

2016 REF-E market scenario: forecast accuracy assessment

September 2017



Accuracy assessment methodology

The analysis aims to evaluate two main aspects of the forecast scenario:

- **predictive capacity (accuracy)** of the model: Elfo++ is a structural model and final accuracy of the results depends on assumptions
- **underlying assumptions**

REF-E analysis is therefore focused on the assessment of the key electricity market scenario drivers in order to monitor the evolution over time of REF-E forecasts for the year 2016

REF-E scenario updates considered for the analysis:

- Forecast for 2016 elaborated during the year 2014 (three scenarios: I2014, II2014, III2014)
- Forecast for 2016 elaborated during the year 2015 (three scenarios: I2015, II2015, III2015)
- Forecast for 2016 elaborated during the year 2016 (three scenarios: I2016, II2016, III2016)

Key variables to be analyzed:

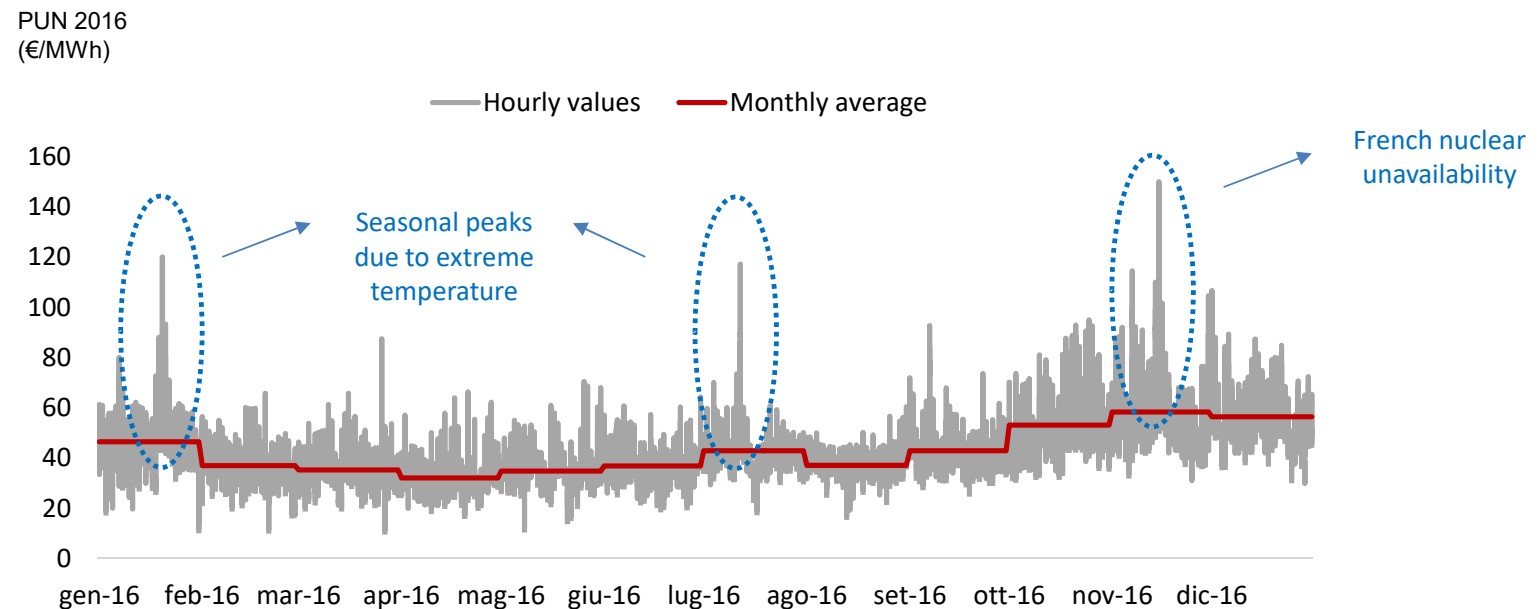
- PUN
- Natural gas price/cost (fuel and logistics)
- Environmental costs: CO2 – ETS
- Clean spark spread (CSS)
- Electricity demand and renewable energy sources for electricity (RES-E)

2016 electricity market overview: market results significantly affected by structural contingencies and climate factors

