Goldman Sachs

Global

Energy Watch

Commodities Research

Between Scylla and Charybdis

In this Energy Watch we present two distinct outlooks for two distinct markets. The Brent market outlook continues to be driven by the effects of the ongoing uncertainty over European sovereign debt and the potential for a second financial crisis against a backdrop on an extremely tight crude oil market. The WTI market outlook is driven by increasing crude supplies in the US Midwest and Midcontinent, and the race to develop to rail and pipeline capacity to take it to the global market.

The Brent market: Between Scylla and Charybdis

The world crude oil market remains exceptionally tight. Over the summer, Saudi produced 9.8 million b/d and the US SPR released 30 million barrels of oil, and yet the oil market remains in a seasonally-adjusted deficit, with inventories outside the United States at the lowest levels in nine years and OPEC spare capacity under 1.0 mmb/d. However, the market continues to focus on the risk of a new economic recession, triggered by the stress on the European financial and banking system. We expect the financial stress in Europe will continue to present headwinds to economic and oil demand growth next year, and we are lowering our 2012 Brent crude price forecast to $120/bbl from $130/bbl as our economists lower their outlook for 2012 world economic growth to 3.5% from 4.3%; we recognize the downside risk to our forecast from a potential European financial crisis. However, we also believe it is important to recognize that an event so widely anticipated will likely have an impact if it does not occur. The oil market continues to destock as prices anticipate a potential crisis. If a crisis does not occur, the oil market risks running into pressing supply constraints, requiring sharply higher prices to force demand in line with supplies.

The WTI market: Clearing the surplus by pipe, barge and rail

The old framework for analyzing the WTI-Brent spread has failed. Crude oil inventories at Cushing have fallen 11 mmb from their April highs, yet the spread has failed to narrow. We introduce a new framework for analyzing the WTI-Brent spread in terms of crude oil flows between the Midwest, the Midcontinent, and the US Gulf Coast. Using this framework we expect that the WTI-Brent spread will likely remain wide as new Canadian and North Dakota supplies enter the market, but will narrow as large amount of new rail capacity comes online by 2Q2012. Consequently, we are changing our WTI price forecast to $109/bbl in 2012, with a WTI-Brent spread target of -$16/bbl, -$13/bbl, and, -$6.50/bbl on a 3-, 6-, and 12-month horizon.

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Hedging and trading recommendations

Petroleum

Hedging recommendations

Consumers: With world economic growth continuing to drive oil demand growth well in excess of non-OPEC production growth, the oil market continues to draw on inventories and OPEC spare capacity in order to balance. In our view, it is only a matter of time before inventories and OPEC spare capacity become effectively exhausted, requiring higher oil prices to restrain demand, keeping it in line with available supply. Consequently, we believe the recent market correction provides a good opportunity for consumers to begin to hedge their forward oil exposure.

Refiners: Refining margins have recently shown counter-seasonal strength. However, this strength largely owes to the local weakness in WTI. As we expect the spread between WTI and Brent to narrow from current levels, we also expect product cracks to weaken. Further, we maintain that refining margins will remain under pressure owing to the large increase in refining capacity in Asia. As a result, we view any renewed rise in long-dated refinery margins in 2011 as a selling opportunity for refinery hedgers. For 2012 and beyond, we believe that crude will be the bottleneck in the system, rather than refining; this would squeeze margins from the crude side through backwardation, suggesting that refiners should also look for potential time-spread hedges.

Producers: While the risk-reward trade-offs for producer risk management programs have diminished with the recent market correction, additional economic disappointments could generate more downside in the near term. We recommend that producers look at option strategies to hedge against this risk. However, we expect supply-demand balances to continue to move to critically tight levels in 2012, with prices above recent levels by next year. Consequently, we think opportunities for producer hedging longer term are less attractive.

Trading recommendations

Long ICE Brent December 2012 contracts (initial price $105.16/bbl, current loss $8.14/bbl)

We recommend a long position in the ICE Brent December 2012 contract, as we expect that the market will continue to tighten to critical levels by 2012, pushing oil prices substantially higher to restrain demand.

Current trading recommendations

Current trades	First recommended	Initial value	Current Value	Current profit/(loss)[1]
Long Brent Crude Oil				
Buy December 2012 ICE Brent Crude Oil	May 23, 2011 - *Energy Watch*	$105.16/bbl	$97.02/bbl	**($8.14/bbl)**
Long Copper				
Buy June 2012 LME Copper	May 23, 2011 - *Commodity Watch*	$8,804/mt	$7,052/mt	**($1,753/mt)**
Long Zinc				
Buy December 2012 LME Zinc	May 23, 2011 - *Commodity Watch*	$2,189/mt	$1,933/mt	**($256/mt)**
Long UK Natural Gas				
Buy Q4 2012 ICE UK NBP Natural Gas	April 26, 2011 - *Natural Gas Weekly*	70.8 p/th	71.1 p/th	**0.3 p/th**
Long Soybeans				
Buy November 2011 CBOT Soybean	November 18, 2010 - *Agriculture Update*	$11.60/bu	$13.29/bu	**$1.69/bu**
Rolled into a long Nov-11 CBOT soybean $14.0/bu call on 3-Aug-11 with a realized gain of $1.68/bu				
Long Gold				
Buy December 2011 COMEX Gold	October 11, 2010 - *Precious Metals*	$1,364.2/toz	$1,622.3/toz	**$258.1/toz**

[1]As of close on September 30, 2011. Inclusive of all previous rolling profits/losses.

Source: Goldman Sachs Global ECS Research.

Price actions, volatilities and forecasts

	Prices and monthly changes[1]			Volatilities (%) and monthly changes[2]				Historical Prices						Price Forecasts[3]		
	units	30 Sep	Change	Implied[2]	Change	Realized	Change	1Q 10	2Q 10	3Q 10	4Q 10	1Q 11	2Q 11	3m	6m	12m
Energy																
WTI Crude Oil	$/bbl	79.20	↓ -9.70	44.1	3.35	41.9	-6.0	78.88	78.05	76.21	85.24	94.60	102.34	**96.50**	**107.00**	**116.00**
Brent Crude Oil	$/bbl	102.76	↓ -11.26	42.1	2.52	32.6	-4.5	77.37	79.41	76.96	87.45	105.52	116.99	**112.50**	**120.00**	**122.50**
RBOB Gasoline	$/gal	2.63	↓ -0.37	38.5	1.44	36.6	-6.3	2.11	2.17	2.00	2.22	2.68	3.10	**2.80**	**3.12**	**2.99**
NYMEX Heating Oil	$/gal	2.79	↓ -0.27	35.1	0.53	25.2	-7.4	2.05	2.11	2.06	2.36	2.82	3.05	**3.09**	**3.24**	**3.35**
NYMEX Nat. Gas	$/mmBtu	3.67	↓ -0.24	31.4	-1.88	32.6	7.0	4.99	4.35	4.23	3.98	4.20	4.38	**4.50**	**4.25**	**4.25**
UK NBP Nat. Gas	p/th	66.50	↑ 8.18	31.0	9.67	55.9	25.1	33.35	37.48	42.68	51.74	56.77	58.04	**66.40**	**66.20**	**87.70**
Industrial Metals[4]																
LME Aluminum	$/mt	2157	↓ -268	24.8	-0.05	23.6	2.8	2199	2122	2110	2365	2531	2618	**2300**	**2400**	**2650**
LME Copper	$/mt	7019	↓ -2142	35.6	5.55	40.7	14.0	7274	7042	7278	8614	9629	9163	**8000**	**9000**	**9500**
LME Nickel	$/mt	17600	↓ -4305	35.9	1.81	51.6	13.2	20163	22431	21271	23619	26926	24191	**18500**	**19000**	**21000**
LME Zinc	$/mt	1860	↓ -425	33.5	1.19	34.9	-1.4	2307	2052	2043	2333	2414	2271	**2050**	**2200**	**2400**
Precious Metals																
London Gold	$/troy oz	1622	↓ -208	29.3	4.92	37.5	5.6	1110	1197	1228	1370	1388	1508	**1645**	**1730**	**1860**
London Silver	$/troy oz	30.5	↓ -10.5	46.5	2.68	103.8	53.2	16.9	18.3	19.0	26.4	31.9	38.0	**27.5**	**28.9**	**31.1**
Agriculture																
CBOT Wheat	Cent/bu	609	↓ -141	30.8	-2.36	38.3	1.2	496	467	653	707	786	745	**640**	**650**	**600**
CBOT Soybean	Cent/bu	1179	↓ -270	20.7	-0.07	21.6	3.9	955	957	1035	1245	1379	1361	**1260**	**1300**	**1300**
CBOT Corn	Cent/bu	593	↓ -171	29.5	-3.72	36.6	9.6	370	355	422	562	670	731	**615**	**615**	**550**
NYBOT Cotton	Cent/bu	100	↓ -5	n/a	n/a	31.8	-2.7	76	81	87	128	179	156	**100**	**100**	**100**
NYBOT Coffee	Cent/bu	229	↓ -59	n/a	n/a	32.5	8.3	134	140	174	205	257	271	**235**	**200**	**175**
NYBOT Cocoa	$/mt	2608	↓ -479	n/a	n/a	24.6	0.8	3070	2987	2863	2856	3307	3043	**2700**	**2700**	**2700**
NYBOT Sugar	Cent/lb	26.3	↓ -3.3	35.0	-2.52	42.0	4.2	24.4	15.5	20.2	29.0	30.5	24.5	**28.0**	**24.0**	**24.0**
CME Live Cattle	Cent/lb	122.2	↑ 7.6	n/a	n/a	18.2	4.0	90.5	93.7	95.0	100.5	111.2	110.7	**120.0**	**130.0**	**120.0**
CME Lean Hog	Cent/lb	93.4	↑ 7.7	n/a	n/a	22.1	-40.8	69.7	81.9	79.7	71.2	86.2	93.6	**95.0**	**95.0**	**95.0**

[1] Monthly change is difference of close on last business day and close a month ago.

[2] Monthly volatility change is difference of average volatility over the past month and that of the prior month (3-mo ATM implied volatility, 1-mo realized volatility).

[3] Price forecasts refer to prompt contract price forecasts in 3-, 6-, and 12-months time.

[4] Based on LME three month prices.

Source: Goldman Sachs Global ECS Research.

The Brent market: Between Scylla and Charybdis

In our last Energy Watch, we cautioned that, while we expected the trajectory for oil prices to be higher moving into 2012, the oil market would likely remain volatile in 2011 as it navigated the slowdown in the pace of world economic growth. However, with the events in Europe continuing to raise the specter of another financial crisis and return to economic recession, the oil market is facing a navigational challenge worthy of Odysseus.

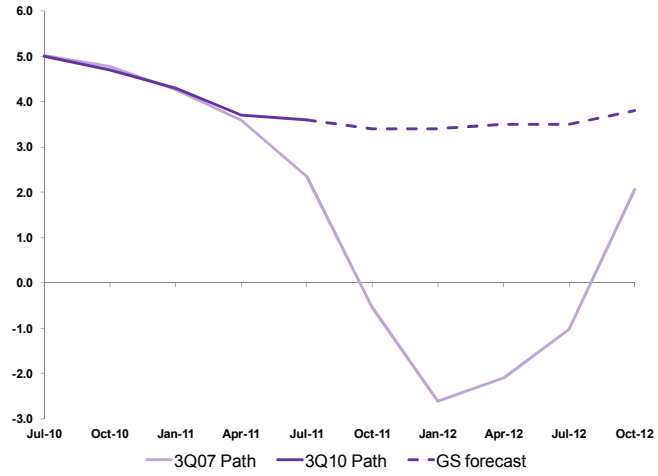
In the Greek myth, Odysseus chose to risk his ship by sailing to close to the rocks of Scylla rather than risk being pulled under by the whirlpool Charybdis. In our view, the oil market is currently pricing in fear that demand may soon be pulled down the whirlpool of another world economic recession. However, this is resulting in a crude oil price too low relative to current market supply-demand balances, leading to a draw on inventories to exceptionally low levels. Should economic growth surprise to the upside, the market risks running into increasingly pressing supply constraints in 2012. Like Odysseus, the oil market is currently running on Scylla wishing avoid Charybdis.

The world crude oil market remains exceptionally tight. This summer, Saudi production hit 9.8 million b/d and the US Strategic Petroleum Reserve (SPR) released 30 million barrels of oil into the market, and yet the oil market supply-demand balance remains in a seasonally-adjusted deficit. Crude oil Inventories outside of the United States have drawn to their lowest levels in nine years, and OPEC effective spare production capacity is less than 1.0 million b/d. This leaves the oil market reliant on Non-OPEC production growth and a resumption of Libyan production to meet world oil demand growth. However, Non-OPEC production continues to disappoint, with the growth that is occurring being predominantly NGLs, and not crude oil, or being trapped behind logistical bottlenecks in the US Midwest and Midcontinent, unable to reach the world oil market.

We believe this increasing lack of oil supply will require that oil demand growth be limited next year, and so the only question is whether demand will need to be restrained by higher prices, or will be undercut by a return to world economic recession off the ongoing events in Europe, in a repeat of the events of the fall of 2008.

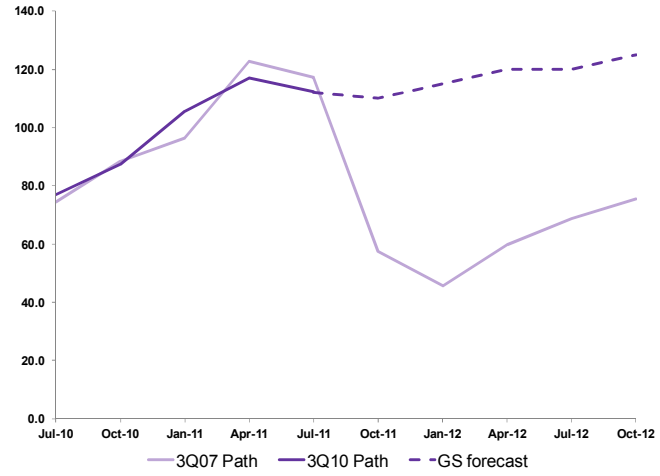
The similarities between now and the fall of 2008 are startling. The slowdown in the pace of world economic growth from 3Q2010-2Q2011 is almost identical to that from 3Q2007-2Q2008. In addition, Brent crude oil prices rose from roughly $75/bbl at the start of both periods to a peak near $120/bbl at the end of both periods (see Exhibits 1 and 2). Consequently, it is only prudent to ask if we once again find ourselves on the precipice of another sharp downturn.

Exhibit 1: World economic growth has followed the same path as 2007-08 so far …
% change yoy starting in 3Q2007 and 3Q2010



Source: GS Global ECS Research.

Exhibit 2: … as have Brent crude oil prices, raising the question of whether history is about to repeat itself
$/bbl



Source: GS Global ECS Research.

In our view, the lesson of the events of 2007-2008 is that the emerging market economies, and by extension the world economy, increasingly can be relatively resilient to a slowdown in the developed market economies like the United States and Europe, as long they are facing simply the transmission of real economic weakness, and not financial stress either to trade channels or their own banking systems. In short, if we can avoid a global financial crisis, we can avoid a global recession.

At this point, the concerns over European sovereign debt and the European financial sector are considerable. However, our economists do not yet expect the financial stress in Europe to trigger a world economic recession, as was experienced in 2008. Consequently, we view the turmoil in Europe as a headwind to world economic growth, which we expect will likely flatten the upward trajectory to oil prices, not reverse it. Specifically, with our economists lowering their outlook for 2012 world economic growth to 3.5% from 4.3%, we are lowering our Brent crude oil price outlook for 2012 to $120/bbl, from $130/bbl.

While the downside event risk surrounding the events in Europe is considerable, however, we must also bear in mind that an event this widely anticipated also has important effects if it does not occur. Specifically, the oil market continues to destock in anticipation of a new economic recession, suggesting a much greater risk of smashing into supply constraints if economic growth surprises to the upside.

