

RED
ELÉCTRICA
DE ESPAÑA

Spanish DSM initiatives

26th March 2008
Task XV Meeting





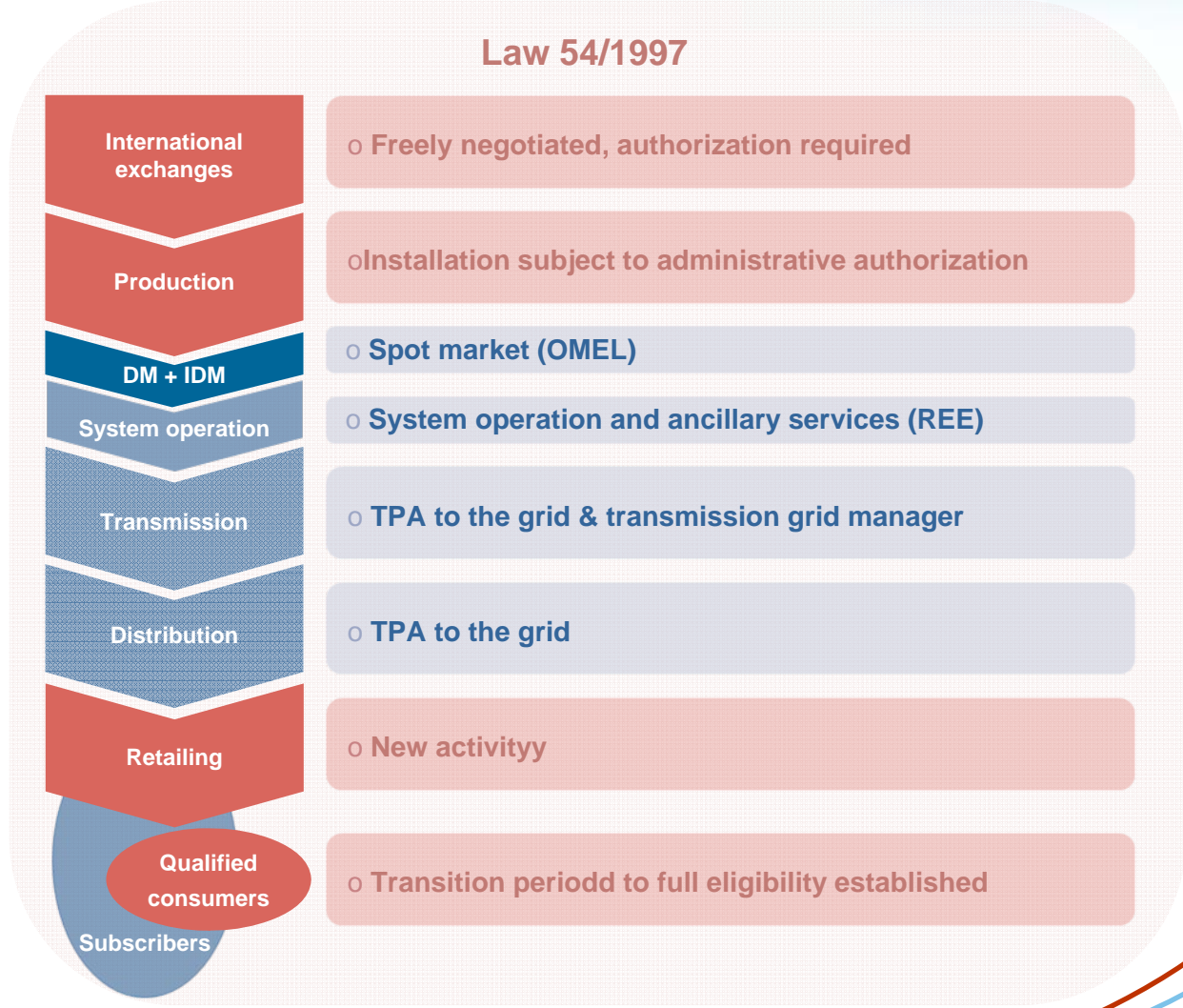
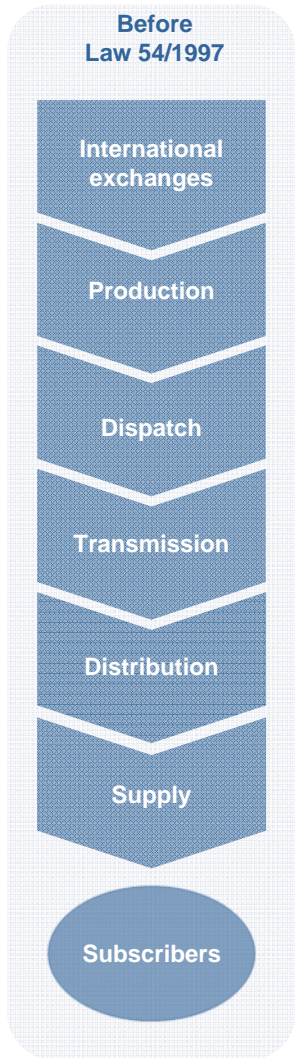
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1. **The Spanish electricity system**
2. **Electricity demand in Spain**
3. **DSM in Spain**
4. **Conclusions**





