



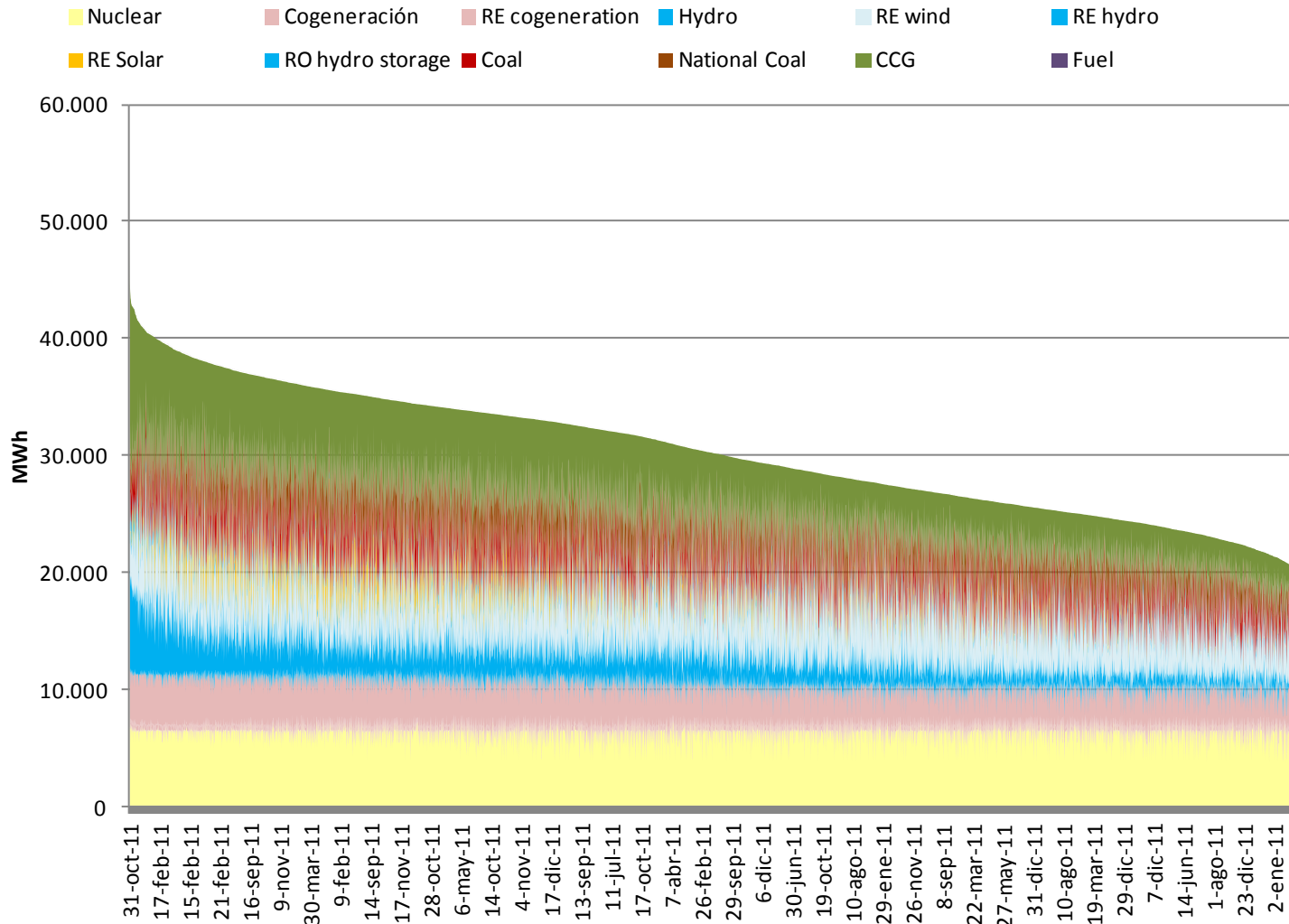
Spanish Capacity mechanism

Comision Nacional de Energia
currently:



