518,88 | $4.638.530,88 | 82.404,37 | $5.771.422,93 | 16.885,49 | $126.932,21 |
| ABR | 8.730,18 | $673.525,14 | 65.636,59 | $4.520.550,38 | 42.232,63 | $3.152.195,50 | 116.599,41 | $8.346.271,01 | 74.366,77 | $607.243,96 |
| MAY | 419,00 | $40.106,00 | 9.718,71 | $773.976,72 | 34.389,43 | $2.938.792,64 | 44.527,14 | $3.752.875,36 | 10.137,71 | $112.410,37 |
| JUN | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| JUL | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| AGO | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| SET | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 | 0,00 | $0,00 |
| OCT | 0,00 | $0,00 | 2.681,18 | $190.636,83 | 1.920,00 | $130.957,20 | 4.601,18 | $321.594,03 | 2.681,18 | $9.864,37 |
| NOV | 0,00 | $0,00 | 0,00 | $0,00 | 6.217,35 | $476.143,69 | 6.217,35 | $476.143,69 | 0,00 | $0,00 |
| DIC | 0,00 | $0,00 | 0,00 | $0,00 | 22,47 | $22,47 | 22,47 | $22,47 | 0,00 | $0,00 |
| TOTALES | 9.394,18 | $731.817,14 | 110.564,81 | $7.691.108,18 | 193.403,83 | $14.232.408,05 | 313.362,82 | $22.655.333,37 | 119.958,99 | $997.825,50 |

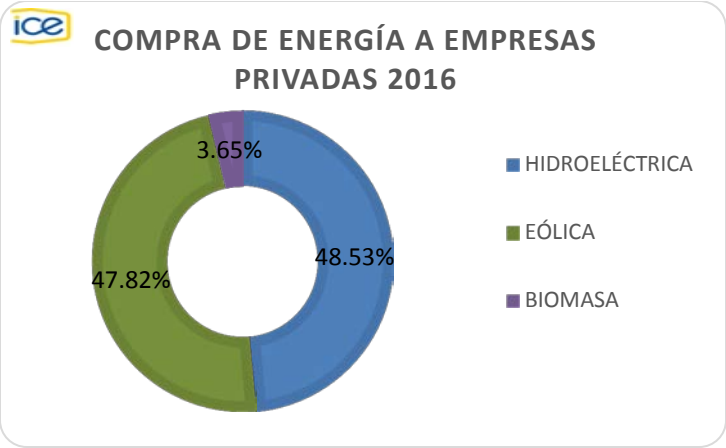
***CMORC*** Cargo Mercado Oportunidad Regional asociado al cumplimiento del compromiso Contratual



Durante el año 2016, OMT logró liquidar y gestionar el pago a tiempo de la compra de 2,139,661.84 MWh de energía a las empresas privadas de generación de los cuales el 48.5% provenían de fuentes hidroeléctricas; el 47.8% de plantas eólicas y el 3.7% de energía producida por ingenios Taboga y El Viejo. La planta geotérmica Miravalles II pasó a ser propiedad del ICE a partir del 25 de marzo de 2015. Estas actividades implicaron para el ICE un cargo de $184.05 millones. El precio promedio resultante de estas transacciones corresponde a $86.02 por MWh. En el siguiente cuadro el detalle de lo anterior:

**Centro Nacional de Control de Energía**
**Proceso Operación MER y Transacciones**
Compra de energía a empresas privadas de generación eléctrica
**2016**

| Fuente | CANTIDAD (MWh) | MONTO ($) | PRECIO PROMEDIO ($/MWh) |
|---|---|---|---|
| HIDROELÉCTRICA | 1.038.406,09 | $94.444.400,98 | 90,95 |
| EÓLICA | 1.023.124,87 | $81.837.160,81 | 79,99 |
| GEOTÉRMICA | 0,00 | $0,00 | 0,00 |
| BIOMASA | 78.130,88 | $7.771.204,20 | 99,46 |
| **Total** | 2.139.661,84 | $184.052.765,99 | **86,02** |




La energía reconocida y pagada a empresas privadas de generación por el ICE en el año 2016 es un 3,41% inferior a la del año 2015. Lo anterior justificado en una reducción de la hidrología en el 2016 respecto al año 2015 cuyo comportamiento climático se puede considerar excepcional y la reducción por la ausencia de Miravalles III como empresa privada de generación, que pasó a ser propiedad del ICE en Marzo 2015 según contrato. Por otro lado, en el año

2016 se contabilizan por 12 meses, las plantas eólicas que iniciaron operación en el año 2015; a saber: Tilawind (marzo 2015), Orosi (Setiembre 2015) y Vientos del Este (Diciembre 2015). Es importante notar que en el mes de diciembre 2016 iniciaron operación las plantas hidroeléctricas Chucás y la eólica Campos Azules, cuyos datos en este informe son preliminares ya que aún se encuentran en proceso de conciliación.

**Centro Nacional de Control de Energía**
**Proceso Operación MER y Transacciones**
Compra de energía a empresas privadas de generación (MWh)
**2015-2016**

| Fuente | 2015 | 2016 | Crecimiento relativo % |
|---|---|---|---|
| HIDROELÉCTRICA | 1.208.251,28 | 1.038.406,09 | -14,06% |
| EÓLICA | 908.067,93 | 1.023.124,87 | 12,67% |
| GEOTERMICA | 16.634,43 | 0,00 | -100,00% |
| BIOMASA | 82.268,72 | 78.130,88 | -5,03% |
| **Total MWh** | 2.215.222,36 | 2.139.661,84 | **-3,41%** |

## Reportes Adjuntos:

1. Producción bruta de energía del **Sistema Eléctrico Nacional**
2. Producción bruta de Energía **Generación Ley 7200, Capítulo I** (Plantas Privadas)
3. Producción bruta de Energía **Generación Ley 7200, Capítulo II** (Plantas B.O.T.)
4. Producción bruta de Energía **por fuente**
5. Crecimiento de la Demanda Nacional de energía
6. Intercambio de energía
7. Importación y exportación de energía
8. Capacidad instalada

# Sistema de Información del S.E.N.
## Resumen Anual 2 0 1 6
## Producción Bruta de energía - Intercambio - Demanda Nacional MWh