Fearing the fear itself: The risk of a European financial crisis is considerable, but the uncertainty posed by this event risk is increasingly having real effects on the economy and the oil market.

There is much to be concerned about in Europe, and the risk remains that the stress on the European financial and banking sectors could become more severe, creating a significant strain on the global financial system. While the market is pricing in the concern of a "Lehman moment" arising from the financial stress in Europe, an event which would pose sharp downside risk to our forecasts, we think it is important to realize that the uncertainty over such an event is increasingly having real effects on the economy and the oil market. Further, our European economists do not believe that a resolution of the broader institutional and systemic issues surrounding the euro area is likely in the coming year, and

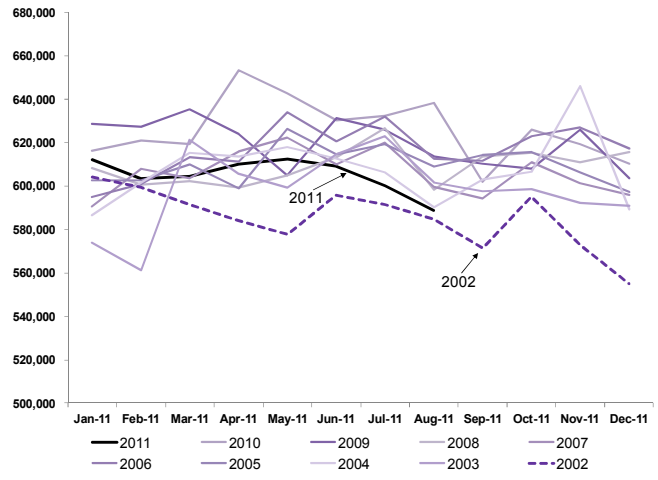
therefore these financial tensions, and their effects on the economy and the oil market, are likely to persist.

In the broader economy, we expect that the continuing stress in the financial and banking system in Europe and the uncertainty surrounding its resolution is likely to have real effects on economic growth into 2012, particularly in the euro area. The elevated financial tensions in Europe have led our European economists to lower their 2012 outlook for euro-area growth to 0.1%, with a recession – defined as two successive quarters of negative growth – foreseen at the turn of the year. The sharp slowdown in European economic growth expected at the end of 2011 is then expected to be followed by stagnation in 2012. While this view is driven in part by the negative effects of the financial dislocation and fiscal austerity measures on the countries of the European periphery, the European core countries are also expected to be effected in part by decisions to delay investment in the face of elevated uncertainty stemming from financial market developments.

In the oil market, the uncertainty and fear that the financial stress in Europe could lead to another economic recession is exacerbating a tight physical market. As the market "prices in" a higher probability of recession, it drives down futures prices below levels needed to balance supply and demand in the current market. This leads to further inventory draws, backwardation and a tighter physical market. Dated Brent prices are trading $5/bbl over the front-month Brent contract, one of the strongest sustained spreads on record, illustrating the strength of the current physical market relative to expectations for the future.

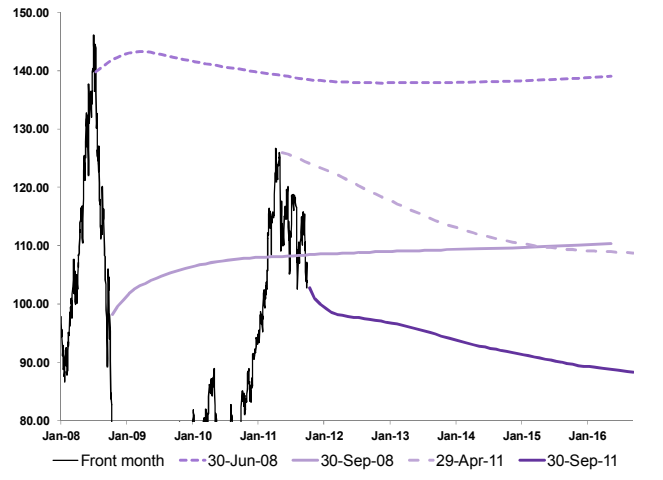
The fact that a second potential global financial crisis is so widely anticipated is a clear contrast to the financial crisis in the fall of 2008. In 2008, the oil market anticipated a much tighter oil market going forward. This was expressed in rising long-dated oil prices, which pushed forward curves into contango, and motivated the building of inventories. In 2011, in contrast, the oil market is anticipating a much weaker market going forward, with long-dated oil prices falling, pushing forward curves into backwardation, and exacerbating a continued destocking of inventories (see Exhibits 3 and 4).

Exhibit 3: OECD crude oil inventories are at their lowest level since 2002
OECD industry crude stocks, thousand barrels



Source: IEA, GS Global ECS Research.

Exhibit 4: In contrast to the contango market of 2008, the current market is backwardated, signaling tightness
$/bbl



Source: NYMEX, ICE, GS Global ECS Research.

This sharp contrast between the current tightness in the physical markets and the fear of future weakness is also being seen in the pricing of physical grades of crude oil. In Asia, Tapis trades over $114/bbl, more than $11/bbl over front-month Brent. On the US Gulf Coast, LLS now commands a premium once again to Brent, and the front-end of the Brent forward curve has exhibited the strongest sustained backwardation in at least a decade.

Consequently, while it is important to focus on event risk like the one now posed by ongoing events in Europe. It is also important to remember that an event risk that is being so widely anticipated has repercussions even if it is not based on the actions taken in anticipation of it. We recognize the event risk and expect the market to remain volatile. Should global growth slow to 2.5%-3.0%, we would anticipate prices falling to $85-$95/bbl as the market finds a first floor at the costs of continued investment in marginal oil projects to grow supply for the future. However, the market could be preparing for a crisis that may not come. Should demand growth surprise to the upside, the oil market does not have the inventory or production capacity to meet it, and so the market could hit the oil supply constraints more severely, with prices rising sharply higher to pull demand back in line with available supplies.

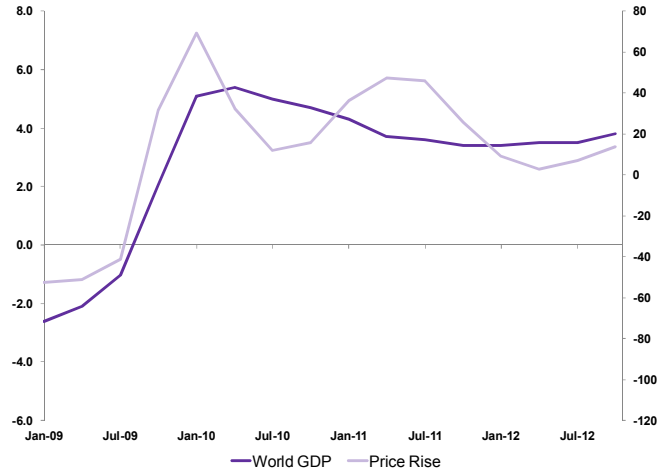
A slower pace of economic growth should ease the pressure on oil supplies and the upward pressure on oil prices, but we expect pressure will remain

In assessing the potential impact of world economic growth over the next year on oil prices, it is important to begin with two observations. First, the changes in Brent crude oil prices in recent years have largely been guided by the rate of world economic growth (see Exhibit 5). Second, the almost 50% rise in Brent crude oil prices over the past year has been acting as a considerable restraint on world oil demand growth.

As we have often discussed, our simplest model of world oil demand implies that it grows at a rate 2.0% below the rate of world economic growth when crude oil prices are stable. Each 10% increase in oil prices slows oil demand growth by 15 bp (0.15%). With Brent crude oil prices up over 45% year-over-year in 3Q11, this translates into a 0.7% drag on oil demand growth. To put it another way, the world economy grew at 3.6% year-over-year in 3Q11 according to the most recent estimates. However, given the 0.7% drag from rising prices, world oil demand grew at the same pace it would have if the world economy grew at only 2.9% with stable oil prices.

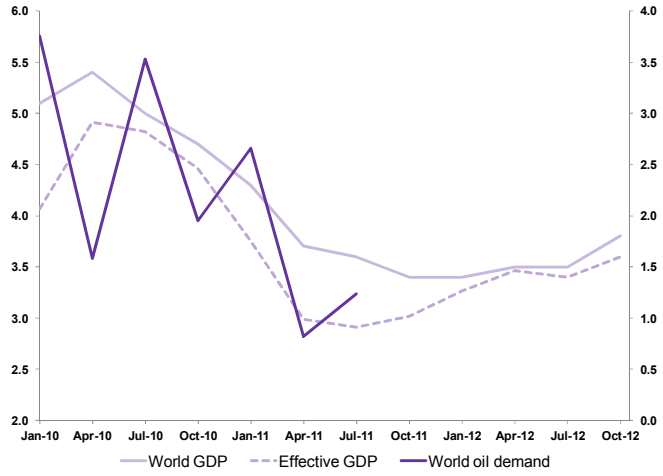
As shown in Exhibit 6, we can calculate an "effective" rate of world economic growth. This is the stable oil price equivalent rate of world economic growth, which is just the actual rate of world economic growth less 0.015 multiplied by the percentage change in Brent crude oil prices. This measure has tracked the growth in world oil demand quite well over the recent period. Further, it shows that the reduced headwinds to oil demand growth from prices as the rate of increase in Brent crude oil prices slows into 2012 will likely offset the increased headwinds to oil demand growth from slower world economic growth. This implies that while we expect that the rate of world economic growth on a year-over-year basis will trough in 1Q12, that the oil price-equalized rate of world economic growth – and world oil demand growth – has likely already troughed in 3Q11, with oil demand growth likely to continue to increase, albeit at a slower pace than previously expected, through 2012 (see Exhibit 6).

Exhibit 5: The rise in Brent crude oil prices has broadly tracked the rate of world economic growth.
% change yoy



Source: ICE and GS Global ECS Research.

Exhibit 6: Rising Brent prices have been a drag on oil demand growth, but that drag is now easing
% change yoy



Source: DOE, ICE and GS Global ECS Research.

Thinking in terms of world oil demand growth in 2012, our economists expect the world economy to grow at 3.5%. With a flatter trajectory for crude oil prices, this suggests that oil demand will likely grow at around 1.4%, which would be the rate of growth expected under 3.4% world economic growth and stable oil prices. This compares to this year, where year-to-date the world economy has grown by 3.9% yearover-year, but the price headwinds made it the equivalent of a world economy growing at only 3.2% with stable prices. Consequently, we expect world oil demand in 2012 to grow at about the same pace as it did in 2011, as the reduced headwinds from price increases are offsetting the slower pace of world economic growth.

However, in 2011 we were able to meet this oil demand growth by taking Saudi production to the highest levels in over a decade, drawing down OECD total petroleum inventories to below their five-year average levels, and releasing Strategic Petroleum Reserves. With OPEC spare capacity now effectively under 1.0 million b/d, and OECD crude oil inventories outside of the United States at the lowest levels in over nine years, 2012 oil demand growth will need to be met largely out of Non-OPEC production growth and Libyan as well as Iraqi crude oil production.

However, non-OEPC production continues to disappoint this year, as the ramp of new projects is much slower than expected and decline rates have once again taken a turn for the worse. Back in December last year we forecasted that non-OPEC supply would grow by 635 thousand b/d in 2011, already a substantial slowdown from the 1.1 million b/d growth realized in 2010. However, as the year passed by it became evident that non-OPEC supply had once again fallen back into old patterns and that supply would growth by 100-200 thousand b/d at most this year and only if some of the delayed projects still come on-stream later this year. Non-OPEC supply growth tends to surprise to the upside in an environment of sharply slowing demand growth and falling prices as it was the case in 2009 and 2010. Typically bottlenecks in the oil service industry tend to ease with lower oil demand and falling crude oil prices, allowing oil companies to maintain their producing fields at reduced service costs, pushing down decline rates while at the same time expediting the ramp up of new projects. In addition, governments tend to shy off fiscal renegotiations with oil companies when oil prices are too low to balance the national budget in order to ensure they keep inventing in new supplies. However, with most

national budgets of oil exporting countries now in surplus at current oil prices, fiscal relegations are much more likely to happen which typically results in slower supply growth.

For 2012 we forecast supply growth only out of a few regions within non-OPEC. Even there, supply growth will be much smaller than what we had expected less than a year ago. We continue to see strong supply growth in the United States where shale oil production will reaccelerate after being restrained for most of the year by bad weather. NGL production will also continue to be supported by higher US natural gas production. However, we expect another year of disappointing production in the US Gulf of Mexico as the industry still suffers from the consequences of the deepwater horizon oil spill. Canadian production will also rise as new oil sand projects come on-stream while previously shut in production returns. In Latin America, Brazilian and Columbian production will continue to show growth but at a slower pace than what we previously had expected. While Brazil is struggling with delays of new projects which resulted in actual year-over-year declines in production in April and May, Columbian production is likely to slow down as service costs have risen and mid-stream bottlenecks start to appear. We expect that Chinese crude output will grow again next year, but only half of last year's levels. We also expect that some producers that accounted for a large share of non-OPEC supply growth over the past year will unlikely be able to deliver growth and some of them might already start to decline while decline rates of mature producers have increased sharply. More specifically, we expect Russian production to remains flat at best while North Sea production from Norway and the UK is declining by 10%-14%. On net, we expect non-OPEC supply to grow by around 370 thousand b/d next year but we see some risk that non-OPEC production could again disappoint next year.

Within OPEC we believe that Iraq will be the only member country that can add any substantial increase in crude oil production capacity. Our forecast remains unchanged at 340 thousand b/d supply growth in 2012. We also expect that Libyan output will rebound in the coming months, but half of that will likely be absorbed by local a rebound in Libyan demand. Further, while we do see production from other OPEC countries to grow as well next year by around 400 thousand b/d, this will not be crude oil supply but NGLs.

We also expect that 600 thousand b/d of Libya's output will return until the end of 2012, but half of that will likely be absorbed by local a rebound in Libyan demand. Further, while we do see production from other OPEC countries to grow as well next year by around 400 thousand b/d, this will not be crude oil supply but NGLs.

This raises an important issue: Of the total global incremental new production capacity of 1.1 million b/d next year, 640 thousand b/d is actually not crude but mainly Natural Gas Liquids (NGLs). NGLs are mainly used in the petrochemical industry to produce plastics. Strong demand for petrochemical products out of the emerging markets has absorbed the strong NGL production increase over the past two years. However, the petrochemical industry in the developed world is getting into capacity constraints, and most of the new capacity will be built mainly in the emerging markets directly. However, unlike in the US where most petrochemical facilities are running on NGLs, petrochemical plants in Asia mainly use naphtha as feedstock. Consequently, as demand will be entirely driven by the emerging markets next year, NGLs and ethanol is not what the world actually will need. Emerging Market growth will mainly translate into demand for products such as middle distillates, naphtha, petroleum coke and fuel oil, which cannot be made out of NGLs.

Further, a substantial part of this years demand growth has been met by inventory draws both from commercial and government stocks. As inventories are already at very low levels – crude oil stocks outside of the United States are at the lowest levels in nine years – it is very unlikely than inventories will draw again to the same extent next year.

On net, crude supply will likely not be able to meet demand by the end of 2012 which will in our view require higher prices to in order to hold demand in line with available supply

(see Exhibit 7). However, at this point, the concerns over European sovereign debt and the European financial sector are considerable and while our economists do not yet expect the financial stress in Europe to trigger a world economic recession, as was experienced in 2008, they still expect the turmoil in Europe to create headwinds to world economic growth. Consequently we expect this will likely flatten the upward trajectory to oil prices, not reverse it. Specifically, with our economists lowering their outlook for 2012 world economic growth to 3.5% from 4.3%, we are lowering our Brent crude oil price outlook for 2012 to $120/bbl, from $130/bbl. We recognize the event risk, and we expect the market to remain volatile. Should global growth slow to 2.5%-3.0% we would anticipate prices falling to $85-95/bbl as the market finds a first floor at the costs of continued investment in marginal oil projects to grow supply for the future. However, the market could be preparing for a crisis that may not come. Should demand growth continue to grow steadily, the oil market does not have the inventory or production capacity to meet it, the mark could hit the oil supply constrains more severely, with prices rising sharply higher to pull demand back in line with available supplies.

