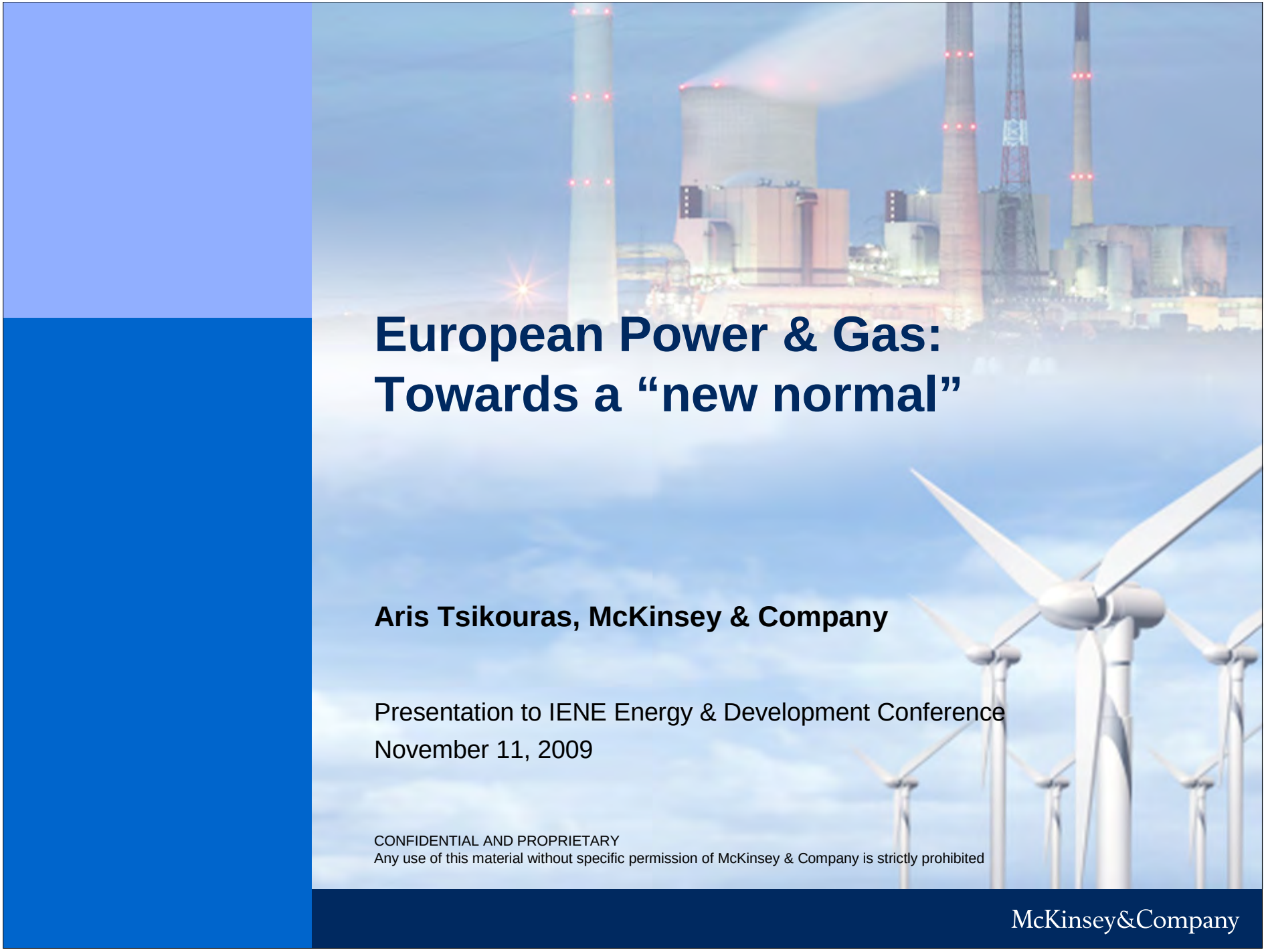


European Power & Gas: Towards a "new normal"