2016 market results were characterised by **high volatility** introduced by different **short-term contingencies**, difficult to predict on yearly basis:

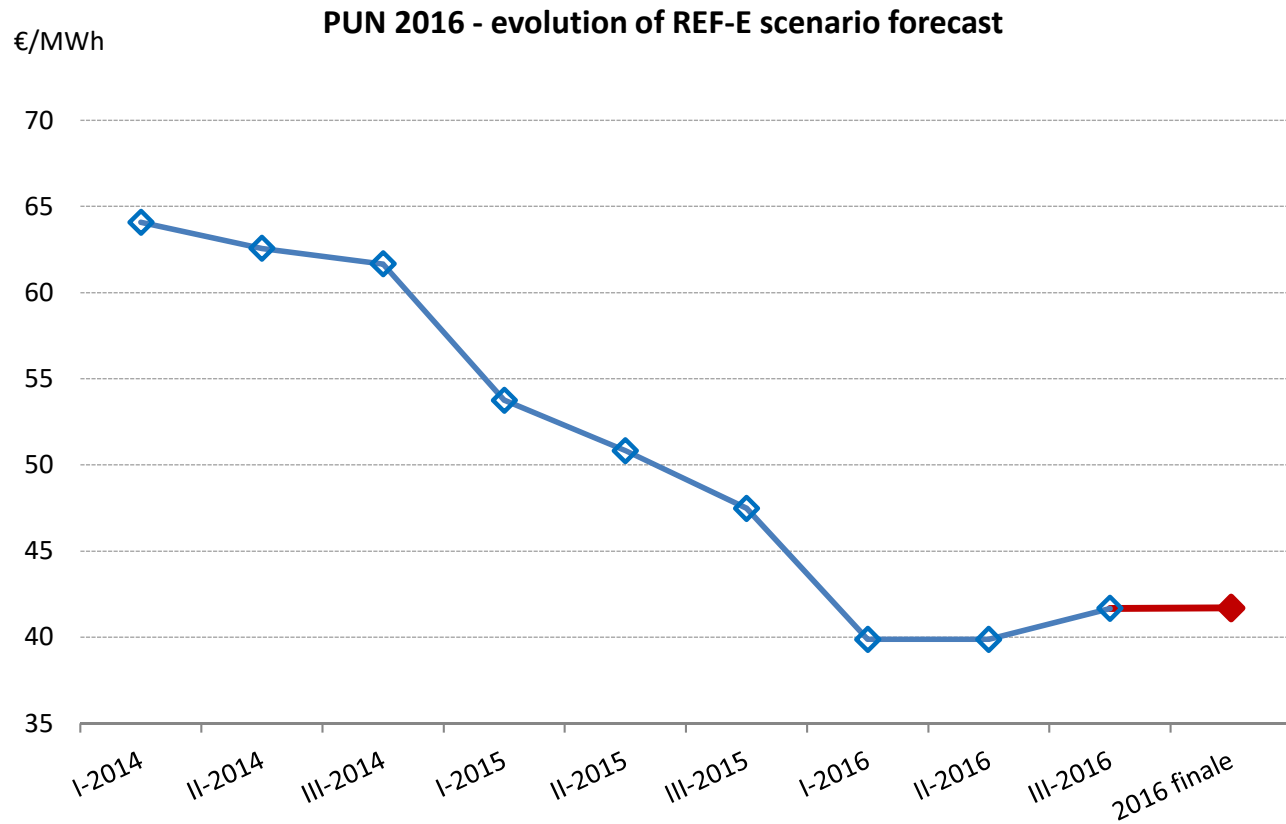
- **Low hydro** contribution to power generation due to low natural water flows
- **Scarcity of generation capacity** abroad: effects of reduced availability of **French nuclear** fleet on the Italian market in Q4 2016

2016 final figures were strongly conditioned by contingency factors in the last quarter of the year thus introducing high deviation from the forecasted values