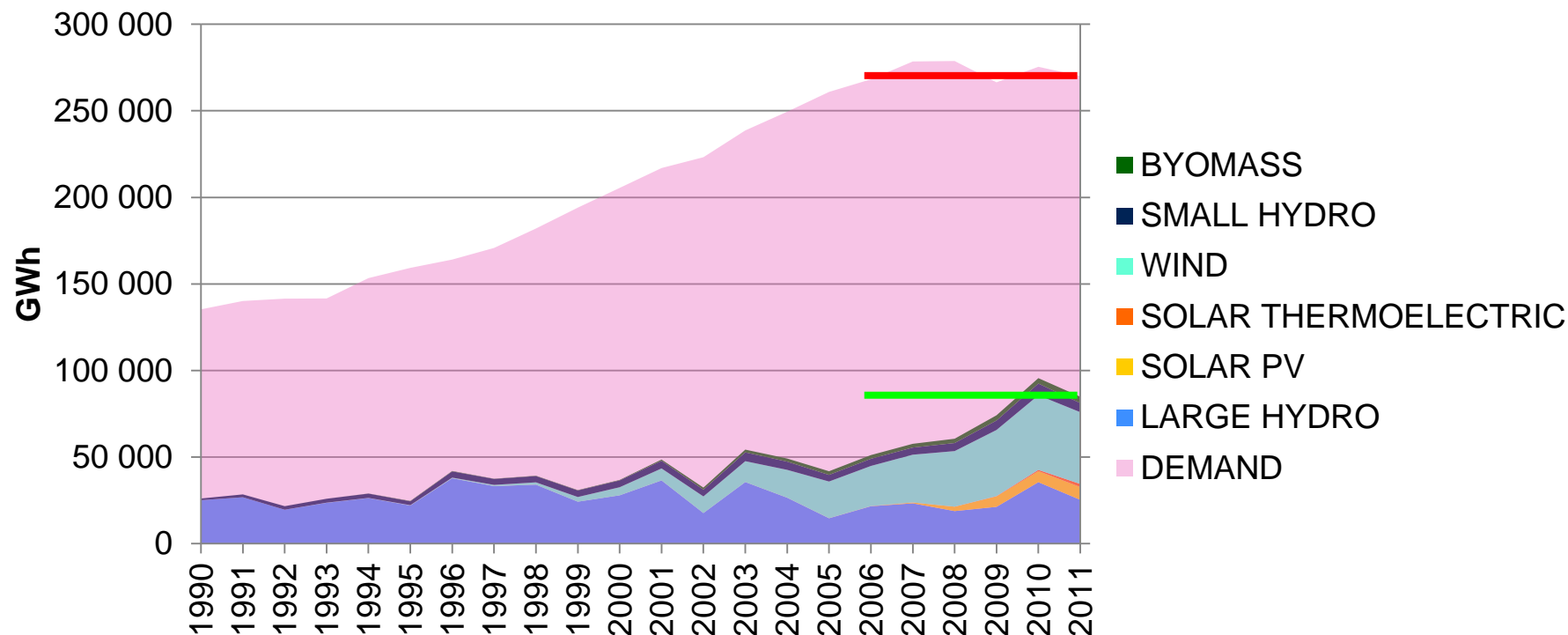
Escobar Rodriguez, Rodrigo

Monotonic function of load MW



Electricity demand and renewable penetration in Spain

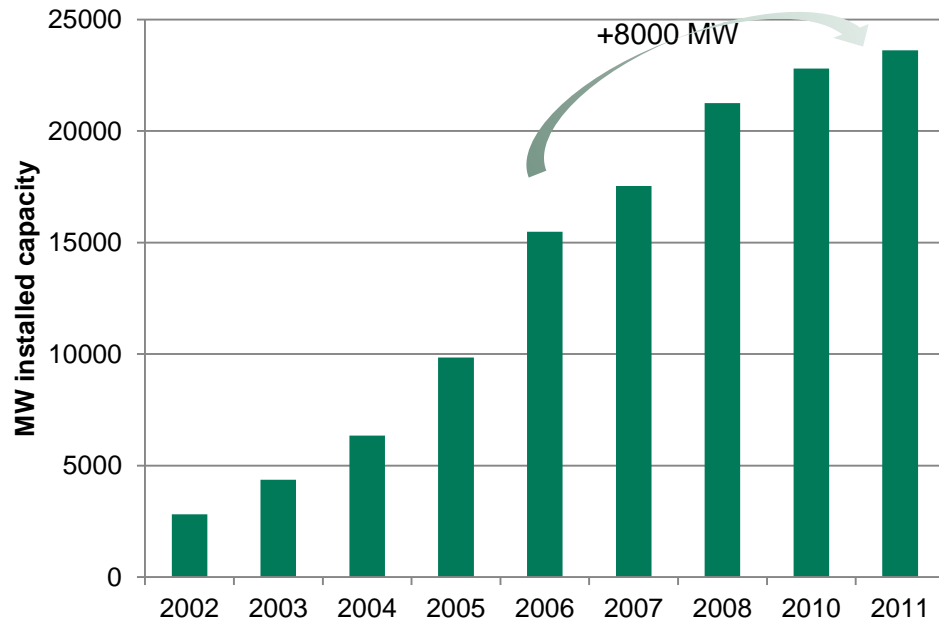
Spanish demand and renewable energy production evolution in Spain



