

## Closing the Transatlantic oil & gas price gaps

Ruud Weijermars

Alboran Energy Strategy Consultants and

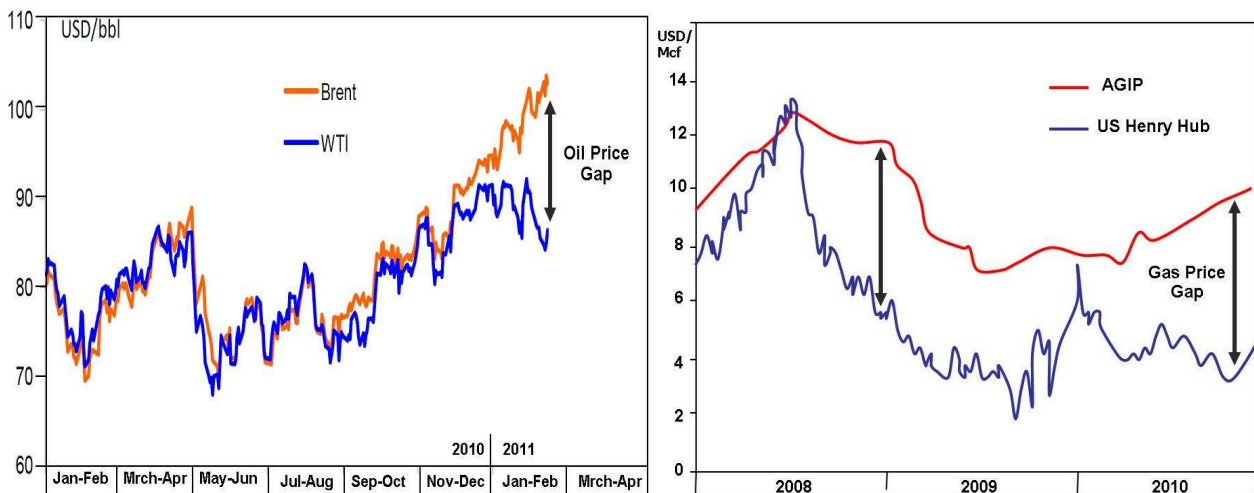
Delft University of Technology

Delft, Netherlands

The gap between North American and European oil & gas prices has widened to historic levels. Divergence in these fossil fuel prices affects the mutual competitiveness of each continent - convergence of oil and gas prices would help to restore an even play field. This article analyses the fundamentals that drive the oil & gas price dichotomy, and gives recommendations for a strategic re-alignment of the two western energy markets.

### New autonomy US oil & gas prices

Unrest in Middle East and North African (MENA) producer countries pushed up oil & gas prices in Europe much faster than in the US, fuelled by worries over tightening supply and rising demand. US prices are now increasingly unaffected by world market volatility. The price dynamics for oil and gas in Europe and the US are decoupling: Brent Crude, Europe's benchmark for oil prices, now trades at 15% premium above the US benchmark price for West Texas Intermediate (Fig. 1a). The price dichotomy is even larger for natural gas: the Continental European gas benchmark given by the Average German Import Price (AGIP) has in 2011 risen further, to three times the Henry Hub reference price used in US NYMEX gas trades (Fig. 1b). The Transatlantic oil & gas price differentials are now larger than ever before, so may be it is time to analyze what causes the dichotomy. One could say that European oil & gas prices are *too high* and US prices *too low*. What can these markets learn from each other? Which measures could be taken to reduce the price gap?



**Fig. 1a:** Price gap between Brent Crude and WTI Crude is widening although these oils have similar APIs and Sulfur contents. **1b:** Wholesale AGIP and Henry Hub gas prices are even further apart.