Exhibit 7: Demand growth in 2012 will likely be comparable to 2011, but sources of new supply are much scarcer

	2011				2012			
	growth	percent	percent of demand growth	level mmb/d	growth	percent	percent of demand growth	level mmb/d
Implied world oil demand	**1,253**	**1.4**	**100**	**88,859**	**1279**	**1.4**	**100**	**90,138**
Supply	**1,058**	**1.2**	**84**	**88,502**	**1,507**	**1.7**	**118**	**90,008**
Crude oil	**421**	**0.5**	**34**	**78,010**	**869**	**1.1**	**68**	**78,878**
Non-OPEC crude only	99	0.2	8	48,083	130	0.3	10	48,213
OPEC ex Libya	1,469	5.2	117	29,524	550	1.9	43	30,074
Libya	-1,147	-74.0	-91	403	189	46.9	15	592
NGL and biofuels	**637**	**6.5**	**51**	**10,492**	**638**	**6.1**	**50**	**11,129**
non-OPEC NGLs and biofuels	135	2.9	11	4,762	240	5.0	19	5,002
OPEC NGLs	502	9.6	40	5,730	398	6.9	31	6,127
Supply from inventories	**196**	**120.3**	**16**	**358**	**-227**	**-63.5**	**-18**	**131**
Industry	296	-450.5	24	229	-99	-43.0	-8	131
SPR	98	998.5	8	108	-108	-100.0	-8	0
Oil at sea	-198	-90.5	-16	21	-21	-100.1	-2	0

Source: IEA, GS Global ECS Research.

The WTI market: Clearing the surplus by pipe, barge and rail

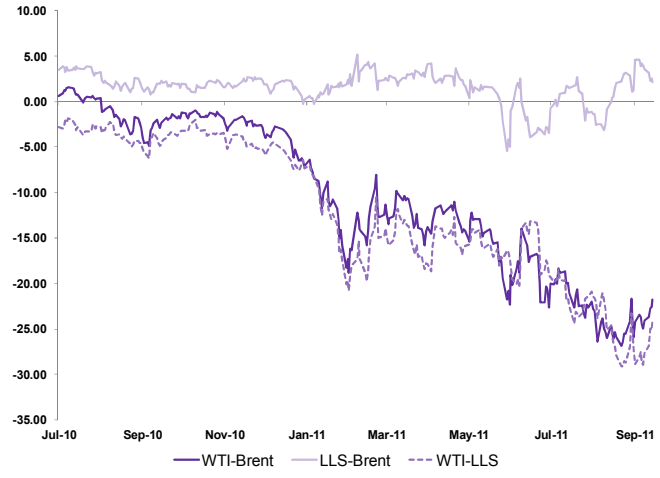
It has been clear that the rising river of crude oil flowing through the midsection of the United States has been responsible for the record decline in the WTI-Brent spread over the past 12 months. However, the nature of the price setting margin linking prices to fundamentals has been elusive. Without a detailed understanding of this price setting margin, it is impossible to assess whether crude oil price spreads have widened sufficiently to open the flood-gates of rail, barge, and truck transportation to direct this river of crude oil out of the US Midwest and Midcontinent down to the US Gulf Coast, or if this river of crude oil will hit flood stage, requiring local crude oil prices to plummet in order to shut in US and Canadian production.

The issue has become increasingly important as it has become clear that the relationship between the WTI-Brent spread and inventory levels at Cushing has changed. Cushing inventories have drawn 11 million barrels from their April 2011 peak, yet the discount of WTI to Brent and to US Gulf Coast crude oils like Louisiana Light Sweet (LLS) continues to widen. Clearly these recent declines are not representative of the classic "Cushing issue."

Further, they are not being driven by movements in the LLS-Brent arb, as WTI continues to price at near record discounts to LLS. While the release of 30 million barrels of SPR crude oil into the US Gulf Coast pushed LLS under Brent in July and parts of August, closing the transatlantic light-sweet crude oil, with the SPR release completed, the forward LLS-Brent spread is once again positive, opening the transatlantic light-sweet crude oil arb in order to attract barrels from West Africa to the US Gulf Coast (see Exhibit 8, and our Energy Weekly: *WTI-Brent spread hits a record low, but it isn't Cushing this time.* June 14, 2011 for details).

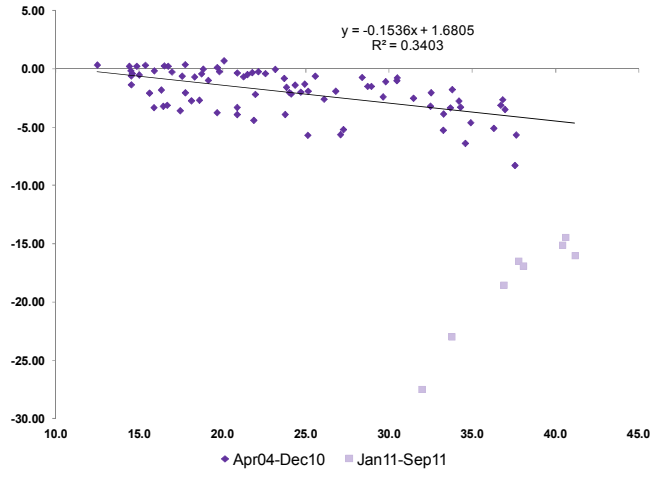
Consequently, the old framework of decomposing the WTI-Brent spread into the WTI-LLS and the LLS-Brent legs and viewing the WTI-LLS leg in terms of Cushing inventories is no longer valid. In fact, a decline in Cushing inventories has been associated with a decline in the WTI-LLS since the opening of the Keystone pipeline to Cushing in February of this year (see Exhibit 9). Understanding the economics the WTI-Brent spread now requires a more detailed look at the landscape of production and pipeline logistics in the US Midwest and mid-continent.

Exhibit 8: WTI-LLS and LLS Brent
$/bbl



Source: NYMEX, ICE, GS Global ECS Research.

Exhibit 9: WTI-LLS vs Cushing
$/bbl (vertical axis), million barrels (horizontal axis)



Source: NYMEX, DOE, GS Global ES Research.

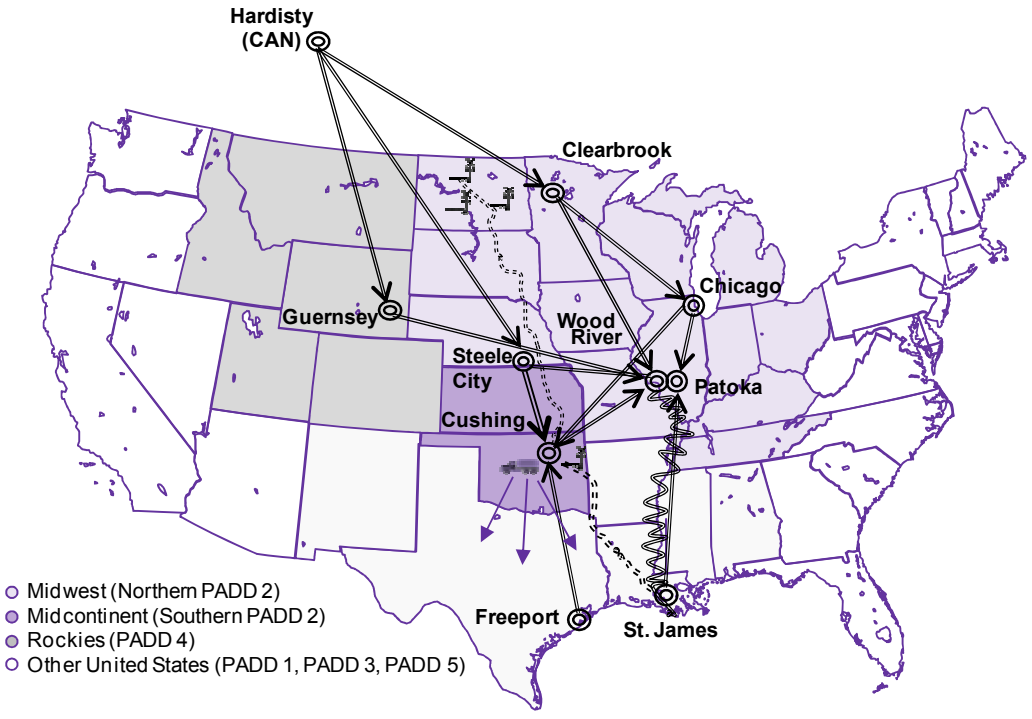
The Midwest and the Midcontinent crude oil markets

It has long been understood that the WTI price reflects the price of light-sweet crude oil in the US Midcontinent, and that it must be understood in the context of the supply-demand balance of that region. However, for many years it was largely possible to think of WTI as being reflective of the broader inland PADD2 market. This is no longer the case. Increasing oil production from Canada and the Bakken Shale in North Dakota has strained and led to the redirection of pipeline infrastructure throughout the PADD 2 region. Consequently, PADD 2 has split into two distinct oil markets (see Exhibit 10).

The Northern PADD 2 region (or the Midwest market) is characterized by the major crude oil pipelines running from Western Canada and the Bakken shale to Chicago area refineries and the Wood River-Patoka oil hub, where they compete with crude oil coming up from the US Gulf Coast along the Capline pipeline, and can barged down to the US Gulf Coast (see Exhibit 10). The price of Canadian Mixed Sweet crude oil (MSW) in Hardisty is a useful benchmark for this region and is closely connected to the prices of Bakken blends at both Clearbrook, Minnesota and Guernsey, Wyoming.

The Southern PADD 2 region (or the Midcontinent market) is the immediate surroundings of Cushing, Oklahoma. We think of it as mainly Oklahoma and Kansas. The price of WTI is the benchmark in this region. Traditionally, crude oil flowed from Cushing to the Midwest market, and it still does on some pipelines like the Ozark and BP1. However, with the center of crude oil production growth having moved from the Permian Basin to Alberta and North Dakota, oil flows increasingly into Cushing. In March 2006, the Spearhead pipeline became the first to continuously deliver Western Canadian crude oil to Cushing. The flows over the Spearhead pipeline have become a critically important connection between the Midwest and the Midcontinent markets.

Exhibit 10: The Major oil transportation routes of the US Midwest and Midcontinent



Source: GS Global ECS Research.

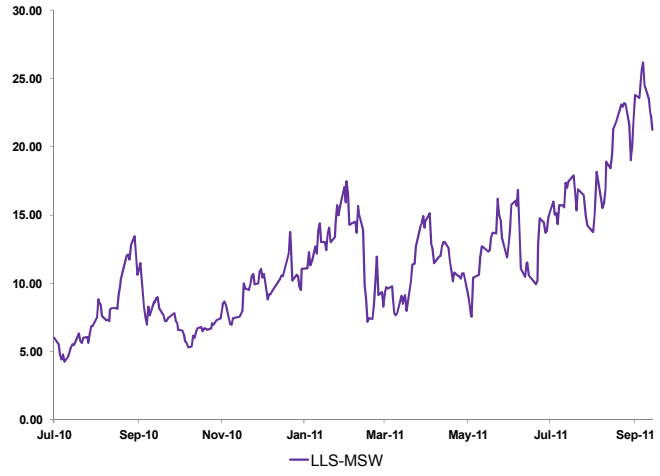
The US Midwest and Midcontinent markets are now distinct crude oil markets, with their own distinct crude oil benchmark prices. Consequently, we find it useful to decompose the WTI-LLS leg of the WTI-Brent spread into two as well: the MSW-WTI leg and the LLS-MSW leg.

- The MSW-WTI leg represents the price difference between the Midwest and the Midcontinent markets. While the spread has flipped from historically pricing MSW $4/bbl under WTI to now trading $4/bbl over, it has remained relatively stable and range bound in the recent period (see Exhibit 11).
- The LLS-MSW leg represents the difference between the Midwest and the US Gulf Coast. After crude oil travels down the pipelines to the Midwest, it competes with crude oil coming up the Capline pipeline from the US Gulf Coast, or it can travel by barge down the Mississippi. It is this leg of the arb that has been under increasing pressure (see Exhibit 12).

Exhibit 11: Canadian crudes like MSW have flipped to price at a premium to WTI…
$/bbl

Source: NYMEX, Platts', and GS Global ECS Research.

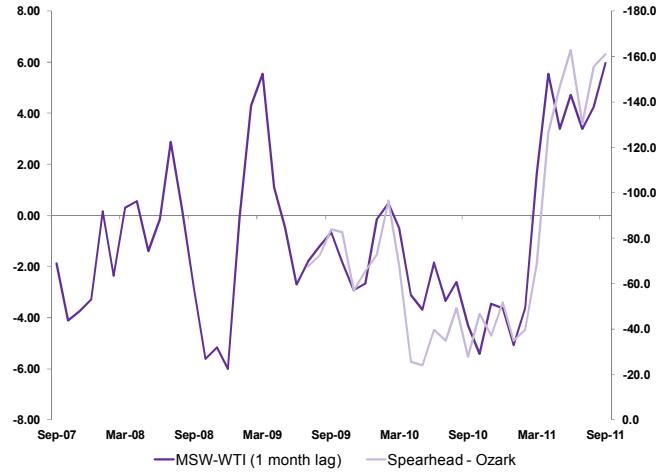
Exhibit 12: …while US Gulf Coast crudes continue to price at a large premium to both
$/bbl



Source: NYMEX, Platts', and GS Global ECS Research.

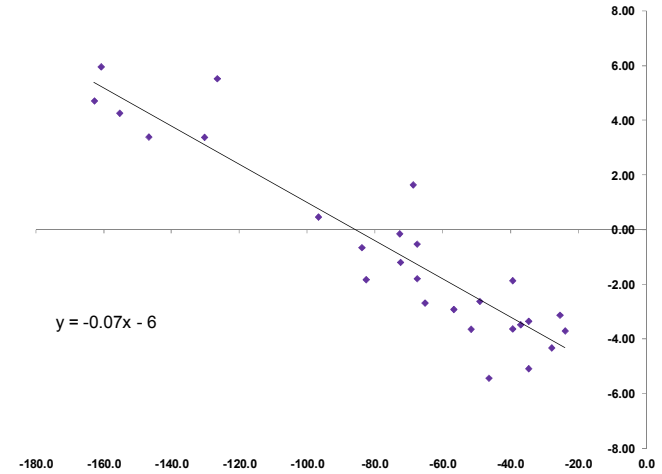
Each of these spreads has tended to reflect the pricing pressures along the logistical routes between the regions. For example, the MSW-WTI spread has been highly correlated with the flows along the Spearhead and Ozark pipelines connecting the Midwest and Midcontinent oil markets (see Exhibit 13). In order to slow southbound flows down the Spearhead (and increase northbound flows on the Ozark) the MSW-WTI spread must increase. Conversely, in order to increase southbound flows to Cushing down the Spearhead (and slow the northbound flows to Wood River on the Ozark) the MSW-WTI spread must decline. We have observed that a 1 thousand b/d increase in net crude oil flows from the Midwest to the Midcontinent along these routes pushed down the MSW-WTI spread 7 cts/bbl. This likely reflects costs associated with congestion along the pipeline routes (see Exhibit 14).

Exhibit 13: The MSW-WTI spread has been largely driven by flows on the Spearhead and Ozark pipelines…
$/bbl (left axis); thousand b/d (right axis, invested)



Source: Genscape, Platts', and GS Global ECS Research.