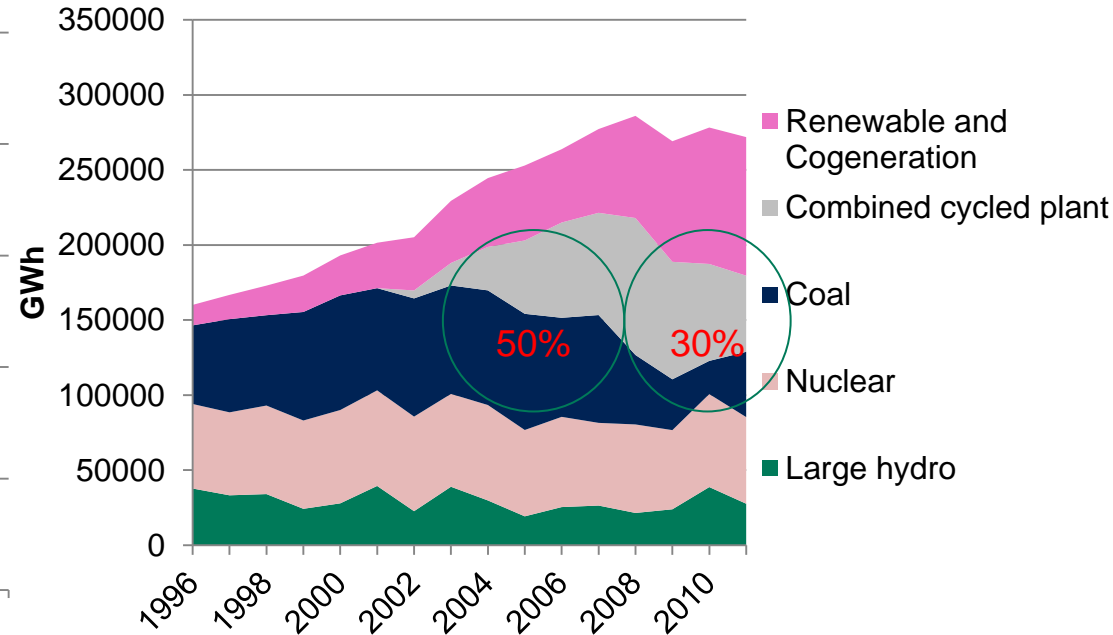
- The annual Spanish demand in 2011 was almost the same as in 2006
- In 2006 the share of renewable energy was 20% while in 2011 raised up to 32%