The activities according to Law 54/1997



Legend:

Regulated activities

Liberalized activities



Mission and activities of Red Eléctrica

Management of the grid and transmission of energy

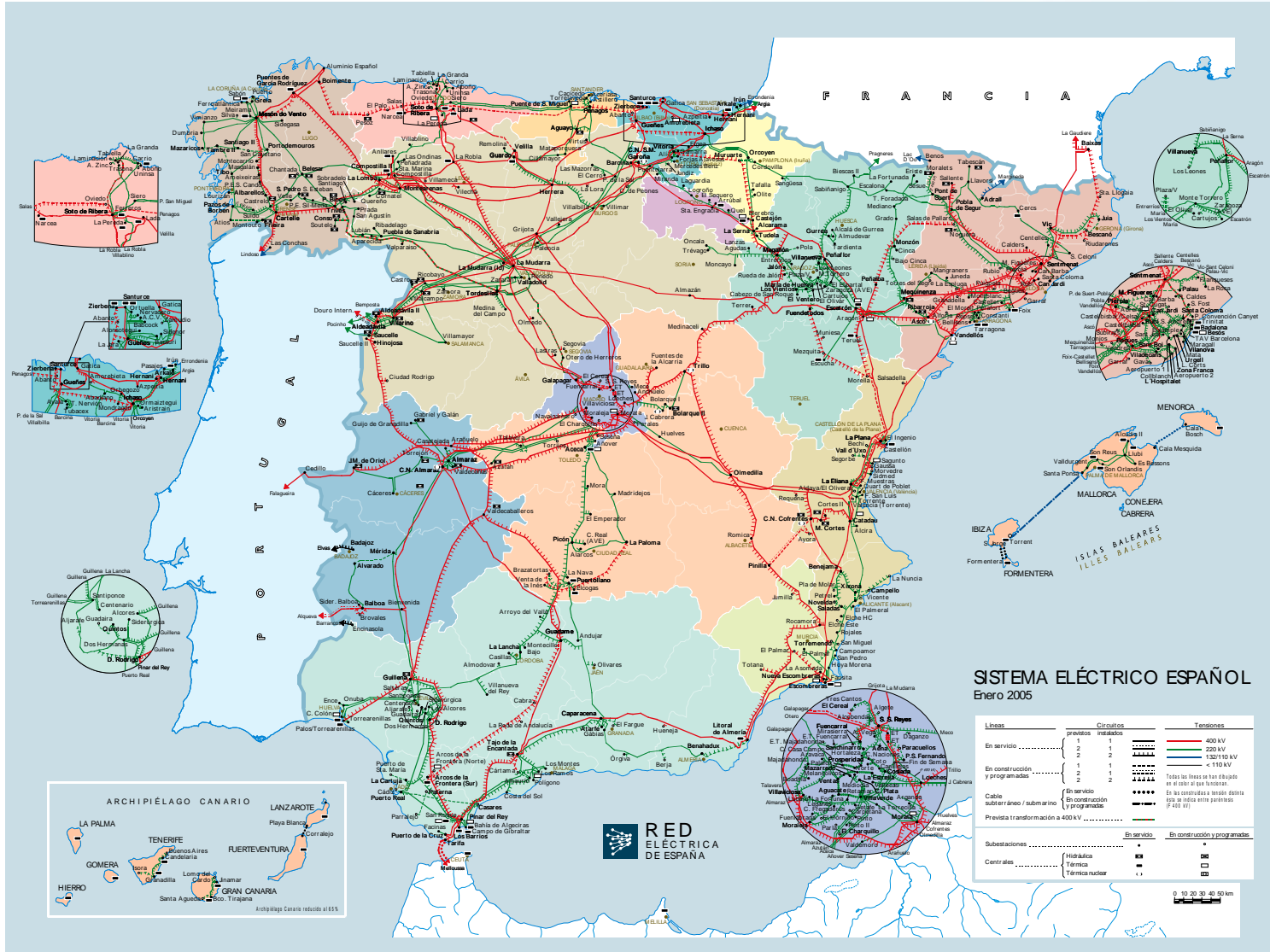
- Transmission Grid Planning and Development
- Management of Interconnections exchanges with E.U. and other countries
- Management of Transmission Grid Access
- Design, Build, Maintenance and Operation of Transmission Facilities (overhead lines and substations)

System Operation

- Guarantee the security of electricity supply
- Coordination of Transmission and Generation
- Ancillary Services Management
- Operate Transmission Grid
- Generation Operation Planning as of electricity market results
- Coordinate Maintenance Planning of Transmission Facilities
- Power demand tracking in real time