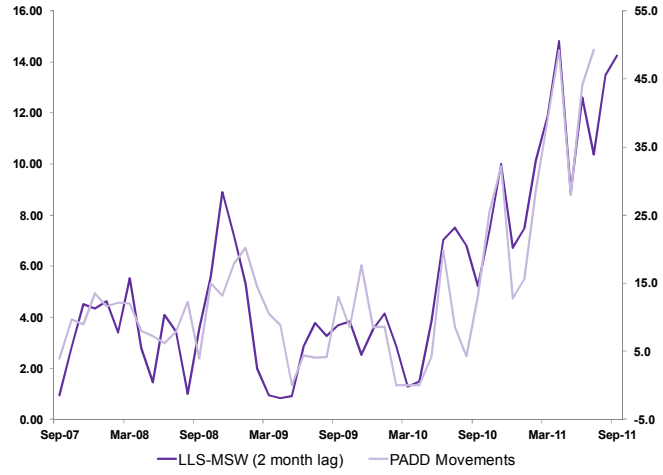
Exhibit 14: … with a lower MSW-WTI spread needed to direct crude oil south into Cushing.
$/bbl (vertical axis); thousand b/d (right axis).



Source: Genscape, Platts', and GS Global ECS Research.

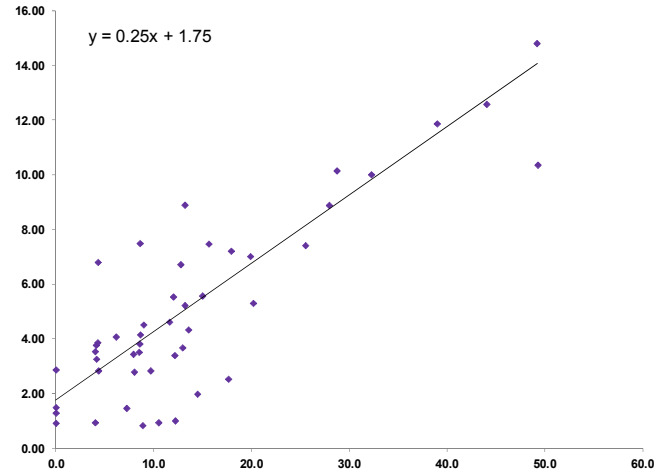
While the MSW-WTI spread reflects flows on the Spearhead and Ozark crude oil pipelines connecting the Midwest to the Midcontinent oil markets, the LLS-MSW spread reflects the ability to move crude oil by barge from Wood River to the US Gulf Coast (see Exhibit 15). Each 1 thousand b/d increase in barge traffic tends to increase the premium of LLS over MSW by 0.25 cts/bbl, likely reflecting congestion on the river (see Exhibit 16).

Exhibit 15: The LLS-MSWI spread has been largely driven by barge flows from Wood River to the US Gulf Coast…
$/bbl (left axis); thousand b/d (right axis)



Source: Platts', DOE, and GS Global ECS Research.

Exhibit 16: … with a higher LLS-MSW spread needed to direct crude oil south to the US Gulf Coast.
$/bbl (vertical axis); thousand b/d (horizontal axis)



Source: Platts', DOE, and GS Global ECS Research.

These two pricing pressure points for the regional price spreads provide a framework for thinking about the spreads in terms of the regional balances. Oversupply in the southern Padd 2 region, or the Midcontinent, will require the price of WTI to fall relative to Mixed Sweet in order to reduce the flow of crude oil down the Spearhead pipeline, and support the flow of oil northbound on the Ozark pipeline. Oversupply of crude oil in the Midwest

requires Mixed Sweet prices to fall relative to LLS in order to stem the flow of crude oil up the Capline from the US Gulf Coast and to incentivize the movement of excess crude oil by barge down to the US Gulf Coast market.

The US Midwest and Midcontinent supply-demand balance outlook

We believe that the US Midwest and Midcontinent balance will go through significant changes over a number of years, both in terms of supply and demand (see Exhibits 33-35). However, in terms of transportation capacity, changes will come mainly in the form of rail capacity over the next 18 months as we do not expect that a larger pipeline connecting PADD 2 with PADD 3 will be operational before early 2013.

US Midwest (PADD 2 ex Kansas & Oklahoma)

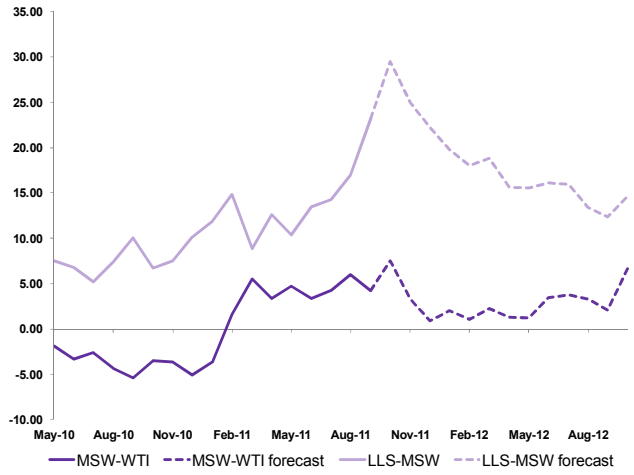
- We believe that crude production in the **US Midwest** will increase by up to 150 thousand b/d in 2012 due to a reacceleration of Bakken production and some small increase for the Niobrara.
- We believe that refining capacity will increase by close to 60 thousand b/d next year.
- There are currently rail projects planned, proposed and under construction that would boost North Dakota crude loading capacity by 450 thousand b/d in 2012.
- We believe that barge transportation capacity could increase by a further 30 thousand b/d.

US Midcontinent (Kansas & Oklahoma)

- While we don't expect any meaningful change in **US midcontinent** (Kansas and Oklahoma) production, we expect that an increase in production in the Permian Basin and the Granite Wash that will be shipped via pipeline to Cushing will add 50 thousand b/d of new supplies next year.
- There are plans for a rail loading terminal at Cushing that could add at least 140 thousand b/d of transpiration capacity by mid-next year.

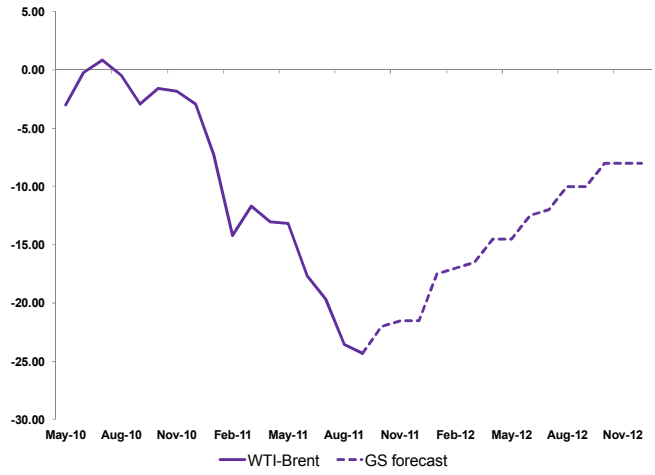
On net, we expect that inventories in the Midwest will soon start building again after several months of declines. This is the result of a rebound in local crude production growth and refineries entering the maintenance season while growth in transportation capacity is likely limited in the near term. However, as significant rail loading capacity will be added from January onwards, we expect that growth in new rail capacity will have outpaced production growth already by the end of 1Q2012, leading to a renewed decline in PADD 2 (ex Cushing) inventories and to a narrowing of the MSW – LLS spread. The opening of the planned rail loading terminal at Cushing by the end of 2Q2012 should help to ease the pressure on Cushing inventories and help to narrow down the spread between WTI and LLS. Once a pipeline is in place that allows large volumes of crude to be shipped from Cushing to the USGC, we would expect that the spread between WTI and LLS will narrow down to pipeline tariffs, which we expect to be around $3-%5/bbl. Consequently, we are changing our WTI-Brent spread target to -$16/bbl, -$13/bbl, and, -$6.50/bbl on a 3-, 6-, and 12-month horizon (see Exhibit 32).

Exhibit 17: Forecasted price paths MSW-WTI, LLS-MSW
$/bbl



Source: GS Global ECS Research.

Exhibit 18: And for WTI-Brent
$/bbl



Source: NYMEX, ICE, GS Global ECS Research.

The US Midwest and Midcontinent supply-demand balance outlook in detail

We expect crude oil supply to the US mid-continent to rise sharply...

We expect that **US imports of Canadian** crude oil will grow strongly over the next six months due to a combination of new projects ramping up and the return of production that was shut in due to planned and unplanned maintenance (see Exhibit 19). For instance, 215 thousand b/d of Suncor's 350 thousand b/d Fort McMurray, Alberta facility has already been brought back on June 20 after being shut in for a 6-week planned maintenance. Further, Canadian Natural Resources announced on August 22 that its 110 thousand b/d Horizon plant is back online and is expected to ramp up to full production within a week. A fire on January 6 at its primary upgrader has forced the plant to keep all production shut in. Initially it was planned to bring back half of the production by mid year, but the forest fires in Alberta in May have delayed those plans. In addition, two large sources of new supply will add significant volumes of Canadian crude over the next months. The first shipments from Suncor's Firebag 3 project have already started at the end of July and will slowly ramp up to 15 thousand b/d by the end of the year. The project will continue to ramp up over a period of 24 months until it reaches its maximum output of 60 thousand b/d, according to the company. Further, the Athabasca Oil Sands Project (AOSP), a joint venture between Shell, Marathon and Chevron, will continue to ramp up over the next 18 months, with the potential to add up to 30 thousand b/d by the end of 2011. However, these increases will be partly offset by the shutdown of 100 thousand b/d of Syncrudes upgrading capacity due to maintenance from mid-September until the end of October.

On net, Canadian production could grow by up to 230 thousand b/d year-over-year in 2012. However, only about half of this production would actually come from new projects. The other half of this strong year-over-year increase is due to exceptionally low utilization of existing capacity in 1H2010 as production was disrupted by unplanned shutdowns on top of already planned maintenance. A production growth of 230 thousand b/d would therefore require that all the existing capacity will be fully utilized in 2012. However, the Canadian upgrader facilities work in exceptionally harsh conditions and past experience has shown that they are prone to disruptions. Consequently, the risk to Canadian production growth is to the downside.

Exhibit 19: Selected Canadian crude oil projects

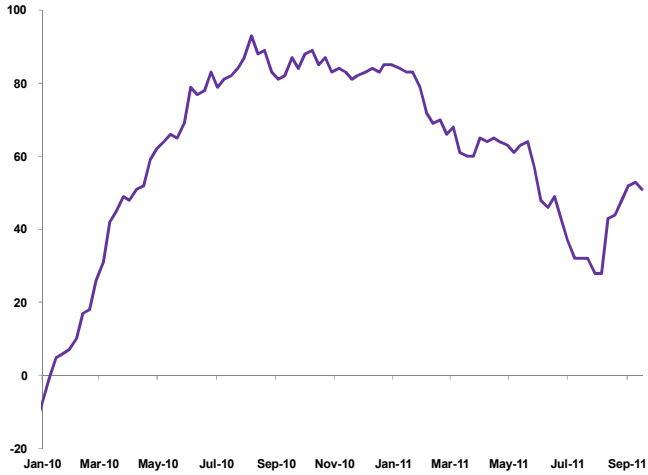
	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12
Western Canada new projects / expansion												
AOSP	125	100	135	170	185	200	215	238	255	255	255	255
Jackfish	35	35	35	35	35	36	41	47	53	58	64	69
Long Lake	25	25	25	25	26	28	34	40	46	52	58	60
Firebag Stage 3	0	0	0	0	0	0	3	10	18	26	34	42
Foster Creek & Christina Lake	115	115	115	115	116	95	116	120	124	129	133	138
Total New	300	275	310	345	361	359	408	454	496	520	544	564
Total Light New	125	100	135	170	185	200	215	238	255	255	255	255
Total Heavy New	175	175	175	175	176	159	193	217	241	265	289	309
Western Canada downtime												
Horizon Oil Sands	110	110	110	110	3	5	53	107	110	110	110	110
Suncor	204	295	306	326	323	244	332	338	340	340	340	340
Syncrude	350	350	350	350	350	350	333	317	350	350	350	350

Source: Company reports, GS Global ECS Research.

Production in the **US midcontinent** also continues to grow. PADD 2 Crude oil production has grown by 80 thousand b/d year-over-year in 2010, and has accelerated to 95 thousand b/d year-over-year in the first four months of 2011. This growth has been mainly driven by the rapid production increases from the **Bakken shale formation**, which has pushed North Dakota output to about half of total PADD 2 production. However, the year-to-date growth in production fell short of expectations in 1H2010. Initially we expected that crude production in the Bakken would grow at a rate of 140 thousand b/d and output was well on track until the end of last year. However, harsh weather conditions hampered rig count growth in winter, resulting in the first meaningful decline in production since the recession and the rig count growth in the Bakken only started to rebound in early August (see Exhibit 20). This has had a direct impact on crude production growth as shale oil production shares a fundamental characteristic with shale gas production: it requires constant drilling in order to keep output steady. Once drilling stops, production declines start almost immediately due to the steep declines rates inherent to this production technique. In addition to reduced drilling, production growth was also held back as the weather conditions affected rail transportation and made it challenging to ship the crude.

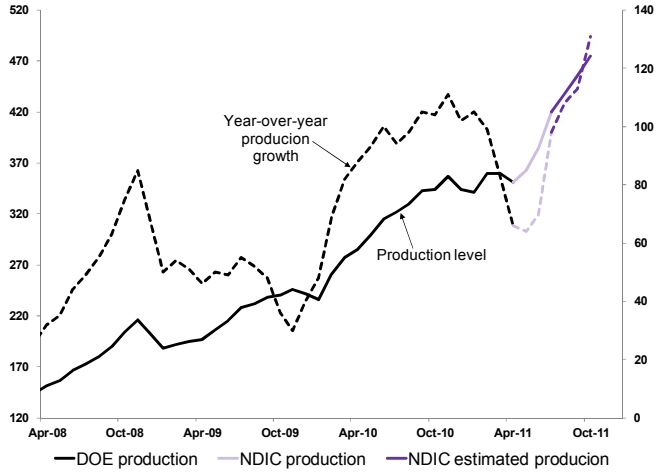
However, data from the North Dakota industrial Commission suggests that the worst part seems to be over now and production started to grow again, hitting a record 420 thousand b/d in July. Further, according to the commission, production could reach 475 thousand b/d by the end of October, implying that production would be growing close to 140 thousand b/d (see Exhibit 21). We therefore remain optimistic that Bakken crude oil production growth next year will reach our forecast of 120 thousand b/d.

Exhibit 20: Bakken drilling activity reaccelerated in August, reversing a lasting weather related slowdown
Year-over-year change in North Dakota drill rig count



Source: Baker Hughes, GS Global ECS Research.

Exhibit 21: Bakken production growth has rebounded and could reach 140 thousand b/d by year end
North Dakota output, thousand b/d, level (left axis); year-over-year change (right axis)



Source: DOE, North Dakota Industrial Commission, GS Global ECS Research.

Other areas in the mid-continent have also experienced production growth. More specifically, we expect crude production from the Niobara shale formation to grow by 10 thousand b/d this year and 20 thousand b/d next year.

Further, there is also growth in production outside PADD 2 that is currently pushed into the US midcontinent due to pipeline restrictions. More specifically, we expect that enhanced oil recovery (EOR) projects and shale oil drilling in the Permian basin in Texas will push up production by about 40 thousand b/d year-over-year in the coming months. In addition, production in the Eagle Ford is also growing in the 10-15 thousand b/d range year-over-year (see Exhibit 22 & 23). Part of the production from the Permian basin and the Granite Wash is typically absorbed by local refineries. However, the remainder flows via the Centurion pipeline and the Basin pipeline to Cushing. We believe that the local refineries are currently taking in as much of this crude as possible given the exceptionally strong refining margins, implying that any incremental increase in Permian and Granite Wash production will flow to Cushing until the pipeline system from West Texas expands, which we do not expect to happen before 2013.

