

The economics of gas and coal-fired plants – signs of market failure?

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Forward Looking Statement

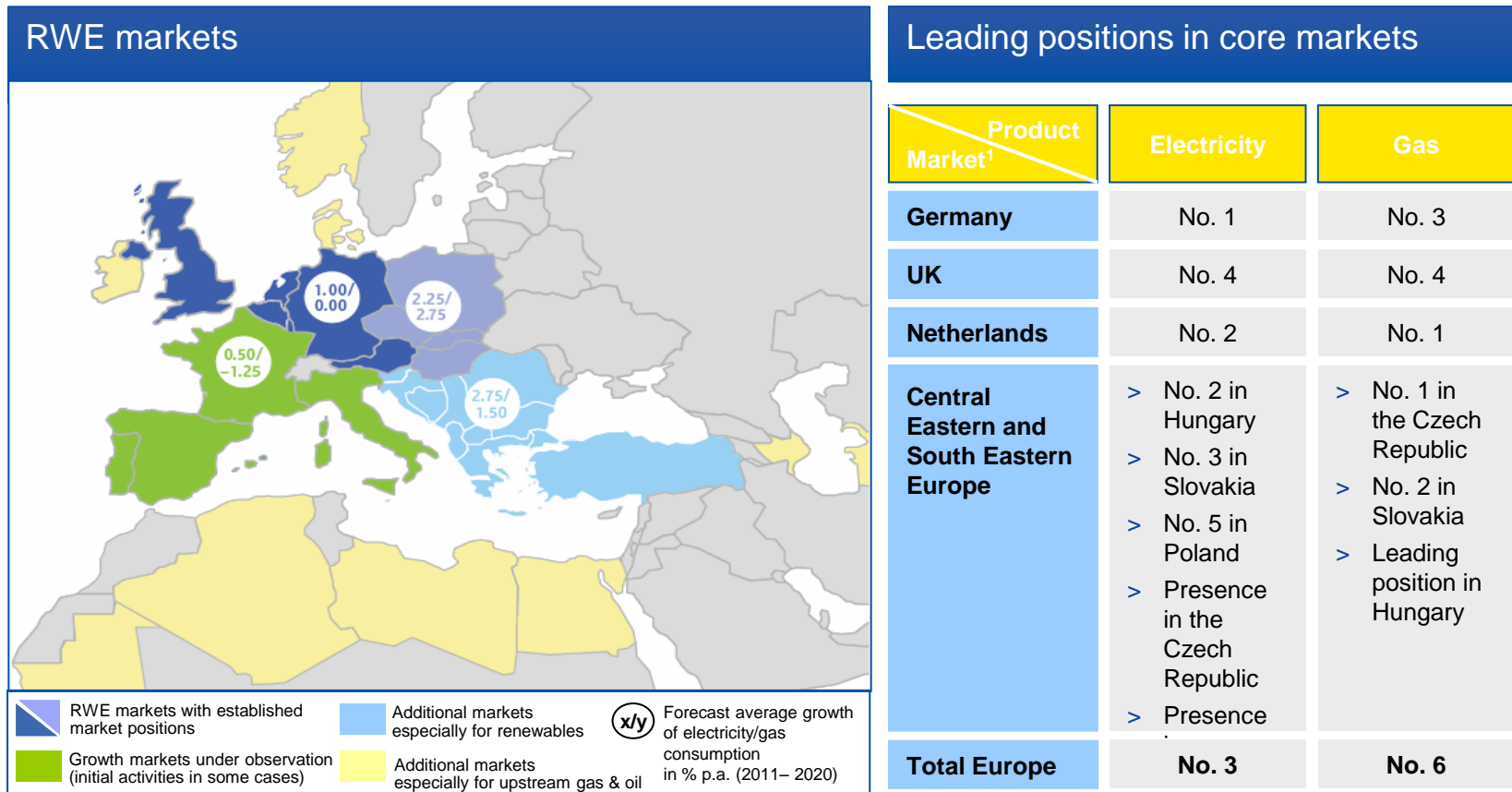
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- Statements of plans or objectives for future operations or of future competitive position,
- Expectations of future economic performance; and
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RWE today: a leading European utility

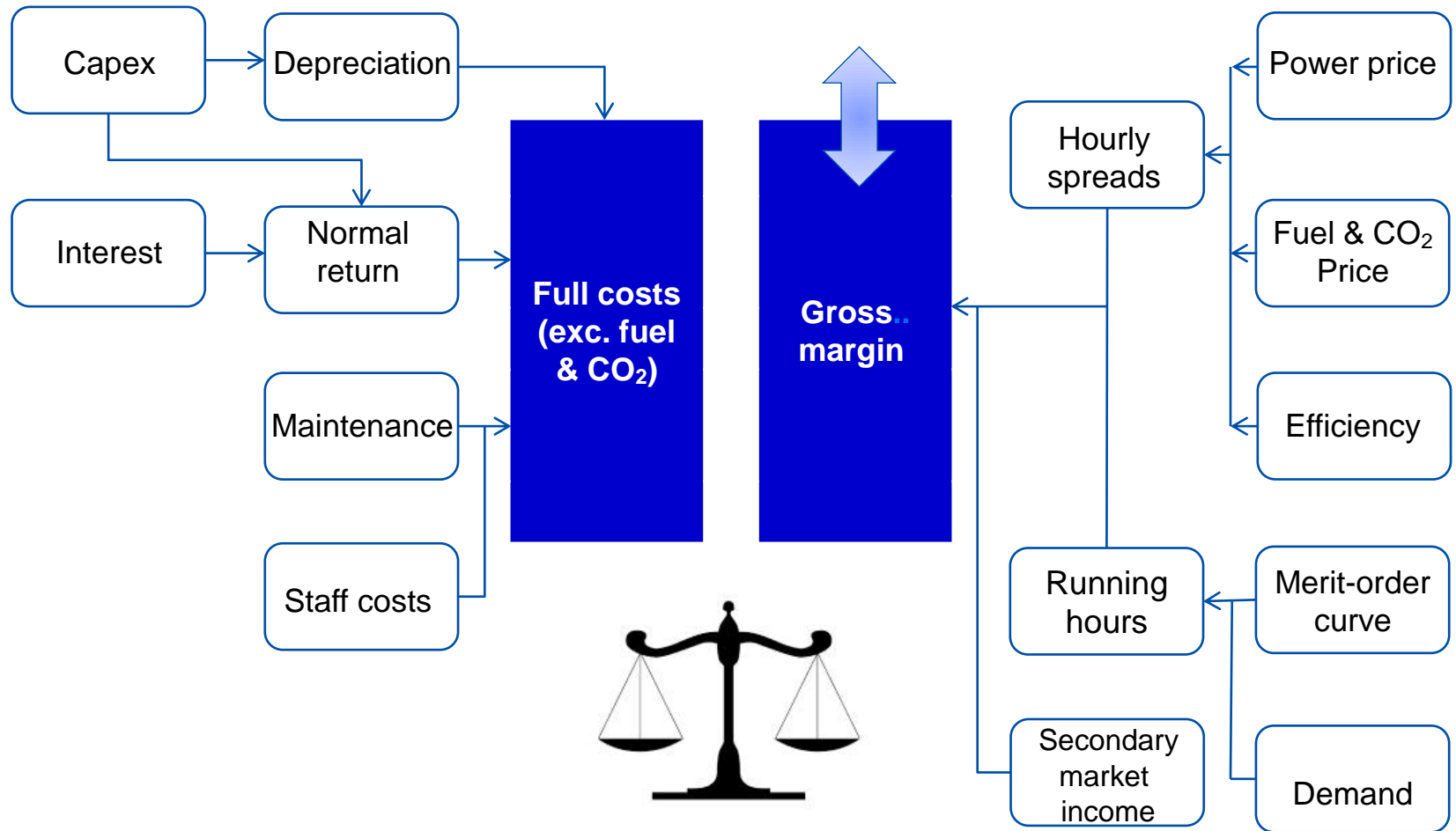


➤ RWE has leading positions in two of Europe's largest markets as well as in fast growing SEE/CEE markets and own a large upstream position in both Europe and North Africa.