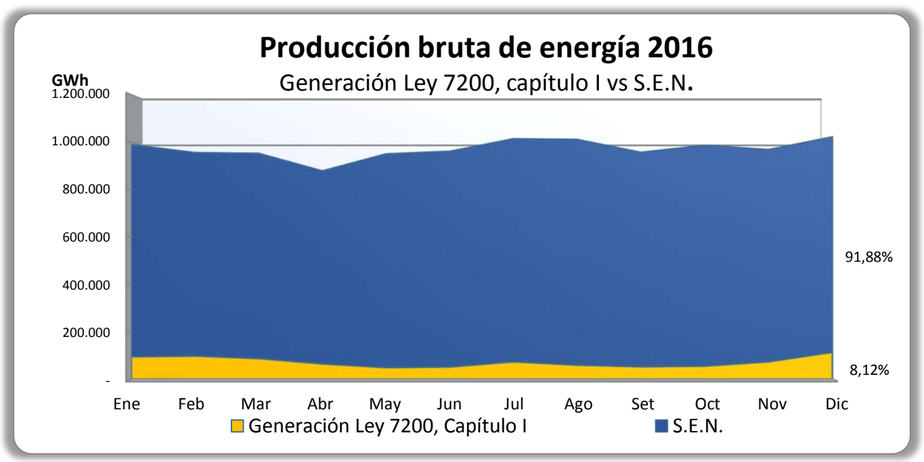
| | Plantas | Enero | Febrero | Marzo | Abril | Mayo | Junio | Julio | Agosto | Septiembre | Octubre | Noviembre | Diciembre | ACUMULADO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Otras Empresas | E.S.P.H. | 7.647,509 | 5.979,567 | 5.013,666 | 2.839,674 | 4.924,526 | 9.922,946 | 12.744,645 | 12.403,979 | 11.248,747 | 12.018,891 | 13.018,256 | 16.738,118 | 114.500,523 |
| | J.A.S.E.C. | 9.696,188 | 8.148,790 | 6.480,804 | 4.825,487 | 6.193,267 | 7.907,039 | 8.360,376 | 6.985,227 | 6.434,992 | 8.535,125 | 11.323,844 | 15.299,188 | 100.190,327 |
| | C.N.F.L. | 25.703,452 | 26.579,201 | 16.512,105 | 13.037,251 | 19.079,154 | 39.193,823 | 35.558,407 | 33.312,401 | 44.697,918 | 56.471,262 | 53.703,776 | 58.726,079 | 422.574,829 |
| | Valle Central | 3.570,726 | 5.195,744 | 1.952,935 | 2.820,307 | 1.509,560 | 1.237,601 | 2.581,489 | 1.794,121 | 1.256,600 | 698,298 | 1.747,377 | 4.257,969 | 28.622,727 |
| | Coopelesca | 18.414,938 | 13.773,881 | 14.698,647 | 10.318,430 | 15.123,123 | 17.351,539 | 19.350,950 | 18.803,639 | 20.725,795 | 25.437,436 | 25.409,341 | 27.084,901 | 226.492,619 |
| | CoopeGuanacaste | 5.962,135 | 4.232,356 | 3.674,451 | 1.829,930 | 3.734,346 | 5.418,126 | 7.636,868 | 8.279,391 | 9.923,122 | 11.885,508 | 11.925,000 | 13.658,434 | 88.159,667 |
| | Coneléctricas | 20.964,07 | 21.424,63 | 11.267,44 | 6.711,17 | 10.902,53 | 20.479,17 | 22.840,45 | 21.146,25 | 19.922,58 | 24.391,65 | 20.257,62 | 23.802,55 | 224.110,109 |
| | Los Santos | 4.071,508 | 5.751,631 | 2.807,265 | 2.707,296 | 1.999,715 | 1.789,033 | 3.901,523 | 2.207,636 | 2.084,255 | 919,006 | 1.322,332 | 4.830,713 | 34.391,911 |
| | **Subtotal** | **96.030,522** | **91.085,798** | **62.407,315** | **45.089,543** | **63.466,224** | **103.299,279** | **112.974,709** | **104.932,639** | **116.294,010** | **140.357,174** | **138.707,548** | **164.397,951** | **1.239.042,712** |
| Paralela | Hidro | 36.811,077 | 44.104,890 | 28.085,622 | 20.453,728 | 30.638,407 | 35.427,434 | 44.104,608 | 38.991,971 | 34.963,638 | 43.908,437 | 46.227,347 | 56.417,336 | 460.134,495 |
| | Térmica | 19.042,473 | 18.734,218 | 19.735,429 | 15.596,995 | 292,531 | - | - | - | - | - | 4,779 | 1.103,445 | 74.509,868 |
| | Eólica | 39.127,134 | 35.092,630 | 39.607,516 | 28.716,215 | 18.307,926 | 16.413,024 | 29.531,783 | 20.630,954 | 17.546,465 | 11.579,060 | 27.548,954 | 56.232,655 | 340.334,315 |
| | **Subtotal** | **94.980,684** | **97.931,737** | **87.428,567** | **64.766,939** | **49.238,864** | **51.840,458** | **73.636,391** | **59.622,925** | **52.510,103** | **55.487,497** | **73.781,080** | **113.753,436** | **874.978,679** |
| ICE Hidro | Garita 1 y 2 | 14.288,507 | 11.025,826 | 10.223,769 | 9.752,187 | 13.919,866 | 15.377,340 | 18.073,766 | 17.747,416 | 18.244,269 | 19.353,655 | 17.804,427 | 16.314,836 | 182.125,863 |
| | Garita 3 y 4 | 22.158,938 | 19.852,170 | 16.898,834 | 17.756,803 | 26.744,980 | 41.186,187 | 28.204,074 | 31.593,122 | 41.219,312 | 53.556,512 | 40.424,266 | 36.054,665 | 375.649,861 |
| | Río Macho | 21.513,827 | 28.129,053 | 17.334,033 | 12.212,993 | 15.210,408 | 4.101,337 | 5.263,115 | 6.794,610 | 6.142,547 | 10.129,146 | 15.437,278 | 50.668,746 | 192.937,093 |
| | Cachí | 24.420,552 | 29.423,604 | 22.174,778 | 20.804,057 | 39.523,313 | 62.977,811 | 61.037,772 | 72.820,490 | 60.974,816 | 55.682,392 | 41.847,903 | 21.571,227 | 513.258,715 |
| | Arenal | 98.111,110 | 82.009,393 | 104.978,661 | 102.536,298 | 104.638,730 | 52.743,632 | 38.282,988 | 57.050,945 | 39.048,748 | 32.651,300 | 26.222,892 | 25.349,312 | 763.624,009 |
| | Dengo | 108.428,892 | 91.796,269 | 117.724,746 | 116.317,367 | 120.279,011 | 64.273,495 | 44.816,772 | 65.233,702 | 47.665,069 | 41.402,477 | 32.955,881 | 32.310,481 | 883.204,163 |
| | Sandillal | 18.036,050 | 14.974,646 | 19.449,856 | 18.976,664 | 19.984,822 | 10.394,805 | 7.246,774 | 10.634,554 | 7.454,839 | 7.430,185 | 3.953,490 | 4.845,144 | 143.381,828 |
| | Toro I | 5.157,542 | 8.056,192 | 4.366,976 | 3.302,276 | 3.446,416 | 6.742,732 | 7.670,872 | 6.183,604 | 8.545,476 | 9.898,180 | 9.764,424 | 12.129,088 | 85.263,778 |
| | Toro II | 15.394,142 | 20.823,807 | 13.113,134 | 9.489,085 | 10.779,566 | 18.251,001 | 20.796,343 | 17.931,241 | 23.005,486 | 25.405,934 | 22.143,182 | 28.359,711 | 225.492,631 |
| | Toro III | 11.430,100 | 15.574,987 | 9.601,520 | 6.892,211 | 8.056,029 | 13.593,799 | 14.573,298 | 12.643,682 | 13.911,894 | 17.873,486 | 16.277,093 | 20.359,158 | 160.787,255 |
| | Angostura | 42.584,596 | 44.501,401 | 36.772,625 | 30.739,300 | 57.814,571 | 80.152,847 | 74.625,181 | 75.302,008 | 72.709,721 | 64.681,539 | 59.110,660 | 35.345,447 | 674.339,895 |
| | Reventazón | - | - | 1.233,707 | 26.017,580 | 55.760,375 | 87.372,954 | 98.176,559 | 109.250,295 | 92.998,272 | 120.146,605 | 85.931,270 | 71.772,768 | 748.660,385 |
| | Peñas Blancas | 13.118,264 | 13.552,848 | 8.656,256 | 3.739,376 | 7.653,120 | 13.277,712 | 14.417,856 | 12.841,632 | 13.362,272 | 19.511,488 | 12.418,912 | 19.620,160 | 152.169,896 |
| | Cariblanco | 16.958,193 | 22.637,259 | 14.306,747 | 9.966,698 | 12.632,458 | 15.840,787 | 19.858,189 | 16.816,164 | 16.041,643 | 25.736,477 | 25.531,730 | 30.512,058 | 226.838,400 |
| | Pirris | 21.580,460 | 11.010,482 | 15.967,927 | 26.574,371 | 44.541,643 | 41.712,579 | 31.488,489 | 37.558,561 | 72.152,322 | 28.204,080 | 58.395,411 | 30.146,495 | 419.332,819 |
| | Echandi | 3.033,500 | 2.686,832 | 2.025,729 | 1.490,104 | 2.149,034 | 2.361,471 | 3.075,267 | 2.747,703 | 3.036,760 | 2.804,840 | 2.694,835 | 3.157,135 | 31.263,210 |
| | **Subtotal** | **436.214,673** | **416.054,768** | **414.829,297** | **416.567,369** | **543.134,340** | **530.360,488** | **487.607,314** | **553.149,727** | **536.513,445** | **534.468,295** | **470.913,652** | **438.516,431** | **5.778.329,799** |
| ICE Térmico | San Antonio Gas | - | - | - | 634,289 | - | - | - | - | - | - | 95,592 | - | 729,881 |
| | Barranca Gas | - | - | - | 169,960 | - | - | - | - | - | - | 63,709 | - | 233,669 |
| | Moín I | - | - | 2.497,864 | 4.658,152 | 3.315,968 | - | - | - | - | - | - | - | 10.471,984 |
| | Moín II | - | - | 0,609 | 1.434,368 | 796,744 | - | - | - | - | 18,689 | - | 3,822 | 2.254,232 |
| | Moín III | - | 0,024 | 226,848 | 2.481,737 | 1.013,661 | - | - | - | - | - | - | 1,591 | 3.723,861 |
| | Guápiles | - | - | 1.094,227 | 2.743,617 | 581,771 | - | - | 19,859 | - | 114,027 | - | - | 4.553,501 |
| | Orotina | - | - | 777,917 | 2.264,754 | 417,628 | - | - | - | - | 8,219 | 9,987 | - | 3.478,504 |
| | Garabito | 13.456,797 | 5.864,849 | 51.052,600 | 67.228,707 | 24.455,499 | 3.774,688 | 61,934 | 85,205 | - | 68,594 | 521,069 | 1.010,348 | 167.580,290 |
| | **Subtotal** | **13.456,797** | **5.864,873** | **55.650,064** | **81.615,583** | **30.581,270** | **3.774,688** | **61,934** | **105,064** | **-** | **209,528** | **690,356** | **1.015,762** | **193.025,921** |
| ICE Geo | Miravalles I | 29.846,752 | 31.831,488 | 34.063,328 | 28.550,944 | 32.985,728 | 33.127,296 | 33.824,256 | 33.942,912 | 26.309,248 | 33.699,840 | 28.989,568 | 14.384,128 | 361.555,488 |
| | Miravalles II | 34.548,576 | 31.004,864 | 33.560,512 | 33.398,368 | 33.380,000 | 32.672,832 | 33.770,240 | 33.585,088 | 32.497,536 | 33.282,752 | 23.194,496 | 19.276,992 | 374.172,256 |
| | Miravalles III | 20.057,168 | 16.444,516 | 17.247,813 | 17.040,431 | 17.506,584 | 16.747,720 | 17.034,160 | 14.573,056 | 17.100,688 | 17.415,744 | 15.076,432 | - | 186.244,312 |
| | Boca de Pozo 1 | 3.145,608 | 3.136,694 | 3.406,544 | 3.361,100 | 3.449,768 | 3.331,156 | 3.020,738 | 3.470,219 | 3.208,566 | 3.426,126 | 3.182,833 | 3.392,756 | 39.532,107 |
| | Miravalles V | 4.910,669 | 4.620,002 | 5.503,805 | 4.379,399 | 612,426 | 3.697,369 | 5.985,416 | 6.304,756 | 5.022,226 | 5.988,229 | 5.242,293 | 4.091,497 | 56.358,086 |
| | Pailas | 29.600,122 | 26.920,261 | 28.760,123 | 27.707,060 | 28.464,334 | 22.472,204 | 28.288,526 | 28.378,565 | 27.207,764 | 27.495,298 | 24.389,168 | 21.969,244 | 321.652,667 |
| | **Subtotal** | **122.108,895** | **113.957,825** | **122.542,125** | **114.437,302** | **116.398,840** | **112.048,577** | **121.923,335** | **120.254,595** | **111.346,027** | **121.307,989** | **100.074,789** | **63.114,617** | **1.339.514,916** |
| | **ICE Eólico (Tejona)** | **5.465,863** | **3.027,373** | **4.981,706** | **3.729,215** | **3.407,417** | **3.072,497** | **5.985,083** | **3.578,069** | **3.294,552** | **2.108,325** | **4.305,662** | **6.201,418** | **49.157,180** |
| | **ICE Solar (Miravalles)** | **187,191** | **174,677** | **181,595** | **148,815** | **110,255** | **81,215** | **77,522** | **94,512** | **90,329** | **93,167** | **88,650** | **83,649** | **1.411,575** |
| BOT | Hidro | 38.121,902 | 44.480,994 | 34.633,165 | 28.280,874 | 45.815,759 | 67.057,789 | 68.604,319 | 71.180,832 | 47.690,768 | 52.250,295 | 53.493,451 | 59.842,964 | 611.453,112 |
| | Eólico | 88.402,779 | 86.117,940 | 83.328,771 | 59.864,341 | 49.802,250 | 38.652,654 | 70.498,952 | 39.546,461 | 37.416,656 | 25.739,600 | 53.388,637 | 62.026,095 | 694.785,137 |
| | Geotérmico | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | **Subtotal** | **126.524,681** | **130.598,934** | **117.961,936** | **88.145,215** | **95.618,009** | **105.710,443** | **139.103,271** | **110.727,293** | **85.107,424** | **77.989,895** | **106.882,088** | **121.869,059** | **1.306.238,249** |