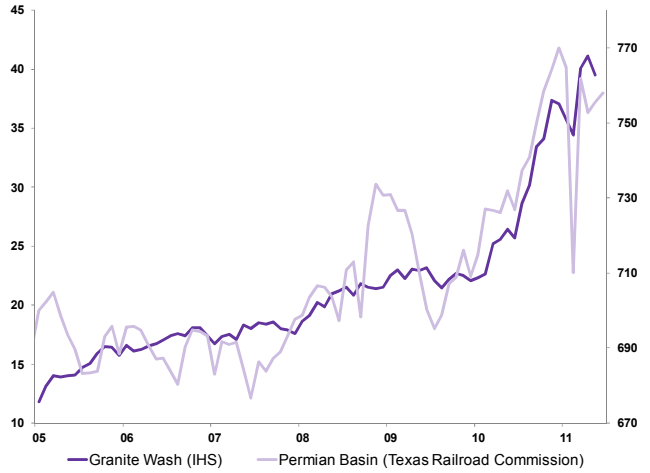
Exhibit 22: Production in the Lower 48 is expected to grow strongly in the coming years
Year-over-year change, thousand b/d

	Total crude oil and NGL					
	2010	2011	2012	2013	2014	2015
Bakken Shale	65	112	133	111	83	66
Eagle Ford	35	156	137	111	105	104
Granite Wash	61	70	69	55	34	24
Permian Basin	24	35	43	43	43	40
California Kern County	10	6	9	6	15	5
California Shale	7	11	7	5	11	7

	Crude oil					
	2010	2011	2012	2013	2014	2015
Bakken Shale	58	101	120	100	75	60
Eagle Ford	23	102	89	72	68	68
Granite Wash	20	23	23	18	11	8
Permian Basin	15	21	26	26	26	24
California Kern County	8	4	7	5	12	4
California Shale	6	9	6	4	8	5

Source: GS Global ECS Research.

Exhibit 23: Rising production from North- and East Texas will flow into the US midcontinent
Crude oil (excluding condensates), thousand b/d, Granite Wash (left axis); Permian Basin (right axis)



Source: Railroad Commission of Texas, IHS, GS Global ECS Research.

...but transportation and refining capacity will likely increase even more

Incremental transportation capacity to ship crude oil out of the US midcontinent in various forms will be added over the coming years. More specifically

- We expect that at least one large pipeline project from Cushing to the USGC will be realized, adding up to 700 thousand b/d of capacity by early 2013.
- The expansion of the West Texas Gulf pipeline will allow up to 150 thousand b/d of production from Texas to be redirected away from Cushing by the end of 2012.
- Further, there are various proposed pipeline projects that could be realized, including a project by Magellan that would include the reversal 60-70 thousand b/d of product pipelines from Cushing to the USGC.
- There is currently more than 700 thousand b/d of rail capacity proposed, planned and under construction, of which the lion's share is scheduled for 1H2012.
- We expect that Barge shipments on the Mississippi could at least double and from the current 30 thousand b/d and potentially reach 85 thousand b/d.
- We believe the lack of qualified drivers that currently limits the amount of crude that is shipped by trucks will slowly alleviate.

We expect that, besides the addition of new transportation capacity, part of the domestic and Canadian production will be absorbed by higher refinery intakes as several expansion projects will add about 75 thousand b/d of refinery capacity by the end of 2012.

On net, we expect that substantial transportation and refining capacity, which we discuss in more detail below, will be added by mid next year, enough to absorb any incremental supply available to the US midcontinent. We expect that the US midcontinent balance will be further supported by the commissioning of at least one pipeline from Cushing to the USGC by early 2013.

Pipelines

We believe pipelines remain the least expensive way to ship crude over the long run. Pipeline operators have made large investments in recent years building new pipelines from Canada into the US while reversing, expanding and modifying existing ones. However, at the same time there has not been any major addition to pipeline infrastructure that would allow shipping crude from Cushing further down to the USGC, even though there are several projects discussed (see Exhibit 24).

The most prominent project is likely **TransCanada's Keystone Gulf Coast Expansion Project** (Keystone XL) that would include the construction of a pipeline from Cushing to crude oil terminals in Nederland, Texas, and further to Houston, capable of shipping 700 thousand b/d of either light or heavy crude. However, while the project has been approved by the National Energy Board (Canada), it has not yet received approval from the US regulator. Nearly three years have passed since the application has been submitted to the US regulator and the project faces strong political opposition. On July 26, 2011, the US House passed a bill that would set a decision deadline by November 1. However, in order to be effective, the bill would have to pass the senate and be signed into law by the president. We believe that even if the project receives approval by late 2012, the Cushing-to-Gulf Coast section of the pipeline will likely only start operating by early 2013.

In the meantime, **Magellan Midstream Partners, L.P**. announced on September 1, 2011 that it is proceeding with the reversal and conversion of an existing product pipeline that would allow shipping West Texas crude oil from **El-Paso to Houston and Texas City. The former Longhorn pipeline** would have an initial capacity of 135 thousand b/d and is expected to be operational by mid-2013. While entirely located in Texas and thus not directly allowing crude being shipped from Padd 2 to the US Gulf Coast, this pipeline would absorb crude oil produced in West Texas that would otherwise have to be shipped to the US midcontinent due to the lack of transportation alternatives. Magellan also announced a month earlier that it is exploring a project to cobble existing pipelines from **Cushing to the US Gulf Coast**. The new pipeline would be capable to ship 60-70 thousand b/d, however, we believe the project is still in a very early stage and it is yet unclear whether it will actually be realized. Nevertheless, the company believes, without giving an exact timeline, that it could be in service before some of the other projects.

The West Texas Gulf Pipeline Company, a subsidiary of Sunoco Logistics Partners L.P., announced in March that it plans to **expand takeaway capacity of the WTG pipeline** from the Permian Basin by at least 100 thousand b/d. The pipeline currently brings crude from West Texas to Longview. Similar to Magellan's Longhorn project, this would not allow directly shipping crude from Padd 2 into Padd 3 but it would result in less Permian crude being shipped from Texas to Oklahoma (Padd 3 into Padd 2) and thus take some pressure form the US mid-continent crude balance. However, unlike the Magellan project, which is expected to come on-stream by mid-2013, the projected is scheduled to be operable already by the end of 2012 according to a company press release from March this year.

A proposed pipeline project by Enterprise Products Partners and Energy Transfer Partners, called the **Double E pipeline** that that would have included the modification of existing gas pipelines and the build of new pipelines as well as storage capacity has been officially cancelled on August 19, 2011. Enterprise subsequently announced the **Wrangler pipeline** project in cooperation with Enbridge. The new pipeline from Cushing to Harris County in Texas will be capable to carry up to 800 thousand b/d of either light or heavy crude oil. A binding open commitment period for one months has started today, 3 October, 2011. The company expects the pipeline to be serviced by mid-2013.

Further, the 350 thousand b/d **Seaway pipeline** that currently brings crude from Freeport, TX, to Cushing, OK, continues to be considered a hot contender for a potential reversal

despite the fact that Conoco Phillips, has already stated in mid-February 2011 that it is not interested in reversing the pipeline. Conoco currently owns 50% of the pipeline while Enterprise Products Partners LP owns the other 50%. Both parties would have to agree to reverse the pipeline. Due to the large discount of crude stored at Cushing relative to USGC crude, Seaway flows have dropped to as low as 30 thousand b/d in August. We believe that that a reversal for the Seaway pipeline could likely be completed faster than most competing projects should Conoco reconsider its position.

There have also been discussions about a potential **Monarch pipeline** proposed by Enbridge that would connect Cushing to the Houston area. While little is known of the project so far besides that it would have a capacity of approximately 350 thousand b/d, the company announced on August 5 that it also considers expanding the project with a pipeline connecting the Chicago area to Cushing. This second segment, called the Monarch North pipeline, would have a capacity between 200-300 thousand b/d and would be able to handle both light Bakken and heavy Canadian crude and would start up in late 2013, the same time as the Cushing – gulf segment.

Enbridge is also considering the **Trailbreaker project**, which would reverse the 240 thousand b/d Line 9 that runs from Montreal to Sarnia. The project would allow shipping heavy oil sands from Alberta all the way to Montreal and potentially even further to the Portland tanker port. Details regarding the schedule of the reversal have not been released yet.

There are also some proposed projects to increase the capacity to ship crude from Alberta through British Columbia to ports at the Pacific coast. Enbridge proposed the **Northern Gateway pipeline** which would be running from Bruderheim near Edmonton to a new marine terminal in Kitimat. The twin pipeline would be able to move 525 thousand b/d of crude from east to west while simultaneously bringing 193 thousand b/d of condensates required as diluents to Alberta. However, while the planned pipeline received commercial commitments, the project is likely to receive political and environmental opposition. This could potentially delay commissioning, which is currently planned for late 2016 the earliest.

Kinder Morgan, who already operates the 300 thousand b/d **Transmountain pipeline** that connects Edmonton to the port of Vancouver proposed several expansion projects. One alternative looks at expanding the capacity of the existing pipeline to Vancouver by up to 400 thousand b/d. Another alternative would include building new pipeline that would branch off the existing Transmountain line, running though Price George and ending also in the port of Kitimat, which, contrary to Vancouver, can also handle large crude carriers. This new pipeline would have a capacity of 450 thousand b/d. However, none of the proposed projects for a new pipeline connecting Alberta and the West coast is scheduled before 2015.

While currently it requires only one large pipeline to remove the US-midcontinent bottleneck and clear the system, with growing Canadian and US-midcontinent production it will likely require additional transportation capacity over the longer term. Consequently, while we do not expect that all the proposed pipelines will be built, we expect at least 2-3 pipelines will be in operation in a couple years.

Exhibit 24: Planned and proposed pipelines impacting the PADD 2 crude oil balance

Company	Name	Loading port	Unloading port	Capacity kb/d	Est. start date
Cushing					
TransCanada	Keystone XL	Cushing	Houston	700	1Q2013
Enterprise / Enbridge	Wrangler	Cushing	Harris County, TX	800	3Q2013
Enbridge	Monarch (South)	Cushing	Houston	350	4Q2013
Conoco / Enterprise	Seaway	Freeport	Cushing	350	curr. not planned
Magellan	Cushing - USGC	Cushing	USGC	60-70	4Q2012
Enterprise	Double E	Cushing	Houston	450	canceled
Padd 2 (ex. Cushing) & Padd 3					
Enbridge	Monarch (North)	Chicago Area	Cushing	200-300	4Q2013
Enbridge	Trailbreaker	Sarnia	Montreal (pot. Portland)	240	n.a.
Magellan	Longhorn	El-Paso	Houston	135	3Q2013
WTG Pipeline Co.	WTG expansion	West Texas	Longview	>100	4Q2012
Canada					
Enbridge	Northern Gateway	Bruderheim	Kitimat	550	2017
Kinder Morgan	Kitimat Alternative	Edmonton	Kitimat	450	2015
Kinder Morgan	Vancouver alternative	Edmonton	Vancouver	400	2015
Existing pipelines out of Cushing					
Enbridge	Ozark	Cushing	Wood River	235	
BP	BP 1	Cushing	Whiting	170	
Magellan	Osage	Cushing	El Dorado / McPherson	150	
Plains All American	Coffeyville	Cushing	Coffeyville	110	
Conoco Phillips	Borger	Cushing	Borger	59	
Enbridge	West Tulsa	Cushing	Tulsa	59	abandoned
Conoco Phillips	Ponca City	Cushing	Ponca City	50	
Plains All American	Red River	Cushing	Eola	22	
Blueknight	Eagle North	Cushing	Ardmore	20	

Source: GS Global ECS Research.

Rail capacity

We expect that the commissioning of a large pipeline from Cushing to the USGC will ultimately remove the bottlenecks in transportation capacity and restore the balance in the US mid-continent crude oil market. However, we currently do not expect any large pipeline to be operable before early 2013 and hence alternative modes of transportation have to bridge the gap in the interim. We believe that rail transportation will play the most important role in balancing the US-midcontinent crude market during this period. More specifically, there is currently more than 700 thousand b/d of rail loading capacity proposed, planned and some of it already under construction, most of it scheduled for 1H2012.

Unlike previously built rail capacities, these new projects are specifically aimed to take advantage of the current price dislocations in the United States. In the past, rail transportation has been mainly used to provide an outlet for newly developed fields that have no access to pipelines. For example, on December 31, 2009, EOG Resources began to ship Bakken crude oil by rail from Stanley in North Dakota to Stroud in Oklahoma, which is connected by a 17 mile pipeline to the tanks at Cushing. The terminals can handle up to 60 thousand b/d and the trip takes four days one way. It took less than nine months to construct both terminals and the pipeline. EOG developed the operation as oil production in North Dakota began to exceed existing pipeline capacity thanks to the steady growth of production from the Bakken Shale. By the time EOG brought its unloading terminal at Stroud into operation, WTI crude traded close to par with Louisiana Light Sweet, while Bakken crude oil at Guernsey traded still at a discount for most of last year, providing an arbitrage opportunity to ship Bakken crude by rail to Cushing. In the meantime, light sweet

crudes at Cushing began to trade at a discount to light sweet crudes at any other US destination and the Arb for shipping Bakken crude from North Dakota to Cushing has closed, particularly as the shipping by rail adds a further $3-4/bbl transportation costs. However, the bottleneck to ship out crude from the Bakken persists and therefore Bakken crude at the Clearbrook hub continues to trade at a $23/bbl discount to LLS, while the discount to LLS for Bakken at Guernsey has risen as high as $25/bbl.

However, once the crude is loaded on railcars at a terminal in North Dakota, it is possible to ship crude by rail further down to destinations at the US Gulf Coast rather than unloading it near Cushing and we estimate that the average cost to ship Bakken crude by rail from North Dakota to destinations at the USGC is approximately $7-$8/bbl. Consequently, there are several new projects for crude oil terminals in North Dakota that are either proposed, planned or already under construction and the off-take capacity for Bakken crude by rail is set to increase significantly over the coming 18 months. We estimate that the loading capacity for Bakken crude in North Dakota is expected to increase from currently 185 thousand b/d to 260 thousand b/d by the end of the year and potentially to 539 thousand b/d already by the end of 2Q2012. If all the planned capacity is built and installed as scheduled, rail capacity would actually exceed our forecasted Bakken production already by mid-next year, particularly as some crude production is likely destined to be shipped trough some of the Bakken pipeline capacity additions.

Exhibit 25: Substantial rail capacity is currently proposed, planned or already under construction
Thousand b/d

Company	Loading terminal	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13
North Dakota															
EOG Resources	Stanley (ND)	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Savage Cos / Yellowstone	Trenton (ND)	0	0	0	0	0	0	0	0	0	23	70	70	70	70
Lario Logistics	Dickinson (ND)	0	0	0	0	0	0	0	60	80	107	110	110	110	110
Rangeland LLS	Epping (ND)	0	0	0	0	0	0	0	0	67	100	100	100	100	100
Hess	Tioga (ND)	0	0	0	0	0	0	0	0	0	0	120	120	120	120
Musket Corp	Dore (ND)	0	0	0	0	0	0	0	0	0	58	70	70	70	70
Watco	Dore (ND)	0	0	0	0	0	0	0	15	27	35	47	70	70	70
Enbridge	Berthold (ND)	0	0	0	0	0	0	0	0	0	31	31	31	31	44
Plains All Amercian (Nexen)	Ross (Stanley) (ND)	0	0	0	0	0	0	0	0	0	0	0	43	65	65
Others	Various (ND)	55	55	55	55	55	55	55	55	55	55	55	55	55	55
From PADD 2 other locations															
Kinder Morgan / Watco†	Stroud (OK)	0	0	0	0	0	0	0	0	0	0	93	140	140	140
Total PADD 2 loading capacity		**115**	**115**	**115**	**115**	**115**	**115**	**115**	**190**	**288**	**469**	**756**	**826**	**826**	**839**

Source: Reuters, Bloomberg, company reports.