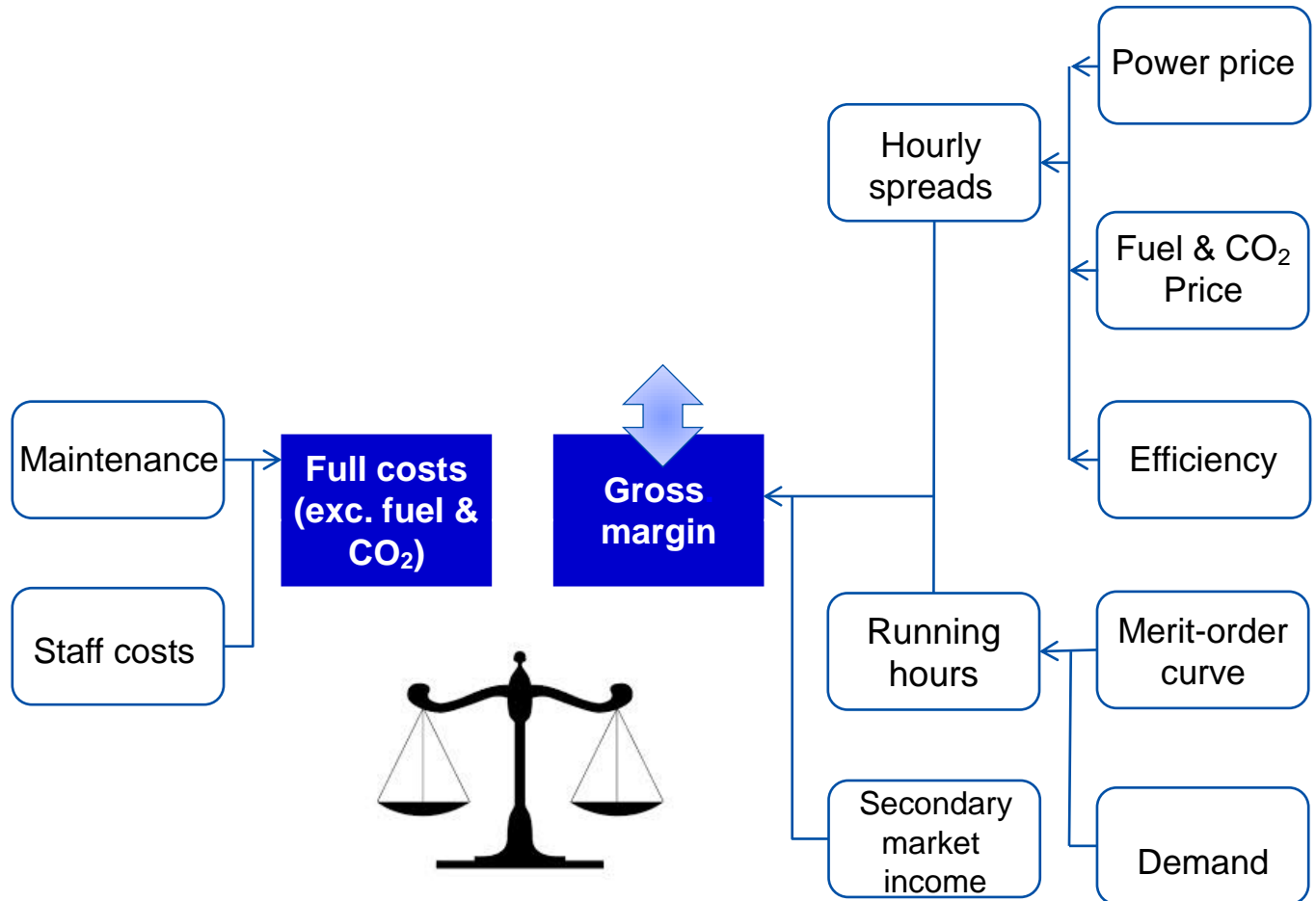
Agenda

- 1. Definition and determinants of „economics“ and key input parameters**
2. Power prices set through merit-order curve
3. Performance of plants and cost recovery

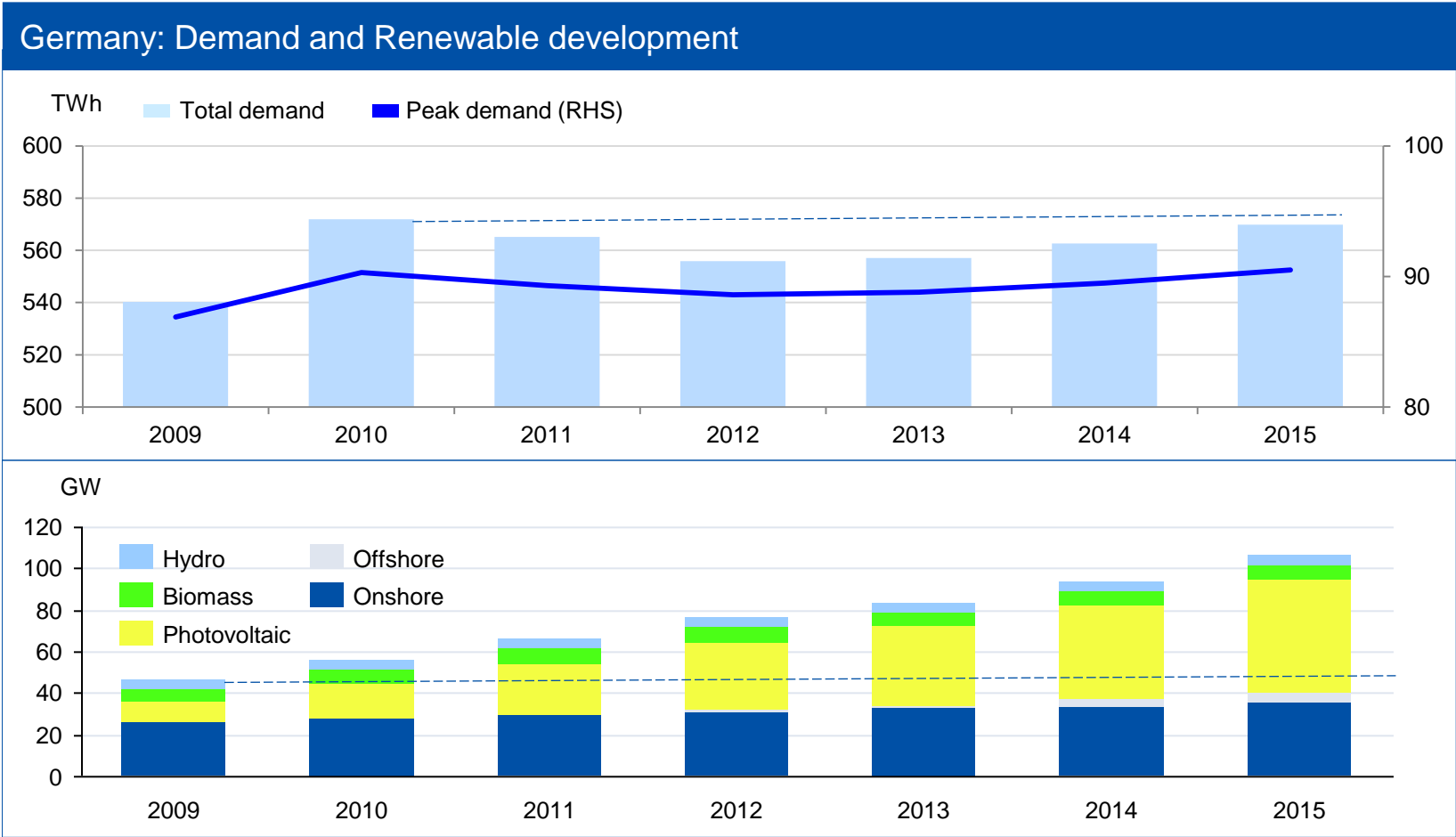
Economics – extent to which relevant costs are recovered: new plants