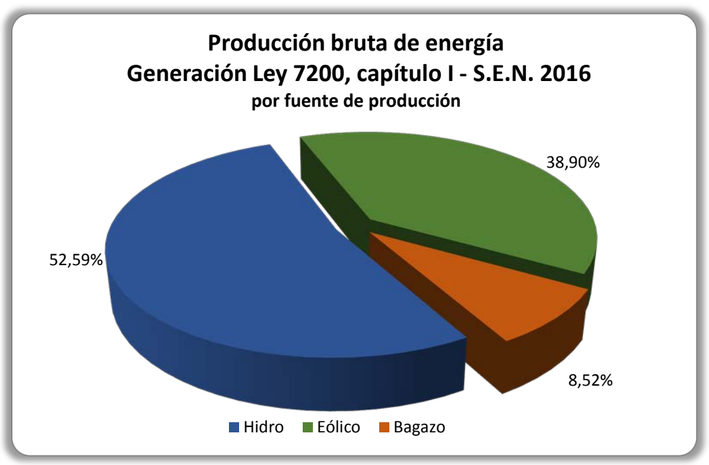
| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Resumen | Producción bruta S.E.N. MWh | 894.969,306 | 858.695,985 | 865.982,604 | 814.499,979 | 901.955,219 | 910.187,644 | 941.369,558 | 952.464,826 | 905.155,890 | 932.021,871 | 895.443,826 | 908.952,322 | 10.781.699,030 |
| | Intercambio MWh | 21.625,890 | 21.819,810 | 83.580,870 | 118.093,980 | 44.928,084 | (16.857,590) | (40.602,340) | (33.669,630) | (11.583,940) | (18.067,520) | (2.516,360) | (16.366,130) | 150.385,124 |
| | Demanda Nacional MWh | 916.595,196 | 880.515,795 | 949.563,474 | 932.593,959 | 946.883,303 | 893.330,054 | 900.767,218 | 918.795,196 | 893.571,950 | 913.954,351 | 892.927,466 | 892.586,192 | 10.932.084,154 |
| | Demanda Máxima MW | 1.642,34 | 1.654,90 | 1.674,58 | 1.655,70 | 1.634,13 | 1.578,11 | 1.590,31 | 1.597,90 | 1.604,41 | 1.599,81 | 1.626,56 | 1.592,93 | 1.674,58 |
| | Día y hora | el 18 a las 18:45 | el 17 a las 18:30 | el 9 a las 18:30 | el 12 a las 18:45 | el 24 a las 13:15 | el 7 a las 19:00 | el 28 a las 18:45 | el 17 a las 18:30 | el 19 a las 18:30 | el 24 a las 18:15 | el 9 a las 18:15 | el 7 a las 18:30 | 9 de marzo a las 18:30 |
| | Factor de Carga % | 75,01% | 71,51% | 76,22% | 75,71% | 77,88% | 76,09% | 76,13% | 77,29% | 74,86% | 76,79% | 73,79% | 75,31% | 74,32% |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Por Fuente | Hidroeléctrico | 599.535,940 | 584.779,074 | 535.195,197 | 504.863,911 | 679.545,455 | 733.118,356 | 706.807,938 | 764.253,413 | 732.121,007 | 769.366,898 | 706.272,290 | 710.086,001 | 8.025.945,480 |
| | Termoeléctrico | 13.456,797 | 5.864,873 | 55.650,064 | 81.615,583 | 30.581,270 | 3.774,688 | 61,934 | 105,064 | - | 209,528 | 690,356 | 1.015,762 | 193.025,921 |
| | Geotérmico | 122.108,895 | 113.957,825 | 122.542,125 | 114.437,302 | 116.398,840 | 112.048,577 | 121.923,335 | 120.254,595 | 111.346,027 | 121.307,989 | 100.074,789 | 63.114,617 | 1.339.514,916 |
| | Bagazo | 19.042,473 | 18.734,218 | 19.735,429 | 15.596,995 | 292,531 | - | - | - | - | - | 4,779 | 1.103,445 | 74.509,868 |
| | Eólico | 140.638,010 | 135.185,318 | 132.678,194 | 97.837,373 | 75.026,868 | 61.164,808 | 112.498,830 | 67.757,241 | 61.598,527 | 41.044,289 | 88.312,962 | 133.548,849 | 1.147.291,270 |
| | Solar | 187,191 | 174,677 | 181,595 | 148,815 | 110,255 | 81,215 | 77,522 | 94,512 | 90,329 | 93,167 | 88,650 | 83,649 | 1.411,575 |

# Sistema de Información del S.E.N.
## Resumen Anual 2 0 1 6
## Generación Ley 7200, Capítulo I - Produccion bruta de energía kWh