It is important to notice that these new projects are designed to ship the crude to the USGC or potentially even farther from day one. Consequently, crude production growth in the Bakken would no longer exacerbate the transportation bottleneck in the US midcontinent. And even more importantly, the increase in Bakken rail loading capacity will improve the current situation, as the capacity expansion would be large enough not just to absorb future Bakken production growth but could redirect some of the existing production that currently ends up at refineries in the US midcontinent.

There are also projects that aim to ship crude directly from the tank farms at Cushing to destinations in the US Gulf Coast. According to information from the company, EOGs Stroud terminal and the pipeline that connects the terminal with Cushing are currently only working in one direction such that the terminal cannot be utilized to ship crude out of Cushing and to the USGC (it could however be modified at a later time if required). However, a joint venture between Kinder Morgan and Watco is also planning a terminal at

Stroud that is connected to the Cushing terminals via a pipeline, but this terminal will designed to load crude from day one. Hence, unlike the other rail terminals in planning and under construction, this rail terminal directly targets the Cushing bottleneck and therefore will have a similar impact on the PADD 2 balance as a new pipeline. We learned that the terminal will be able to load at least two unit trains per day, potentially four. One unit train consists of approximately 100 rail cars with a capacity of 700 barrels. The Stroud terminal will therefore have a loading capacity of at least 140 thousand b/d and should be in operation by mid 2012. Simultaneously, the two companies will build and unloading terminal at a St. James in order to distribute the crude to the USGC refineries. Other companies such as US development group, Savage Cos and NuStar are also expanding existing terminal along the USGC and building new ones (see Table 26). There are currently more projects announced for adding capacity in PADD 2 than such for unloading capacity along the USGC, which could imply that the real bottleneck will be unloading capacity going forward. However, while almost all loading capacity in the Bakken has to be built from scratch, we believe that there is currently still some existing offloading capacity outside the US-midcontinent that can be utilized once the loading capacity is operational.

Exhibit 26: Incremental offloading capacity
Thousand b/d

Company	Unloading terminal	1Q10	2Q10	3Q10	4Q10	1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13
Offloading terminals															
US Development Group	St. James (LS)	0	0	0	65	65	65	65	130	130	130	130	130	130	130
Savage Cos / KCS	Port Arthur	0	0	0	0	0	0	0	0	0	0	46.7	70	70	70
Tesoro (Anacortes)	Anacortes Refinery	0	0	0	0	0	0	0	0	0	0	10	30	30	30
NuStar / EOG Resources	St. James (LS)	12	12	12	12	12	12	12	12	12	36.7	70	70	70	70
Kinder Morgan / Watco	USGC	0	0	0	0	0	0	0	0	0	0	93.3	140	140	140
US Development Group	USGC	3 terminals 2012-13													
US Development Group	East Coast	1 terminal 2012-13													
US Development Group	West Coast	1 terminal 2012-13													
Existing capacity	Various	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
EOG Resources	Stroud / Cushing (OK)	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Total outside PADD 2 offloading capacity		**12**	**12**	**12**	**77**	**77**	**77**	**77**	**142**	**142**	**167**	**350**	**440**	**440**	**440**

Source: Reuters, Bloomberg, company reports.

In addition, many refineries also do have direct access to rail. However, we believe that most rail facilities at the refineries are unlikely to be capable of handling unit trains. This would therefore require that the unit trains are broken down into smaller compositions once they arrive at the USGC, which will greatly reduce efficiency as it will take much longer to complete a full trip. As railcars will most likely be the dominant bottleneck in the system, longer trips will likely result in less crude being shipped.

It is also important to highlight that there is a high likelihood that some rail projects that are currently under construction are not officially announced. For example, Lario Logistics announced just three weeks ago that it had completed a 70 thousand b/d loading terminal in Dickinson, ND, and is ready to commence shipments October 1. This project had gone largely unnoticed until its official announcement and one therefore may infer that there are likely other projects, both loading terminals in PADD 2 and unloading terminal outside of PADD 2, which have not shown up on the radar screen yet.

We believe there is also a lot of potential to ship Canadian heavy crude oil directly at the production fields on rail cars and ship it to destinations along the USGC and the ports at the Canadian West Coast. Rail transportation already plays an important role in the Canadian oil sands industry, but mainly as a way to ship equipment to the production sites. With WCS (Western Canadian Select) now pricing roughly $20-25/bbl below Maya, it is not

surprising that producers and rail companies are currently evaluating how they could utilize these train lines to ship crude directly from the Canada to destinations in the USGC.

For example, Canadian National Railway (CN) states on its website that it is able to ship up to 200 thousand b/d of crude on their "PipelineOnRail™" from the oil sands regions to the USGC and other destinations in Canada, including the West Coast. Canadian Pacific, which already ships crude by rail out of the Bakken, also aims to ship crude from Alberta to Canada's West Coast. Another proposal comes from G Seven Generations to build a new railway from Alberta to the marine oil terminal at Valdez, Alaska. The idea is to bring crude by rail to Delta Junction, AK: There it would join the Alyeska pipeline, and the crude could flow to the port facilities and be loaded onto large tankers. However, unlike for most US rail projects, there are currently no details announced yet.

We see some fundamental differences between the rail projects in the United States and Canada. In our view, the US projects have mainly two goals: (1) to profit from the current arbitrage of mid-continent and USGC crudes for as long as it lasts, and (2) to provide an outlet for the Bakken production that otherwise would not have an outlet at all and hence production growth itself would be limited. Over the longer run, however, the arbitrage opportunities will disappear once a pipeline is in place and the rail option has to prove that the flexibility it provides in regards to shipping destinations is worth the extra cost. Hence, building these terminals as fast as possible in order to profit from the current arbitrage opportunities is crucial in regards to profitability of the project.

In contrast, the Canadian projects, even though also highly valuable at current Canadian crude prices, would still make economic sense in a number of years, particularly those that allow crude to be shipped to the West Coast, as a pipeline solution is even further away for Canada than in the United States. Consequently, while we expect that crude oil rail shipment capacity within and out of Canada will grow going forward, it will likely take longer to bring the projects online compared to the proposed US projects.

Box 1: Rail Economics

While more expensive than pipelines, we estimate that average breakeven costs for a North Dakota to the US Gulf Coast project are around $7-8/bbl. We estimate all-in costs for a producer to ship crude from Canada to the USGC around $14-18/bbl.

There are around 50 different types of tanker railcars. The most common tanker cars used for crude oil shipments have a capacity of roughly 30,000 gallons or 700 barrels. Costs can vary from around $65,000 thousand for a low-end car to up to $170,000 for a high-end model but on average a tanker railcar costs around $100,000.

Large scale crude oil rail operations typically consist of a terminal that can handle one or several unit trains. In a unit train, contrary to a manifest train, all railcars carry the same commodity. A crude oil unit train consists of 100 railcars with a capacity of carrying up to 700 barrels of crude. We estimate the average transit time between a loading terminal in North Dakota and an offloading terminal at a US Gulf Coast destination to be at least 3- 4 days. We further estimate that loading and unloading one unit train will take between 0.5-1 day (it can take considerably longer to load / unload a manifest train).

A typical one-unit train operation in North Dakota capable of shipping 70 thousand b/d will therefore require roughly 800 railcars.

100 railcars/train x (1d loading, 3d to USGC, 1d unloading, 3d return) = 800 railcars

To add rail capacity of 700 thousand b/d would therefore require at least 8000 tanker railcars. Industry sources suggest that the US railcar industry is capable of building up to 80'000 rail cars a year. While tanker railcars require unique parts such as special valves and other structural elements which may limit production volumes, we do not expect the production capacity of tanker cars to become a bottleneck. However, due to the high demand for tanker cars, the lead time for a new railcar can be up to a year, while most new loading facilities in the Bakken are scheduled to be operable by 1H2012. The availability of rail cars is therefore likely the most limiting factor for these upcoming operations, in our view.

We do not expect that all the rail capacity that is currently proposed and planned actually be built. This would most likely exceed capacity needs by far and the commissioning of a pipeline from Cushing to the USGC will likely create substantial risks to revenues from these projects over the longer term. We also expect some delays in the commissioning of these projects, as some bottlenecks are already looming ahead, particularly the availability of rail cars (see Box 1: Rail economics), but also potential shortages of building materials and skilled workers for all these projects, similar to what we have seen in the trucking industry.

Further, limited space for oil shipments on the tracks could lead to delays in shipments even if the terminals are in place, effectively reducing loading capacities. We estimate that there are currently around 750-850 thousand b/d of petroleum and coke products loaded on rail cars in the United States. The potential increase in installed loading capacity suggests that this number could nearly double in two years if all proposed terminal are actually built. Petroleum and coke shipments made only 2.3% of total US car loadings in 2010 (see Exhibit 27 suggesting that the US rail system is unlikely to struggle even if crude loadings increase sharply from current levels. However, most crude terminals will be built in North Dakota, and the trains will likely take similar routes down to the USGC, which could potentially lead to some congestion. However, in a statement back in February, BNSF railway said it would alone be able to transport 730 thousand b/d of Bakken crude as

production grows. We therefore do not expect that actual track capacity will be the dominant limiting factor over the short run (it's rather rail cars and the availability of material and skilled workers to build the terminals), but increased traffic could lead to delays in shipments and thus reduce installed loading capacity if trains run late. Further, loading and unloading unit trains is much faster than loading manifest trains. While most upcoming loading terminals are designed as unit train terminals, not every loading terminal does have an associated offloading terminal in the USGC. Hence trains might be loaded very efficiently in the unit train terminals in the Bakken, but have to be broken up later as the offloading facilities at the refineries with rail access will likely not be able to handle those large train compositions. This could lead to serious delays in shipments, requiring more railcars and reduce the actual capacities of the loading terminals.

Exhibit 27: Shipments of petroleum and coke products make only a small fraction of total rail freight in the United States

Commodity	Tons originated		Revenues	
	Thousand tons	% of total	million $	% of total
Coal	814,467	44.0	13,914	24.2
Chemicals & allied products	187,388	10.1	8,178	14.2
Farm products	158,705	8.6	5,281	9.2
Non-metallic minerals	122,525	6.6	1,817	3.2
Misc. mixed shipments*	109,895	5.9	7,121	12.4
Food & kindred products	109,320	5.9	4,794	8.3
Metallic ores	71,446	3.9	605	1.1
Metals & products	45,028	2.4	2,081	3.6
Waste & scrap materials	42,673	2.3	1,206	2.1
Petroleum & coke	**42,369**	**2.3**	**1,771**	**3.1**
Stone, clay and glass	39,831	2.2	1,424	2.5
Pulp, paper & allied	30,558	1.7	1,883	3.3
Lumber & wood products	24,616	1.3	1,252	2.2
Motor vehicles and equipment	21,353	1.2	3,402	5.9
All other commodities	30,822	1.7	2,708	4.7
Total	**1,850,996**	**100.0**	**57,438**	**100.0**

Source: Association of American Railroads.

Barges

When US mid-continent price differential started to widen back in spring, there was limited idle transportation capacity that could have been activated. Both pipelines and rail terminals take a long time to build. Transportation by trucks can provide some short-term relief, but it is an expensive form of transportation and capacity is limited by the availability of trucks and even more importantly, drivers. Barge transportation is the other short-term alternative, but we believe it's by no means inexpensive either, and capacity is mainly limited by the availability of black oil barges and loading facilities.

Box 2: Barge Economics

We believe that the lead time for a new black oil barge is currently up to one year. There are currently close to 21,000 barges operating in the United States, of which around 3000 are tanker barges. However, we estimate that only 350-400 are so-called black oil barges, suitable to carry crude oil. Black oil barges typically feature high-capacity pumps and onboard heating systems to handle viscous oils.

Tanker barges exist in different sizes, from small tank barges (≤10'000 barrels) to jumbo barges (10'001-20'000 barrels) and semi-integrated unit tow tank barges (>20'000 barrels) (see Exhibit 28). Black oil barges are mainly the lattermost type. Further, black oil barges are typically towed together, allowing to ship up to 150 thousand barrels at once.

Shipping crude from the Wood River area down to St. James takes approximately four days and shippers are required to pay for the return trip, as the barges will return empty to Woodriver as there is currently only very limited quantities of crude high viscosity products such as asphalt shipped up the Mississippi river. On net, we believe the cost of barging crude oil to the US Gulf Coast is around $8/bbl.

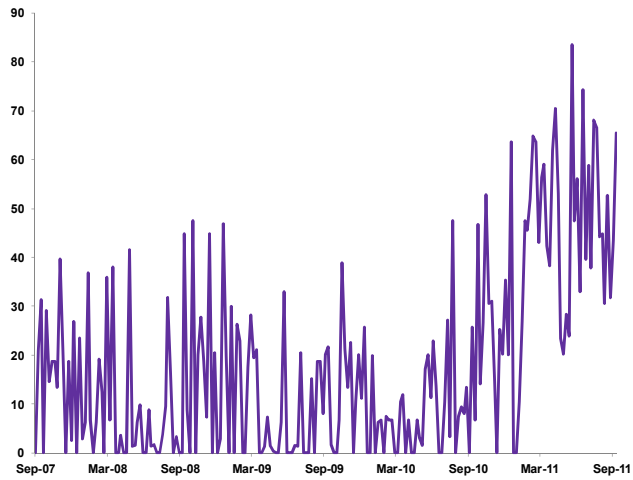
Crude shipments on barges from PADD 2 to PADD 3 have already risen to 50 thousand b/d over the past months. Unfortunately, there is no data available that would indicate the potential loading capacity for barges, and this situation is exacerbated by the fact that only very few players are active in this market. However, data provided by Genscape indicates that weekly loading rates have been as high as 85 thousand b/d during peak time in June and July. This suggests that loading capacity in the Wood River area is likely higher than the monthly loading numbers suggest, but it's currently not fully utilized due to the shortage of black oil barges. We therefore believe there could be some room to the upside for barge transportation as new barges enter into service over the coming months.

Exhibit 28: US tanker fleet profile

Type of Barge	Capacity, bbl	2008	2009	2010
Small Tank Barges	10,000 or less	182	175	145
Jumbo Tank Barges	10,000 - 20,000	1,355	1,286	1,286
Semi-Integrated Unit Tow Tank Barges	20,000 or more	956	1,102	1,022
Other Independent & Specialty Barges	n.a.	498	446	559
Total number of barges		**2,991**	**3,009**	**3,012**

Source: Informa Economics, GS Global ECS Research.

Exhibit 29: Weekly crude oil barge loadings at Wood River have been as high as 85 thousand b/d
Thousand b/d



Source: Genscape, GS Global ECS Research.

Refinery expansion

Several refiners in the US mid-continent are currently modifying and expanding their facilities in order to both process Canadian heavy sour crude and process more crude as a whole. Conoco's CORE project at their Wood River Refinery is now nearly completed and is expected to start up in 4Q11, adding 50 thousand b/d of refining capacity and doubling the heavy crude oil capacity to 225 thousand b/d. Tesoro is expanding its Mandan refinery in order to take in more Bakken crude. We expect that the project will be completed by 2Q12 and will add 10 thousand b/d of additional capacity. Shortly after that, Marathons HOUP project at their Detroit refinery is scheduled to come on-line, allowing the refinery to process more Canadian heavy crudes. Valero is planning to expand its refinery at McKee, TX. While not directly in Padd 2, the refinery has access to the tanks at Cushing via a pipeline; thus, the expansion should help to alleviate the situation in Padd 2.