Installed Capacity of CCGTs and generation mix in Spain

Accumulated Installed capacity in Spain of CCGT

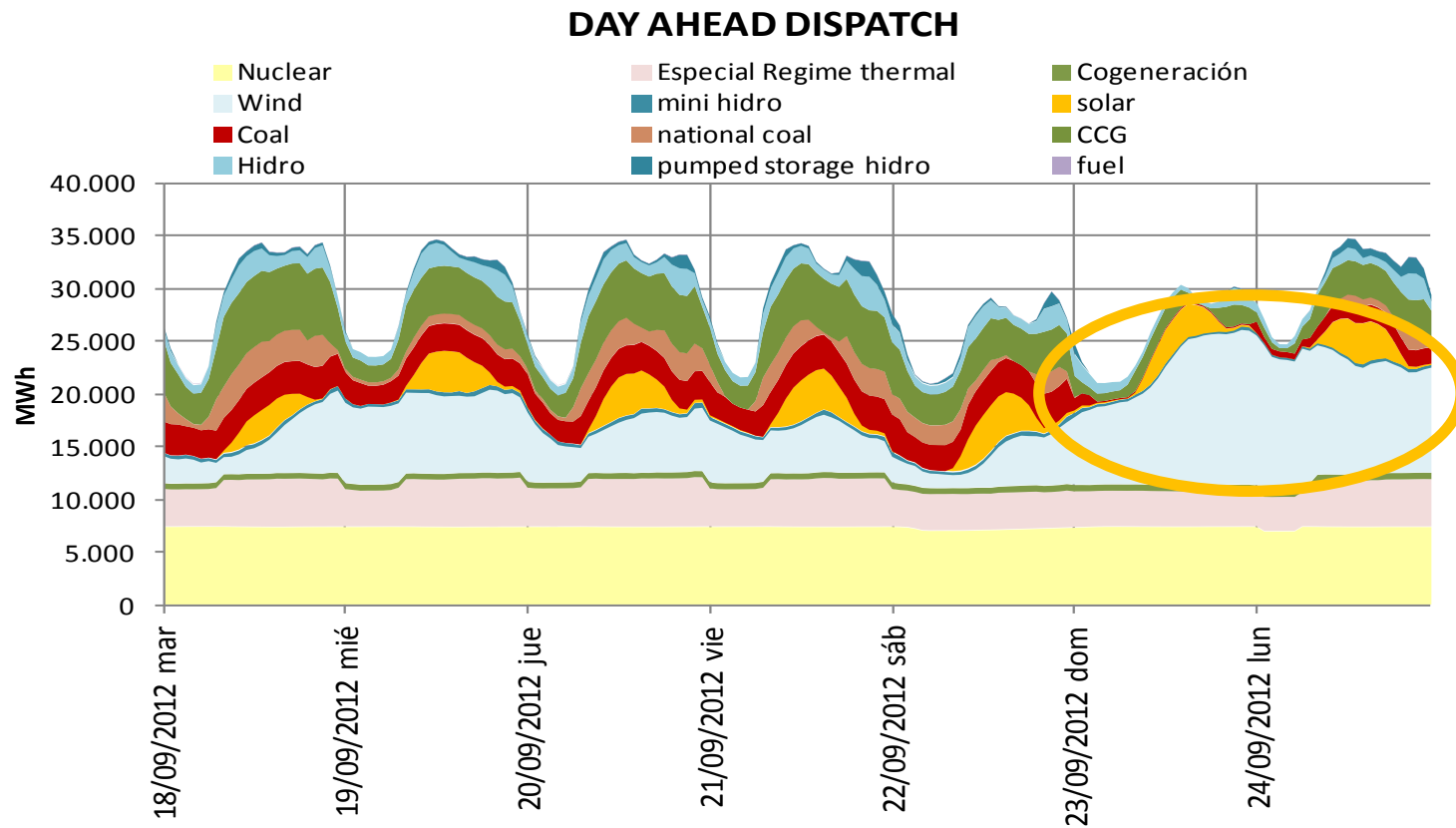


Coal and gas share in Spanish mix



- Since 2006, 8 GW of CCGT have been installed
- CCGT utilization factor decreased from 4,000 hours (2006) to 2,000 hours (2011)
- Coal and CCGT plants share in 2006 was 50%, while in 2011 was 30%