| | Plantas | Enero | Febrero | Marzo | Abril | Mayo | Junio | Julio | Agosto | Septiembre | Octubre | Noviembre | Diciembre | ACUMULADO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hidro | Tapezco | 82.191,430 | 76.318,100 | 40.564,020 | 1.122,500 | 19.678,790 | 81.361,610 | 77.729,510 | 94.669,520 | 93.495,990 | 61.691,820 | 64.966,710 | 71.710,700 | 765.500,700 |
| | Vara Blanca | 757.520,400 | 1.087.002,000 | 554.456,700 | 335.008,800 | 440.668,200 | 738.258,150 | 1.060.117,800 | 853.302,450 | 706.509,300 | 1.087.671,900 | 1.112.077,050 | 1.715.224,350 | 10.447.817,100 |
| | El Ángel | 1.159.405,800 | 1.593.935,700 | 826.246,050 | 638.163,750 | 1.033.494,000 | 1.314.635,700 | 1.373.132,250 | 1.137.550,050 | 1.098.640,200 | 1.798.683,600 | 1.839.020,400 | 2.211.475,350 | 16.024.382,850 |
| | El Ángel Ampliación | - | - | 58.296,458 | 1.210.836,379 | 1.212.494,600 | 1.209.877,010 | 1.454.201,180 | 1.109.170,100 | 1.152.246,260 | 1.874.449,750 | 2.247.423,320 | 2.528.139,290 | 14.057.134,347 |
| | Caño Grande | 1.604.467,620 | 1.624.877,100 | 1.266.037,740 | 701.141,220 | 1.095.299,100 | 1.523.040,840 | 1.721.604,060 | 1.493.066,700 | 1.235.100,240 | 1.580.474,340 | 795.771,180 | 1.580.153,940 | 16.221.034,080 |
| | Santa Rufina | 192.502,020 | 185.530,280 | 199.457,750 | 173.132,930 | 200.425,840 | 182.708,150 | 201.012,530 | 160.493,820 | 185.433,420 | 203.900,030 | 194.299,360 | 192.170,480 | 2.271.066,610 |
| | La Rebeca | 55.745,860 | 52.656,010 | 53.668,840 | 53.311,070 | 58.987,630 | 53.637,410 | 58.945,760 | 58.445,090 | 54.983,990 | 23.966,770 | 22.345,060 | 22.888,940 | 569.582,430 |
| | Platanar | 5.944.805,060 | 7.698.347,000 | 4.747.835,770 | 3.696.918,930 | 3.933.595,440 | 6.180.252,500 | 8.054.140,960 | 7.523.262,010 | 7.327.491,650 | 7.888.506,350 | 8.351.704,370 | 9.699.882,170 | 81.046.742,210 |
| | Zuerkata | 917.172,900 | 1.284.998,410 | 799.553,480 | 500.689,880 | 540.505,360 | 772.493,410 | 1.067.238,900 | 1.040.026,060 | 933.315,090 | 1.672.320,830 | 1.392.725,780 | 1.936.182,670 | 12.857.222,770 |
| | Hidrozarcas | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | Don Pedro | 3.879.439,210 | 5.121.974,030 | 2.401.964,780 | 1.175.531,180 | 3.068.986,730 | 4.812.110,100 | 5.849.548,850 | 4.695.101,590 | 3.883.689,690 | 5.263.052,080 | 6.139.353,420 | 7.033.367,240 | 53.324.118,900 |
| | Poás I y II | 358.716,230 | 363.416,030 | 233.379,310 | 180.299,180 | 236.532,990 | 352.803,670 | 330.075,910 | 396.688,430 | 614.056,800 | 651.132,310 | 1.079.255,110 | 1.191.615,610 | 5.987.971,580 |
| | Matamoros | 1.578.848,630 | 1.801.919,460 | 1.466.120,380 | 1.022.477,550 | 1.108.571,690 | 1.262.472,520 | 792.240,510 | 1.976.109,270 | 2.072.172,430 | 2.519.612,410 | 2.270.993,050 | 2.714.520,350 | 20.586.058,250 |
| | Río Lajas | 4.812.102,660 | 5.127.604,890 | 4.426.506,260 | 2.951.719,850 | 3.491.064,820 | 1.607.329,150 | 3.875.753,160 | 3.744.966,380 | 3.068.378,790 | 3.791.237,550 | 3.669.270,230 | 5.360.508,100 | 45.926.441,840 |
| | El Embalse | 588.899,160 | 781.804,800 | 560.832,120 | 397.958,040 | 364.739,040 | 502.250,040 | 668.804,400 | 620.225,280 | 607.742,640 | 604.455,120 | 550.631,520 | 784.018,440 | 7.032.360,600 |
| | Volcán | 4.118.596,660 | 5.785.627,060 | 1.852.335,460 | 1.076.408,560 | 4.369.125,600 | 4.890.962,480 | 6.285.906,910 | 5.343.632,290 | 4.551.173,750 | 4.501.274,060 | 6.446.588,780 | 7.192.458,360 | 56.414.089,970 |
| | Río Segundo II | 428.031,150 | 502.843,330 | 327.446,700 | 217.886,770 | 318.809,830 | 454.863,890 | 542.901,560 | 418.665,460 | 444.501,340 | 549.079,560 | 491.501,850 | 677.931,670 | 5.374.463,110 |
| | Doña Julia | 8.251.478,870 | 8.981.002,580 | 6.652.375,950 | 5.258.900,820 | 7.721.357,390 | 7.584.297,610 | 8.420.842,160 | 6.408.025,540 | 5.418.421,210 | 7.876.688,550 | 8.586.441,190 | 9.573.742,510 | 90.733.574,380 |
| | Caño Grande III | 2.081.153,520 | 2.035.032,840 | 1.618.543,800 | 862.220,880 | 1.424.069,640 | 1.904.079,600 | 2.270.411,640 | 1.918.571,400 | 1.516.285,080 | 1.960.240,320 | 972.978,840 | 1.931.346,000 | 20.494.933,560 |
| | **Subtotal** | **36.811.077,180** | **44.104.889,620** | **28.085.621,568** | **20.453.728,289** | **30.638.406,690** | **35.427.433,840** | **44.104.608,050** | **38.991.971,440** | **34.963.637,870** | **43.908.437,350** | **46.227.347,220** | **56.417.336,170** | **460.134.495,287** |
| Eólico | Aeroenergía | 3.152.919,210 | 3.493.279,070 | 3.011.290,080 | 2.245.755,720 | 1.627.199,350 | 1.349.047,350 | 2.629.401,640 | 1.545.889,410 | 1.202.435,390 | 781.026,380 | 1.834.177,690 | 2.865.410,570 | 25.737.831,860 |
| | Vientos del Este | 5.767.804,640 | 4.946.649,320 | 5.972.732,690 | 4.330.445,550 | 3.748.581,810 | 2.992.043,750 | 5.188.619,730 | 3.229.747,620 | 2.963.158,540 | 2.062.620,940 | 4.063.048,330 | 5.121.795,910 | 50.387.248,830 |
| | PESA (Tilarán) | 9.328.042,500 | 9.047.416,750 | 9.341.498,250 | 6.835.063,000 | 5.298.882,750 | 3.852.733,250 | 7.681.255,500 | 4.423.083,250 | 3.196.092,500 | 1.955.319,000 | 4.806.250,250 | 7.661.440,500 | 73.427.077,500 |
| | MOVASA | 10.101.034,780 | 9.686.899,060 | 9.175.012,200 | 6.564.448,560 | 4.245.087,150 | 2.415.824,700 | 5.286.164,100 | 3.154.907,770 | 2.126.203,310 | 1.103.404,030 | 4.017.037,790 | 6.268.616,310 | 64.144.639,760 |
| | Tilawind | 10.777.332,400 | 7.918.385,910 | 12.106.983,230 | 8.740.502,460 | 3.388.174,970 | 3.445.025,410 | 6.233.246,450 | 3.383.613,450 | 3.317.602,290 | 2.024.322,560 | 4.586.061,180 | 6.981.468,390 | 72.902.718,700 |
| | PE Mogote | - | - | - | - | - | 2.358.349,520 | 2.513.095,240 | 4.893.712,520 | 4.740.973,020 | 3.652.366,890 | 7.583.841,830 | 10.289.553,520 | 36.031.892,540 |
| | Altamira | - | - | - | - | - | - | - | - | - | - | 320.285,445 | 7.730.474,960 | 8.050.760,405 |
| | Campos Azules | - | - | - | - | - | - | - | - | - | - | 338.251,233 | 9.313.894,440 | 9.652.145,673 |
| | **Subtotal** | **39.127.133,530** | **35.092.630,110** | **39.607.516,450** | **28.716.215,290** | **18.307.926,030** | **16.413.023,980** | **29.531.782,660** | **20.630.954,020** | **17.546.465,050** | **11.579.059,800** | **27.548.953,748** | **56.232.654,600** | **340.334.315,268** |
| Bagazo | Ingenio Taboga | 8.907.298,400 | 9.086.486,690 | 9.375.195,780 | 5.069.920,920 | - | - | - | - | - | - | - | 1.103.444,790 | 33.542.346,580 |
| | Ingenio El Viejo | 10.135.174,430 | 9.647.730,970 | 10.360.232,720 | 10.527.074,060 | 292.530,810 | - | - | - | - | - | 4.778,790 | - | 40.967.521,780 |
| | **Subtotal** | **19.042.472,830** | **18.734.217,660** | **19.735.428,500** | **15.596.994,980** | **292.530,810** | **-** | **-** | **-** | **-** | **-** | **4.778,790** | **1.103.444,790** | **74.509.868,360** |
| | **Total** | **94.980.683,540** | **97.931.737,390** | **87.428.566,518** | **64.766.938,559** | **49.238.863,530** | **51.840.457,820** | **73.636.390,710** | **59.622.925,460** | **52.510.102,920** | **55.487.497,150** | **73.781.079,758** | **113.753.435,560** | **874.978.678,915** |