Aris Tsikouras, McKinsey & Company

Presentation to IENE Energy & Development Conference
November 11, 2009

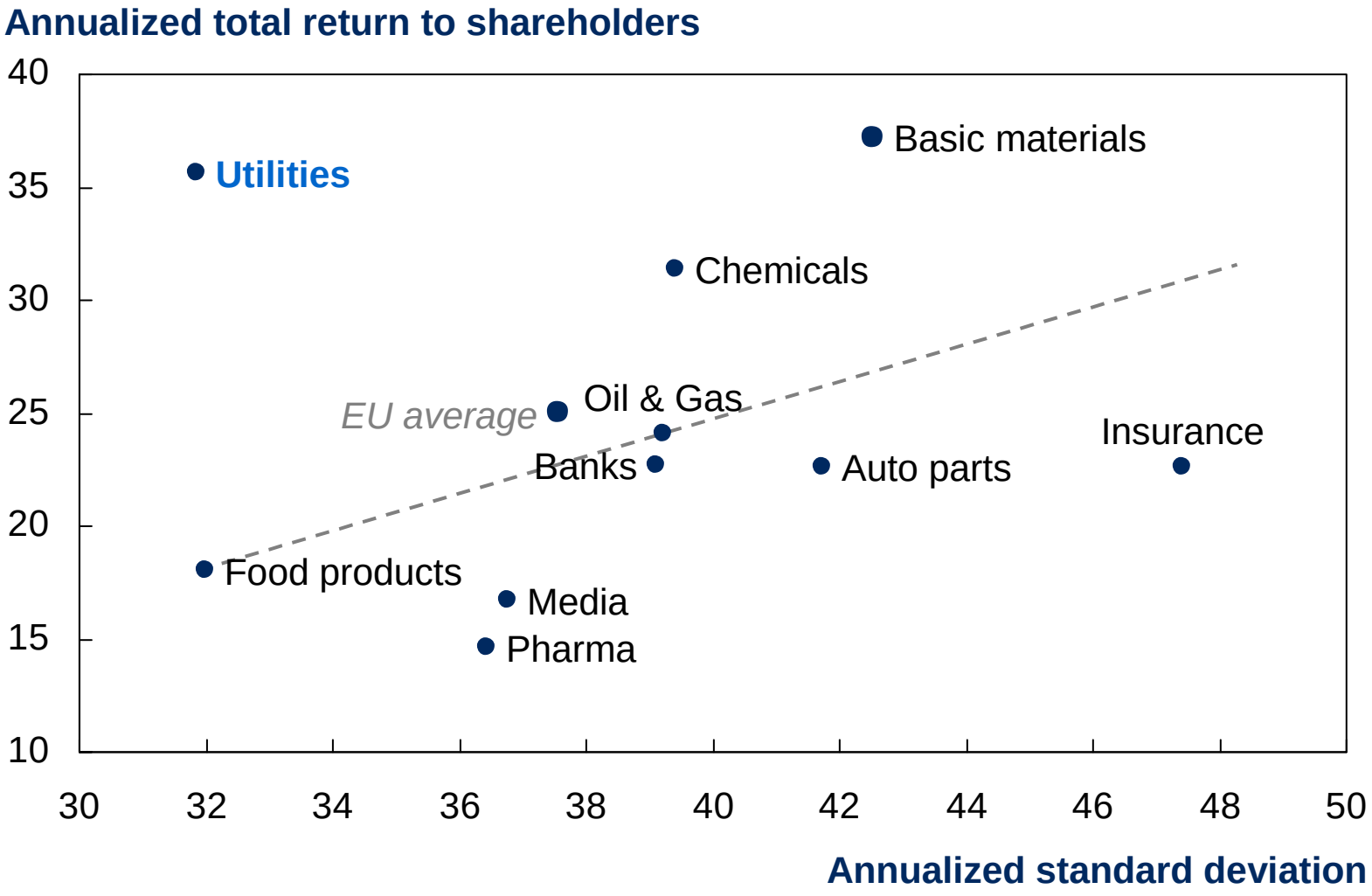
McKinsey&Company

Contents

- **2003 – 07: ‘Riding the great commodity wave’**
- The new reality
- Considerations on Greece

From 2003 to 2007, EU utilities outperformed the market while maintaining the best risk-return profile across sectors