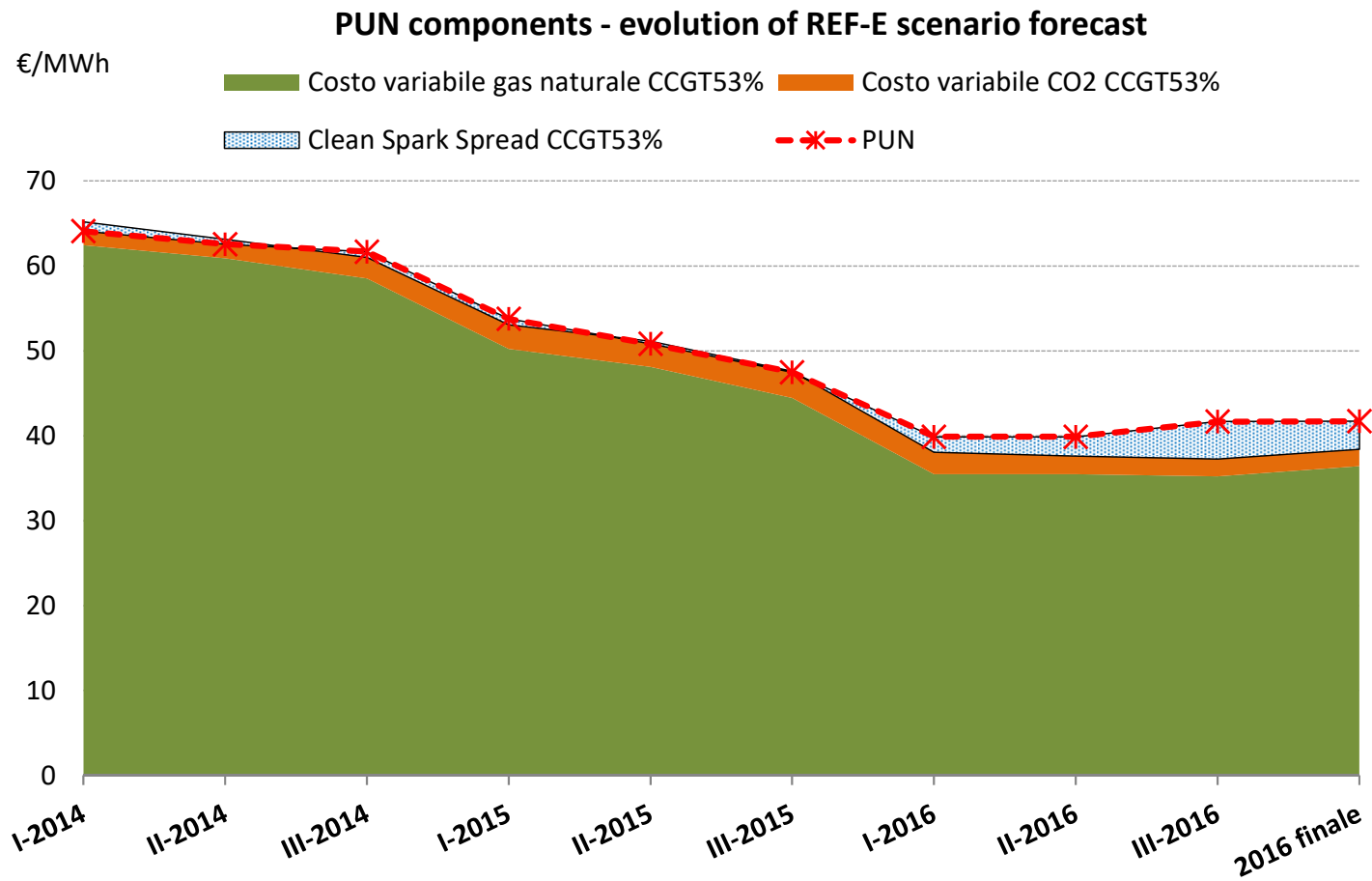
Source: REF-E elaboration on GME data

2016 PUN forecasts: a progressive convergence to the final value

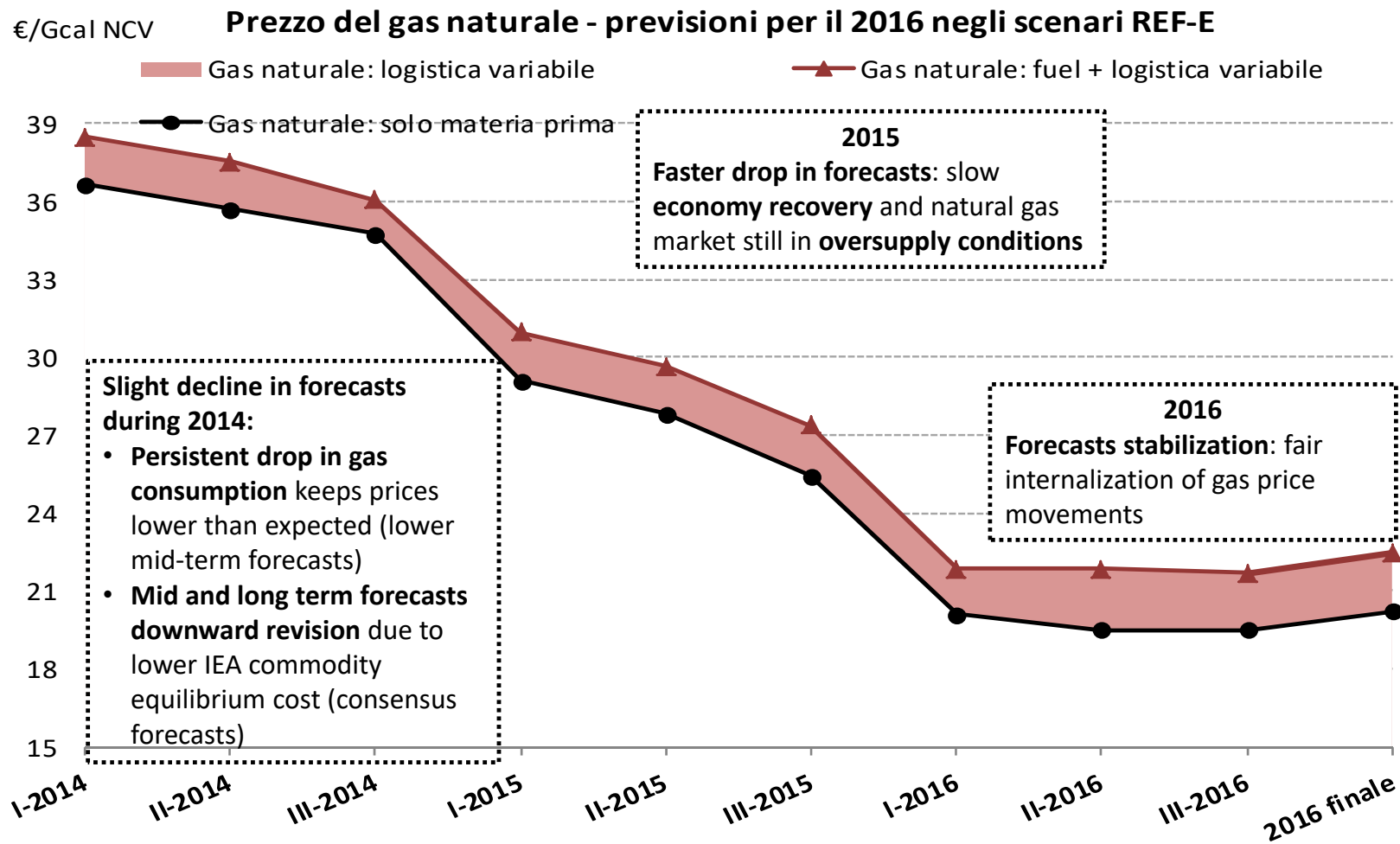


Improved market perspectives in the middle of 2016 due to low hydro generation and potential increase of the residual market demand for thermal plants in the second semester of the year