Spanish electricity network





REE transmission assets

Transmission lines	33.396 km
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400 kV

16.844 km

220 kV

16.552 km

Substations	2.624
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Transformers	51.072 MVA
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FO Grid	13.412 km
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Employees	1.294
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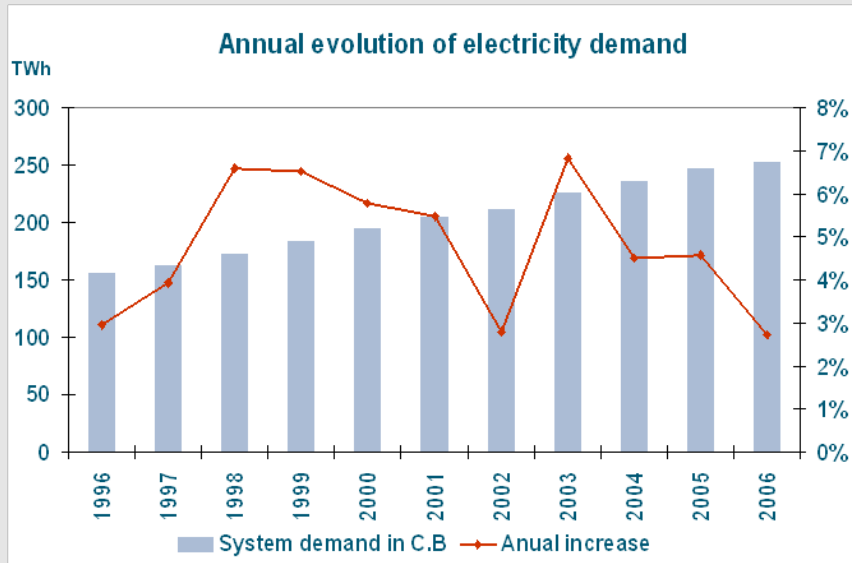




Load Demand in Spain

1

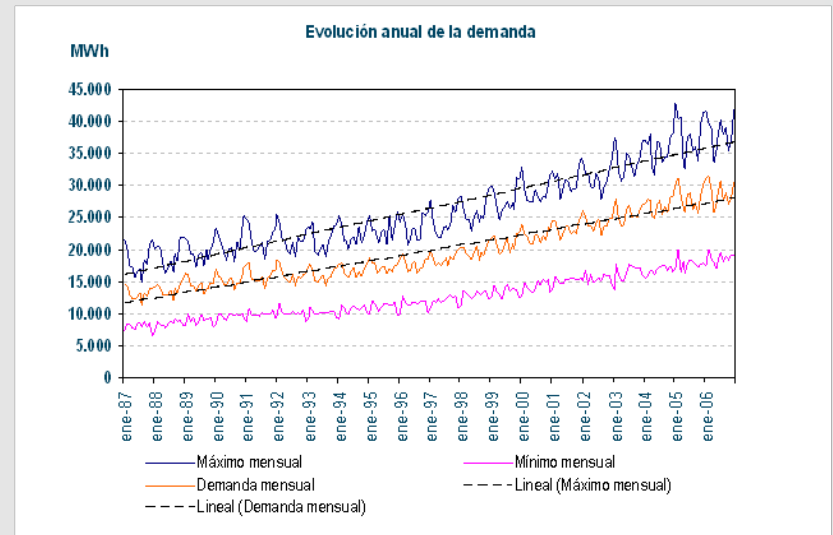
High increase



5% Average Interannual increase since 1996

2

Interannual increase of load peak



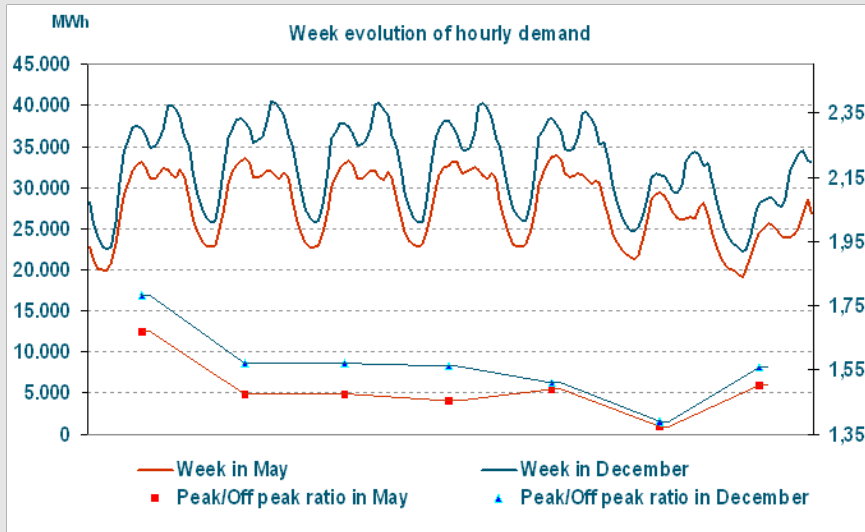
Higher load peak increase than energy increase