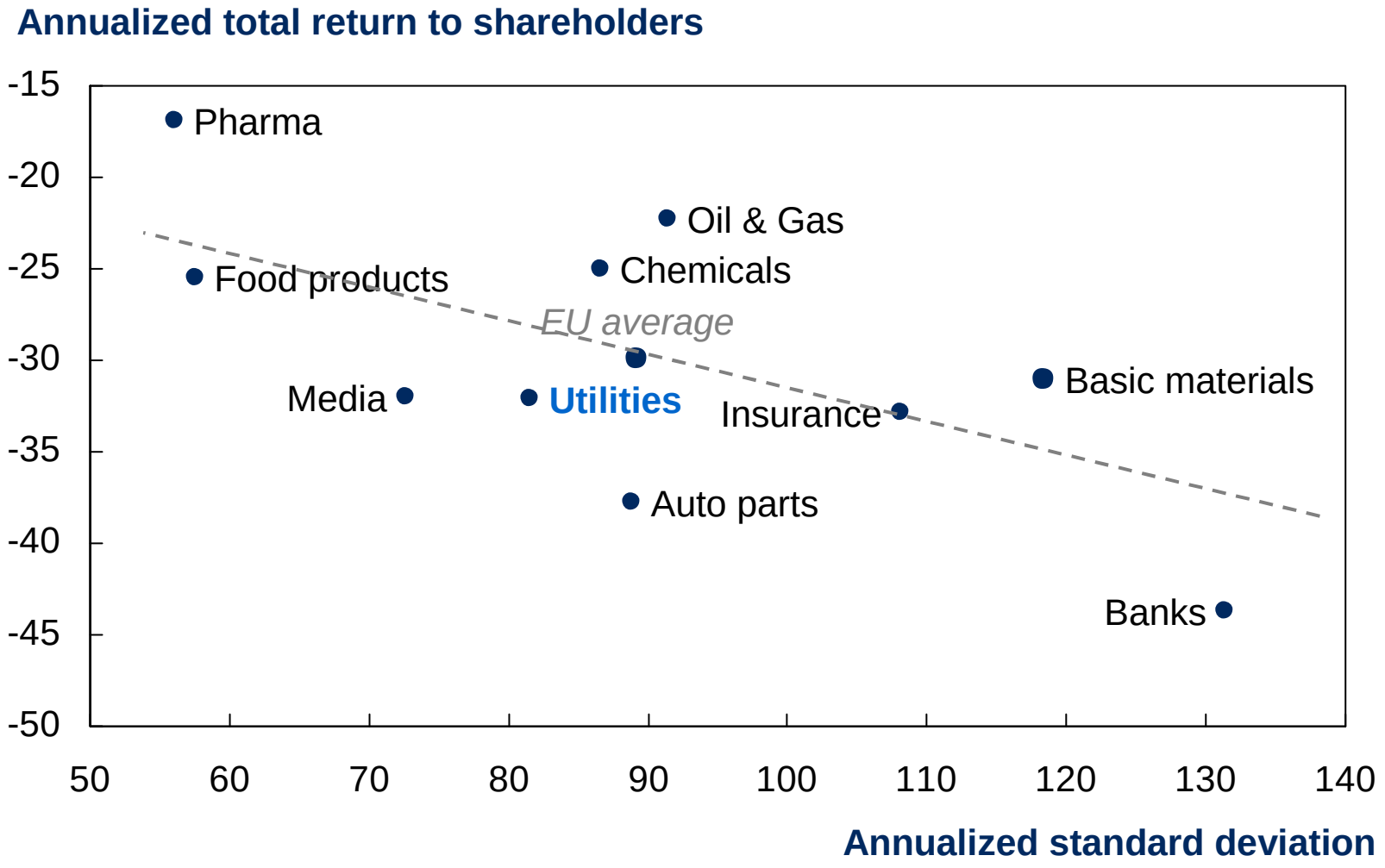
Jan 2003 - Dec 2007, percent



SOURCE: Datastream

However, this risk-return profile has dropped below market average since early 2008

January 2008 - June 2009, percent



SOURCE: Datastream

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Three forces are driving the new reality for European power & gas

1 Long-term structural impact of the crisis

- Unprecedented power demand drop
- Power demand growth expected to remain at new low level

