



# The cost of price de-linkages between European gas hubs

*Executive Summary*  
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Previous work by OIES tracked the progressive path towards a Single European Gas Market, with the aim of assessing the degree of integration of European gas markets and unveiling the remaining barriers to the free flow of gas across the borders. Notwithstanding differences in traded volumes, this research has shown that, in the January 2007-October 2013 period, day ahead prices set by demand and supply at the main European gas hubs were broadly aligned and featured generally good correlation, suggesting that the main European gas markets are spatially well integrated and competitive.

The same research also showed that exceptions to good correlation occurred in periods where pipeline bottlenecks (physical or contractual) or closure (for maintenance) had caused a de-linkage between prices at the main North Western European hubs and those of Italy (PSV), Austria (CEGH), Southern France (PEG Sud) and at times the UK (NBP). This finding supported the thesis that hub prices represent market prices (i.e. prices resulting from the interplay between demand and supply) in Europe. The nature and causes of price de-linkages, however, could not be fully explored in the Author's 2014 work, due to lack of reliable and consistent data on gas flows between the markets, in particular as far as the Italian and the Austrian hubs were concerned.

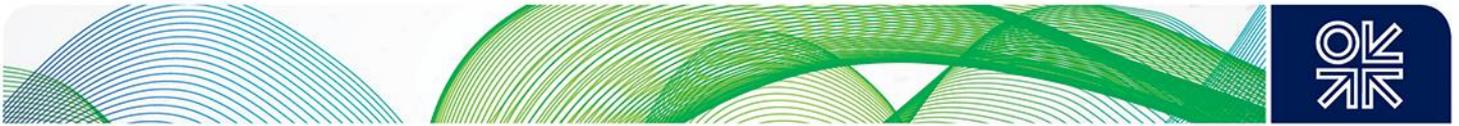
Latest available data show record high correlation scores: in 2014 the average correlation score was 96% (with 100% indicating perfect alignment) and only PEGS prices were substantially different from the other hubs, with minor de-linkages in Italy and Austria.

The North West Europe core group (ZEE, TTF, the German hubs and PEGN) stands out as it remains almost perfectly correlated over the whole period with these hubs behaving as a single integrated market area. In 2014 the NBP gas prices also moved in tandem with North Western Europe prices.

Periodic de-linkage, however, still occurs at the more peripheral hubs: not just at the PEGS, but also, although to a lesser extent, at the Italian and the Austrian hubs. Reductions in correlation scores signal that, still in 2014, we have barriers that prevented a full integration between the main gas hubs in Europe. The analysis shows that gas flows do not always fully exploit the arbitrage opportunities emerging between these peripheral markets and the core group, so impeding full price alignment.

The nature of these barriers is found to be mainly physical: de-linkages occur when there is physical congestion of the interconnecting infrastructure. On the other hand there is no evidence of widespread non-physical barriers to trade, with the exception of Italy.

The analysis finally argues that these periodic price de-linkages come at non-negligible costs. This is due to the fact that above 60% of consumption in the countries with the less aligned hubs (France, Italy and Austria) is priced based on gas-on-gas competition (as reported by IGU/Nexant). Physical congestion between Germany and Austria resulted in an additional gas procurement cost in 2014 of about €60 million, most of which was accounted for by CEGH prices being higher than NCG in September and October 2014.



Although the total volume of gas sold at hub-based prices at PEGS is similar to CEGH, the wider de-linkage of prices in the South of France compared to those at the adjacent PEGN translated into a cost of €240 million in 2014. The size of the Italian market meant that, in 2014, barriers to flow gas into PSV resulted in an estimated increase in purchase costs of €330 million incurred mostly in the September–December period, when the average premium over NCG exceeded 2 €/MWh but most of the time the cross border capacity was not fully utilized.

The findings in this work have relevant policy implications as different measures need to be undertaken depending on the nature of the de-linkage drivers, assuming that the policy maker is interested in avoiding price misalignments and the corresponding estimated cost for the gas consumers. Physical barriers (so called “physical congestion”) can be removed by additional investment in the infrastructure, non-physical ones instead need to be addressed by rules which optimize the use of existing infrastructures.

Finally the work suggests that, even in a mature and well integrated European gas market, it may happen that for some periods, as a consequence of changes in gas flow patterns across Europe, a hub may split from the others and display a price dynamic which is completely different compared to the others, possibly resulting in higher costs.

A natural follow up for this work would then be simulating future bottlenecks in the European gas grid, as well as the corresponding price de-linkages, in the possible scenarios for key global gas fundamentals post 2015, as identified by recent OIES research. Anticipating the future bottlenecks would then help to assess whether there is a case for developing suitable frameworks/incentives aimed at mitigating the potential future factors reducing price integration in the European gas market.

### About the Author

Beatrice Petrovich joined the OIES in November 2012, after she conducted research with the institute in August 2012 focusing on European gas hubs. Her first paper on European gas hub price correlation was published in October 2013. In September 2014 she published a second paper on gas hub price correlation and volatility, which investigates the possible barriers to price alignment among the main gas hubs in Europe. Beatrice is currently based in Milan where she works as researcher and consultant at REF-E, a leading energy consultancy in Italy. Among other activities, she works for the REF-E Energy Observatory, specialising in the analysis of the natural gas market and energy regulation, and contributes to the editing and writing of the Energy Observatory monthly newsletter. She holds an MSc in economics from the University of Milan Bicocca and completed a one-year exchange at the University of Glasgow. While at university, she collaborated on a research project in the field of experimental economics.