

# MEXICAN POWER SYSTEM AND WIND ENERGY



# Important data of the Mexican Power System 2006



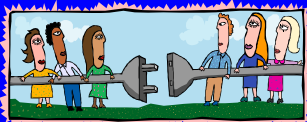
Users  
29.9 Millions



Installed Effective Capacity  
48,768.62 MW

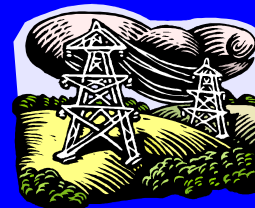


Maxim Demand Integrated  
non Coincident  
33,943 MWh/h



Rate of Growth  
Gross Consumption  
2006 vs 2005

3.5 %



Thousands of Kilometers of  
Transmission Lines

400 kV 19.7

230 kV 28.9

161 a 115 kV 44.2

TOTAL 92.8



Produced Gross Energy  
223,434 GWh

# STRUCTURE OF THE MEXICAN POWER SYSTEM

**State owned utilities**

**Vertically Integrated Utilities**

**CFE**

**National**

**LFC Metropolitan Zone City of Mexico**

**Generation**

**Generation**

**Transmission**

**Transmission**

**Distribution**

**Distribution**

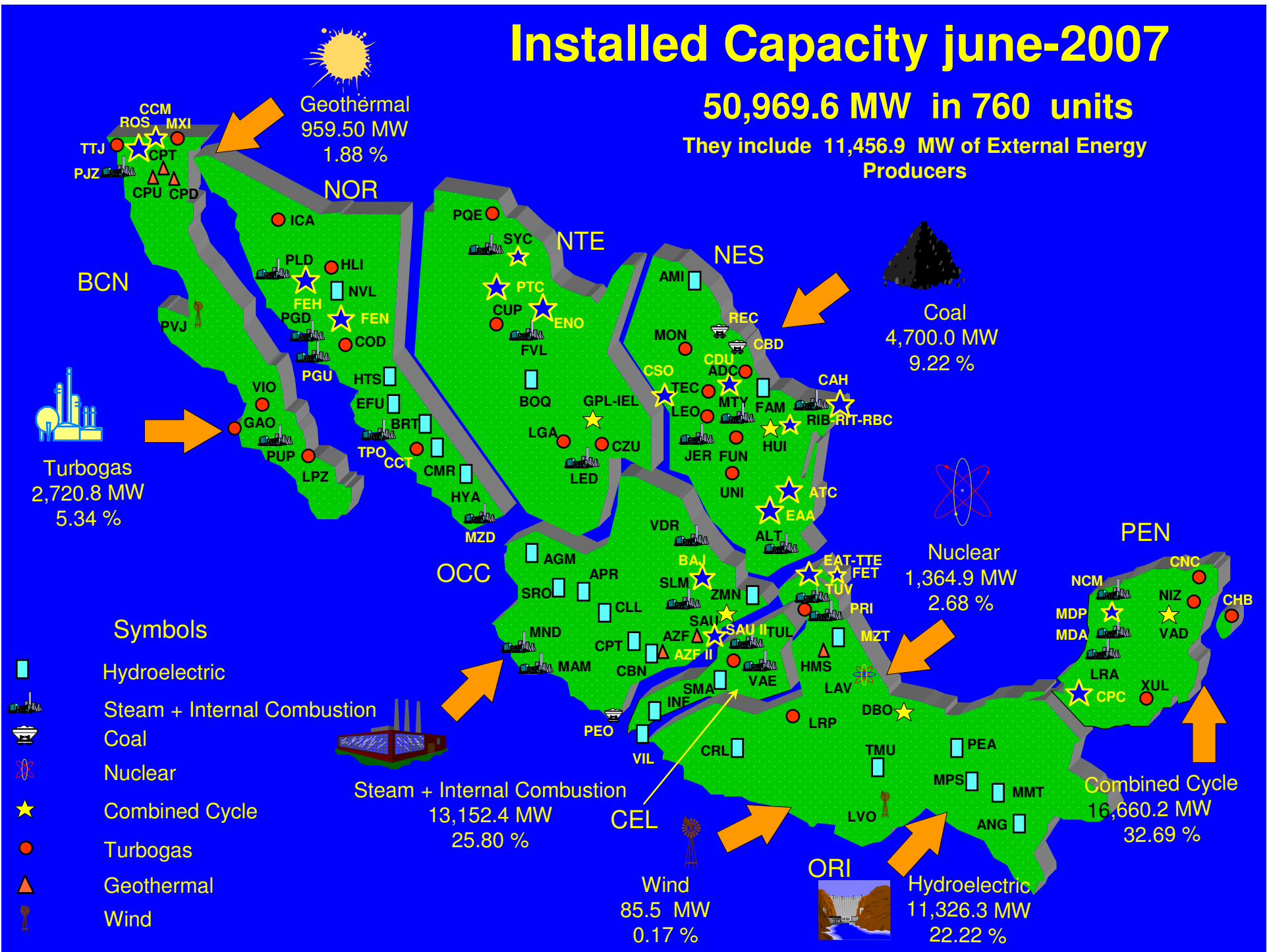