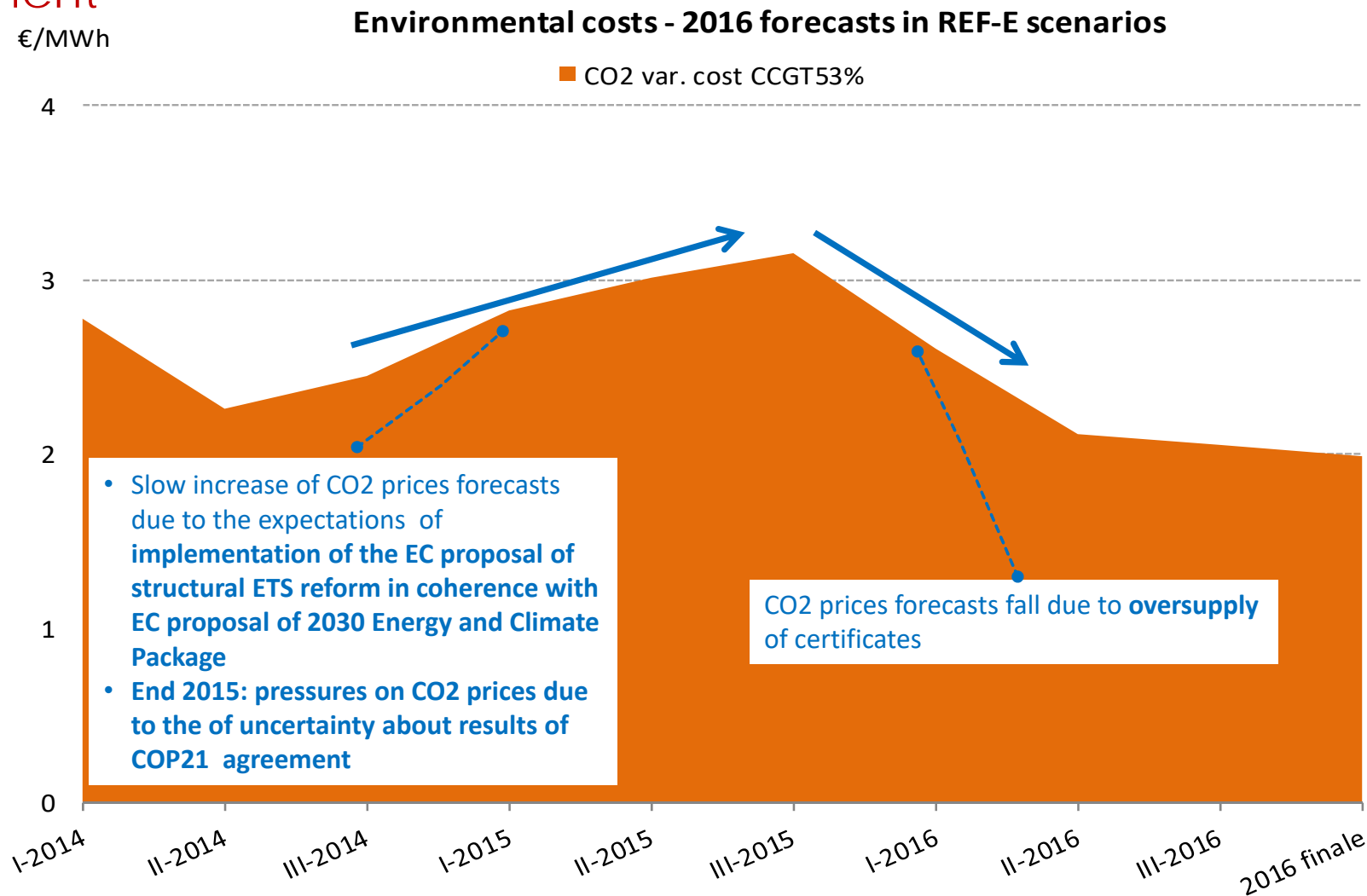
PUN components: natural gas is the main driver