Load Demand in Spain

3

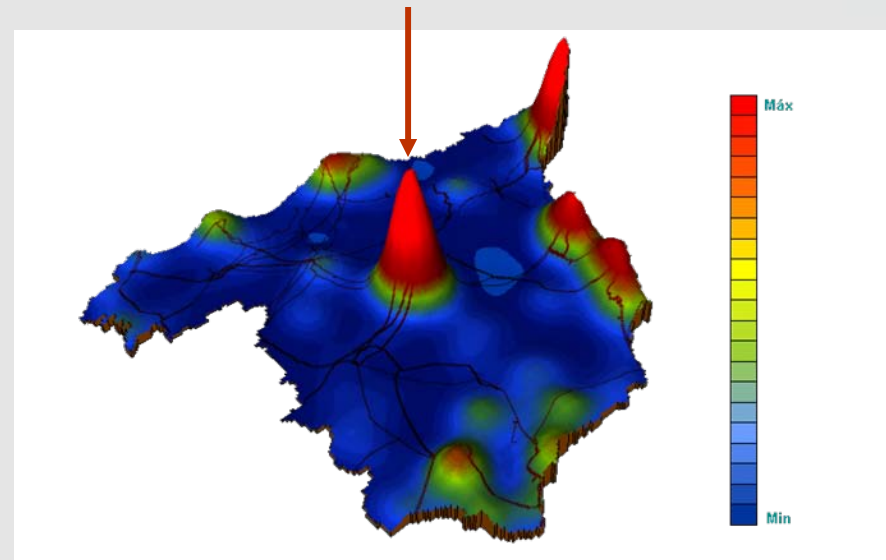
Big gradients in daily demand



Peak/off peak ratio between 1,35 and 1,75

4

High demand concentrated in specific areas

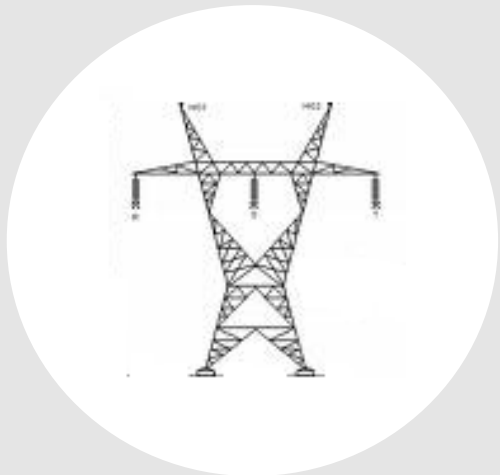


Concentrated around city areas



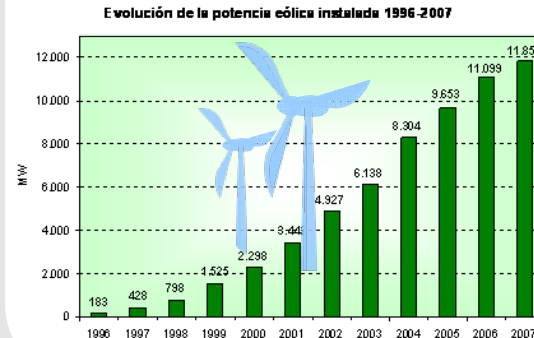
Challenges

Need of network reinforcement



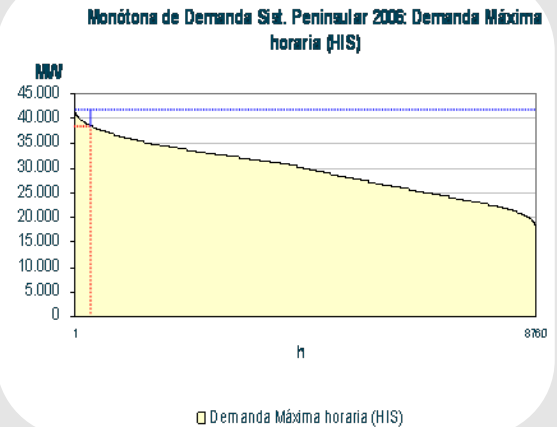
Big difficulties for developing new infrastructures