**System Operations**

**System Operations**

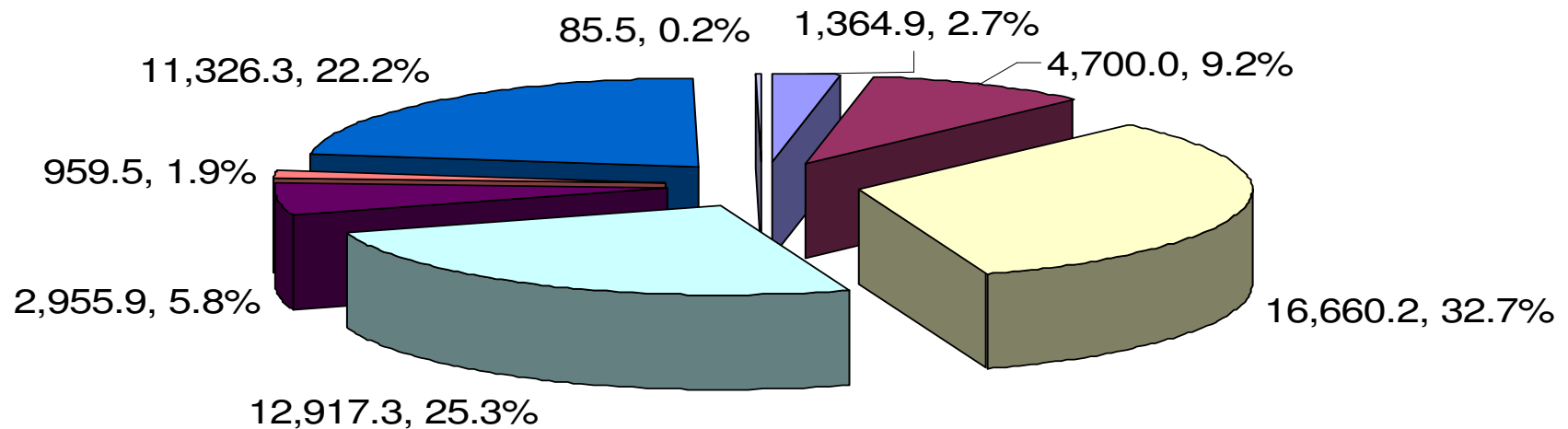
# Installed Capacity june-2007

50,969.6 MW in 760 units

They include 11,456.9 MW of External Energy Producers



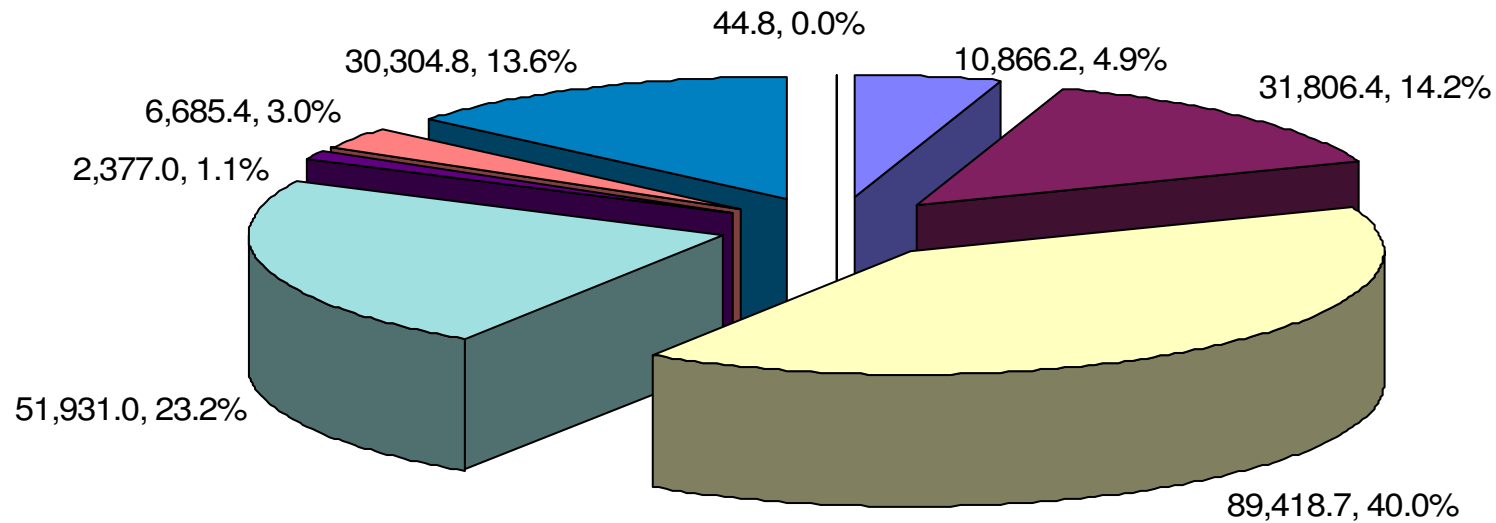
## INSTALLED CAPACITY MW JUNE 2007



■ Nuclear ■ Coal ■ Combined Cycle ■ Steam ■ Tgs + IC ■ Geothermal ■ Hydro ■ Wind

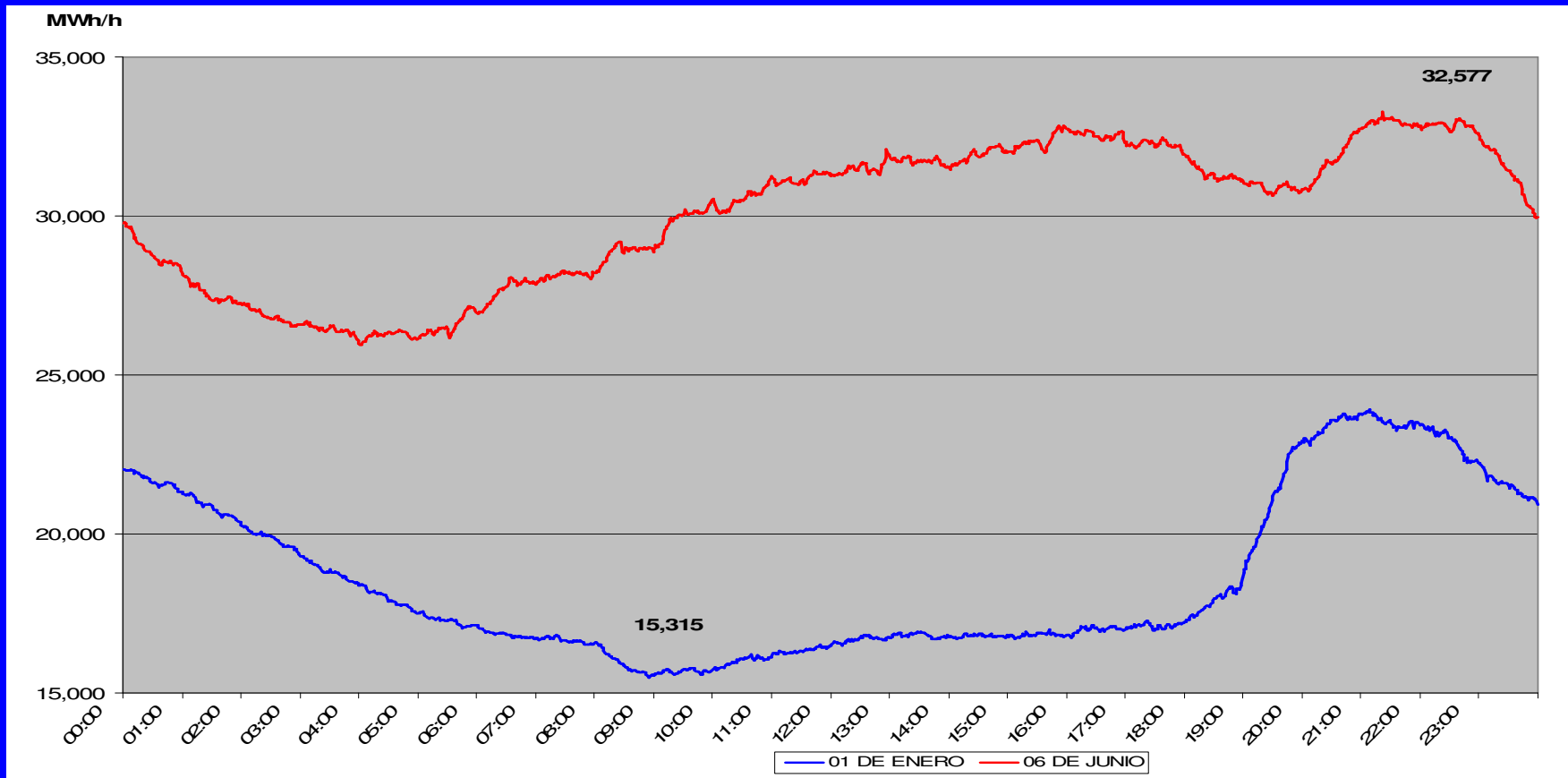
**The Mexican power system is thermal based  
50,969.6 MW.**