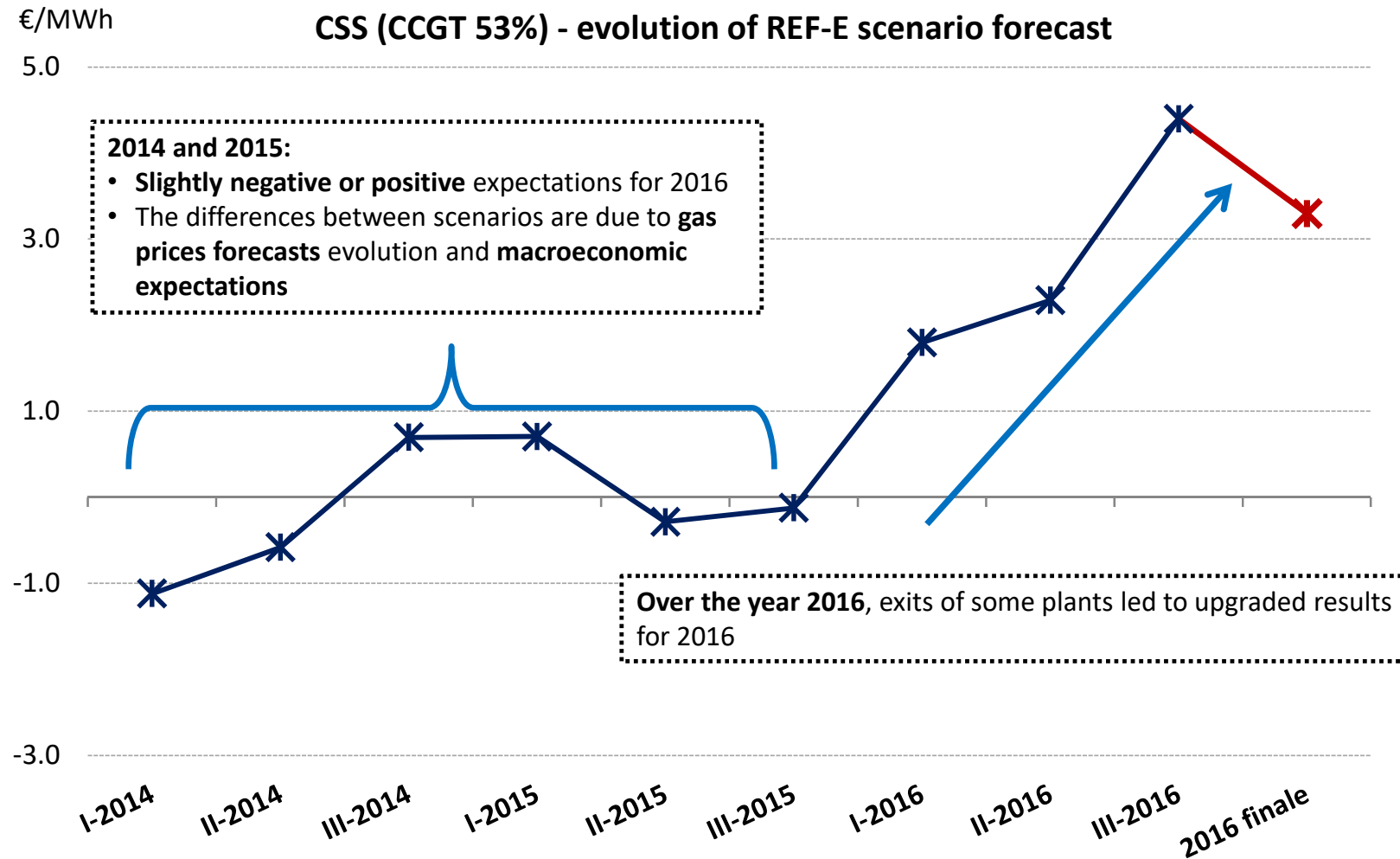
Natural gas price: the impact of macroeconomic expectations