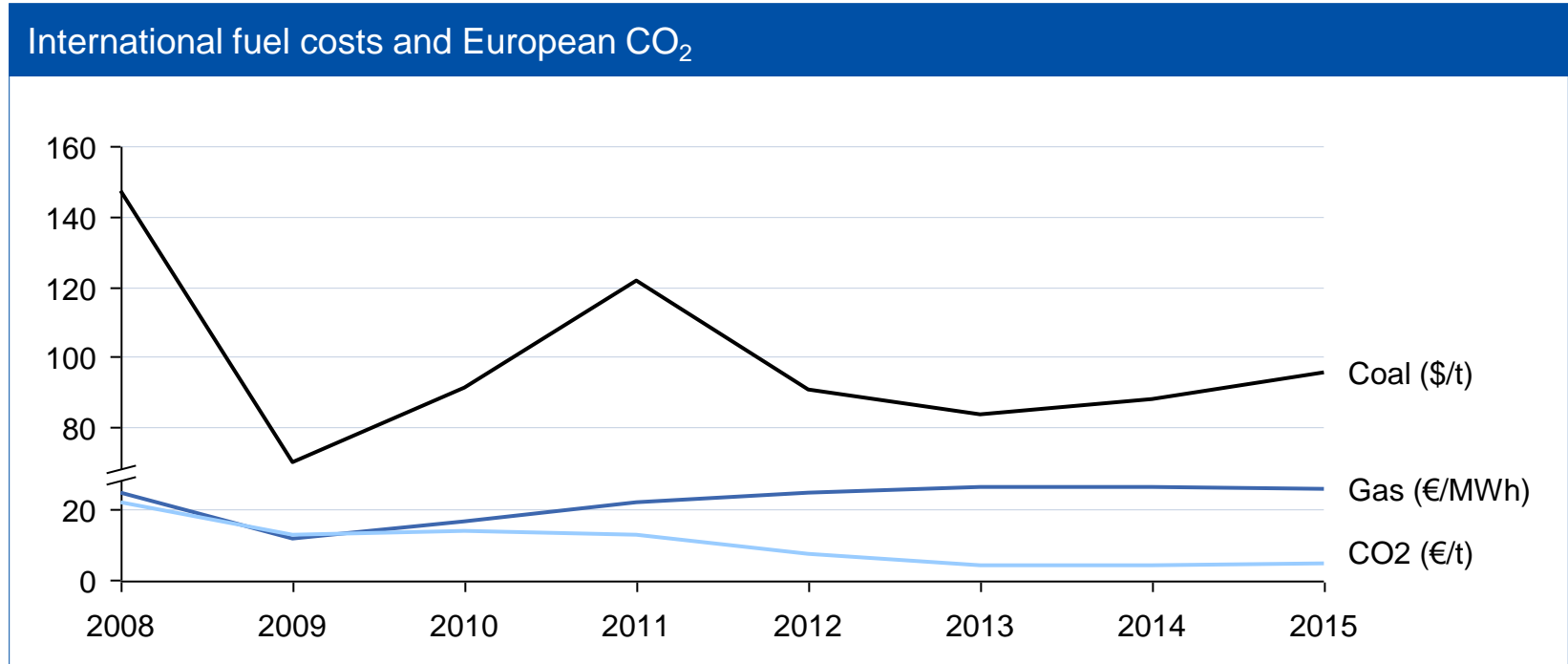
Economics – extent to which relevant costs are recovered: existing plants



Renewables capacity grows much more quickly than total or peak demand

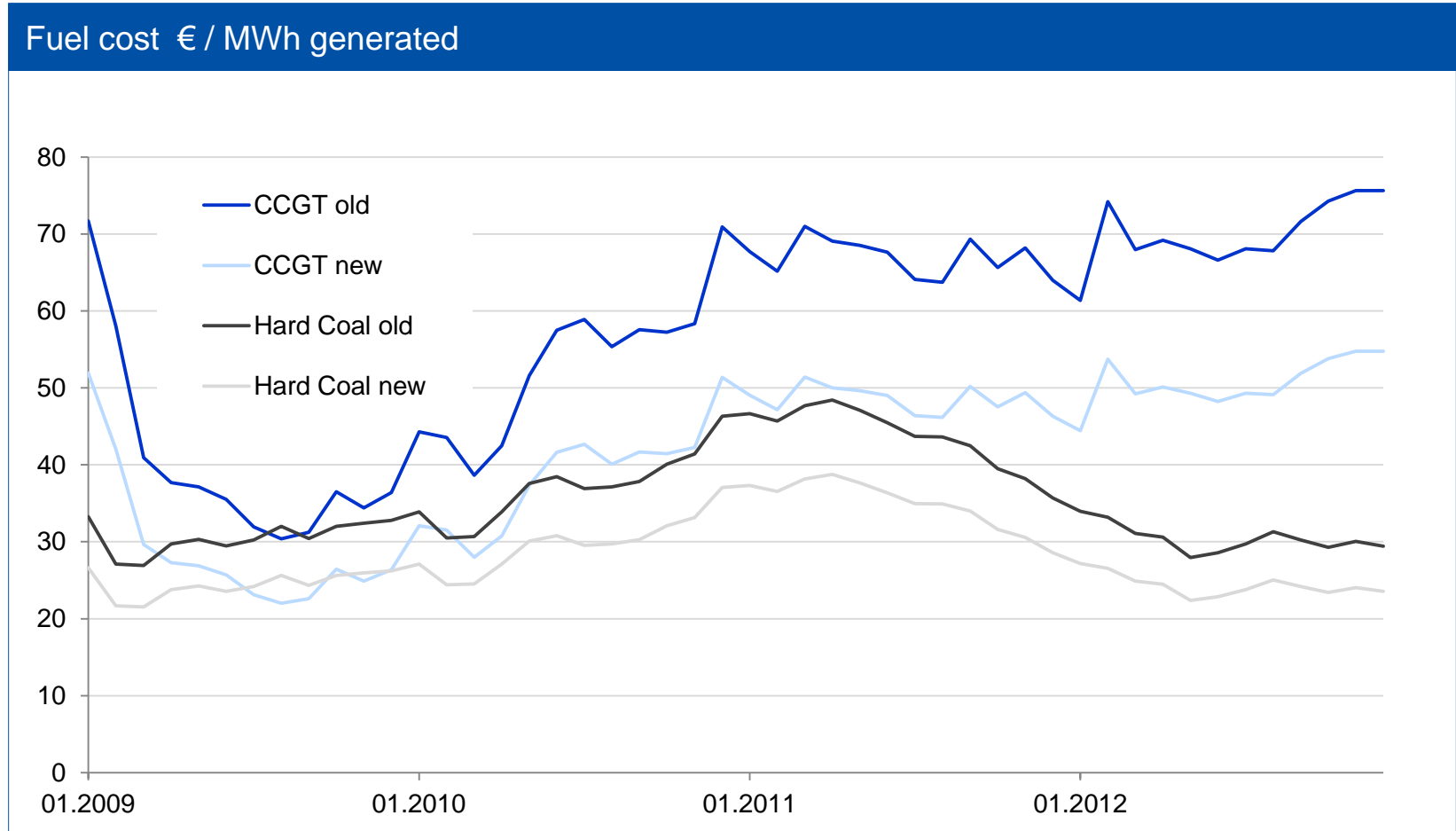


Import coal price has fallen in relation to gas, whilst CO₂ remains continually low