## GROSS GENERATION 2006 GWh



**The Mexican power system is thermal based**

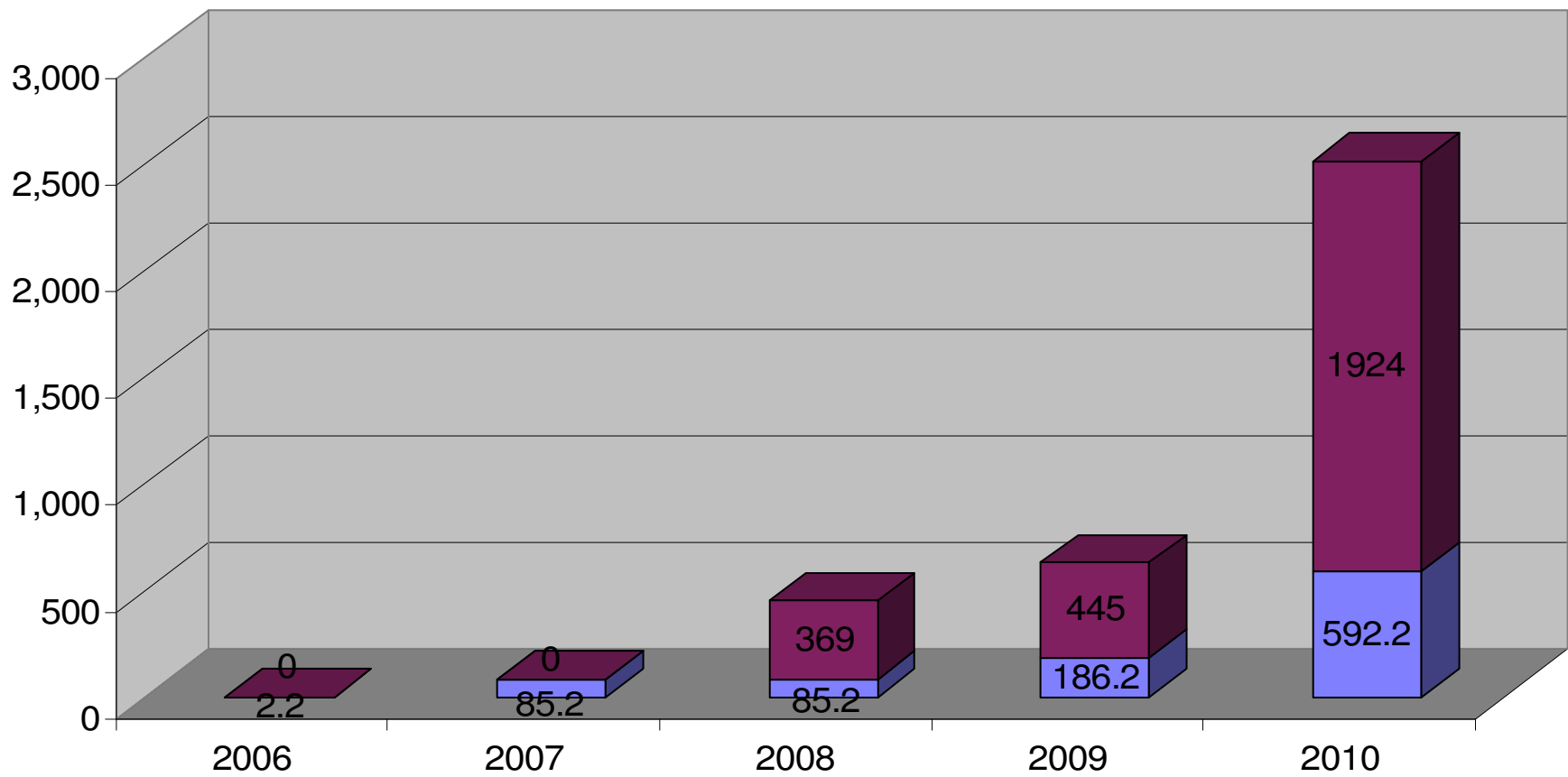
**223,434 GWh.**



**Normally the peak demand appears in summer and minima demand in winter.**

## CAPACITY AND INCREMENT OF CAPACITY IN WIND POWER

MW



Public Service Self-Supplying



## **NEW NETWORK INFRASTRUCTURE INVESTMENTS WITH WIND POWER**

### **3 Transmission Lines en 400 Kv**

**Juile – Cerro de Oro**

**La Ventosa – Juile**

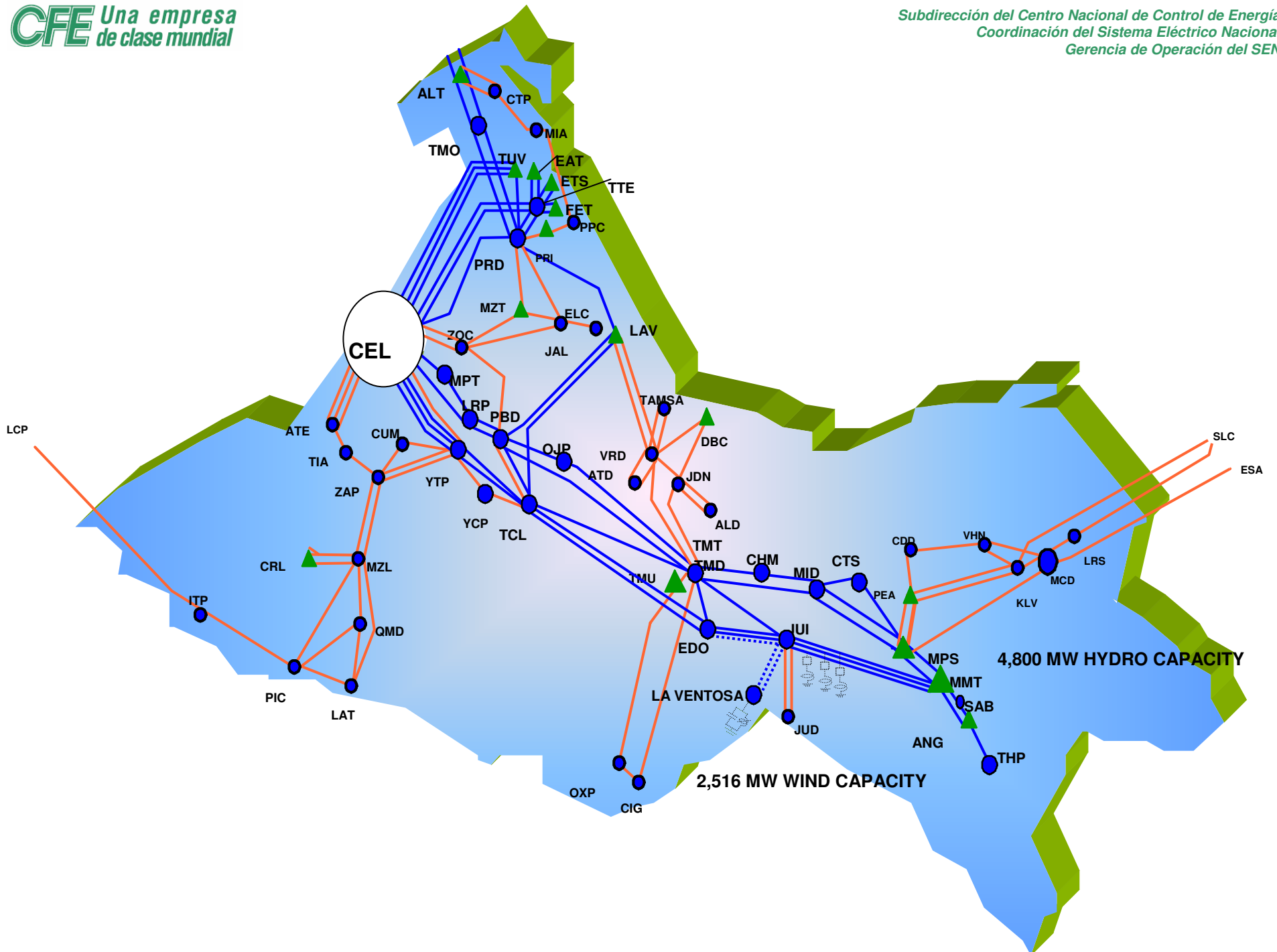
**La Ventosa - Juile**

**3 Autotransformers in S.E. La Ventosa 400/230 kV 375 MVA**

**2 Transformers in S.E. La Ventosa 400/115 kV 