ETS burden: environmental costs still play a marginal role in PUN development

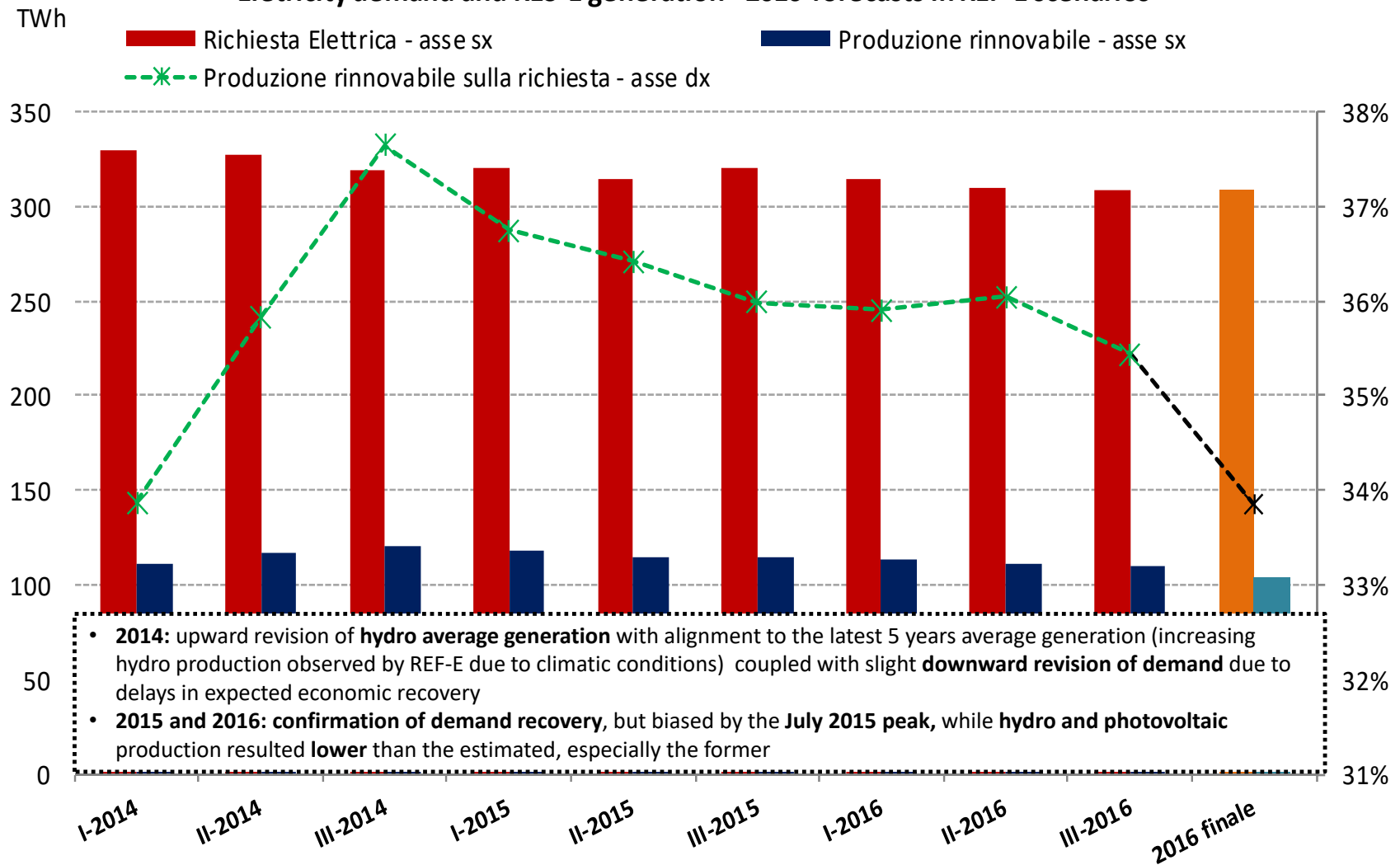


Clean spark spread: average margins around 3 €/MWh over all



Electricity demand and RES-E: reduced share of RES-E due to low wind and hydro

Electricity demand and RES-E generation - 2016 forecasts in REF-E scenarios



Considerations: the evolution of REF-E forecasts according to the evolution of market design and structural changes

- REF-E scenarios are complete market studies, processed every four months, setting out the evolution of the Italian electricity market in long term horizon (2040 currently)
- For each new scenario REF-E updates all the relevant market drivers and assumptions according to
 - the latest **public information available**: historical data, regulatory news and changes, energy and climate policies, structural breaks, contingencies (for the short-mid term) , evolution of the installed thermal capacity, of RES-E capacity and of network constraints
 - **REF-E own view** on the evolution of market drivers, based on the **in-depth analysis and accurate understanding** and knowledge of power and natural gas markets, and on the **direct contact** and view/information sharing with **market players**
- Relevant market changes are promptly included in REF-E scenario updates
- A frequent and regular update of the market scenario allows REF-E to gradually include not always predictable structural changes and contingencies that impact the short and long term forecasts, leading to a gradual convergence to the actual market results

REF-E scenarios are mid-long term horizon forecasts, based on current information and on equilibrium (average) conditions

The **accuracy assessment** shows that REF-E forecasts for **2016** progressively incorporated all relevant changes and contingencies that affect the market scenario but still approaching the real time, **unpredictable variations** have led to **significant deviation** of the final market results from the expected values



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