Difficult to integrate renewable energies



22.000 MW of Wind power installed in 2.010

Over capacity to cover peak load



3.700 MW needed to cover 300 hours of maximum demand



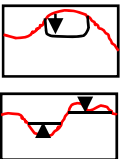
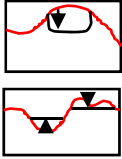
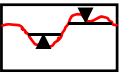
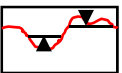
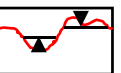
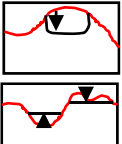
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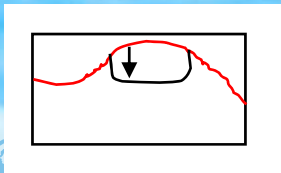
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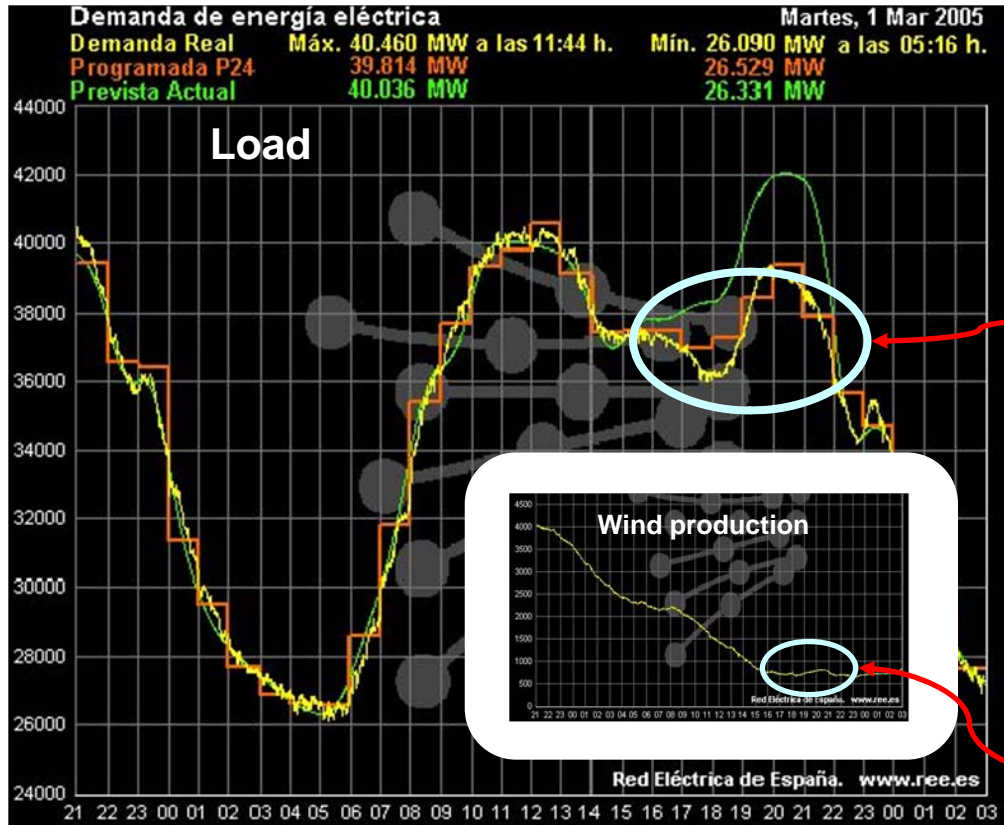


DSM Initiatives in Spain

	Regulated tariffs	Liberalized market
Large Industrial customers	<p>Interruptibility Time of use tariffs Reactive control</p> 	<p>New Interruptibility Access to network tariffs Market prices Voltage control service</p> 
Medium services customers	<p>Time of use tariffs</p> 	<p>Market prices Access to network tariffs Operational services</p> 
Residential customers	<p>Night tariffs</p> 	<p>Operational services Price signals</p> 