### Gas price dynamics

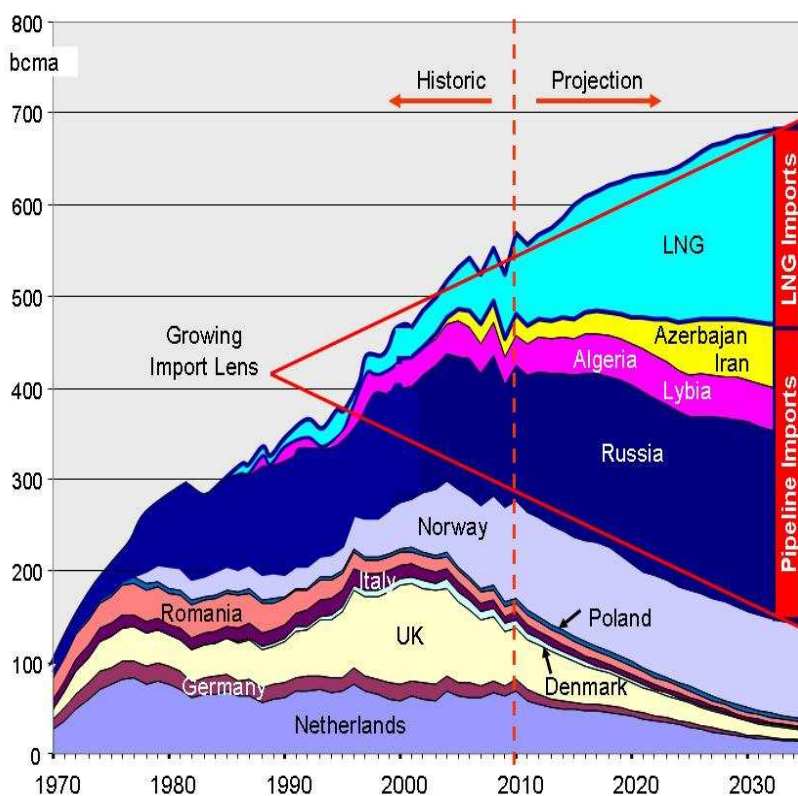
Looking first at gas prices, the transatlantic price differential is supported by differences in gas supply dynamics. For example, Europe must import half of its natural gas volume to meet indigenous consumption<sup>1</sup>. These supplies come from outside the EU zone via pipelines from Russia, Algeria and Lybia, as well as in LNG tankers. Europe's indigenous gas production is set to decline steeply and imports must grow in step to account for 80% of the projected demand by 2035 (Fig. 2).

Europe has a declining indigenous gas production, with rising gas demand. The result is that European gas prices – also lifted further by oil-indexing – are generally firmer than in the US, due to structural tightness of gas supply.

Remember, price fundamentals of physical gas trades are driven both by (1) real shifts in the supply/demand balance, and (2) perceived impending shifts in that balance. Short supply drives up prices and oversupply depresses the market's premium.

With Europe's continued dependency on foreign gas as a given, it is important to bring more stability in the pricing mechanism.

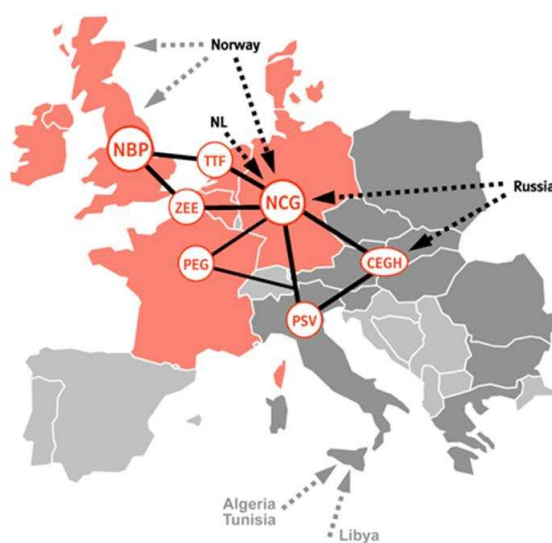
Europe's historic coupling of gas prices to oil prices in long-term, oil-indexed wholesale delivery contracts<sup>2-4</sup> hedges against price spikes when gas supply is short as long as oil prices do not rise in a volatile fashion themselves.



**Fig. 2:** More gas imports (pipeline & LNG) must help to fill the growing wedge between Europe's gas demand and its dwindling indigenous gas production (Source: Author, BP Yearbook & IHS CERA).