- > **Coal:** Weaker global, especially Chinese demand eroded prices in 2012/13. With a cautious demand recovery the market expects a moderate upward movement
- > **Gas:** Strong Asian prices diverting LNG from Europe, a cautious demand recovery and limited pipeline supplies pushes prices 2012/13 higher. Midterm new LNG supplies to Asia plus some US LNG will end LNG diversions leading to more comfortable supplies and moderate European price levels

Fuel costs per MWh generated by plant type – rising gap between gas and coal (especially older plant)



Assumed full load hours:

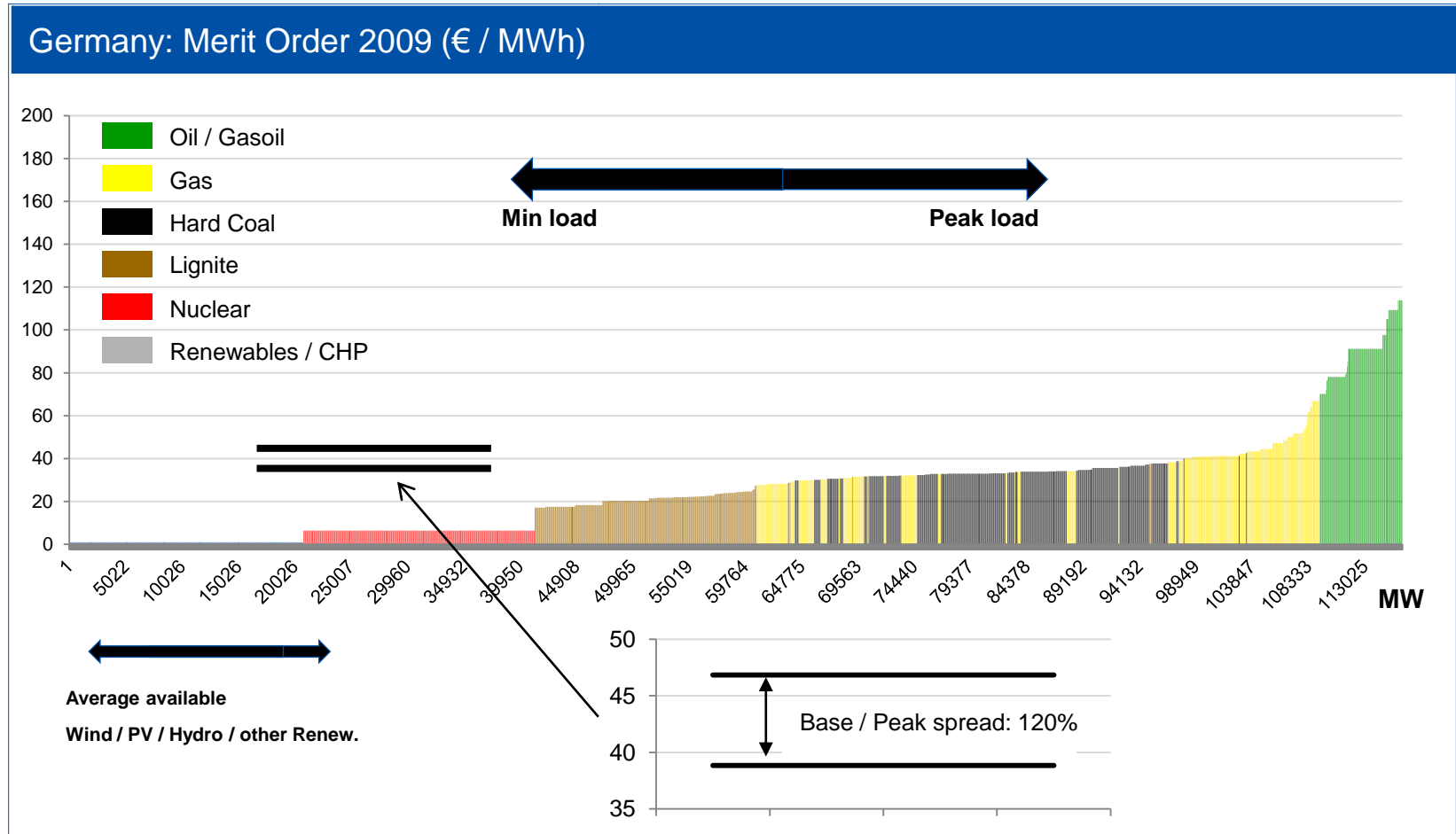
HC old (36% - 3000Flh), HC new (46% - 5000Flh)

CCGT old (42% - 1000 Flh), CCGT new (58% - 1500 Flh)