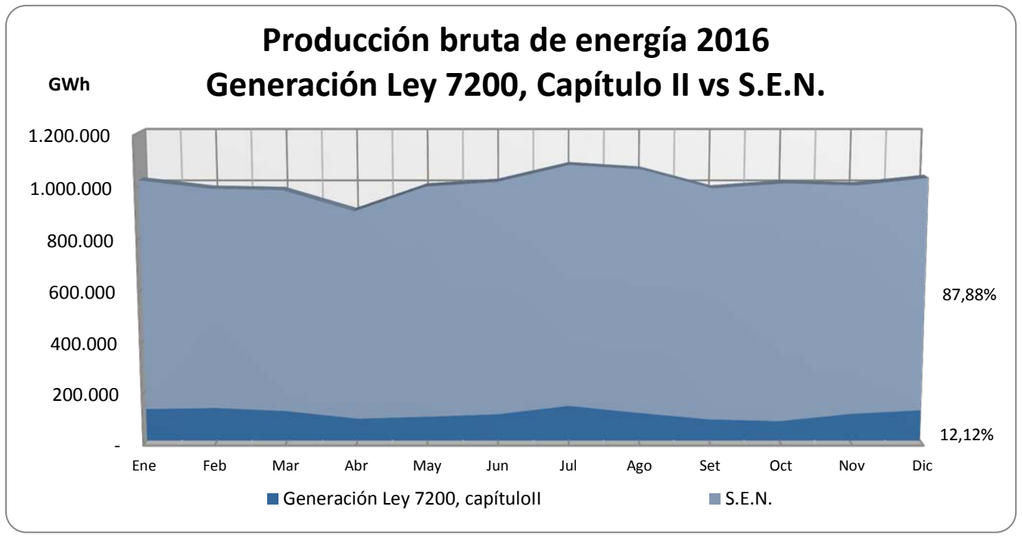


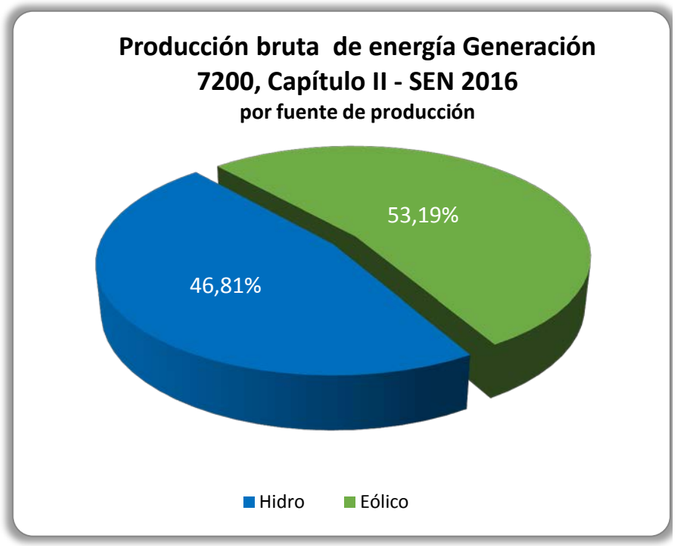



# Sistema de Información del S.E.N.
## Resumen Anual 2 0 1 6
## Generación Ley 7200, Capítulo II - Producción burta de energía kWh

| Plantas | Hidro | | | | Subtotal Hidro | Eólico | | | Subtotal Eólico | Acumulado KWh |
|---|---|---|---|---|---|---|---|---|---|---|
| | El General | La Joya | Torito | Chucas | | P.E. Guanacaste | Chiripa | P.E. Orosi | | |
| Enero | 15.168.352,000 | 9.156.715,000 | 13.796.835,000 | - | 38.121.902,000 | 26.788.359,810 | 29.537.939,590 | 32.076.480,000 | 88.402.779,400 | 126.524.681,400 |
| Febrero | 17.789.455,800 | 12.085.244,000 | 14.606.294,440 | - | 44.480.994,240 | 27.778.143,310 | 27.572.796,830 | 30.767.000,000 | 86.117.940,140 | 130.598.934,380 |
| Marzo | 14.620.560,000 | 9.113.990,000 | 10.898.614,600 | - | 34.633.164,600 | 23.831.327,820 | 28.958.211,340 | 30.539.232,000 | 83.328.771,160 | 117.961.935,760 |
| Abril | 9.695.696,000 | 8.502.454,000 | 10.082.724,010 | - | 28.280.874,010 | 16.789.104,030 | 21.164.884,650 | 21.910.352,000 | 59.864.340,680 | 88.145.214,690 |
| Mayo | 11.653.920,000 | 15.527.839,000 | 18.633.999,900 | - | 45.815.758,900 | 12.921.819,190 | 19.029.958,400 | 17.850.472,600 | 49.802.250,190 | 95.618.009,090 |
| Junio | 16.290.592,000 | 24.758.753,000 | 26.008.444,120 | - | 67.057.789,120 | 9.730.400,090 | 15.217.263,120 | 13.704.990,400 | 38.652.653,610 | 105.710.442,730 |
| Julio | 19.873.216,200 | 24.737.679,000 | 23.993.423,600 | - | 68.604.318,800 | 19.263.773,190 | 25.787.882,960 | 25.447.296,000 | 70.498.952,150 | 139.103.270,950 |
| Agosto | 17.548.416,000 | 28.855.502,000 | 24.776.914,400 | - | 71.180.832,400 | 11.812.341,440 | 13.393.239,630 | 14.340.880,000 | 39.546.461,070 | 110.727.293,470 |
| Septiembre | 13.956.768,000 | 24.798.487,000 | 8.935.513,000 | - | 47.690.768,000 | 8.000.146,190 | 15.365.533,720 | 14.050.975,990 | 37.416.655,900 | 85.107.423,900 |
| Octubre | 15.449.696,000 | 22.499.378,000 | 14.301.220,500 | - | 52.250.294,500 | 6.043.363,560 | 10.447.180,920 | 9.249.056,000 | 25.739.600,480 | 77.989.894,980 |
| Noviembre | 17.617.568,000 | 17.178.900,000 | 18.202.214,160 | 494.769,210 | 53.493.451,370 | 14.410.777,310 | 19.943.166,100 | 19.034.693,380 | 53.388.636,790 | 106.882.088,160 |
| Diciembre | 22.100.704,000 | 8.891.545,000 | 11.023.727,000 | 17.826.987,930 | 59.842.963,930 | 20.846.399,750 | 25.868.783,480 | 15.310.912,000 | 62.026.095,230 | 121.869.059,160 |
| ACUMULADO | 191.764.944,000 | 206.106.486,000 | 195.259.924,730 | 18.321.757,140 | 611.453.111,870 | 198.215.955,690 | 252.286.840,740 | 244.282.340,370 | 694.785.136,800 | 1.306.238.248,670 |

Generación Ley 7200, capítulo II anteriormente referenciado como B.O.T.(build-operate-transfer)

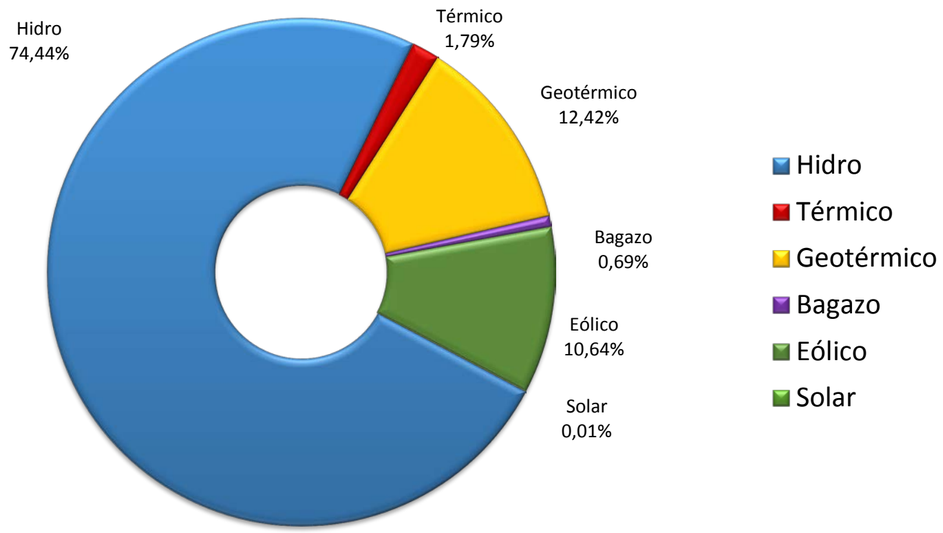


# Sistema de Información del S.E.N.
## Resumen Anual 2 0 1 6
## Generación por Fuente GWh

| | | | Tipo de Fuente | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G W h | Regulación | Filo Agua | Hidro | Térmico | Geotérmico | Bagazo | Eólico | Solar | Producción Total | Intercambio | Demanda Nacional* | Máxima MW |
| Enero | 224,58 | 374,96 | 599,54 | 13,46 | 122,11 | 19,04 | 140,64 | 0,19 | 894,97 | 21,63 | 916,60 | 1.642,34 |
| Febrero | 188,78 | 396,00 | 584,78 | 5,86 | 113,96 | 18,73 | 135,19 | 0,17 | 858,70 | 21,82 | 880,52 | 1.654,90 |
| Marzo | 242,15 | 293,04 | 535,20 | 55,65 | 122,54 | 19,74 | 132,68 | 0,18 | 865,98 | 83,58 | 949,56 | 1.674,58 |
| Abril | 237,83 | 267,03 | 504,86 | 81,62 | 114,44 | 15,60 | 97,84 | 0,15 | 814,50 | 118,09 | 932,59 | 1.655,70 |
| Mayo | 244,90 | 434,64 | 679,55 | 30,58 | 116,40 | 0,29 | 75,03 | 0,11 | 901,96 | 44,93 | 946,88 | 1.634,13 |
| Junio | 127,41 | 605,71 | 733,12 | 3,77 | 112,05 | - | 61,16 | 0,08 | 910,19 | (16,86) | 893,33 | 1.578,11 |
| Julio | 90,35 | 616,46 | 706,81 | 0,06 | 121,92 | - | 112,50 | 0,08 | 941,37 | (40,60) | 900,77 | 1.590,31 |
| Agosto | 132,92 | 631,33 | 764,25 | 0,11 | 120,25 | - | 67,76 | 0,09 | 952,46 | (33,67) | 918,80 | 1.597,90 |
| Septiembre | 94,17 | 637,95 | 732,12 | - | 111,35 | - | 61,60 | 0,09 | 905,16 | (11,58) | 893,57 | 1.604,41 |
| Octubre | 81,48 | 687,88 | 769,37 | 0,21 | 121,31 | - | 41,04 | 0,09 | 932,02 | (18,07) | 913,95 | 1.599,81 |
| Noviembre | 63,13 | 643,14 | 706,27 | 0,69 | 100,07 | 0,00 | 88,31 | 0,09 | 895,44 | (2,52) | 892,93 | 1.626,56 |
| Diciembre | 62,50 | 647,58 | 710,09 | 1,02 | 63,11 | 1,10 | 133,55 | 0,08 | 908,95 | (16,37) | 892,59 | 1.592,93 |
| **T o t a l e s** | **1.790,210** | **6.235,735** | **8.025,945** | **193,026** | **1.339,515** | **74,510** | **1.147,291** | **1,412** | **10.781,699** | **150,385** | **10.932,084** | **1.674,58** |