### Liquefying the European gas market

Continental European gas markets can move toward spot price indexing rather than oil-indexing as soon as real trade liquidity emerges in the European gas market. Such liquidity is now handicapped by the lack of a single price reference hub<sup>5</sup> as is the case in the liquid US gas market. At present there are half a dozen trading centers in Europe (Fig. 3), each providing their own reference price for gas derivatives (futures & swaps). As long as the EU does not adopt a single reference price for its gas contracts, all other measures and efforts to liquefy the EU gas market (European regulator ACER, tariff harmonization, transport regulation etc.) remain ineffective instruments. Decoupling gas prices from oil price indexation in long-term (LT) contracts and instead indexing by a single

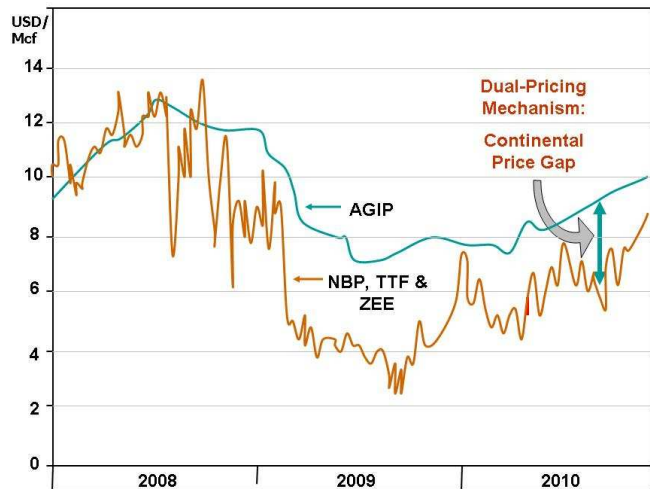


**Fig. 3:** Principal gas trading hubs in Europe (Source: EON).

spot gas price reference is the only real measure that could bring more market dynamics to gas pricing in Continental Europe<sup>5</sup>.

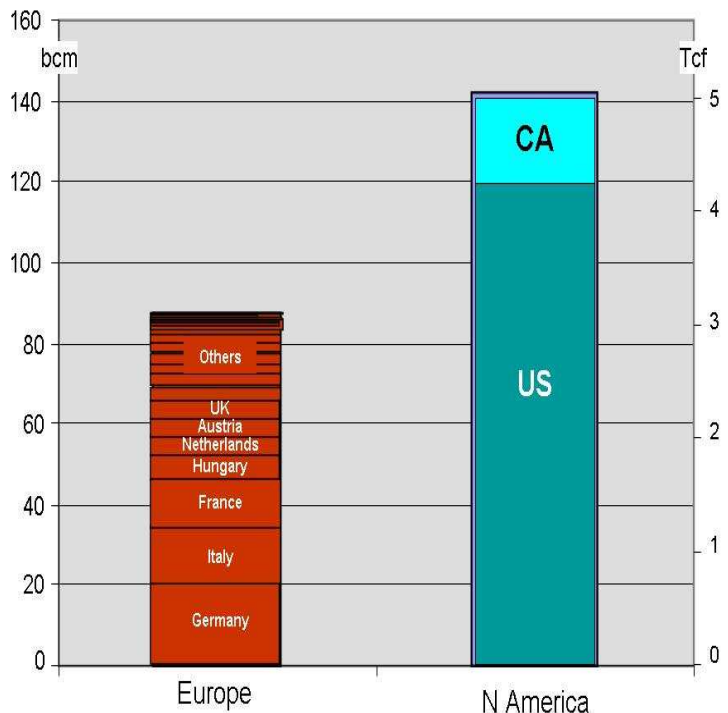
Spot gas trades in a price range that may be nearly half AGIP as occurred in 2009 (Fig. 4). Integration of trading hubs and spot markets can bring further liquidity to the EU gas market, and faster smooth out unnecessary price differentials across European regions by better matching supply & demand in real-time trades rather than stay locked into long-term contracts.

Gas prices in Europe cannot be lowered by liquid trading, when gas demand continues to rise and supply remains structurally tight. This latter scenario poses a real threat for Europe’s future gas price stability, in spite of recent advances to establish a pan-European gas infrastructure model. Lowering Europe’s strategic vulnerability to short gas supply will require the building of massive storage capacity, to ensure gas volumes remain at hand to match periods of sustained peak demand (winter) and short supply (unrest in supply regions). The current EU gas storage capacity - combining depleted gas field injection, aquifers, salt caverns and LNG peak shavers – is only 60% of the North American capacity (Fig. 5). At 2011 consumption rates, the European gas storage facility holds less than 2 months strategic reserve. Clearly this is not enough to bridge shortages, when 75% of EU gas must come from overseas in 2030.