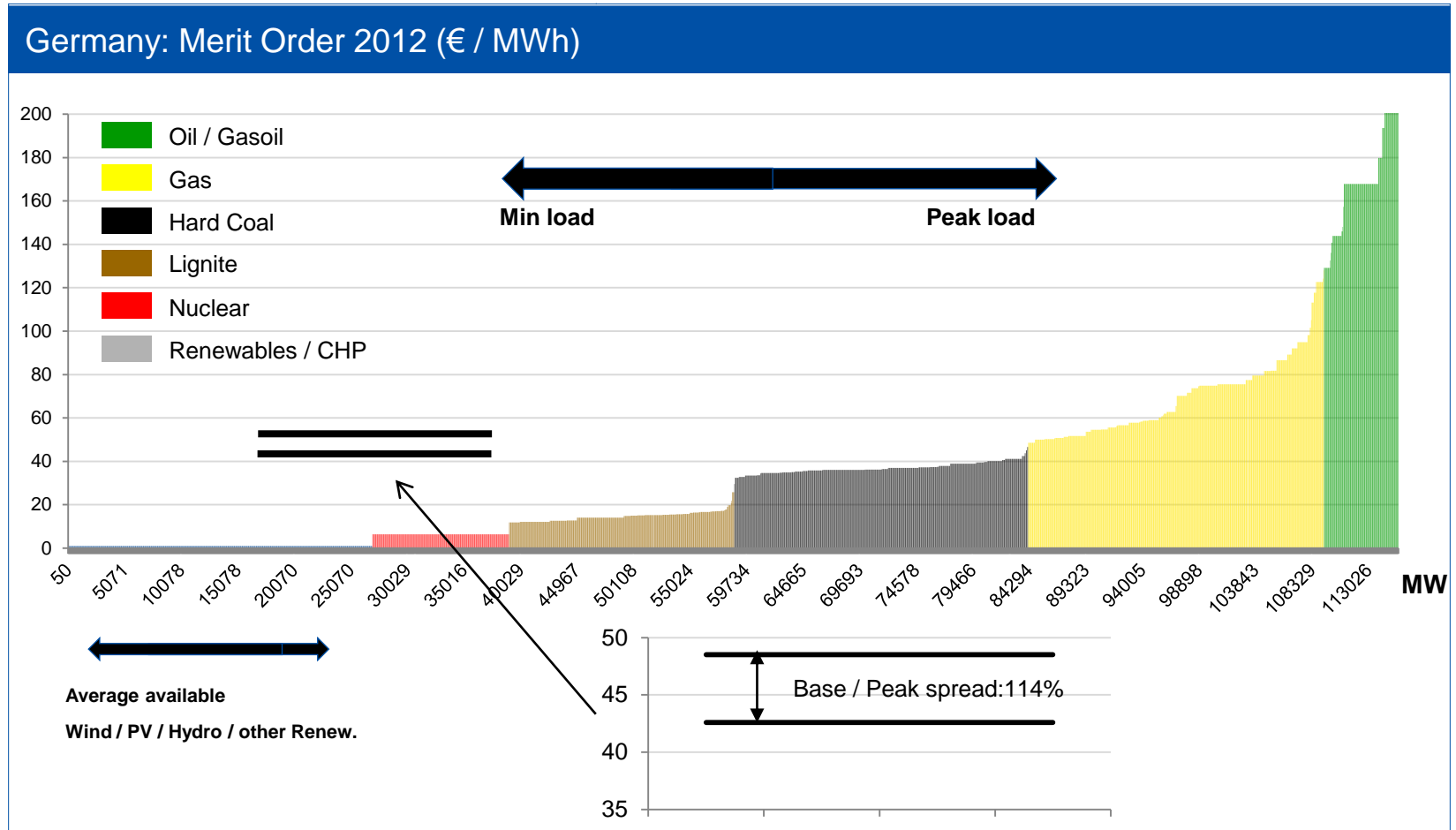
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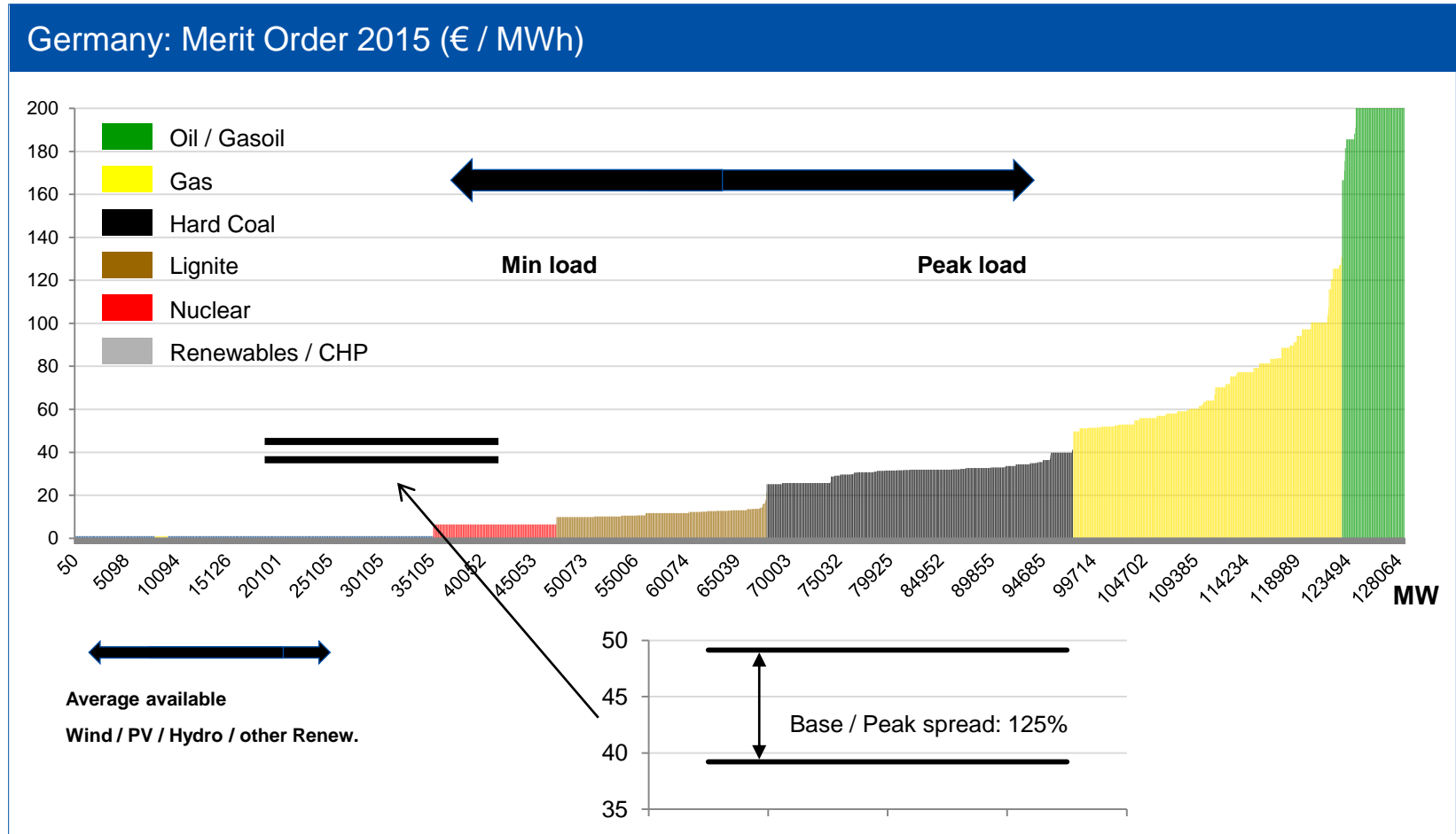
Merit-Order 2009: new gas and hard coal plants competing strongly