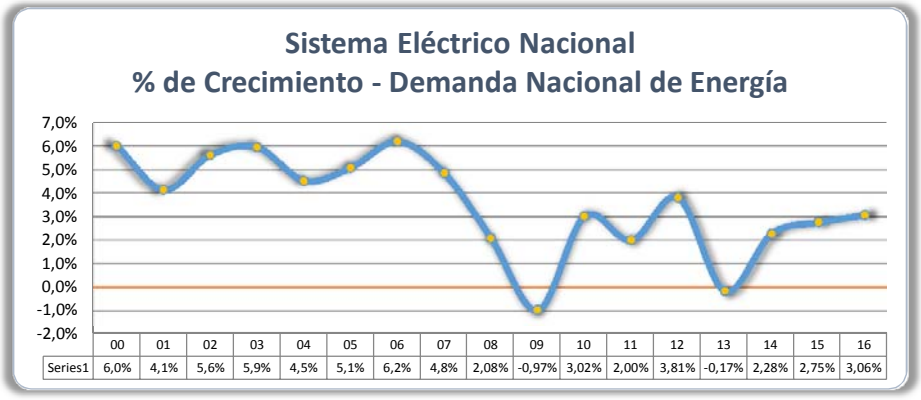
## PRODUCCIÓN BRUTA DE ENERGÍA 2 0 16




**Notas:**
Regulación :: incluye Arenal Dengo Sandillal
Filo de Agua :: Plantas hidroeléctricas pequeñas del ICE y otros productores

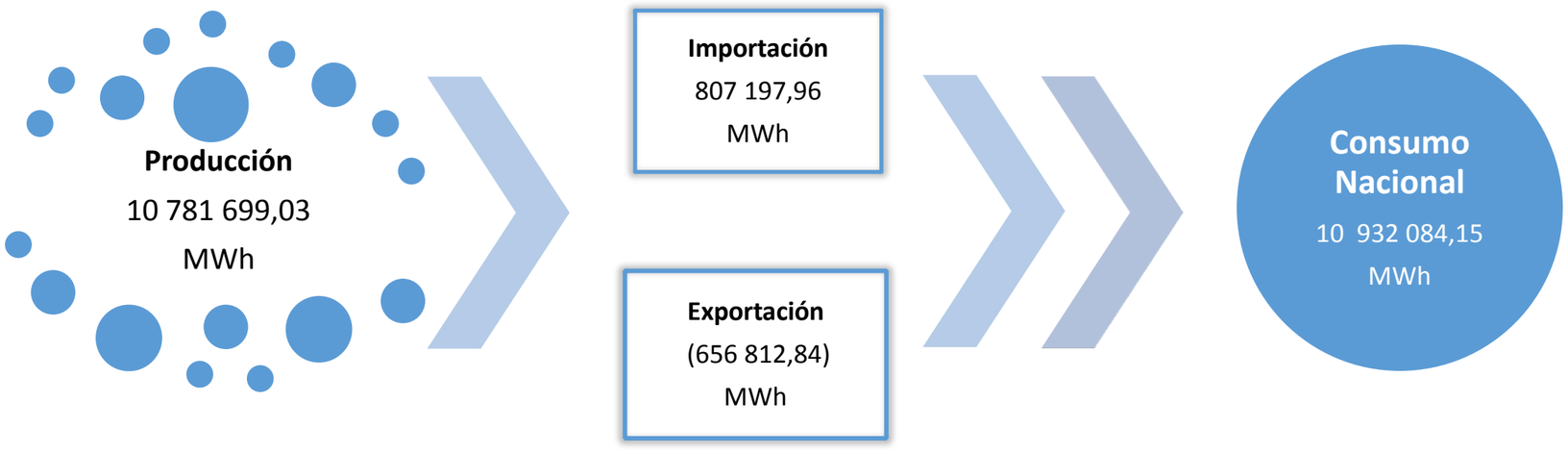
# Sistema de Información del S.E.N.
# Resumen Anual 2 0 1 6
# Crecimiento del Consumo Nacional

| Mes | Producción Nacional | INTERCAMBIO REGIONAL MW h | | | Demanda Nacional | 2015 / 2016 % |
|---|---|---|---|---|---|---|
| | | Importación | Exportación | Diferencia | | |
| Enero | 894.969,31 | 58.832,14 | 37.206,25 | 21.625,89 | 916.595,20 | 6,28% |
| Febrero | 858.695,98 | 59.193,72 | 37.373,91 | 21.819,81 | 880.515,79 | 9,24% |
| Marzo | 865.982,60 | 95.781,17 | 12.200,30 | 83.580,87 | 949.563,47 | 5,09% |
| Abril | 814.499,98 | 121.980,24 | 3.886,26 | 118.093,98 | 932.593,96 | 6,78% |
| Mayo | 901.955,22 | 67.974,51 | 23.046,43 | 44.928,08 | 946.883,30 | 4,13% |
| Junio | 910.187,64 | 56.036,23 | 72.893,82 | (16.857,59) | 893.330,05 | 1,22% |
| Julio | 941.369,56 | 46.293,28 | 86.895,62 | (40.602,34) | 900.767,22 | 0,35% |
| Agosto | 952.464,83 | 46.763,52 | 80.433,15 | (33.669,63) | 918.795,20 | 1,95% |
| Septiembre | 905.155,89 | 62.108,46 | 73.692,40 | (11.583,94) | 893.571,95 | 3,10% |
| Octubre | 932.021,87 | 75.855,80 | 93.923,32 | (18.067,52) | 913.954,35 | 0,52% |
| Noviembre | 895.443,83 | 59.285,34 | 61.801,70 | (2.516,36) | 892.927,47 | 1,04% |
| Diciembre | 908.952,32 | 57.093,55 | 73.459,68 | (16.366,13) | 892.586,19 | -2,07% |
| **TOTAL** | **10.781.699,03** | **807.197,96** | **656.812,84** | **150.385,12** | **10.932.084,15** | **3,06%** |



# Sistema de Información del S.E.N.
## Resumen Anual 2 0 1 6
## Intercambio Regional MWh

| Mes | Producción Nacional | Norte (Liberia) | | | Sur (Progreso) | | | Total | | | Consumo Nacional |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Importación | Exportación | Diferencia | Importación | Exportación | Diferencia | Importación | Exportación | Diferencia | |
| Enero | 894.969,31 | 50.250,34 | -8.425,94 | 58.676,28 | 8.581,80 | -28.780,31 | 37.362,11 | 58.832,14 | 37.206,25 | 21.625,89 | 916.595,20 |
| Febrero | 858.695,98 | 27.202,37 | -27.026,34 | 54.228,71 | 31.991,35 | -10.347,57 | 42.338,92 | 59.193,72 | 37.373,91 | 21.819,81 | 880.515,79 |
| Marzo | 865.982,60 | 60.472,70 | -7.474,62 | 67.947,32 | 35.308,47 | -4.725,68 | 40.034,15 | 95.781,17 | 12.200,30 | 83.580,87 | 949.563,47 |
| Abril | 814.499,98 | 79.348,69 | -829,29 | 80.177,98 | 42.631,55 | -3.056,97 | 45.688,52 | 121.980,24 | 3.886,26 | 118.093,98 | 932.593,96 |
| Mayo | 901.955,22 | 33.019,52 | -12.354,71 | 45.374,23 | 34.954,99 | -10.691,72 | 45.646,71 | 67.974,51 | 23.046,43 | 44.928,08 | 946.883,30 |
| Junio | 910.187,64 | 253,24 | -61.288,64 | 61.541,88 | 55.782,99 | -11.605,18 | 67.388,17 | 56.036,23 | 72.893,82 | -16.857,59 | 893.330,05 |
| Julio | 941.369,56 | 867,90 | -70.163,22 | 71.031,12 | 45.425,38 | -16.732,40 | 62.157,78 | 46.293,28 | 86.895,62 | -40.602,34 | 900.767,22 |
| Agosto | 952.464,83 | 388,68 | -64.093,88 | 64.482,56 | 46.374,84 | -16.339,27 | 62.714,11 | 46.763,52 | 80.433,15 | -33.669,63 | 918.795,20 |
| Septiembre | 905.155,89 | 253,24 | -61.288,64 | 61.541,88 | 61.855,22 | -12.403,76 | 74.258,98 | 62.108,46 | 73.692,40 | -11.583,94 | 893.571,95 |
| Octubre | 932.021,87 | 38,33 | -79.869,61 | 79.907,94 | 75.817,47 | -14.053,71 | 89.871,18 | 75.855,80 | 93.923,32 | -18.067,52 | 913.954,35 |
| Noviembre | 895.443,83 | 762,26 | -50.321,29 | 51.083,55 | 58.523,08 | -11.480,41 | 70.003,49 | 59.285,34 | 61.801,70 | -2.516,36 | 892.927,47 |
| Diciembre | 908.952,32 | 353,03 | -61.576,54 | 61.929,57 | 56.740,52 | -11.883,14 | 68.623,66 | 57.093,55 | 73.459,68 | -16.366,13 | 892.586,19 |
| TOTAL | 10.781.699,03 | 253.210,30 | -504.712,72 | 757.923,02 | 553.987,66 | -152.100,12 | 706.087,78 | 807.197,96 | 656.812,84 | 150.385,12 | 10.932.084,15 |