**Fig. 4:** Price differential in Europe between spot gas (NBP, TTF, Zee) and gas traded under oil-indexed long-term contracts (AGIP).

What Europe really has completely missed out on, so far, is taking advantage of its indigenous unconventional gas potential. Starting developing these resources now can realistically lead to a recovery of the decline in conventional gas production by 2020<sup>6-8</sup>. An indigenous production from unconventional gas resources could close part of the import lens shown in Figure 2. Europe would become less vulnerable to supply interruptions, and can minimize future decline in tax income and reduce job losses by reviving its gas operations, and simultaneously avoid spending on dear gas imports. Surprisingly, the unconventional gas development option has yet to reach the agenda of the EU’s Energy Directorate, which still focuses on infrastructure building rather than

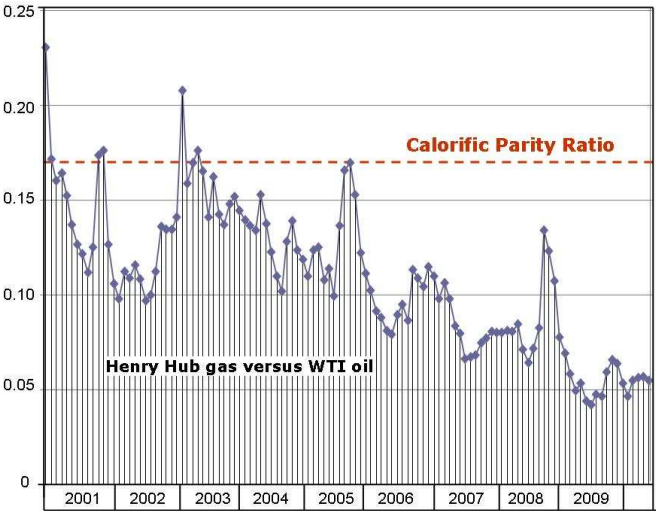


**Fig. 5:** Natural gas storage capacity for Europe and North America (Source: OECD/IEA).

stimulating indigenous gas supply. Overstimulation of midstream transport expansions may lead to overbuilding capacity. Additionally, lagging support for supply incentives for the upstream sector could lead to underuse of the constructed gas transport capacity due to gas shortage: a more balanced approach seems needed.

**Lifting US gas prices**

North America gas market is strongly affected by the indigenous unconventional gas production boom, which lead to depressed gas price due to structural oversupply and stable demand<sup>9-11</sup>. The US market receives insignificant net imports from outside North America. LNG terminals are sitting idle and remain so as long as the reduction in gas rig count is not resulting in a restoration of the supply and demand balance. Downward pressure on US gas prices has steadily increased over the past decade and gas trading is now far below its calorific parity value with oil (Fig. 6).



**Fig. 6:** The US gas-to-oil price ratio<sup>5</sup>, defined by \$/Mcf gas divided by \$/bbl oil, has lowered from .23 in early 2001 to .05 by the second quarter of 2010.

Adopting some of Europe’s pricing practices, by introducing a proportion of oil-indexed gas contracts could potentially help to restore and stabilize the US wholesale gas price. Such oil-indexing may be more effective than adopting a price-floor mechanism, proposed earlier<sup>11</sup> for the benefit of the US gas industry and adopted in India. Gas traders in Europe customarily negotiate oil-indexed contracts with suppliers. The gas volumes are then dispatched in the EU gas transmission networks. The seasonal swing in demand and supply, with lower demand in the summer and higher in the winter, leads the trader to schedule LT supply contract accordingly. The uncertainty range in actual demand may result in temporary demand peaks, for which supplementary spot gas and storage gas must then be purchased to complement the prior anticipated demand load. This means the spot market has a more limited role in the Continental European gas contracts than in the US, where the majority of gas contracts are short-term spot gas indexed.