2 Strengthening societal drive for sustainability

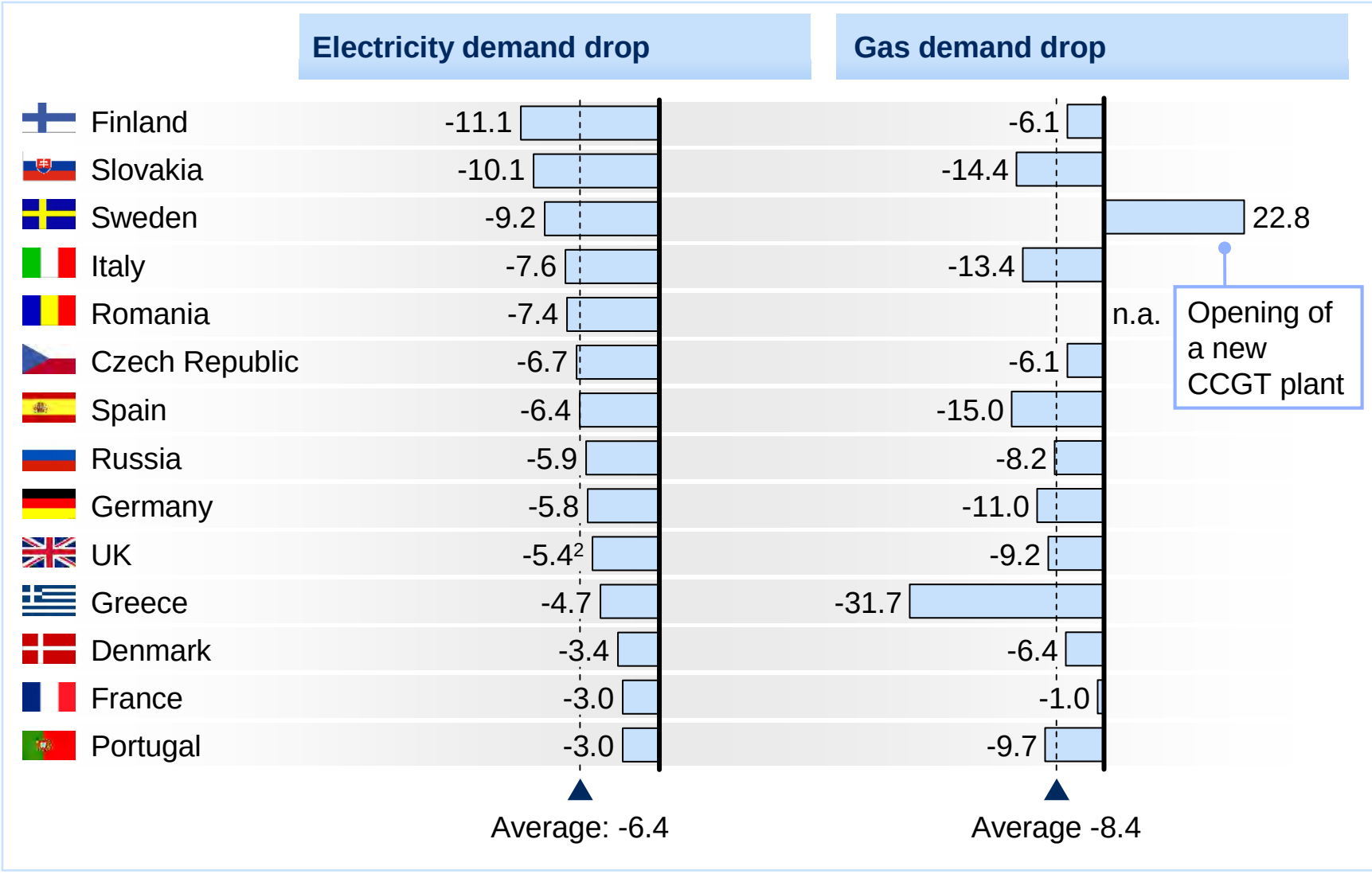
- Tougher CO_2 regulations
- Up to 280 GW of new installed capacity in renewables
- Boost in energy efficiency
- Increasing concern about security of supply

3 Broader scope for regulators to exert cost and performance pressure

- Increasing regulation of generation
- Continuous push for increasing performance in T&D