Load interruption contracts



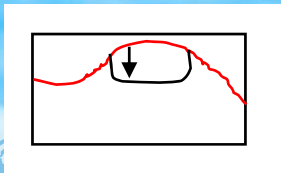
1st March 2005

✓ Interruption of consumption

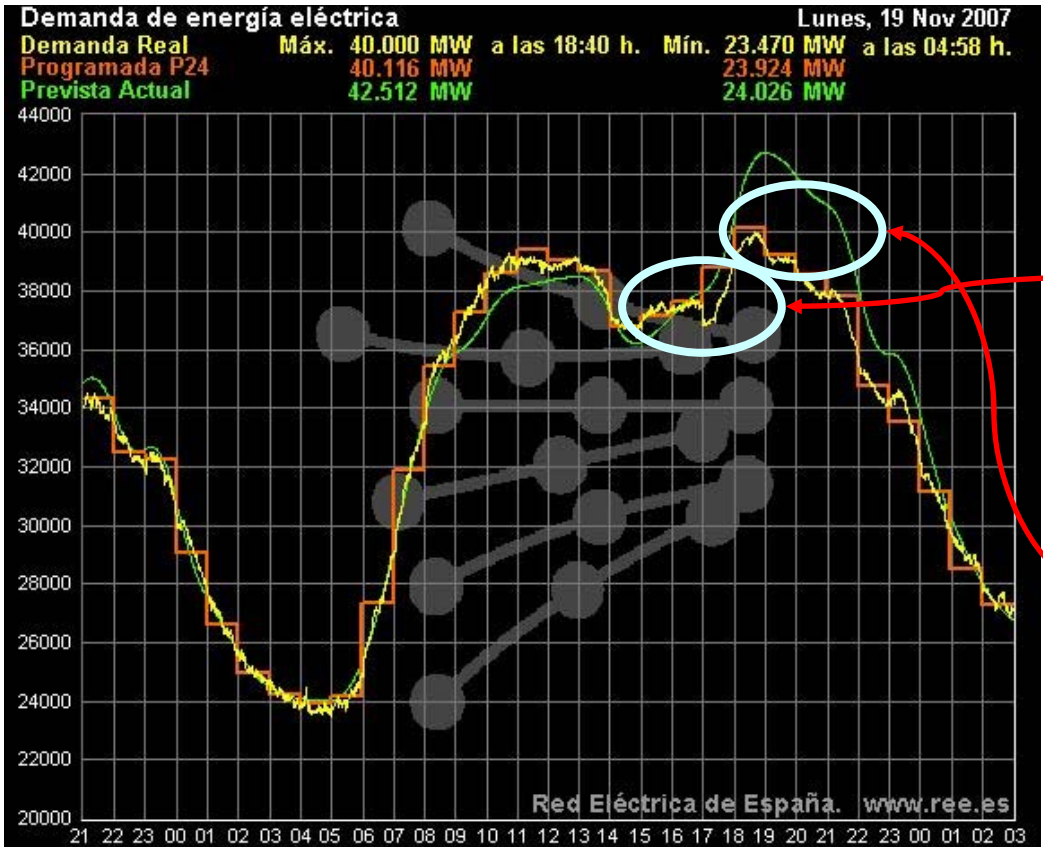
✓ Load interruption order sent from 17:30 to 23:30 1st March 2005

✓ Coincident with low wind production

Reduction of consumption of large customers to agreed values and with specific warning times as a request from the SO or distribution companies



Load interruption contracts

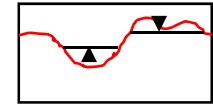


19th November 2007

✓ Load interruption orders type "C" from 17:40 to 20:40 hours and from 17:45 to 20:45 19-11-07

✓ Load interruption orders type "C" from 19:00 to 22:00 hours and from 19:05 to 22:05 19-11-07

Reduction of consumption of large customers to agreed values and with specific warning times as a request from the SO or distribution companies



Time of use tariffs

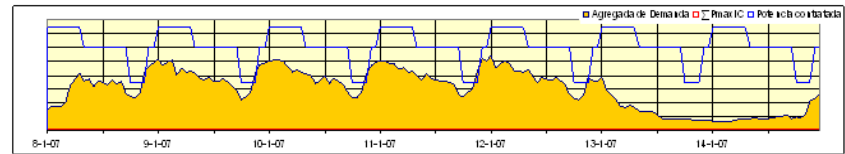
Regulated tariffs

Integral		
Modalidad	Aplicabilidad	Nº Periodos
Tipo 0	2.0	2
Tipo 1	Uso General (No 2.0)	
Tipo 2	Uso General (No 2.0)	2
Tipo 3	Uso General (No 2.0)	3
Tipo 4	Uso General (No 2.0)	3+Sabados y Festivos
Tipo 5	Uso general pero incompatible con complemento por estacionalidad y con R.X y 2.0	5
THP	AT ; P≥20 MW en algún periodo y P≥5MW en todos los periodos	7

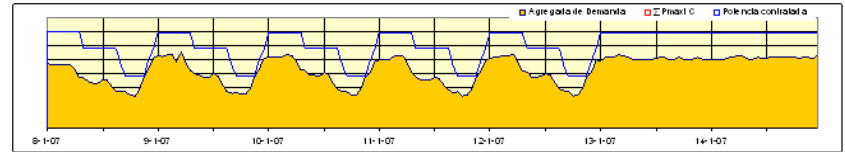
✓Tariff supplement for hourly discrimination