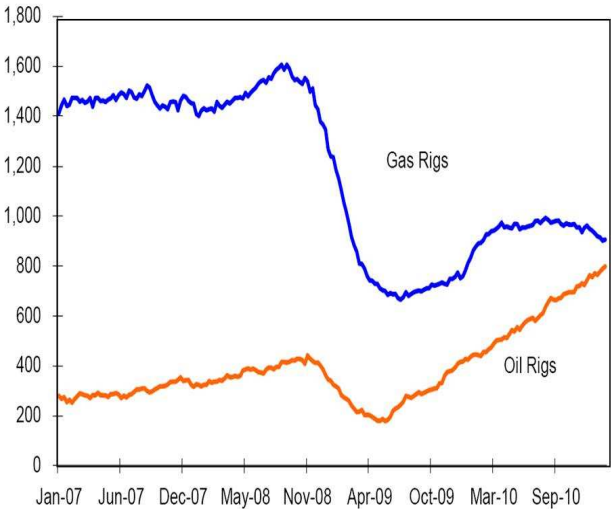
In the EU, spot gas prices remain important, because these can suppresses the gas price when arbitrage sets in to take advantage of lower spot prices by settling TOP in long-term contracts. This may happen in unusual warm winters resulting in demand lag and LT gas oversupply. This also occurs when cheap LNG spot gas becomes available in the world market, as happened over the past two years in the Atlantic basin due to the US diversion of unneeded LNG loads<sup>12</sup>.

The US gas industry is under severe financial pressure due to investors’ growing patience with low operational margins<sup>13</sup>. Waiting for a recovery of the US gas price may not occur fast enough. Producer gas traders might be well advised to start offering longer-term gas contracts to gas consumers using oil-indexing (or a mixed indexing of oil and gas spot prices). If the market is not prepared to adopt such contracts, perhaps governmental intervention should be considered to stimulate the use of such contracts and thereby remove the short-term volatility from the US gas market in favor of a more profitable and stable gas industry. The US currently uses bilateral negotiated physical contracts (spot gas indexed) and already benefits from standardized spot market gas contracts.

EU gas markets are still dominated by the oil-indexed bilateral LT gas contracts and a range of spot market contracts (different for BNP, TTF, PEG & NCG) – these contracts need harmonization. Finding more common ground by sharing and adopting best practices of both gas markets could bring convergence between North American and European gas prices. That would help making the gas business more stable for all major stakeholders - producers, consumers, investors, as well as reduce governments' concern about supply vulnerability. Such aims might be put on the agenda of such organizations as the World Forum on Energy Regulation (WFER), International Confederation of Energy Regulators (ICER) and the International Energy Regulatory Network (IERN).

**US & EU oil prices**

The US oil market is now starting to feel the impact of shale gas companies' massive shift from gas to oil drilling<sup>14</sup>. Lead by their ambition to restore gas prices, gas drill counts have been halved and oil drill counts have doubled over the past two years (Fig. 7). However, the benefit from oil prices is lower than expected as the WTI intermediate benchmark price has begun to lag behind the global recovery of oil prices. US oil production has now halted its three decades of decline and this retards the rise of US oil prices.



*Fig. 7: US gas weekly rig counts have halved and oil rig counts have doubled since 2008, as unconventional gas companies shift from gas to oil production (Source: Baker Hughes).*

The steep rise in US oil production is due to the application of unconventional drilling methods, horizontals and multistage fracking, to emerging US oil plays like the Bakken.

Although the US still imports 60% of its crude, the rise in domestic oil production contributes to depressed WTI prices as compared to the European benchmark (Brent crude oil, cf. Fig. 1a).

Europe imports 70% of its crude and nearly 50% of its natural gas. Security of supply would benefit and prices would come down to US levels when the development of Europe's indigenous unconventional oil & gas resources takes off. Serious efforts are needed to reduce growing concerns about oil and gas supply interruptions such as recently occurred due to MENA unrest. The adoption and development of the "new" US unconventional oil & gas field development techniques would improve the vitality of the European oil & gas industry.

**Conclusions**

*So what does the above analysis say about the future of oil and gas prices?* Oil-indexed gas contracts have gradually lifted gas prices in Continental Europe, as crude oil prices are firming up. This upward price trend will continue for both commodities as long as the economic recovery does not falter. Continental Europe's AGIP gas prices have held relatively firm over the recession. The impact of rapid drops in oil prices during the recession was cushioned as trailing averages of oil-prices are used in the oil-indexed LT gas contracts. The time lag is 6 to 9 months, which explains why the 2009 AGIP traded at double the price of 2009 US spot gas. The rise of oil & gas prices in Europe can only be slowed down in a structural fashion when the development of unconventional oil & gas resources starts to add regional price pressure to oppose the current short supply dynamics. Unless that is realized, expansion of storage capacity is needed too.