1 European power & gas demand negatively affected by the crisis

1H 2009 vs. 1H 2008, percent

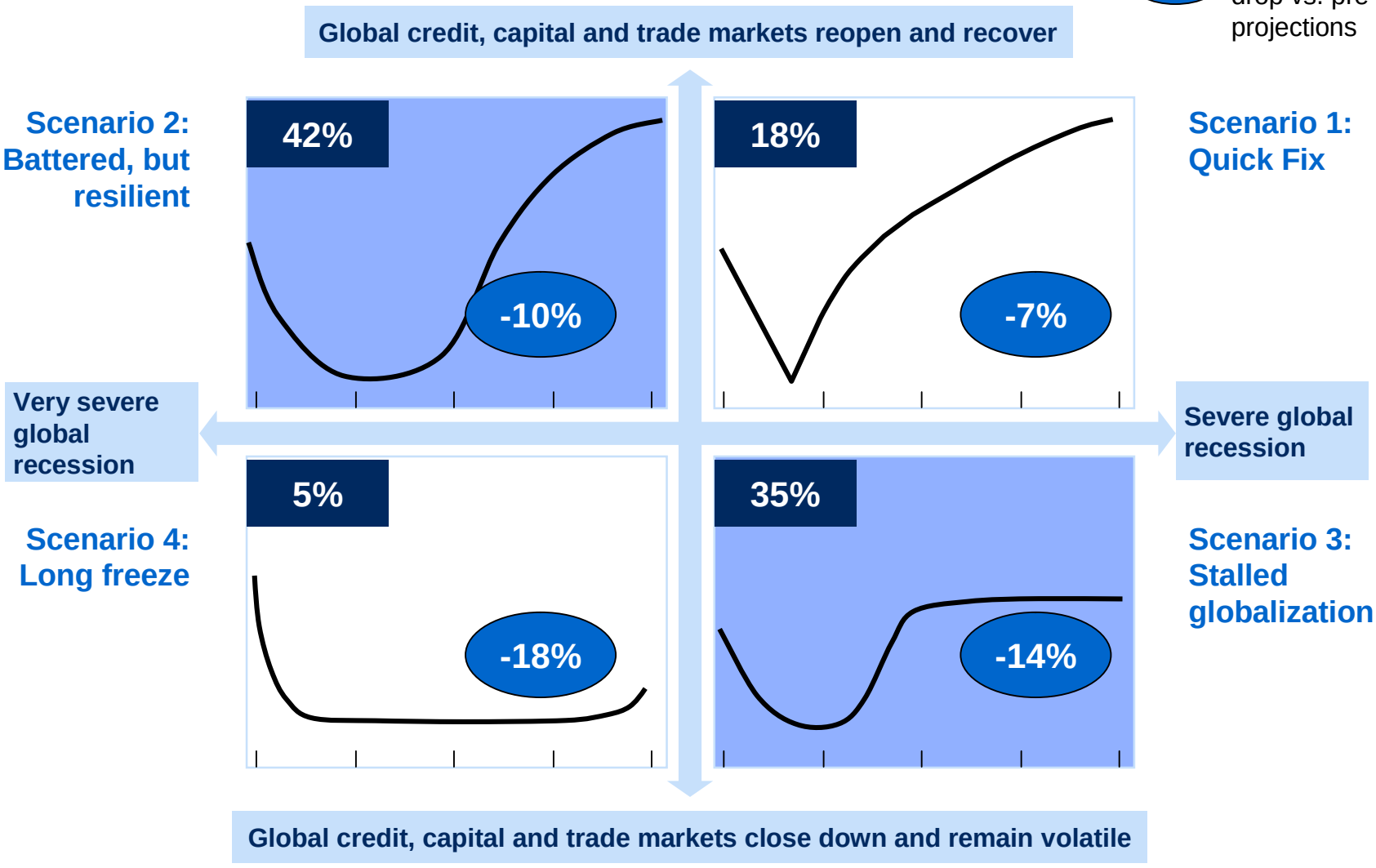


SOURCE: IEA; local sources; McKinsey analysis

1 Long-term demand expected to drop below trend in all scenarios

% Executives' view of scenario likelihood

-% Estimated demand drop vs. pre-crisis projections

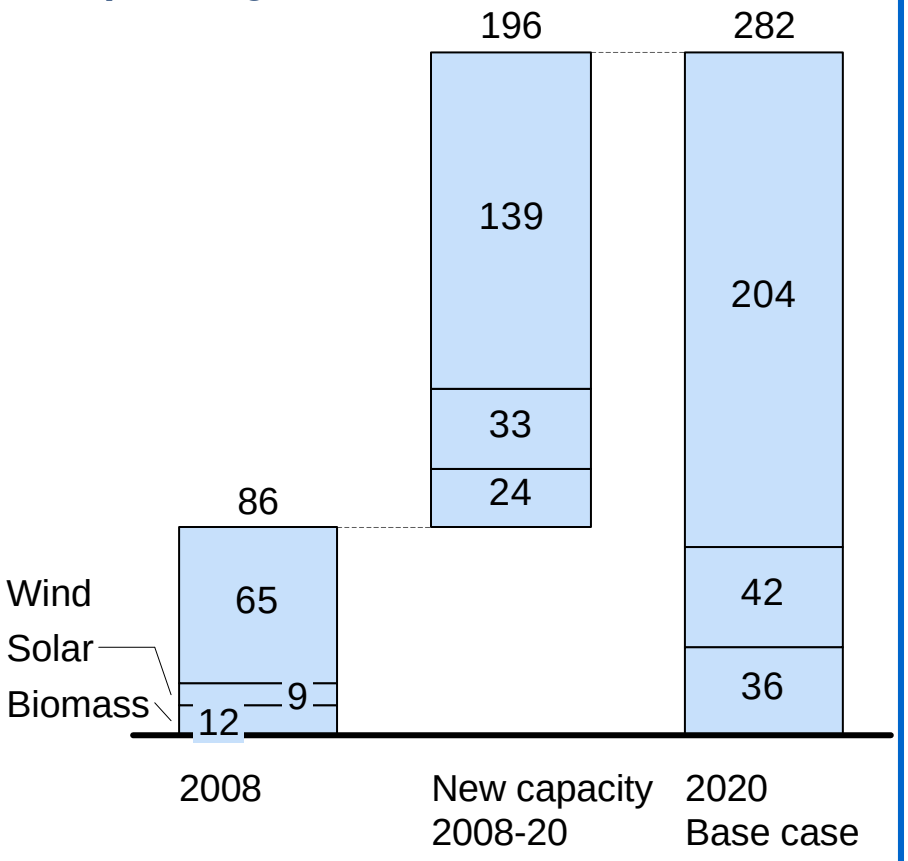


SOURCE: McKinsey Global Institute; Center for Managing Uncertainty; McKinsey Quarterly Executive Survey, July/August 2009; based on global sample of 1,800 senior executives