375 MVA**

**1 Reactor in S.E. Juile 400 kV 75 MVAR**

**1 Static Var Compensators (SVC) in S.E. La Ventosa  $\pm$  300 MVAR**



## **CHALLENGES TOWARDS THE FUTURE**

**Coordination: Hydro – Wind, seasonal, daily**

**Hydro Generation : Peak generation, Low Plant Factor, High Availability in the Summer, Low Availability in Winter**

**Wind Generation : High Availability in Winter, Low Availability in Summer**

**The hydro and wind generation are complementary in the use of the electrical network**

# Electricity grids

- The system and market operator is the National Center of Control Energy (CENACE).
- The network operator in Mexico is Comision Federal de Electricidad (CFE).

# Power Market Aspects

The wind power is purchased by hour in the interconction node, at local marginal price

The network operator is obliged to purchase the electricity from wind farms

Wind power operator must submit production schedule to the system operator at 9 and 13 hours one day before of the dispatching day

Actually there are not an intra- day trading in the country, in the future probably there will be

Wind power operators could adjust their schedules

# Power Market Aspects

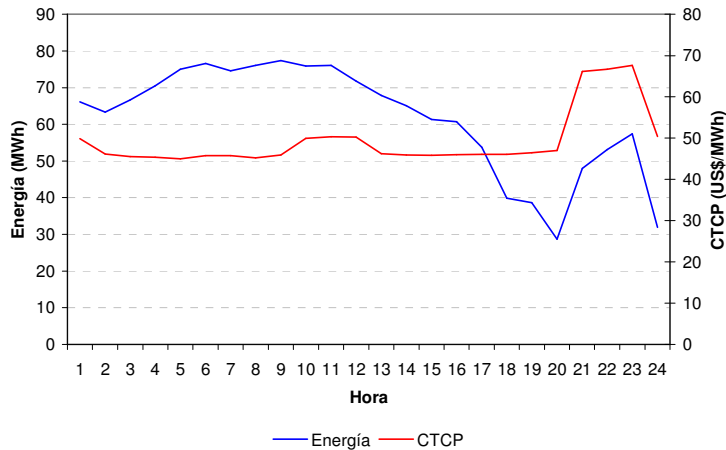
The power wind will be purchase with balancing market