US wholesale gas prices have not yet reacted to the rising trend in US oil-prices. However, there still exists a certain link between oil & gas prices - even in the US - as highlighted in several studies<sup>3, 15</sup>:

- Calorific equivalence tends to direct consumer choices such that a loose price link is maintained. For example, power generators use gas for peak cycling, but could take residual fuel oil (diesel) as an alternative if gas becomes too expensive. However, burner-tip competition is limited due to lack of gas infrastructure in some regions.
- US independents can either drill for oil or gas – if the price of one is more advantageous than the other resources will be deployed accordingly. Although Rogers<sup>12</sup> doubted a trend reversion of gas and oil rig counts could still occur, it actually did occur<sup>14</sup> in 2010.

US gas prices will eventually recover, and perhaps faster than expected, as the effect of halving the gas rig counts to mitigate low oil prices will begin to take effect in the course of 2012. Price spikes may occur even faster when the financial woes of the unconventional gas industry trigger shut-ins as explained elsewhere<sup>14</sup>. Adoption of oil-indexed gas contracts would help to stabilize price-making in the US gas market. US oil prices themselves will rise further in step with the economic recovery. The discount of US oil with respect to Brent could grow further – especially if US independents continue to produce WTI equivalents under marginal cost, which these depresses the internal US oil prices.

### References

1. OECD/IEA, 2010. Natural Gas Information 2010. International Energy Agency, 594 pages.
2. Stern, J., 2007. Is there a rationale for the continuing link to oil product prices in Continental European long term gas contracts? Oxford Institute for Energy Studies, Natural Gas Series 19, 47 pages. <http://www.oxfordenergy.org/pdfs/NG19.pdf>
3. Stern, J., 2009. Continental European Long-Term Gas Contracts: is a transition away from oil product-linked pricing inevitable and imminent? Oxford Institute for Energy Studies, Natural Gas Series 34, 24 pages. <http://www.oxfordenergy.org/pdfs/NG34.pdf>
4. Weijermars, R. & McCredie, C., 2011. Gas Pricing – Lifting the Price. Petroleum Review, vol. 65, No. 768, March issue, p. 14-17.
5. McCredie, C. & Weijermars, R., 2011. The Rising Power of the Gas Traders. Petroleum Review, vol. 65, No. 771, June issue, in press.
6. Oswald, C., 2010. How unconventional gas fits into the gas market. Finding Petroleum Conference. April 27, 2010.
7. Geny, F., 2010. Can Unconventional Gas be a Game Changer in European Markets? Oxford Institute for Energy Studies, Natural Gas Series 46, 120 pages. <http://www.oxfordenergy.org/pdfs/NG46.pdf>
8. Weijermars, R., Drijkoningen, G., Heimovaara, T.J., Rudolph, S., Weltje, G.J, Wolf, K.H.A.A., & Zitha, P.L.J., 2011. Unconventional Gas Research Initiative for Clean Energy Transition in Europe. Submitted.
9. Berman, A. E., 2009, Lessons from the Barnett Shale imply caution in other shale plays: World Oil, v. 230, no. 8, p. 17.
10. Berman, A. E., 2010, Shale Gas—Abundance or Mirage? Why The Marcellus Shale Will Disappoint Expectations: The Oil Drum October 29, 2010: <http://www.theoil Drum.com/node/7075#more>.
11. Weijermars, R., 2010. Why untenable US natural gas boom may soon need wellhead price-floor regulation for industry survival. First Break, vol. 28, no. 9 (Sept issue), p. 33-38.
12. Rogers, H., 2010. LNG Trade-flows in the Atlantic Basin: Trends and Discontinuities, Oxford Institute for Energy Studies, Natural Gas Series NG 41, 133 pages. <http://www.oxfordenergy.org/pdfs/NG41.pdf>
13. Weijermars, R., and Watson, S., 2011. Can Technology R&D close the Unconventional Gas Performance Gap? First Break, vol. 29, no. 5 (May issue), in press.
14. Weijermars, R., 2011. Price scenarios may alter gas-to-oil strategy for US unconventional. Oil & Gas Journal, vol.109, no.1, p. 74-81.
15. Hartley, P., Medlock, K. & Rosthal, J., 2008. The Relationship Between Crude Oil and Natural Gas Prices. The Energy Journal, vol. 29, no.3, p.47-65.