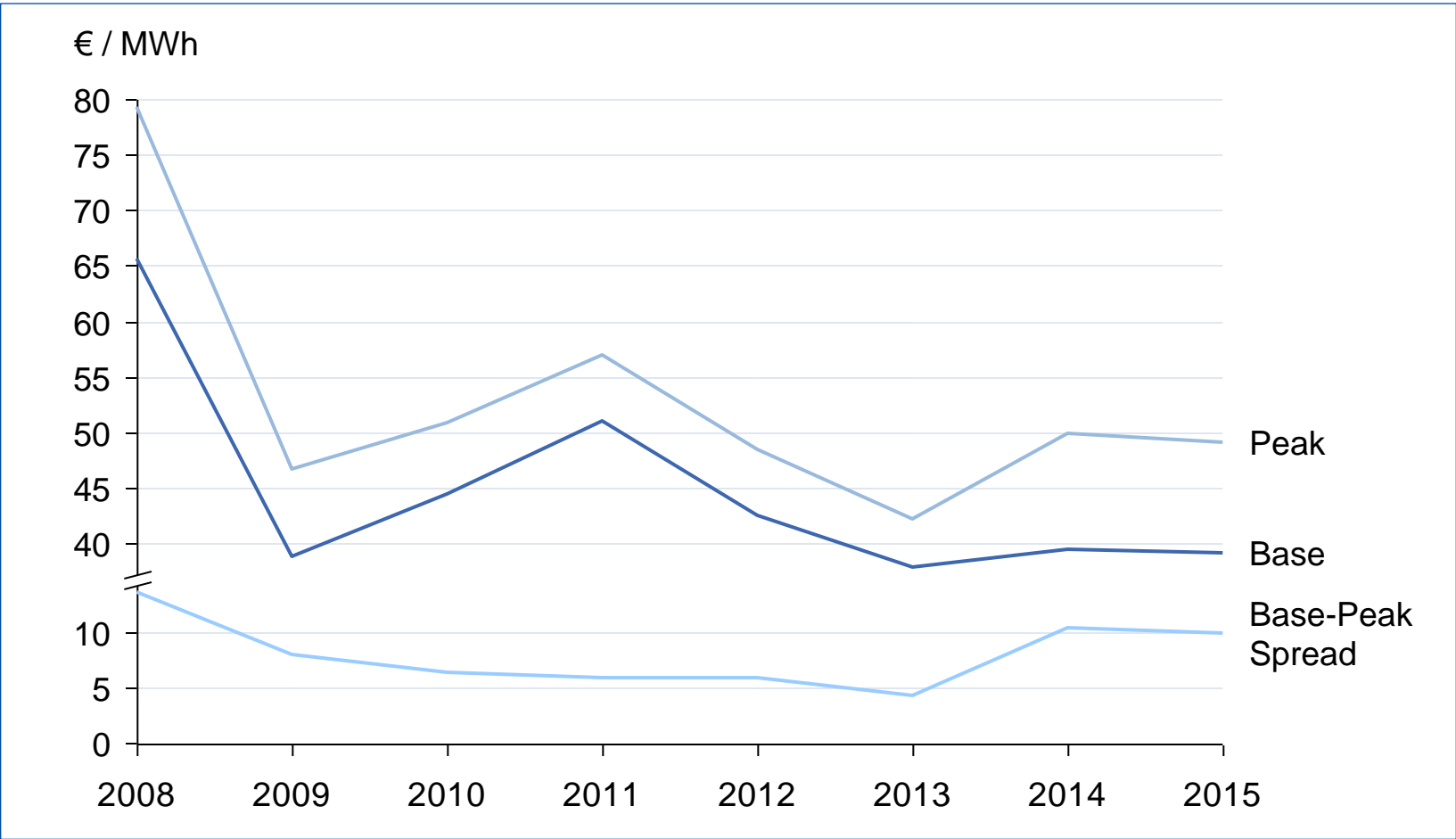
Merit Order 2012: hard coal plants with high utilisation but gas weakening



Merit Order 2015: hard coal plants still active but gas plants only have low utilisation



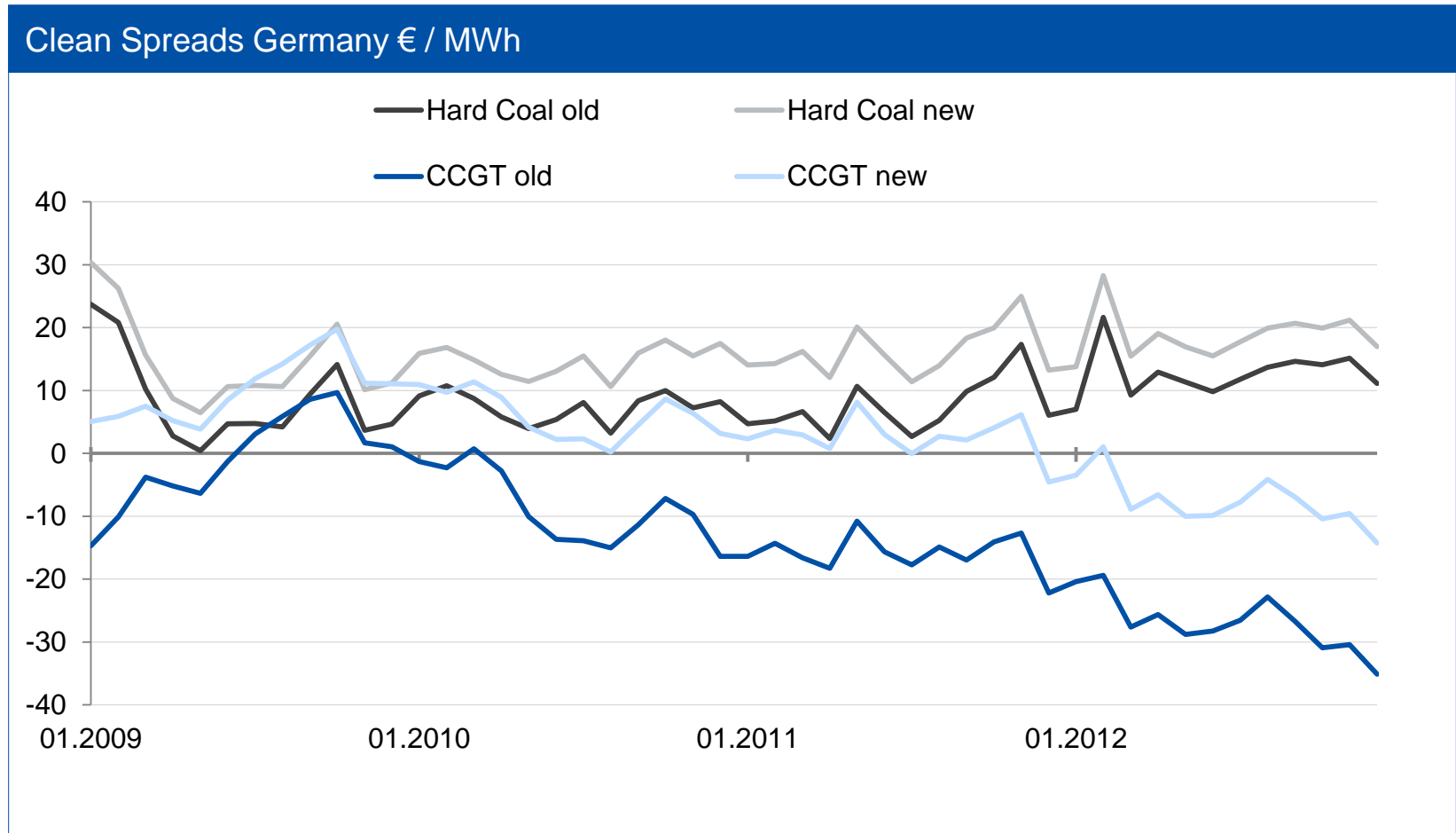
Base and peak power prices – little sign of increase despite planned closures and capacity tightness