2 Given expected evolution of technology and policy, the ~34% renewables power production target looks feasible

GW, EU-27

Required capacity to meet EU target of 34% power generation from renewables



Feasibility driven by

- **Decrease of full cost of generation**, e.g.
  - **Wind:** Expected to approach 60 EUR/MWh
  - **Solar:** 60% expected cost reduction in 2009-2020
- **Required investments EUR 27 bn p.a.** (30% higher than in 2005-2008)
- **Regulators expected to keep on supporting renewables**, although likely to reduce returns from current 11-12% to WACC levels (~8%)
- **Availability of land** for wind and solar (potential constraint only in Germany towards 2020)

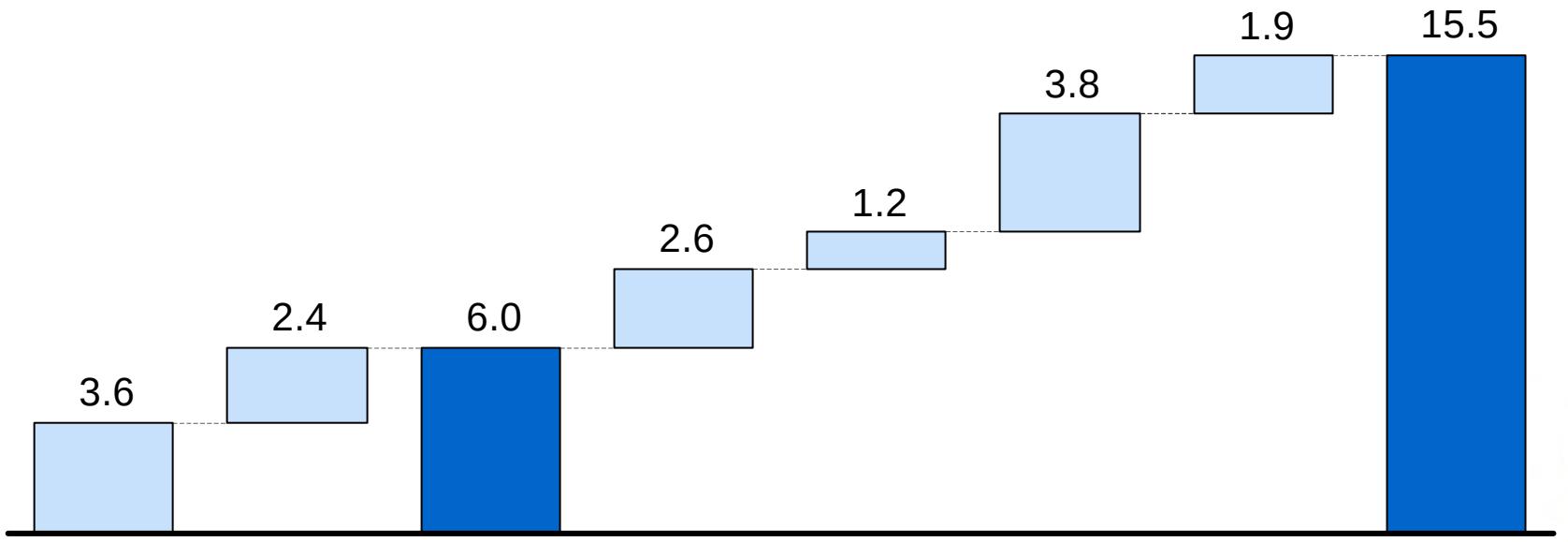
SOURCE: McKinsey analysis

2 Boost in energy efficiency: 16% reduction can be achieved through energy savings initiatives with positive returns

EU-27 + Norway and Switzerland

Percent

Energy savings opportunities with IRR >= 10% as percentage of total demand



SOURCE: McKinsey Energy Efficiency Effort

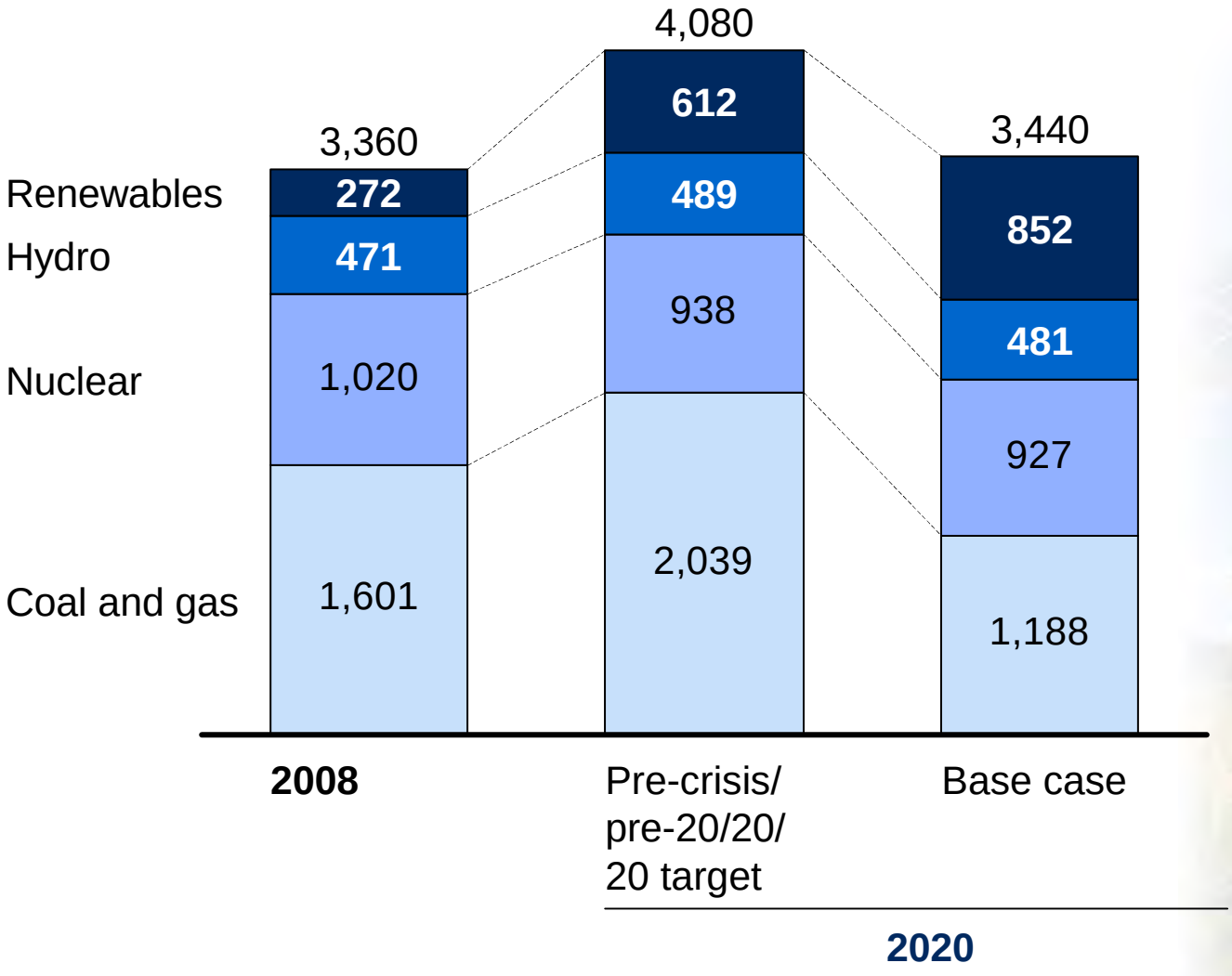
The new reality for the EU power sector: A different risk / return profile

1 Generation	2 Supply & Trading	3 Transmission	4 Distribution	5 Retail
"Renewable and flexibility game"	*"Significant potential from portfolio optimization"*	*"European standards; need to stimulate investments"*	*"Increased performance pressure; higher investments"*	*"Small-is beautiful – option value for generators"*
▪ **Decreasing share of production from conventional technologies** ▪ **Risk of over-investment** ▪ **Increased value of flexibility**	▪ **Significant value from aggregating and optimizing fuel, power, and customer sales portfolios** ▪ **Scale and insight race**	▪ **Ownership unbundling** ▪ **Push for performance improvements** ▪ **Significant investment pipeline** ▪ **Regulatory challenge due to generation uncertainty**	▪ **Push for performance improvements** ▪ **Investment pipeline strongly influenced by smart metering**	▪ **Relatively high margins** ▪ **Electric vehicles and energy efficiency** ▪ **Limited sell-offs over the next 5-10 years**