There are not charges for wind farm operators by deviations from schedules

# Income for Energy Plant La Venta Dos

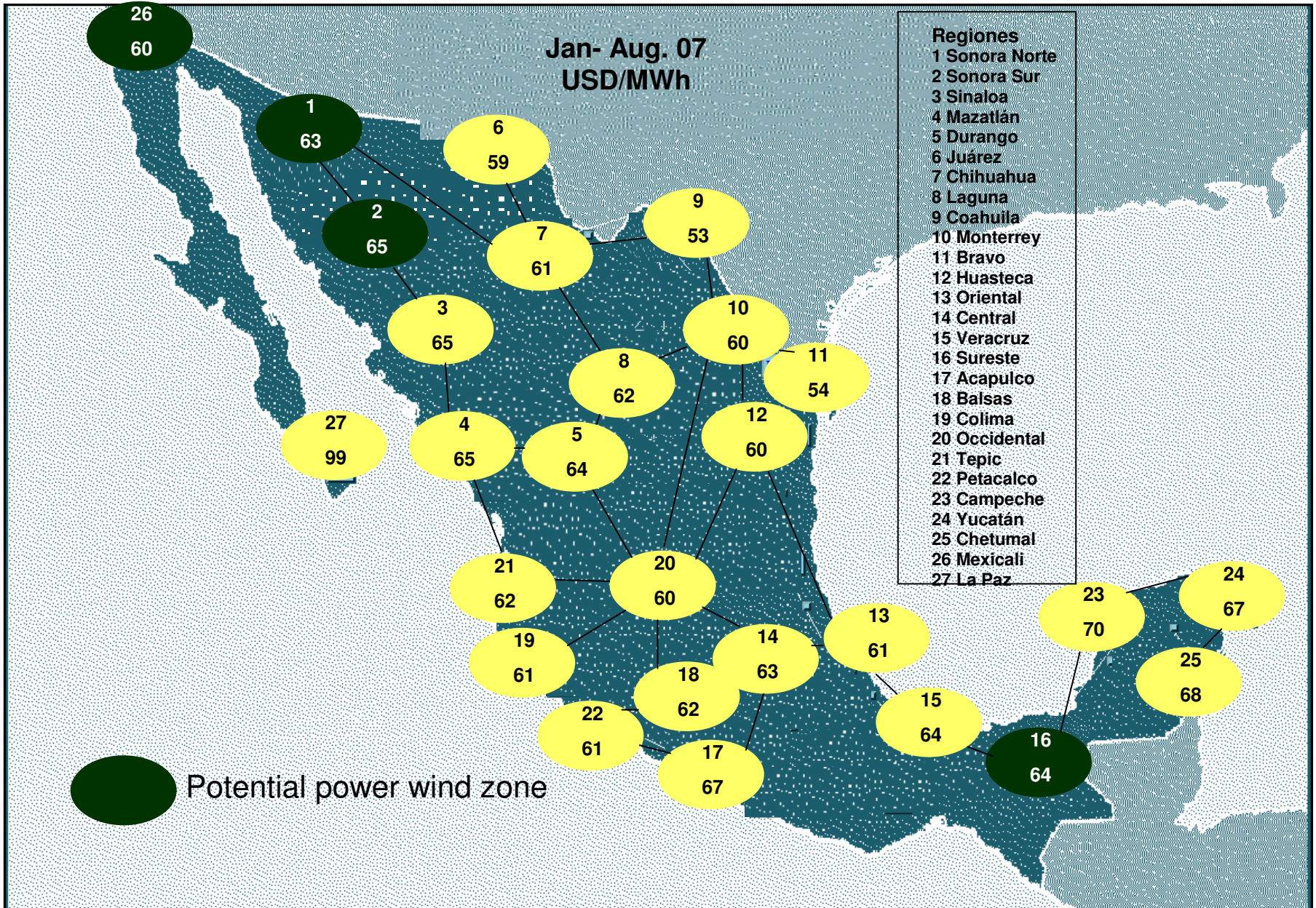
**August, 5 2007**

Hora	Energía MWh	CTCP US\$/MWh	Ingreso US\$
1	66.11	49.85	3,296
2	63.32	46.17	2,924
3	66.64	45.47	3,030
4	70.45	45.34	3,194
5	74.98	45.01	3,375
6	76.60	45.75	3,505
7	74.58	45.75	3,412
8	76.05	45.17	3,435
9	77.31	45.92	3,550
10	75.91	49.93	3,790
11	76.08	50.31	3,828
12	71.86	50.25	3,610
13	67.83	46.24	3,136
14	65.04	45.87	2,983
15	61.36	45.81	2,811
16	60.70	46.00	2,792
17	53.70	46.05	2,473
18	39.88	46.05	1,837
19	38.61	46.44	1,793
20	28.71	47.00	1,349
21	47.99	66.10	3,172
22	53.15	66.67	3,543
23	57.36	67.60	3,878
24	31.88	50.37	1,606
<b>TOTAL</b>	<b>1,476.11</b>		<b>72,322</b>



**From January to August the total income is 8,838,615 \$US**

# National Electrical System Average Regional Prices



El Centro Nacional de Control  
de Energía

CENACE

*¡¡ Thanks !!*