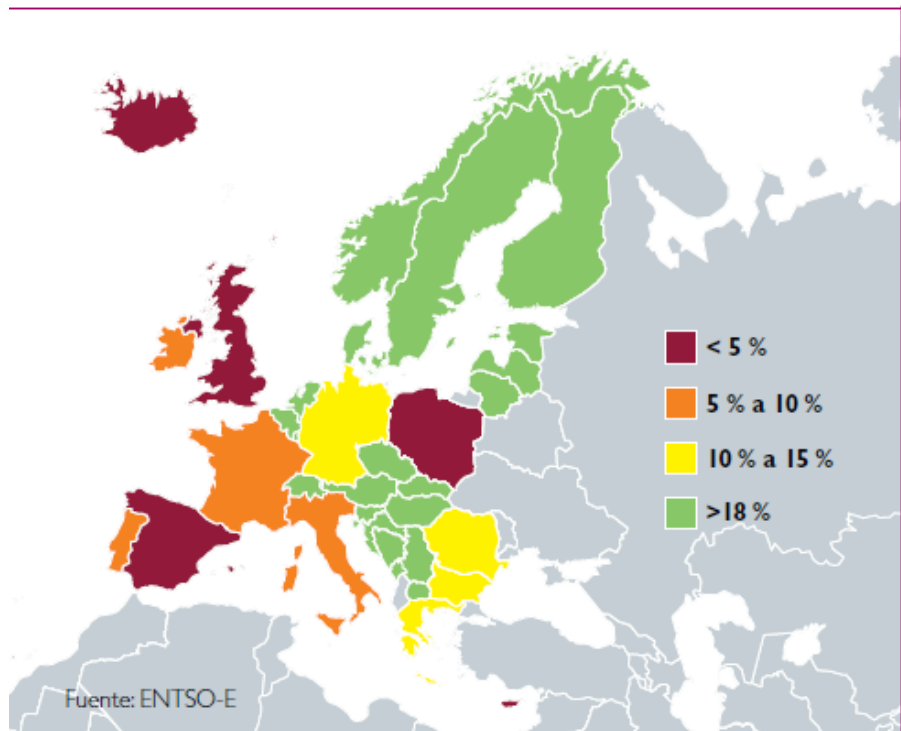
Leader in renewable integration



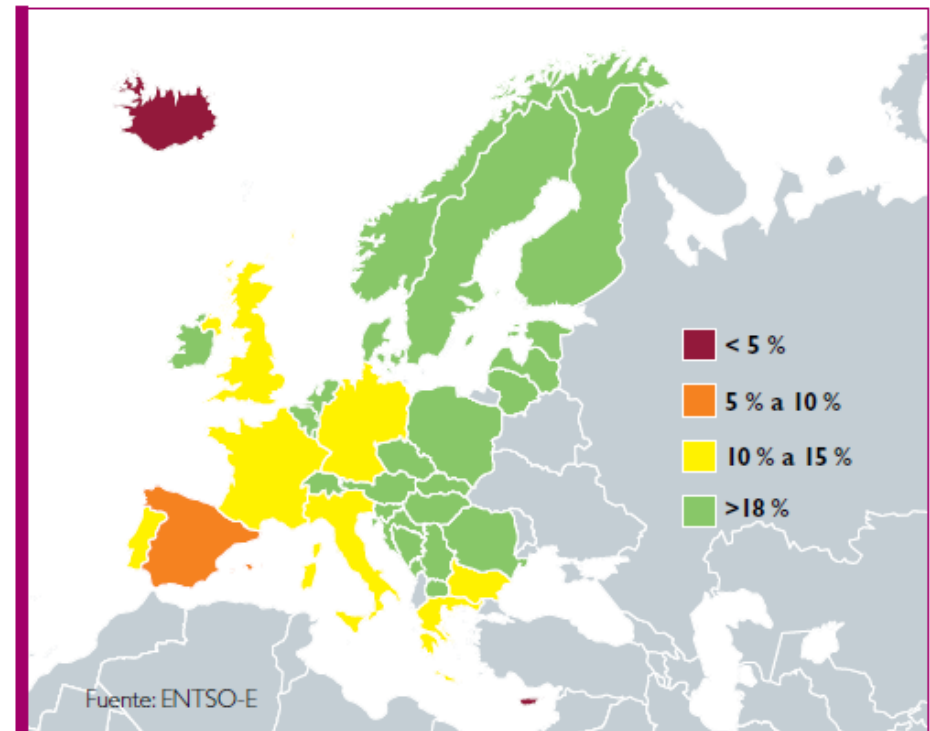
- The 24th September 2012 the wind production covered the **64% of demand**.
- the **highest hourly wind production** was reached the 18/04/2012 with **16.636 MWh**

But Spanish interconnection level is one of the lowest in Europe

Ratio de interconexión (2011)



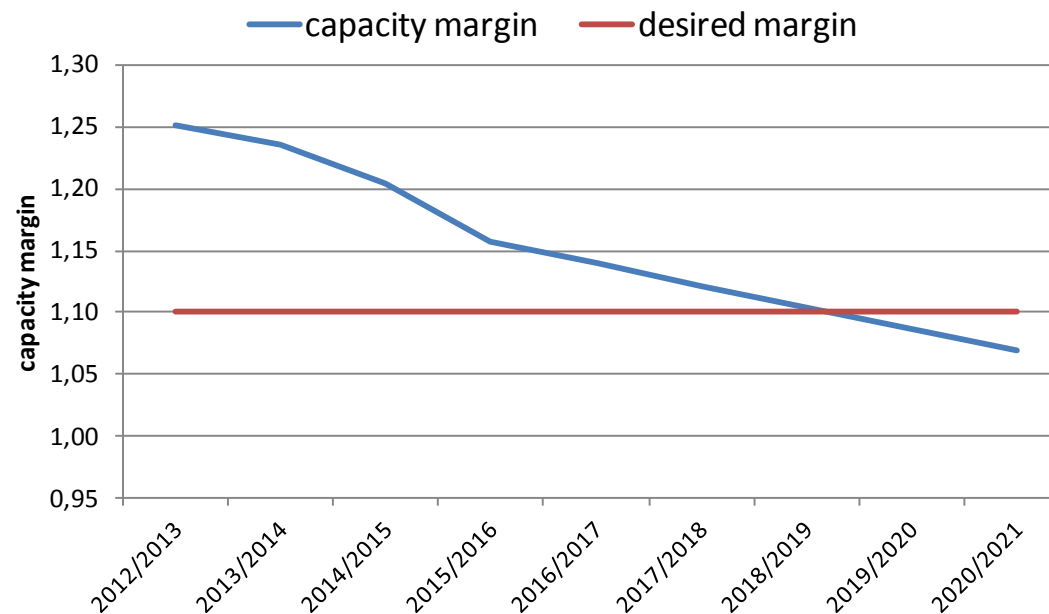
Ratio de interconexión (2020)



- The Spanish level of interconnection means a **3% of total production capacity**.
- It is very low compared to the **minimum level required in Europe of 10%**