1 Renewables could limit growth of conventional thermal generation

Demand EU-27 + Norway and Switzerland

TWh, percent



SOURCE: McKinsey Power Model; Renewables Discontinuity KIP; McKinsey analysis

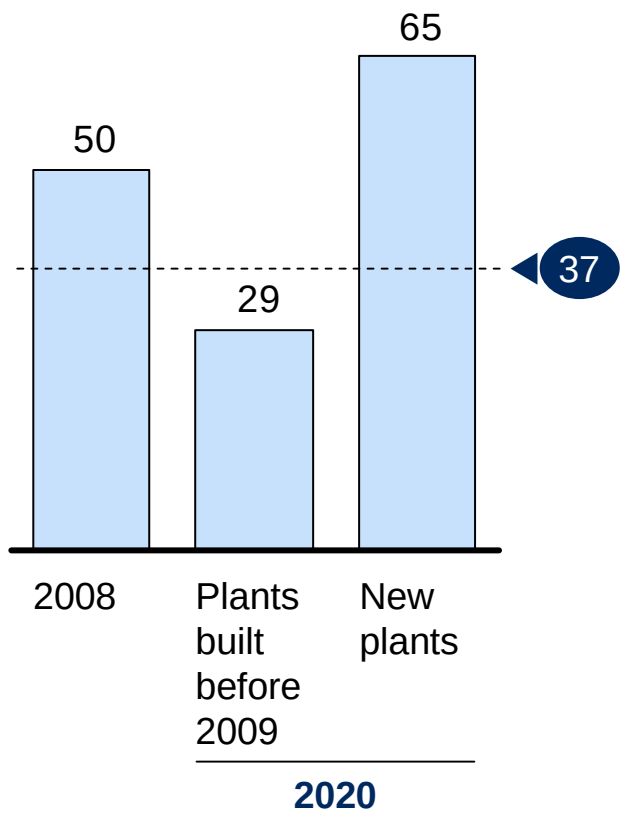
1 Low utilization expected for plants built before 2009

Utilization
Percent

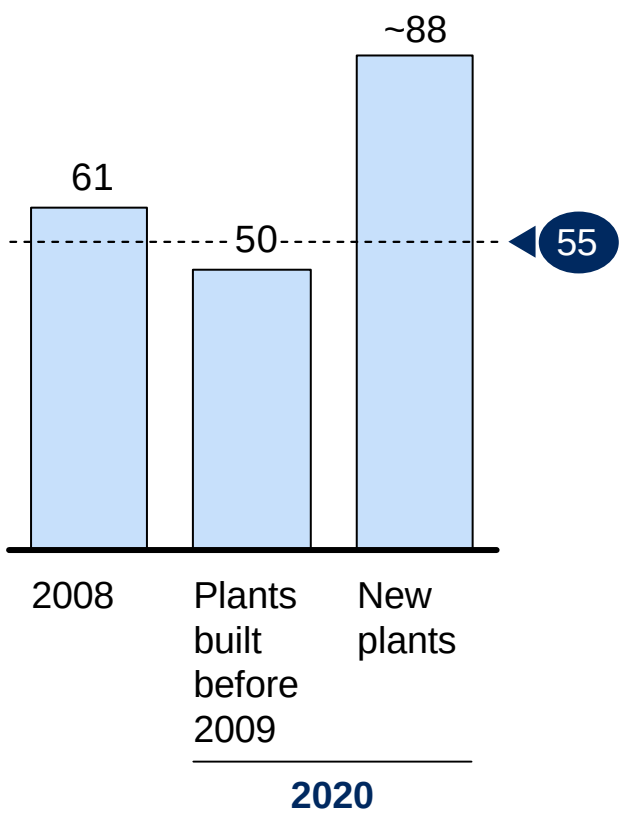
BASE CASE

Average utilization of all plants in 2020

CCGT



Coal



SOURCE: McKinsey Power Model; McKinsey analysis

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How could these trends translate to Greece?

- How will **power demand** evolve? How much of the current demand drop will be structural vs. one-off?
- To what extent will the country be able to meet its **renewable** targets? How much will this cost?
- What will be the impact of these two trends on the utilization and profitability of **baseload technologies** (e.g., lignite, gas)? How will this impact the country's natural gas needs?
- In the end, what is the optimal **fuel mix** that could achieve the long-term objectives of security of supply, minimizing carbon emissions, and achieving an efficient supply of electricity? What will be the effects of the proposed fuel mix guidelines on end-user prices?
- What **energy efficiency** targets and plans would make sense for the country? How can these be achieved and at what cost?

Thank you