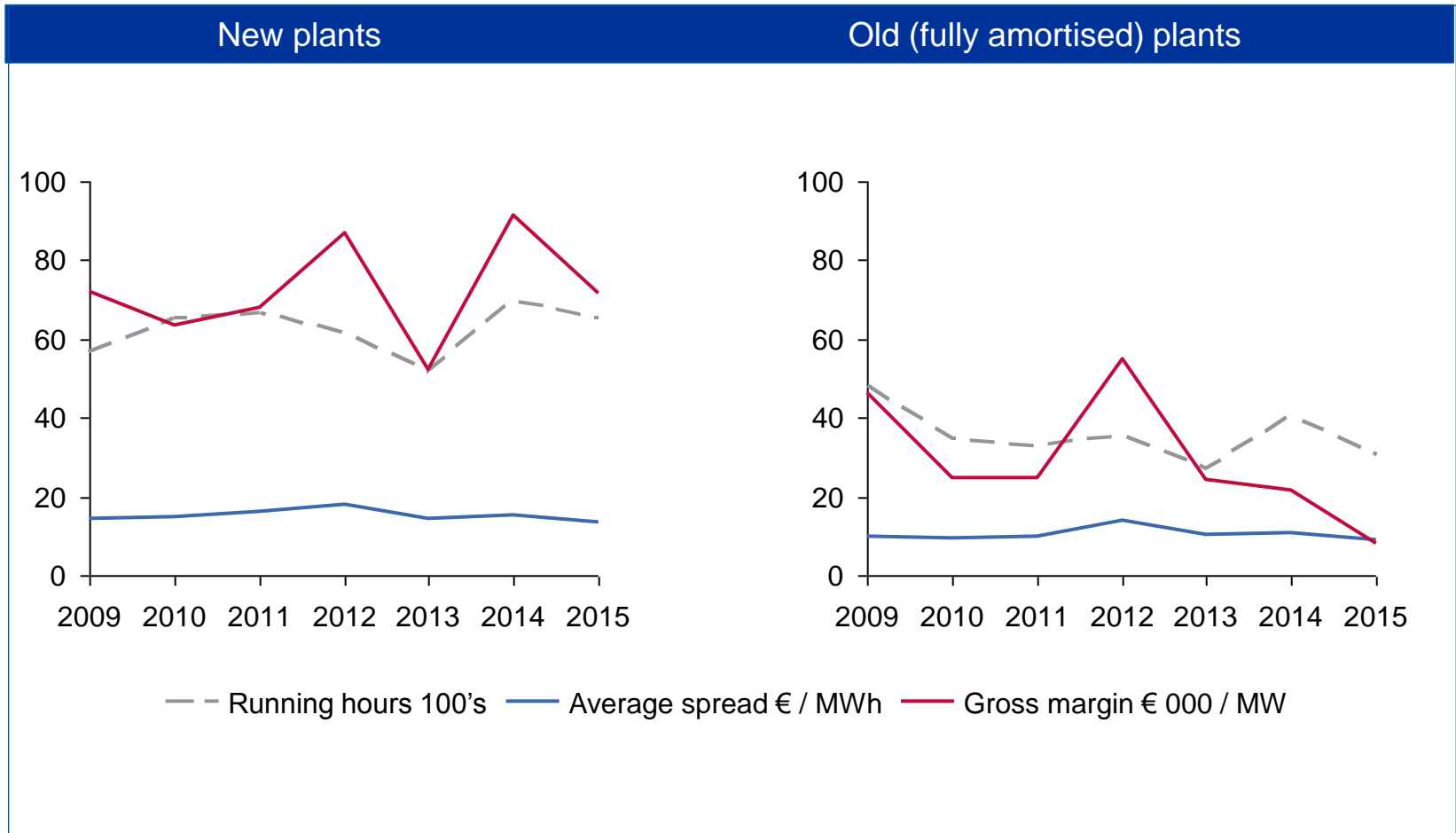
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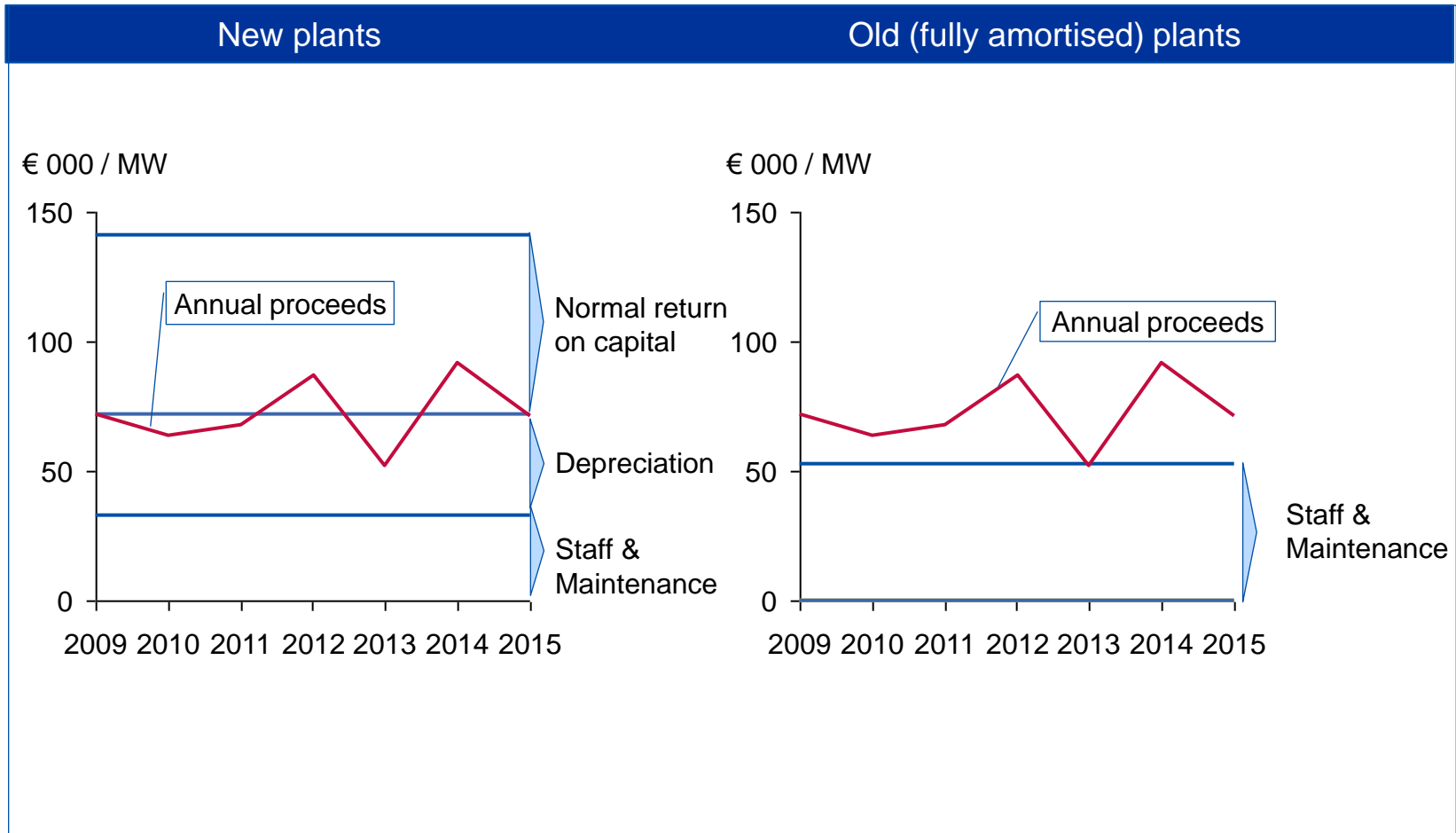
Clean spreads – coal still positive whilst gas increasingly below zero