Electricity context in Spain: Over-supply

- The continuous build-up of renewable joined to an increase in CCGT and the economic crisis, has contributed to reach an important reserve margin in Spain
- It is expected that no new capacity will be needed until 2019.
- **But the European emissions limits (IED) can push older coal plants to the closure, so new capacity could be needed in advance => Capacity payments can impact on the decision to be made by those coal plants if they are adapted to meet the new environmental requirements**



Basic description of the capacity mechanisms in Spain

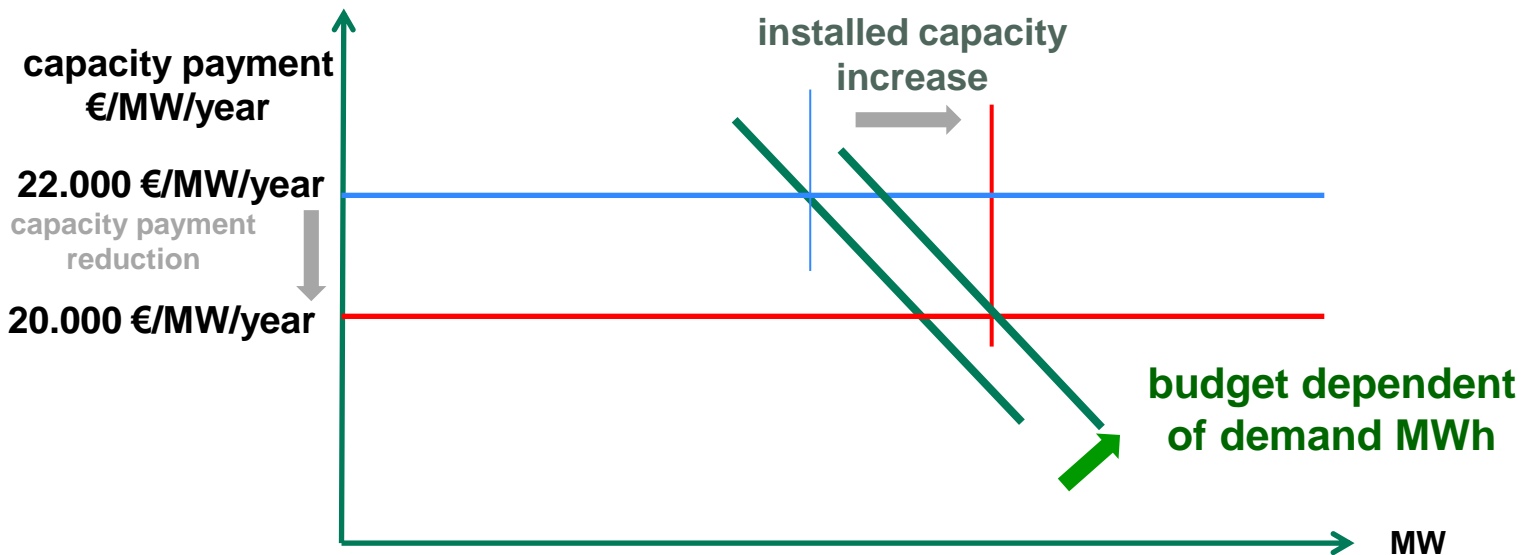
- **Aim: to ensure security of supply in electricity markets => decreasing volatility and high prices**
- Different time horizons for security of supply
 - ▶ *Long-term: investment in generation (years ahead)*
 - ▶ *Medium-term: availability and firmness of existing resources (based on one or more years commitment)*
 - ▶ *Short-term: operational reserves and real-time dispatch*
- In Spain, capacity mechanisms is focused on ensuring long and medium-term security of supply
- Operational security in the short-term is managed through intraday and balancing markets

Current capacity mechanisms in Spain

- Since liberalization, capacity payments have been included in the electricity market design
- Current legislation based on Order ITC/2794/2007 updated by ITC/3127/2011
 - ▶ **Long-term:** *Incentive payment for new thermal generators (CCGT and investment in coal plants) which started operation after liberalization in 1998*
 - ▶ **Medium-term:** *Availability payment differentiated by technologies: CCGT, Coal, Hydro, ... (transitional arrangement waiting for new legislation)*
- Ministry launched a draft based on CNE proposal:
 - ▶ *An scenario with high renewable share and little interconnection capacity makes necessary **to keep on considering a capacity mechanisms***
 - ▶ **Mothballing** *should be allowed in order to reach a more efficient scenario*