Last but not least is BP's Whiting Refinery Modernization Project. The expansion would allow increasing the use of Canadian heavy crudes from the current 30% to 80%-90%. It would also require that half of the 410 thousand b/d capacity would be offline for about six months. The project has been postponed several times and, until recently, was scheduled for 1Q12. Unlike for the other projects, the market focused less on the potential increase in intake capacity but rather on the threat that the shutdown of the refinery would take 200 thousand b/d of capacity off the market for several months at exactly the same time when Padd 2 refineries are going through their typical maintenance period, both domestic and Canadian production ramps up, and only little incremental rail capacity is on-stream. Therefore, we think the recent announcement to shift the project back to 4Q12 is quite positive in regards to the future Padd 2 crude balance, as by then, enough rail capacity should have been added such that a shutdown can be absorbed without the threat of major Padd 2 inventory builds.

We also expect that the existing refinery capacity in Padd 2 can be utilized at higher rates than it was the case in 1H11. Refineries in PADD 2 have operated at >93% capacity over the past two months. While we do not expect these levels to be sustainable throughout the remainder of the year due to the fact that we enter the maintenance season now but also due to the vulnerability of the system when running so close to full capacity, as we do see clear upside potential for PADD 2 refinery runs from last year's levels. Currently, we forecast PADD refinery runs to be 75 thousand b/d above last year's levels for the remainder of the year, while currently the scheduled outages are almost 140 thousand b/d below last year's levels.

Exhibit 30: Refineries with access to Canadian and Cushing crude continue to upgrade their facilities to process heavy crude and increase the capacity
Thousand b/d

Refinery	Company	Name	Costs $	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12	1Q13	2Q13	3Q13	4Q13
Wood River	COP/CVE	CORE project (Coker and Refienry Expansion)	3.0bn	0	22	47	50	50	50	50	50	50	50
Mandan	TSO	n.a.	35mn	0	0	0	10	10	10	10	10	10	10
Detroit	MRO	Detroit HOUP (Heavy Oil Upgrade Project)	2.2bn	0	0	0	0	15	15	15	15	15	15
McKee	VLO	n.a.	n.a.	0	0	0	0	0	0	0	0	25	25
Whiting *	BP	Whiting Refinery Modernization Project	3.8bn	0	0	0	0	0	0	0	0	0	0
Total				**0**	**22**	**47**	**60**	**75**	**75**	**75**	**75**	**100**	**100**

** The Whiting Refinery Modernization Project's main goal is to make the refinery capable of processing heavy Canadian crude. However, we expect some small capacity expansion as well. In this table, the capacity expansion is assumed to be zero.*

Source: Company reports, GS Global ECS Research.

Storage

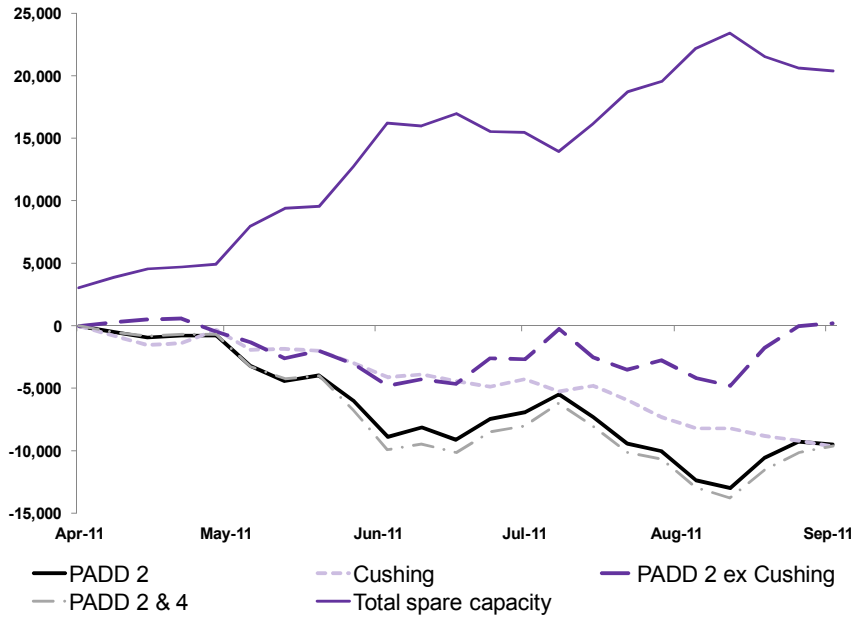
According to data provided by the US Department of Energy (DOE), combined crude oil working storage capacity at tank farms and refineries in PADD 2 and PADD 4 stood at 121 million barrels on March 31, 2011. On top of this, there were about four million barrels of crude oil stocks held on leases (inventories adjacent to the production wells). At the same time, crude oil stocks stood at 121 million barrels, leaving just four million barrels of spare storage capacity.

Since then, crude stocks have declined by around nine million barrels, almost entirely driven by declines at Cushing, OK, while we estimate that inventory capacity has increased by close to eight million barrels, also almost entirely driven by expansions at Cushing. Consequently, we estimate current spare storage capacity slightly above 20 million barrels. Further, we believe that there is still significant new storage capacity being built and planned at Cushing. We expect that Cushing capacity will grow by around 7 million barrels over the next 6 months.

In addition, Canadian inventories have drawn down significantly over the past months with WCS being in backwardation most of the time. We estimate that by the end of August, about 15 million barrels of crude was stored at the sites at Hardisty and Edmonton, approximately half of capacity.

On net, we estimate current total combined storage capacity in PADD 2, 4 and in Canada at around 35 million barrels.

Exhibit 31: Combined PADD 2 & 4 crude oil storage spare capacity has increased by more than 20 million barrels since inventories peaked in early April
Thousand barrels



Source: DOE, GS Global ECS Research.

Exhibit 32: Goldman Sachs oil and oil products price forecast table

	Unit	Forecasts							
		1Q11	2Q11	3Q11	4Q11	1Q12	2Q12	3Q12	4Q12
Crude Oil									
WTI	$/bbl	94.0	102.5	90.0	90.0	99.5	107.5	111.0	118.5
Brent	$/bbl	105.0	117.0	112.0	110.0	115.0	120.0	120.0	125.0
Product									
RBOB	$/gal	2.7	3.1	2.9	2.7	2.9	3.1	3.0	3.1
USGC Heating Oil	$/gal	2.8	3.0	3.0	3.0	3.1	3.2	3.3	3.4
NYHB Res. Fuel Oil	$/bbl	92.0	104.0	102.0	100.0	105.0	110.0	110.0	115.0
London Gasoil	$/mt	882.0	961.5	920.0	918.0	965.5	1005.0	1011.0	1054.5
Cracks									
RBOB	$/bbl	17.80	28.20	30.30	24.00	22.70	23.30	16.90	9.80
USGC Heating Oil	$/bbl	23.90	25.30	35.30	36.10	32.40	28.36	26.40	25.20
USGC Res. Fuel Oil	$/bbl	-2.20	1.40	12.00	10.00	5.50	2.30	-0.80	-3.50
London Gasoil	$/bbl	13.00	11.70	11.20	13.10	14.40	14.80	15.50	16.40

Source: GS Global ECS Research.

Exhibit 33: Midwest (Northern PADD 2) supply and demand
Thousand b/d

	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012
Production	**441**	**445**	**518**	**566**	**598**	**629**	**661**	**692**
North Dakota	354	364	399	424	447	471	496	523
Net Inflows	**2183**	**2109**	**2099**	**1979**	**2019**	**2025**	**2000**	**1942**
Refinery Runs	**2570**	**2601**	**2642**	**2586**	**2609**	**2686**	**2724**	**2640**
Inventory Change	**41**	**-14**	**7**	**-41**	**8**	**-32**	**-63**	**-6**
Implied inventory change	54	-47	-25	-41	8	-32	-63	-6
End of month Inventories	63	63	63	62	58	59	53	51
Inflows	**2741**	**2596**	**2592**	**2615**	**2702**	**2706**	**2776**	**2791**
Canada	1612	1507	1527	1553	1640	1644	1714	1729
*Enbridge**	1283	1176	1138	1200	1200	1200	1200	1200
Keystone	329	331	388	353	440	444	514	529
PADD 4	157	181	178	175	175	175	175	175
PADD 3	621	563	534	535	535	535	535	535
Capline	404	354	333	325	325	325	325	325
Mid Valley	214	209	200	210	210	210	210	210
PADD 2	351	343	354	352	352	352	352	352
Ozark	212	210	215	212	212	212	212	212
BP 1	138	132	139	140	140	140	140	140
PADD 1	0	2	0	0	0	0	0	0
Outflows	**558**	**487**	**493**	**636**	**682**	**680**	**776**	**849**
PADD 4	61	62	67	62	62	62	62	62
PADD 3	192	203	212	310	312	306	435	547
Pegasus	90	88	91	90	90	90	90	90
Rail (USGC)	75	75	75	117	140	153	288	410
Barge (Wood River)	28	40	46	104	82	63	56	47
PADD 2	257	179	180	248	292	296	263	224
Keystone	57	80	77	140	147	154	148	122
Spearhead	165	65	66	70	108	104	76	64
Rail (Hawthorn)	36	34	38	38	38	38	38	38
PADD 1	15	15	16	16	16	16	16	16

**Estimated based on DOE import and Genscape data*

Source: IEA, DOE, Genscape, GS Global ECS Research.

Exhibit 34: Midcontinent (Southern PADD 2) supply and demand
Thousand b/d

	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012
Production	**306**	**313**	**313**	**312**	**317**	**320**	**325**	**324**
Net Inflows	**438**	**364**	**377**	**470**	**510**	**523**	**495**	**497**
Refinery Runs	**714**	**739**	**791**	**766**	**778**	**800**	**808**	**785**
Cushing Inventory Change	46	-58	-73	17	48	43	12	36
Implied inventory change	30	-62	-102	18	48	32	12	36
End of month inventories	40	39	33	31	34	39	41	44
Inflows	**820**	**744**	**756**	**470**	**510**	**523**	**495**	**497**
PADD 4	25	27	36	30	30	30	30	30
White Cliffs	25	27	36	30	30	30	30	30
PADD 3	538	538	540	579	574	583	589	629
Seaway	44	34	30	30	30	30	30	30
Basin	336	345	345	385	376	385	385	425
Centurion	58	59	64	64	68	69	74	74
Other Permian	100	100	100	100	100	100	100	100
PADD 2	257	179	180	248	292	296	263	224
Keystone	57	80	77	140	147	154	148	122
Spearhead	165	65	66	70	108	104	76	64
Rail (Hawthorn)	36	34	38	38	38	38	38	38
Outflows	**382**	**380**	**379**	**387**	**387**	**387**	**387**	**387**
PADD 3	31	37	25	35	35	35	35	35
Phillips	31	37	25	35	35	35	35	35
PADD 2	351	343	354	352	352	352	352	352
Ozark	212	210	215	212	212	212	212	212
BP 1	138	132	139	140	140	140	140	140

Source: IEA, DOE, Genscape, GS Global ECS Research.

Exhibit 35: Canadian supply and demand
Thousand b/d

	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012
Production	3188	3030	3312	3397	3484	3488	3558	3573
Crude oil	2853	2703	2956	3032	3114	3111	3164	3171
Light	829	798	793	787	800	791	793	788
Synthetic	838	821	927	989	1046	1045	1048	1045
Heavy	424	413	420	413	414	403	410	403
Bitumen	763	745	817	842	853	871	913	934
Diluent	335	327	356	366	370	377	394	402
Production	160	147	150	154	171	158	161	165
Other	175	180	206	212	200	219	233	237
Unaccounted for production	109	118	118	70	70	70	70	70
Imports	750	679	600	600	600	600	600	600
Exports	2328	2239	2317	2353	2440	2444	2514	2529
Refinery Runs	1781	1549	1836	1690	1781	1549	1836	1690
Inventory Change	-62	39	-122	24	-67	165	-122	24
Implied inventory change	-62	39	-122	24	-67	165	-122	24
Exports	2328	2239	2317	2353	2440	2444	2514	2529
PADD 1	191	234	236	225	225	225	225	225
PADD 2	1612	1507	1527	1553	1640	1644	1714	1729
Enbridge	1283	1176	1138	1200	1200	1200	1200	1200
Keystone	329	331	388	353	440	444	514	529
PADD 3	20	44	55	50	50	50	50	50
PADD 4	303	295	302	300	300	300	300	300
PADD 5	201	159	198	225	225	225	225	225

**Estimated based on DOE import and Genscape data*

Source: IEA, DOE, Genscape, GS Global ECS Research.

Exhibit 36: OPEC oil supply

Thousand b/d

Supply	1Q2009	2Q2009	3Q2009	4Q2009	1Q2010	2Q2010	3Q2010	4Q2010	1Q2011	2Q2011	3Q2011	4Q2011	1Q2012	2Q2012	3Q2012	4Q2012	2010	2011	2012	yoy10	yoy11	yoy12
Algeria	1260	1235	1225	1225	1247	1240	1257	1270	1270	1260	1280	1270	1260	1245	1230	1215	1253	1270	1238	17	17	-33
Angola/Cabinda	1630	1673	1763	1837	1877	1785	1667	1613	1610	1547	1687	1740	1770	1785	1800	1815	1735	1646	1793	9	-89	147
Ecuador	480	480	462	460	467	465	463	473	497	500	490	472	460	460	460	460	467	490	460	-3	23	-30
Iraq	2336	2435	2503	2453	2383	2309	2338	2425	2667	2665	2675	2770	2875	2980	3085	3190	2364	2694	3033	-68	330	338
Iran	3763	3723	3773	3693	3713	3750	3687	3670	3630	3650	3563	3650	3644	3635	3626	3617	3705	3623	3631	-33	-82	7
Kuwait	2337	2247	2237	2280	2287	2300	2303	2297	2360	2447	2523	2450	2390	2375	2360	2345	2297	2445	2368	22	148	-78
Libya	1583	1527	1553	1520	1527	1545	1557	1560	1138	120	53	300	567	600	600	600	1547	403	592	1	-1144	189
Nigeria	1812	1767	1757	1962	1997	1950	2150	2213	2137	2250	2193	2173	2247	2247	2247	2247	2078	2188	2247	253	111	59
Qatar	815	832	815	825	834	824	831	847	877	872	885	846	905	905	905	905	834	870	905	12	36	35
Saudi Arabia	8216	8266	8293	8203	8298	8370	8532	8652	8918	9285	9795	9000	8902	8604	9695	9980	8463	9250	9295	218	787	45
UAE	2285	2248	2270	2277	2283	2300	2330	2333	2478	2477	2520	2443	2526	2526	2526	2526	2312	2480	2526	42	168	46
Venezuela	2787	2785	2581	2510	2527	2528	2676	2404	2540	2520	2617	2600	2594	2585	2576	2567	2534	2569	2581	-132	35	11
Total OPEC oil	**29304**	**29218**	**29232**	**29245**	**29439**	**29436**	**29790**	**29758**	**30122**	**29592**	**30281**	**29714**	**30140**	**29947**	**31110**	**31467**	**29606**	**29927**	**30666**	**356**	**322**	**739**
Total OPEC NGL	**4659**	**4711**	**4915**	**5000**	**5058**	**5064**	**5331**	**5458**	**5648**	**5655**	**5787**	**5827**	**6127**	**6127**	**6127**	**6127**	**5228**	**5730**	**6127**	**406**	**502**	**398**
Total OPEC supply	**33963**	**33929**	**34148**	**34245**	**34497**	**34500**	**35121**	**35216**	**35770**	**35247**	**36069**	**35541**	**36267**	**36074**	**37237**	**37594**	**34834**	**35657**	**36793**	**762**	**823**	**1136**
World Supply	**84867**	**85250**	**85877**	**86491**	**86659**	**87041**	**87733**	**88343**	**88493**	**87465**	**89031**	**89018**	**89426**	**89264**	**90646**	**90694**	**87444**	**88502**	**90008**	**1823**	**1057**	**1506**

Source: IEA,GS Global ECS Research.