Large customers

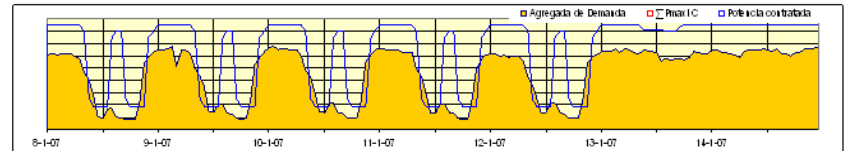
Type 3



Type 4



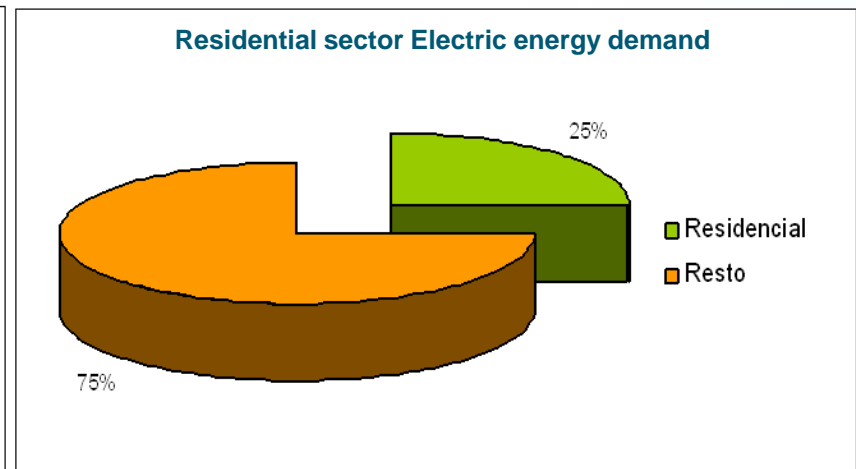
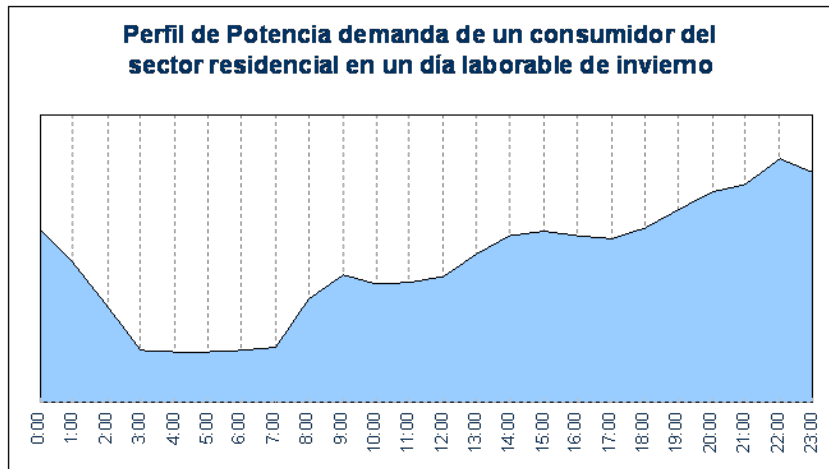
Type 5



Adjustment of load profile to the needs of the system increasing their consumption in valley hours and reducing their consumption in peak hours as a response to price signals



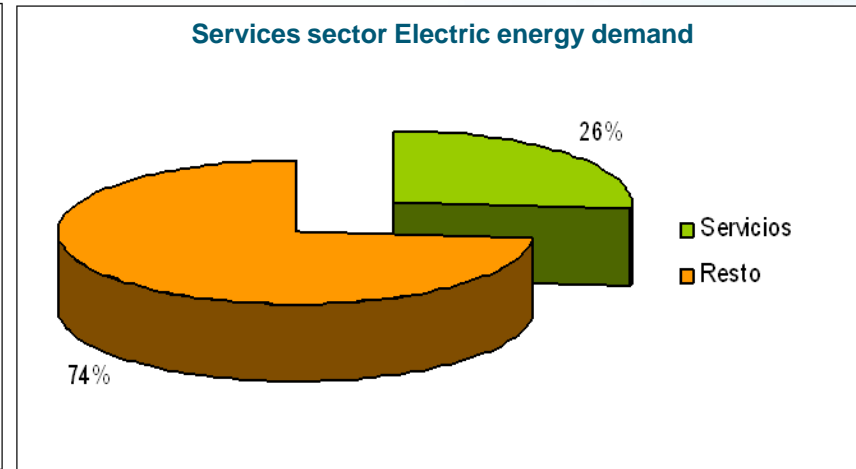
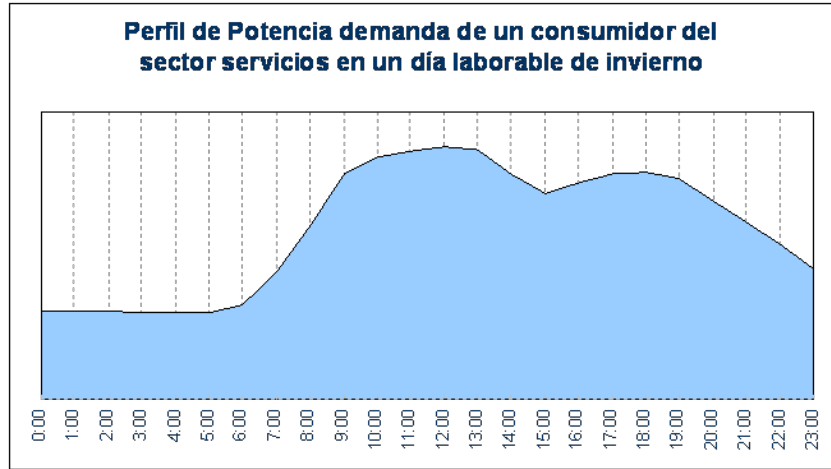
Expectations and future trends: Residential sector



- ❑ **Improvement of measurement and operation equipment:**
 Regulation contemplates providing residential customers with metering appliances integrated in a system with demand management capacity aimed at reducing load under specific circumstances.
- ❑ **Feed-back on consumption:**
 Development of European Directives: Final customers should get information about their energy consumption in order to allow them regulate their own energy consumption.