## EXPORTACIÓN DEL ICE AL MERCADO REGIONAL 2016

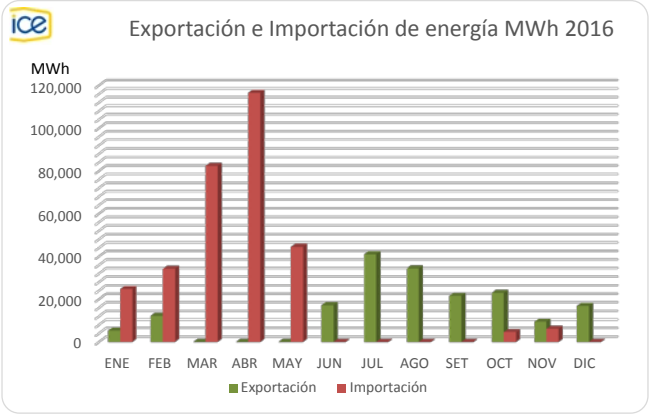
| | Contrato Sur | | Contrato Norte | | Oportunidad | | Total | |
|---|---|---|---|---|---|---|---|---|
| MES | MWh | USD | MWh | USD | MWh | USD | MWh | USD |
| ENE | 0.00 | $0.00 | 0.00 | $0.00 | 5,320.36 | $209,376.34 | 5,320.36 | $209,376.34 |
| FEB | 0.00 | $0.00 | 0.00 | $0.00 | 12,239.58 | $338,470.44 | 12,239.58 | $338,470.44 |
| MAR | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| ABR | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| MAY | 0.00 | $0.00 | 0.00 | $0.00 | 35.26 | $2,538.58 | 35.26 | $2,538.58 |
| JUN | 0.00 | $0.00 | 0.00 | $0.00 | 17,179.94 | $981,406.15 | 17,179.94 | $981,406.15 |
| JUL | 0.00 | $0.00 | 6,130.24 | $262,043.67 | 34,893.06 | $1,550,109.52 | 41,023.30 | $1,812,153.19 |
| AGO | 0.00 | $0.00 | 18,262.61 | $668,751.80 | 16,126.56 | $763,925.04 | 34,389.17 | $1,432,676.84 |
| SET | 0.00 | $0.00 | 12,467.12 | $451,741.82 | 9,171.58 | $389,630.66 | 21,638.70 | $841,372.48 |
| OCT | 0.00 | $0.00 | 3,786.07 | $188,007.45 | 19,244.83 | $1,040,623.58 | 23,030.90 | $1,228,631.03 |
| NOV | 0.00 | $0.00 | 2,332.47 | $120,452.23 | 7,181.90 | $338,857.23 | 9,514.37 | $459,309.46 |
| DIC | 0.00 | $0.00 | 829.21 | $37,057.95 | 16,029.94 | $297,596.70 | 16,859.15 | $334,654.65 |
| TOTALES | 0.00 | $0.00 | 43,807.73 | $1,728,054.93 | 137,423.00 | $5,912,534.22 | 181,230.73 | $7,640,589.15 |

## IMPORTACIÓN DEL ICE AL MERCADO REGIONAL 2016

| | Contrato Sur | | Contrato Norte | | Oportunidad | | Total Contrato y Oportunidad | | CMORC | |
|---|---|---|---|---|---|---|---|---|---|---|
| MES | MWh | USD | MWh | USD | MWh | USD | MWh | USD | MWh | USD |
| ENE | 0.00 | $0.00 | 7,503.32 | $538,895.23 | 17,248.57 | $1,248,326.71 | 24,751.89 | $1,787,221.94 | 7,503.32 | $95,519.84 |
| FEB | 0.00 | $0.00 | 8,384.52 | $552,342.97 | 25,854.50 | $1,647,438.97 | 34,239.02 | $2,199,781.94 | 8,384.52 | $45,854.74 |
| MAR | 245.00 | $18,186.00 | 16,640.49 | $1,114,706.06 | 65,518.88 | $4,638,530.88 | 82,404.37 | $5,771,422.93 | 16,885.49 | $126,932.21 |
| ABR | 8,730.18 | $673,525.14 | 65,636.59 | $4,520,550.38 | 42,232.63 | $3,152,195.50 | 116,599.41 | $8,346,271.01 | 74,366.77 | $607,243.96 |
| MAY | 419.00 | $40,106.00 | 9,718.71 | $773,976.72 | 34,389.43 | $2,938,792.64 | 44,527.14 | $3,752,875.36 | 10,137.71 | $112,410.37 |
| JUN | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| JUL | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| AGO | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| SET | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 | 0.00 | $0.00 |
| OCT | 0.00 | $0.00 | 2,681.18 | $190,636.83 | 1,920.00 | $130,957.20 | 4,601.18 | $321,594.03 | 2,681.18 | $9,864.37 |
| NOV | 0.00 | $0.00 | 0.00 | $0.00 | 6,217.35 | $476,143.69 | 6,217.35 | $476,143.69 | 0.00 | $0.00 |
| DIC | 0.00 | $0.00 | 0.00 | $0.00 | 22.47 | $22.47 | 22.47 | $22.47 | 0.00 | $0.00 |
| TOTALES | 9,394.18 | $731,817.14 | 110,564.81 | $7,691,108.18 | 193,403.83 | $14,232,408.05 | 313,362.82 | $22,655,333.37 | 119,958.99 | $997,825.50 |

***CMORC*** Cargo Mercado Oportunidad Regional asociado al cumplimiento del compromiso Contratual

| | 2016 | |
|---|---|---|
| | Exportación | Importación |
| | MWh | |
| ENE | 5,320.36 | 24,751.89 |
| FEB | 12,239.58 | 34,239.02 |
| MAR | 0.00 | 82,404.37 |
| ABR | 0.00 | 116,599.41 |
| MAY | 35.26 | 44,527.14 |
| JUN | 17,179.94 | 0.00 |
| JUL | 41,023.30 | 0.00 |
| AGO | 34,389.17 | 0.00 |
| SET | 21,638.70 | 0.00 |
| OCT | 23,030.90 | 4,601.18 |
| NOV | 9,514.37 | 6,217.35 |
| DIC | 16,859.15 | 22.47 |
| | 181,230.73 | 313,362.82 |