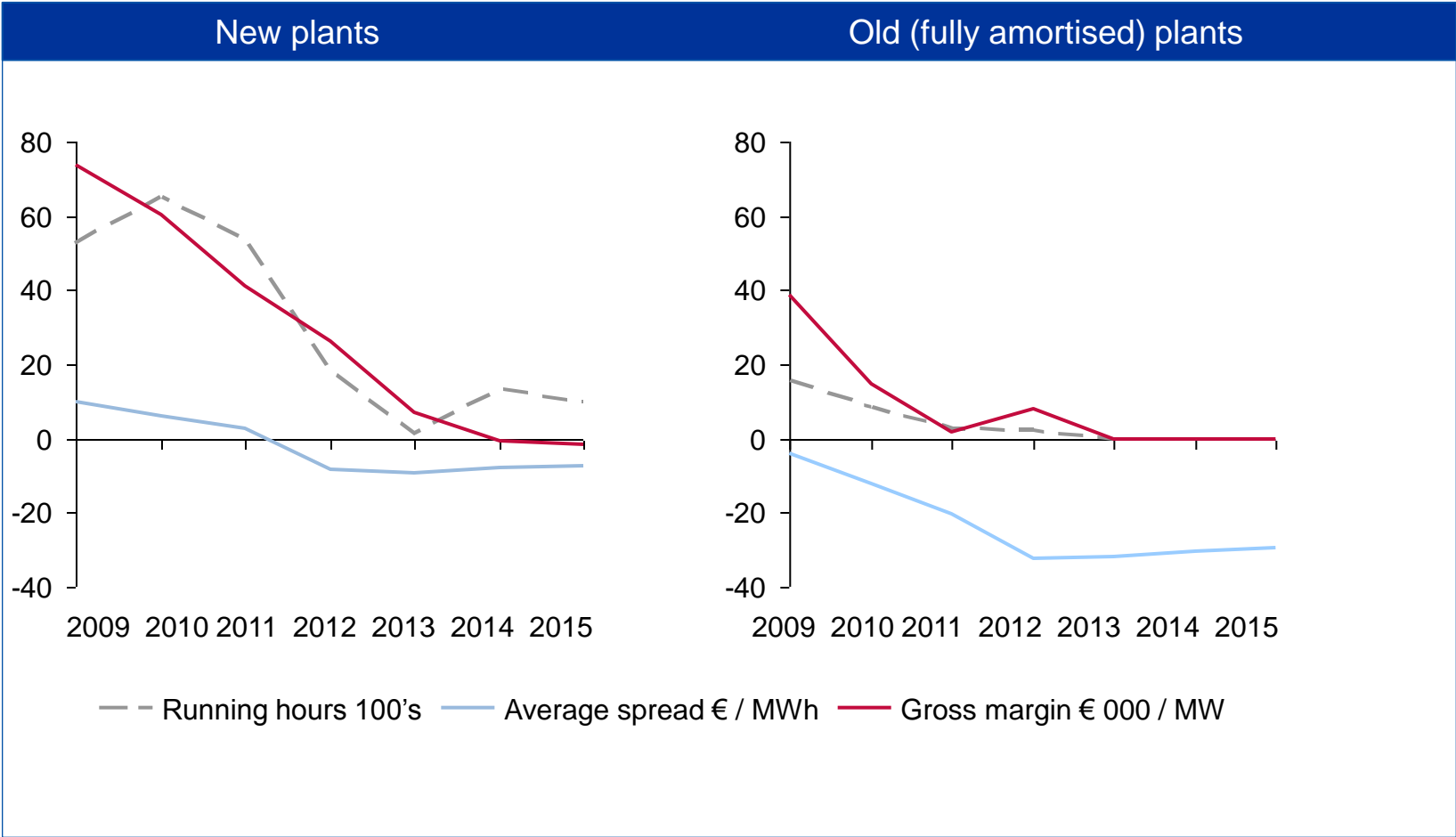
Clean dark spreads, running hours and gross margins for hard coal plants all still positive....



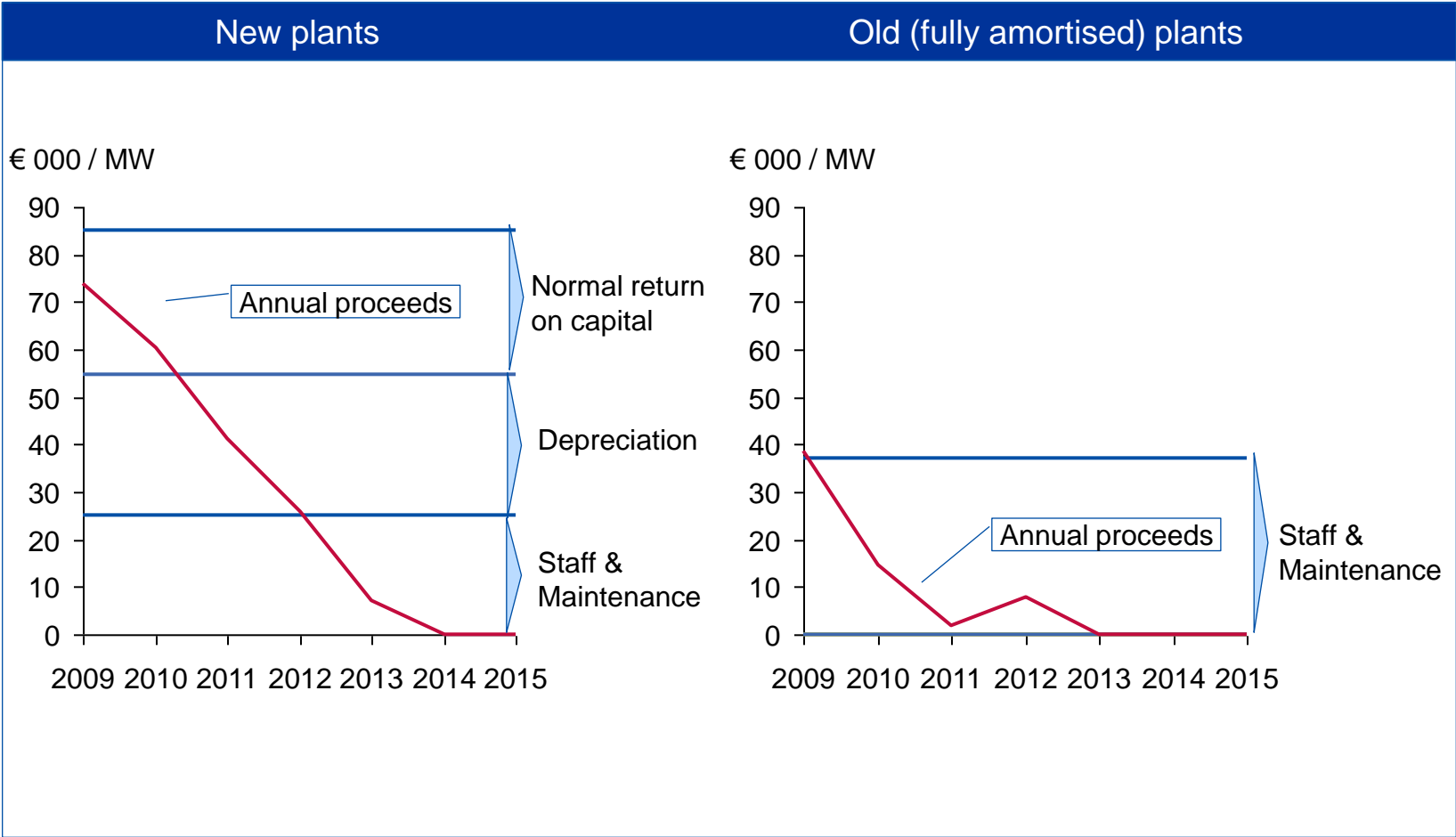
...but new coal plants not earning a return on capital whilst old plants are adequately covering fixed costs



Clean spark spreads for gas plants running disastrously down hill – plants hardly operating



Gas plants never recovered their full costs; from 2011/2012 failed to cover depreciation then O & M



Conclusions – strong evidence of market failure, requiring new instruments to ensure supply security

- Only certain older coal plants are truly „economic“ – covering relevant costs
- New coal plants have earned no return on capital employed whilst new gas plants are not even covering depreciation – major destruction of capital
- The following factors explain the situation:
 - Rapid renewables build with no price signal for new capacity
 - Relatively flat power demand due to continuing weak economy
 - Relatively shallow merit-order curve
- Strong signs of market failure: despite prospective tight capacity the power price forwards remain virtually flat
- Highlights limitations of energy-only market beyond efficient dispatching of plant
- New instruments will be required to keep adequate existing capacity online and incent new conventional plants required for energy transition

THANK YOU VERY MUCH FOR
YOUR ATTENTION.

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