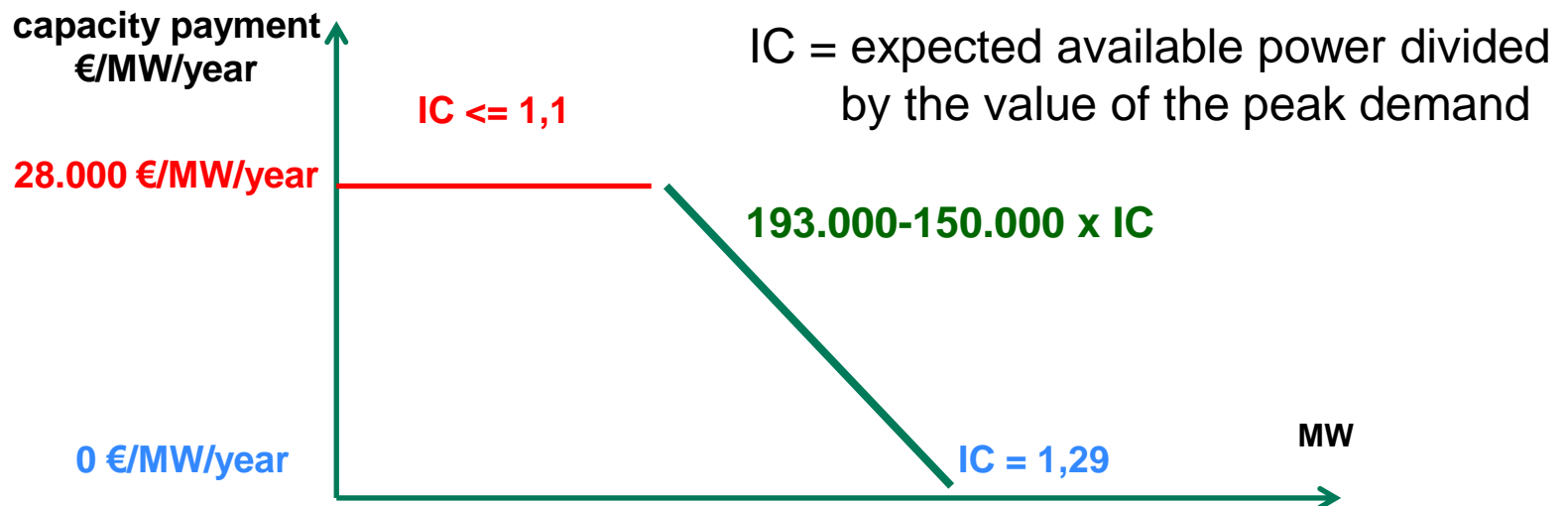
capacity payments up to 2007 (Ley 54/1997 - RD 2019/1997) CNE

- capacity payments are financed by demand
- it works as a **budget of 4,808 €/kWh * total demand**, to be shared among **available power** according to RD 6/2002 (initially 7,81 €/MWh OM 17/12/1998 and 6,912 €/kWh RD 2066/1999)
- based of marginal technology not recovered fixed costs.
- this shared budget **actually acts as a long term auction with elastic demand curve**:



capacity payments > 2007 (ITC/2794/2007)

- **Only for the first 10 years of operation** of the power plants: **CCG plants** (and a few hydro over 50 MW) are now receiving this incentive
- **Special regime** power plants are **excluded** (cogeneration, photovoltaic, wind,...)
- ***proved availability in peak hours***
- *Existing plants over 10 years undergo significant refurbishments (sulfur removal plants: 8.750 €/MW/year)*
- **Existing plants under 10 years keeps: 20.000 €/MW/year**
- **For new plants:** payment according to coverage index, but since coverage index never went into practice, new plants received also 20.000€/Mw/year



capacity payments > 2011 (ITC/3127/2011)

● investment payment

- ▶ *fixed annual payment (€/MW) for new plants during its first 10 years*
- ▶ *updated to 26.000 €/MW/year in 2011, and 23.400 €/MW/year in 2012 (Real Decreto-ley 13/2012)*
- ▶ *reduced to 10.000 in 2013 and extended to first 20 years (Real Decreto-ley 9/2013)*
- ▶ *No need to prove availability in peak hours*

● availability payment

- ▶ *payment: 5.150 €/MW/year * availability index*
 - COAL 0,912
 - CCG 0,913
 - FUEL 0,877
 - HYDRO 0,237
- ▶ *power plants have to prove **availability in predefined peak hours (wider range)***

New proposal of the capacity mechanisms

- The philosophy of two separated products is kept:
 - ➔ **Long-term:** Incentive for new generation investment: Only if wholesale prices are not enough to encourage new investments and operator detects need for new power
 - ➔ **Medium-term:** Availability incentive for existing flexible and back up generators (CCGT, Coal, Hydro (?)): 1-year commitment
 - These technologies could have problems to offset their fixed costs. So if mothballing was permitted, security of supply could be affected
- Setting payments and required quantities for providing the product
 - ➔ **Criteria:** Market mechanisms when there is competitive context, if not, a regulated payment
 - Incentive for new generation investment → organized auction
 - Availability incentive → concern about high concentrated scenery → regulated payment