Expectations and future trends: Services



□ Energy saving:

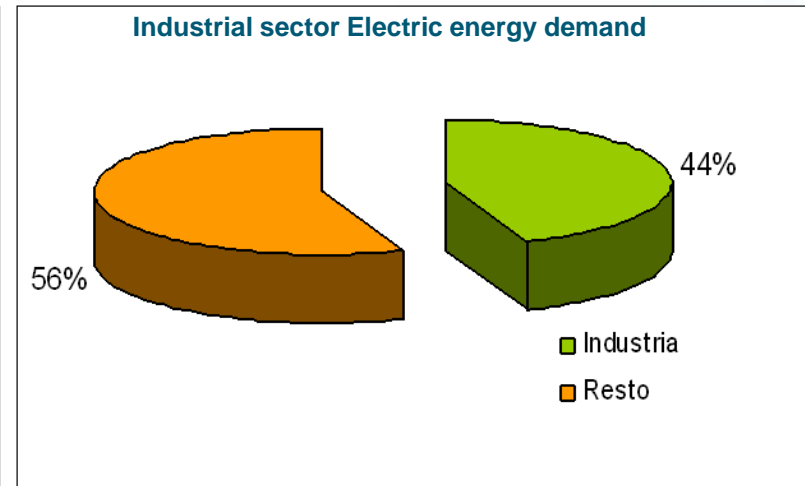
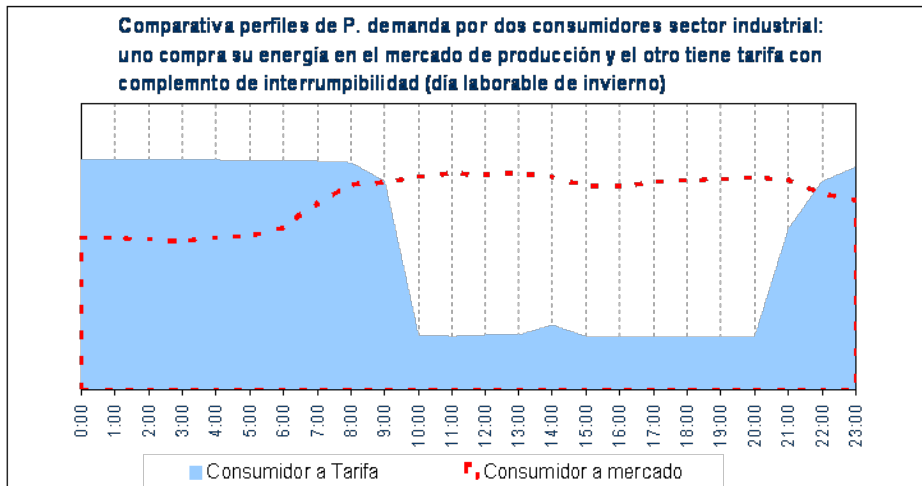
Energy saving requirements based on: limitation of electricity demand, performance of thermal installation, efficient lighting systems, solar minimal contribution to hot water and PV minimal contribution to electric energy.

□ Energy efficiency certificates:

Energy efficiency certificates for new buildings: Methodology taking into account final hourly energy consumption that will provide information of final use profiles.



Expectations and future trends: Industrial sector



- **Disappearance of regulated tariffs for high voltage customers in 1/07/2008:**
It may lead to the lost of modulation for the whole sector due to the lost of incentives introduced by tariff supplements (time of use tariffs).
- **Energy Audits:**
They will allow detecting potential in saving and best practices in the industrial sector.



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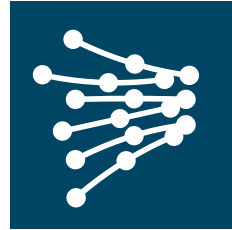


Conclusions

- ❑ Large tradition in large industrial customers providing operational services under regulated tariffs
- ❑ New challenge due to liberalization of supply side: evolution to new services into the market
- ❑ Existing measures: Interruptibility and modulation, both representing a big value for the electricity system and meaning an economical benefit for the industry.
- ❑ Need of introducing DSM in planning of the transmission system
- ❑ Residential customers need of information of consumption
- ❑ Large smart metering substitution plan



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