Fuente: Proceso Operación MER y Transacciones- CENCE

# Sistema Eléctrico Nacional
## Capacidad Instalada en placa - Diciembre 2016

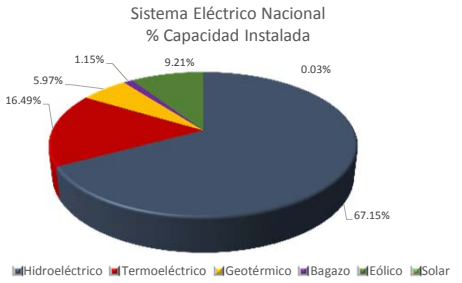
| I.C.E.[7] | Número Unidades | kW en placa[1] |
|---|---|---|
| **ICE HIDRO** | | |
| Garita | 4 | 134,740.00 |
| Río Macho | 5 | 135,680.00 |
| Cachí | 4 | 152,000.00 |
| Arenal | 3 | 157,398.75 |
| Miguel Dengo | 3 | 174,012.00 |
| Sandillal | 2 | 31,977.00 |
| Angostura | 3 | 172,201.50 |
| Peñas Blancas | 3 | 38,172.00 |
| Cariblanco | 2 | 87,941.00 |
| Pirrís | 2 | 140,272.00 |
| Toro I | 2 | 27,300.00 |
| Toro II | 2 | 73,040.00 |
| Toror III | 2 | 47,520.00 |
| Echandi | 1 | 4,696.00 |
| Reventazón[10] | 5 | 306,868.00 |
| **Subtotal Hidro** | **43** | **1,683,818.25** |
| **ICE TERMICO** | | |
| San Antonio Gas[2] | 2 | 44,299.20 |
| Barranca Gas[3] | 2 | 53,280.00 |
| Moín Gas[4] | 4 | 156,450.00 |
| Moín Gas - C.N.F.L.[5] | 2 | 90,000.00 |
| Guápiles | 2 | 14,267.20 |
| Orotina | 2 | 10,686.40 |
| Garabito[6] | 11 | 202,708.00 |
| **Subtotal Térmico** | **25** | **571,690.80** |
| **ICE GEOTERMICO** | | |
| Miravalles I | 1 | 55,080.00 |
| Miravalles II | 1 | 55,080.00 |
| Miravalles III | 1 | 29,450.00 |
| Miravalles V | 1 | 10,500.30 |
| Boca de Pozo I | 1 | 4,999.70 |
| Pailas | 2 | 51,750.00 |
| **Subtotal Geotérmico** | **7** | **206,860.00** |
| **ICE EÓLICO** | | |
| Tejona | 28 | 18,480.00 |
| **Subtotal Eólico** | 28 | 18,480.00 |
| **ICE SOLAR** | | |
| Parque Solar Miravalles | 10 | 1,000.00 |
| **Subtotal Solar** | 10 | 1,000.00 |
| **TOTAL ICE (sin contratos)** | **113** | **2,481,849.05** |

| OTRAS EMPRESAS[8] | Número undiades | kW en placa |
|---|---|---|
| **Hidro** | | |
| E.S.P.H. | 6 | 27 500 |
| J.A.S.E.C. | 10 | 23 855 |
| C.N.F.L.[13] | 22 | 126 337 |
| Coopelesca | 6 | 70 340 |
| Coopeguanacaste[14] | 4 | 34 630 |
| Coneléctricas | 5 | 46 780 |
| **Subtotal Hidro** | 53 | 329 442 |
| **Eólico** | | |
| Valle Central (CNFL) | 17 | 15 300 |
| COOPESANTOS | 15 | 12 750 |
| **Subtotal Eólico** | 32 | 28 050 |
| **Total Otras Empresas** | **85** | **357 492** |

| Generación Ley 7200 Capítulo I[9] | Número unidades | kW en placa | En contrato |
|---|---|---|---|
| **HIDRO** | | | |
| Tapezco | 1 | 208 | 186 |
| El Ángel | 2 | 3 424 | 3 850 |
| El Ángel Ampliación | 2 | 5 568 | 5 000 |
| Caño Grande | 13 | 2 917 | 2 570 |
| Platanar | 2 | 14 594 | 15 000 |
| Suerkata | 1 | 3 000 | 2 700 |
| Don Pedro | 1 | 14 000 | 14 000 |
| Poás I y II | 3 | 2 125 | 1 942 |
| Matamoros[16] | 7 | 4 790 | 4 828 |
| Río Lajas | 2 | 11 000 | 10 000 |
| El Embalse | 2 | 2 000 | 1 500 |
| Volcán | 1 | 17 000 | 17 000 |
| Río Segundo II | 3 | 1 074 | 1 030 |
| Doña Julia | 2 | 16 470 | 17 400 |
| Caño Grande III | 1 | 3 375 | 3 280 |
| Santa Rufina | 1 | 336 | 290 |
| Vara Blanca | 1 | 2 677 | 2 500 |
| Rebeca I[15] | 1 | 35 | 35 |
| **Subtotal Hidro** | **46** | **104 593** | **103 111** |
| **EÓLICO** | | | |
| Plantas Eólicas | 55 | 22 660 | 19 800 |
| Aeroenergía | 9 | 6 750 | 6 400 |
| Tilawind | 7 | 21 000 | 19 550 |
| Movasa | 32 | 20 000 | 20 000 |
| Vientos del Este | 4 | 12 000 | 9 000 |
| Mogote | 7 | 21 000 | 20 000 |
| Campos Azules | 10 | 20 000 | 20 000 |
| **Subtotal Eólico** | **124** | **123 410** | **114 750** |
| **BAGAZO** | | | |
| El Viejo | 1 | 20 000 | 18 000 |
| Taboga | 3 | 20 000 | 19 800 |
| **Subtotal Bagazo** | 4 | 40 000 | 37 800 |
| **Total Ley 7200, Capítulo I** | **174** | **268 003** | **255 661** |

| Generación Ley 7200, Capítulo II[9] | Número unidades | kW en Placa | kW Contrato |
|---|---|---|---|
| **Hidro** | | | |
| El General | 2 | 42 000 | 39 000 |
| La Joya | 3 | 50 700 | 50 000 |
| Torito | 2 | 67 500 | 50 000 |
| Chucás | 2 | 50 000 | 50 000 |
| **Subtotal Hidro** | 9 | 210 200 | 189 000 |
| **Eólico** | | | |
| P.E. Guanacaste | 55 | 49 700 | 49 500 |
| Chiripa | 33 | 49 500 | 49 500 |
| Orosí | 25 | 50 000 | 50 000 |
| **Subtotal Eólico** | 113 | 149 200 | 149 000 |
| **Total Ley 7200, Capítulo II** | **122** | **359 400** | **338 000** |

| Sistema Eléctrico Nacional Instalado en Placa | | | |
|---|---|---|---|
| **I C E** | **kW** | **Unidades** | **%** |
| Hidro | 1 683 818 | 43 | 67.85% |
| Térmico | 571 691 | 25 | 23.03% |
| Geotérmico | 206 860 | 7 | 8.33% |
| Eólico | 18 480 | 28 | 0.74% |
| Solar | 1 000 | 10 | 0.04% |
| Total ICE | 2 481 849 | 113 | 71.59% |
| **Otras Empresas** | **kW** | **Unidades** | **%** |
| Hidro | 329 442 | 53 | 92.15% |
| Biogás | | | |
| Eólico | 28 050 | 32 | 7.85% |
| Total Ot.Empresas | 357 492 | 85 | 10.31% |
| **Ley 7200, Capítulo I** | **kW** | **Unidades** | **%** |
| Hidro | 104 593 | 46 | 39.03% |
| Eólico | 123 410 | 124 | 46.05% |
| Biomasa | 40 000 | 4 | 14.93% |
| Total Ley 7200, Capítulo I | 268 003 | 174 | 7.73% |
| **Ley 7200, Capítulo II** | **kW** | **Unidades** | **%** |
| Hidro | 210 200 | 9 | 58.49% |
| Eólico | 149 200 | 113 | 41.51% |
| Total Ley 7200, Capítulo II | 359 400 | 122 | 10.37% |
| **Total instalado** | **3 466 744** | **494** | |




| Resumen kW Costa Rica | | | |
|---|---|---|---|
| | Hidroeléctrico | 2 328 053 | 67.15% |
| | Termoeléctrico | 571 691 | 16.49% |
| | Geotérmico | 206 860 | 5.97% |
| | Bagazo | 40 000 | 1.15% |
| | Eólico | 319 140 | 9.21% |
| | Solar | 1 000 | 0.03% |
| | **Total** | **3 466 744** | **100.00%** |

**Consideraciones:**

1. **Placa Generador** = Dato de diseño del generador utilizado en la unidad, no necesariamente corresponde con la potencia del conjunto turbina-generador.
   **Mínima de operación** = mínimo para operación estable y segura de la unidad.
2. En las unidades de San Antonio los generadores son de 22 150 KW c/u, mientras que las turbinas son de 19 050 KW c/u.
3. En las unidades de Barranca los generadores son de 26 640 KW c/u, mientras que las turbinas son de 20 800 KW c/u.
4. En la unidad # 8 Moín G. el generador es de 48 150 KW, mientras que la turbina es de 34 651 KW.
5. En la unidades # 9 y 10 de Moín CNFL los generadores son de 45 000 KW, mientras que las turbinas son de 39 300 KW.
6. Para el caso de Garabito se debe planificar con solo 10 unidades ya que la onceava unidad es un respaldo de potencia.
7. Datos suministrados por el Negocio de Generación del ICE.
8. Potencia en placa sin confirmar. En junio se actualizaron los datos sobre la capacidad instalada en Coopelesca y CoopeSantos.
9. De acuerdo a los contratos vigentes y se sustituyen los nombre *Generación Privada* y *Grupo BOT* según la Ley 7200.
10. Reventazón, fechas de entrada: Unidad 1 el 10/09/2016, Unidad 2 el 2/4/2016, Unidad 3 el 4/5/2016, Unidad 4 el 8/6/2016 y la Unidad 5 el 14/7/2016.
11. Moín 1 fuera de operación el 01 junio 2016.
12. Mogote entró en operación comercial el viernes 22 de julio 2016
13. El 27 de octubre del 2016 entra en operación la planta hidroeléctrica Ventanas de la CNFL con 11 268 kW.
14. El 12 de agosto se registra generación de Bijagua, dos unidades 8 879.95 kW cada una. El 17 de Octubre de 2016 es la entrada oficial en operación.
15. La Rebeca actualiza su potencia instalada y contratada a partir del 29 octubre 2016.
16. Matamoros actualiza su potencia instalada y contratada a partir 1° de agosto 2016.