New proposal of the capacity mechanisms

● Investment incentive

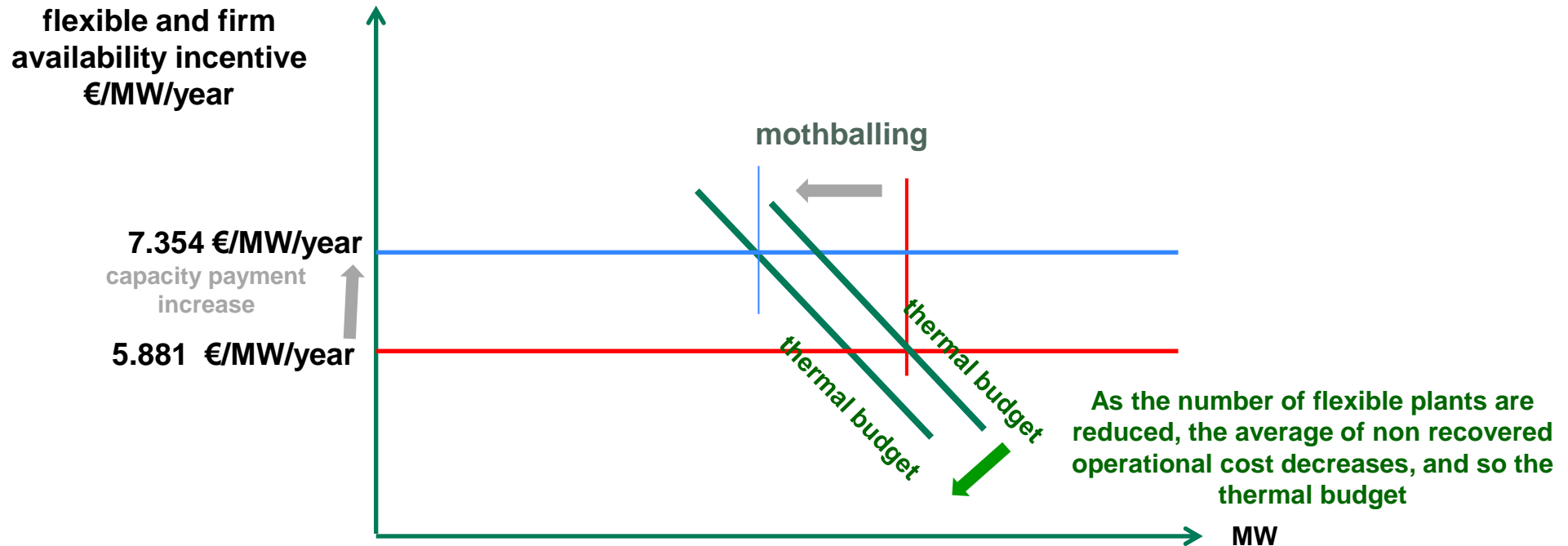
- ▶ *Only for first 10 years*
 - ➔ Continuous system for **existing plants under 20 years**->20.000 €/MW/year and significant refurbishments under 0 years : 8750 €/MW/year
- ▶ ***New plants and existing plants over 10 years that need new significant refurbishments : auctions*** when system operator detects need for new power
- ▶ *No need to prove availability in peak hour*

● Manageable power availability incentive

- ▶ *Only for **flexible and firm power required by the system to cope with renewable and demand variations: plants offering replacement reserve.***
- ▶ *Estimation oriented to **provide incentive to be available when market incomes don't provide these incentives***
- ▶ ***Thermal budget:*** requirement of flexible power * estimation of non recovered operational costs
 - ➔ **Hourly distribution** according to hourly thermal generation requirement
 - ➔ To be **shared among available thermal power** in each hour.
 - ➔ Same level of retribution to hydro according to utilization factor
- ▶ *Those power plants that don't find it enough may **ask for mothballing***

New proposal of the capacity mechanisms

through mothballing availability incentive adapts to real needs



New proposal of the capacity mechanisms

- **Why not a direct auction for availability incentive?**
 - ▶ *When **capacity margin approaches to the required reserve** there may be easily **agents which can exercise market power: pivotal**.*
 - ▶ *On the other way, when system face overcapacity, auction **may lead to zero price** (only the power plants with opportunity costs close to zero are required). This would mean a problem to those generators which require those payments in order not to close their thermal plants*



Muchas gracias

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