Exhibit 37: Non-OPEC oil supply

Thousand b/d

Supply	1Q2009	2Q2009	3Q2009	4Q2009	1Q2010	2Q2010	3Q2010	4Q2010	1Q2011	2Q2011	3Q2011	4Q2011	1Q2012	2Q2012	3Q2012	4Q2012	2010	2011	2012	yoy10	yoy11	yoy12
Alaska	772	696	647	729	709	637	618	674	571	592	536	630	565	552	512	552	660	582	546	-51	-77	-37
GOM	1312	1519	1730	1669	1655	1520	1526	1507	1545	1521	1486	1357	1452	1456	1376	1198	1552	1477	1370	-5	-75	-107
L-48	3303	3262	3244	3200	3309	3456	3566	3618	3690	3759	3775	3932	3982	4007	4111	4255	3487	3789	4089	235	302	300
US NGL	1809	1923	1930	1977	2045	2066	2056	2132	2036	2185	2208	2264	2176	2277	2331	2322	2075	2173	2276	165	99	103
US Ethanol	648	678	737	783	834	845	866	910	913	895	889	939	889	899	922	961	864	909	918	153	45	9
Total US	7843	8077	8287	8357	8553	8524	8632	8841	8755	8953	8894	9121	9064	9191	9253	9288	8638	8931	9199	497	293	268
Canada Conventional	1892	1750	1747	1779	1927	1943	1900	1960	2016	1938	1998	2033	2058	2038	2067	2108	1933	1996	2068	141	64	72
Canada non-conventional	698	711	821	824	671	785	822	898	838	704	933	1004	1031	987	1038	1060	794	869	1029	30	75	159
Canada NGL	717	656	641	634	676	615	628	653	686	593	624	657	695	595	624	657	643	640	643	-19	-3	3
Total Canada	3308	3117	3210	3237	3274	3343	3351	3512	3539	3234	3554	3694	3784	3620	3728	3826	3370	3505	3739	152	136	234
Mexico	3043	2972	2944	2960	2994	2968	2949	2930	2971	2963	2885	2798	2834	2821	2762	2674	2960	2905	2773	-19	-56	-132
Total North America	**14194**	**14166**	**14441**	**14554**	**14821**	**14835**	**14931**	**15283**	**15265**	**15150**	**15334**	**15614**	**15683**	**15633**	**15742**	**15788**	**14968**	**15341**	**15712**	**629**	**373**	**371**
Argentina	755	746	710	731	707	706	702	661	693	614	678	660	672	668	667	636	694	662	661	-42	-32	-1
Brazil Biofuels	101	521	567	488	77	592	744	381	53	455	683	391	65	438	751	429	449	396	421	29	-53	25
Brazil crude oil	1919	1944	1963	1998	2017	2068	2044	2089	2089	2087	2169	2299	2259	2263	2260	2282	2054	2161	2266	98	106	105
Brazil NGL	77	72	71	75	78	81	84	87	88	90	87	87	87	90	87	87	83	88	88	9	5	0
Total Brazil	2098	2537	2601	2561	2172	2741	2872	2558	2229	2632	2939	2777	2411	2791	3098	2797	2586	2644	2774	137	59	130
Colombia	638	656	670	724	758	781	792	817	866	923	945	954	1018	1029	1031	1022	787	922	1025	115	135	103
Other Latam	456	445	450	450	459	455	458	437	444	437	447	442	434	432	440	435	452	442	435	2	-10	-7
Total Latam (non-OPEC)	**3947**	**4384**	**4431**	**4466**	**4095**	**4683**	**4824**	**4473**	**4232**	**4606**	**5010**	**4833**	**4536**	**4920**	**5236**	**4890**	**4519**	**4670**	**4895**	**212**	**151**	**225**
Norway	2577	2258	2331	2430	2363	2155	1956	2206	2186	1986	1929	2003	1997	1819	1730	1746	2170	2026	1823	-229	-144	-203
UK	1630	1569	1274	1468	1516	1403	1210	1352	1262	1163	1087	1191	1214	1103	992	957	1370	1176	1066	-115	-194	-110
Turkey	41	47	48	49	48	50	48	48	46	46	46	44	43	43	42	40	48	46	42	2	-3	-4
Other OECD Europe	659	618	619	599	599	582	569	612	626	622	620	619	647	633	614	613	590	622	627	-33	31	5
Non-OECD Europe	148	138	145	145	142	141	139	137	139	139	141	148	149	147	148	154	140	142	150	-4	2	8
Total Europe	**5054**	**4630**	**4417**	**4690**	**4667**	**4331**	**3921**	**4355**	**4260**	**3956**	**3823**	**4006**	**4051**	**3745**	**3526**	**3511**	**4319**	**4011**	**3708**	**-379**	**-307**	**-303**
Azerbaijan	991	1098	1086	1025	1014	1073	1078	1001	992	957	1008	999	952	975	999	991	1042	989	979	-9	-53	-10
Kazakhstan	1520	1545	1581	1654	1646	1600	1607	1686	1700	1635	1515	1612	1699	1680	1499	1611	1635	1615	1622	60	-19	7
Russia	10058	10157	10259	10362	10395	10426	10439	10539	10519	10546	10578	10591	10503	10547	10532	10548	10450	10558	10532	241	109	-26
Other FSU	436	434	434	421	418	420	415	423	428	426	422	385	394	391	377	344	419	415	377	-12	-4	-39
Total FSU	**13005**	**13235**	**13360**	**13462**	**13474**	**13519**	**13538**	**13650**	**13639**	**13564**	**13523**	**13587**	**13547**	**13593**	**13407**	**13495**	**13545**	**13578**	**13510**	**280**	**33**	**-68**
Bahrain	194	194	194	194	190	190	190	190	200	200	195	187	200	198	191	181	190	195	192	-4	6	-3
Oman	792	803	837	837	855	858	867	878	887	873	910	936	921	923	938	964	864	902	937	47	37	35
Syria	401	401	401	401	385	385	385	385	384	383	362	361	362	354	345	340	385	373	350	-16	-12	-22
Yemen	308	312	307	296	287	280	274	268	260	142	215	249	199	194	229	186	277	217	202	-28	-61	-14
Middle East (non-OPEC)	**1694**	**1710**	**1738**	**1728**	**1718**	**1713**	**1716**	**1721**	**1731**	**1598**	**1683**	**1733**	**1682**	**1669**	**1704**	**1671**	**1717**	**1686**	**1682**	**-1**	**-30**	**-5**
Congo	271	266	277	290	296	294	292	290	290	288	295	296	290	300	299	291	293	292	295	17	0	3
Egypt	720	712	704	696	698	698	698	698	700	695	673	637	641	636	614	579	698	676	618	-10	-22	-58
Equatorial Guinea	320	311	303	295	285	278	270	263	260	254	255	261	229	253	266	272	274	258	255	-33	-17	-3
Gabon	231	233	248	251	251	233	249	249	248	234	242	250	240	239	247	254	245	244	245	4	-2	2
South Africa	183	183	179	172	182	182	182	182	182	182	180	177	177	177	175	173	182	180	175	3	-2	-5
Sudan	443	488	486	483	466	465	476	474	464	436	456	474	460	450	451	469	470	458	458	-5	-13	0
Other Africa	383	378	373	369	364	362	362	362	403	424	434	439	446	449	449	443	362	425	447	-13	63	21
Total Africa (non-OPEC)	**2551**	**2571**	**2570**	**2557**	**2542**	**2511**	**2529**	**2517**	**2546**	**2513**	**2535**	**2535**	**2484**	**2504**	**2502**	**2480**	**2525**	**2532**	**2493**	**-37**	**8**	**-40**
Australia	559	544	565	546	529	517	516	492	425	419	488	492	455	483	496	457	514	456	473	-40	-58	17
China	3829	3896	3929	3910	3989	4059	4144	4219	4214	4174	4227	4316	4266	4261	4295	4376	4103	4233	4300	212	130	67
India	787	794	796	812	829	835	883	911	906	894	899	903	891	895	907	905	865	900	899	67	36	-1
Indonesia	994	973	975	983	984	995	980	940	928	901	909	873	863	849	859	823	975	903	848	-6	-72	-54
Malaysia	734	714	719	700	740	717	700	708	703	613	586	600	624	614	623	607	716	625	617	-1	-91	-8
Other OECD Pacific Asia	92	93	102	101	102	99	96	91	93	82	84	84	85	80	81	80	97	86	82	0	-11	-4
Other non-OECD Pacific Asia	1123	1123	1146	1174	1145	1128	1168	1140	1106	1068	1125	1145	1145	1131	1166	1176	1145	1111	1154	4	-34	43
Total Asia Pacific (non-OPEC)	**8118**	**8137**	**8232**	**8226**	**8320**	**8350**	**8487**	**8501**	**8375**	**8151**	**8318**	**8412**	**8329**	**8312**	**8426**	**8424**	**8414**	**8314**	**8373**	**236**	**-100**	**59**
Processing gains	1922	2038	2052	2074	2032	2074	2137	2140	2164	2140	2146	2170	2212	2168	2182	2178	2096	2155	2185	74	60	30
Other Biofuels	418	451	487	488	494	525	529	487	510	539	590	587	635	645	683	663	509	557	657	48	48	100
Total non-OPEC supply	**50904**	**51321**	**51730**	**52245**	**52162**	**52541**	**52612**	**53127**	**52723**	**52218**	**52962**	**53477**	**53159**	**53190**	**53409**	**53100**	**52611**	**52845**	**53214**	**1061**	**234**	**370**

Source: IEA, GS Global ECS Research.

Exhibit 38: Global oil demand

Thousand b/d

Demand	1Q2010	2Q2010	3Q2010	4Q2010	1Q2011	2Q2011	3Q2011	4Q2011	1Q2012	2Q2012	3Q2012	4Q2012	Jan-09	Jan-10	Jan-11	Jan-12	yoy 10	yoy 11	yoy 12
USA	18867	19149	19473	19224	19079	18751	19021	18990	18818	18738	19135	18910	18771	19178	18960	18900	407	-218	-60
US territories	310	278	288	307	313	280	290	309	309	278	287	306	294	296	298	295	2	2	-3
Canada	2156	2173	2261	2247	2250	2169	2223	2227	2250	2169	2223	2227	2158	2209	2217	2217	52	8	0
Mexico	2075	2099	2049	2070	2030	2046	2030	2055	2047	2062	2047	2072	2070	2073	2040	2057	3	-33	17
Total North America	**23409**	**23699**	**24071**	**23849**	**23672**	**23246**	**23564**	**23582**	**23424**	**23246**	**23692**	**23515**	**23292**	**23757**	**23516**	**23469**	**464**	**-241**	**-47**
Argentina	660	677	719	692	712	693	737	711	731	724	744	734	623	687	713	733	64	26	20
Brazil	2574	2605	2782	2752	2666	2650	2850	2828	2739	2766	2878	2920	2517	2678	2748	2826	162	70	77
Chile	329	327	345	319	343	322	349	328	352	336	352	339	347	330	335	345	-17	5	9
Venezuela	697	705	740	724	741	751	784	744	761	784	791	768	744	717	755	776	-28	38	21
Other Latam	1728	1727	1794	1784	1765	1793	1867	1833	1813	1871	1885	1893	1703	1758	1814	1866	55	56	51
Total Latam	**5989**	**6041**	**6378**	**6271**	**6226**	**6210**	**6586**	**6444**	**6397**	**6481**	**6649**	**6654**	**5934**	**6170**	**6367**	**6545**	**236**	**197**	**179**
France	1905	1821	1868	1856	1859	1792	1825	1856	1830	1762	1789	1816	1871	1862	1833	1799	-9	-29	-34
Germany	2399	2400	2647	2536	2353	2339	2549	2483	2325	2308	2511	2439	2454	2495	2431	2396	42	-64	-35
Italy	1473	1500	1580	1561	1435	1470	1490	1507	1402	1436	1452	1465	1544	1529	1475	1439	-15	-53	-37
Spain	1461	1423	1429	1453	1436	1370	1395	1416	1406	1338	1359	1376	1468	1441	1404	1370	-27	-37	-35
UK	1644	1612	1630	1605	1623	1618	1603	1578	1611	1605	1585	1556	1646	1623	1606	1589	-23	-17	-16
Other OECD Europe	5443	5501	5775	5814	5489	5566	5707	5728	5397	5468	5594	5600	5685	5633	5622	5515	-52	-11	-108
Non-OECD Europe	670	656	677	694	674	674	698	714	693	703	705	737	707	674	690	709	-33	16	20
Total Europe	**14995**	**14913**	**15606**	**15519**	**14870**	**14829**	**15267**	**15283**	**14664**	**14620**	**14995**	**14989**	**15375**	**15258**	**15062**	**14817**	**-117**	**-196**	**-245**
FSU	4355	4170	4521	4509	4445	4460	4749	4634	4568	4655	4794	4785	4142	4389	4572	4700	247	183	128
GCC	6525	6724	7327	6752	6766	6944	7635	6938	6951	7246	7708	7163	6642	6832	7071	7267	190	239	196
Other Middle East	795	762	824	795	811	777	847	817	833	810	855	844	772	794	813	835	22	19	23
Total Middle East	**7320**	**7486**	**8150**	**7547**	**7576**	**7721**	**8481**	**7755**	**7783**	**8056**	**8562**	**8007**	**7413**	**7626**	**7883**	**8102**	**213**	**258**	**219**
Total Africa	3294	3289	3329	3361	3378	3196	3337	3454	3471	3336	3370	3566	3293	3318	3341	3436	25	23	95
Australia	938	955	958	992	978	991	974	1002	988	1001	984	1011	951	961	986	996	10	25	9
Japan	4826	4070	4357	4569	4864	3965	4606	5085	4959	3964	4561	5060	4395	4456	4630	4636	61	174	6
Korea	2315	2182	2158	2354	2355	2038	2155	2302	2391	2073	2190	2338	2190	2252	2212	2248	62	-40	36
New Zealand	154	138	152	156	160	151	144	156	161	151	144	157	151	150	153	153	-1	3	0
China	8701	9095	8867	9694	9726	9627	9436	9682	10029	10164	10223	10452	8128	9089	9618	10217	962	528	599
Hong Kong	387	332	376	382	363	357	392	393	373	373	396	406	374	369	376	387	-4	7	11
India	3351	3312	3094	3321	3481	3433	3222	3413	3576	3584	3254	3524	3226	3270	3387	3484	44	117	97
Indonesia	1407	1363	1411	1407	1459	1410	1464	1445	1499	1472	1478	1492	1367	1397	1445	1485	30	48	41
Malaysia	437	523	482	614	582	496	512	631	599	518	517	652	539	514	555	571	-25	41	16
Pakistan	439	438	409	458	443	442	418	471	456	462	422	486	416	436	444	456	20	7	13
Philippines	304	305	308	290	285	282	301	298	292	294	304	308	298	302	291	300	4	-10	8
Singapore	1033	1100	1215	1153	1056	1124	1262	1185	1085	1173	1274	1223	1056	1125	1157	1189	69	31	32
Taiwan	1012	969	944	912	995	973	964	937	1022	1016	973	968	972	959	967	995	-13	8	27
Thailand	1071	1002	996	1019	1109	1102	1049	1047	1139	1150	1060	1081	1017	1022	1077	1108	5	55	31
Vietnam	397	369	354	365	419	389	372	375	430	406	376	387	355	371	389	400	17	17	11
Other non-OECD Asia	415	405	409	429	434	423	427	441	446	442	432	455	402	414	431	444	12	17	12
Total Asia Pacific	**27188**	**26558**	**26492**	**28116**	**28709**	**27202**	**27700**	**28863**	**29444**	**28240**	**28586**	**30001**	**25838**	**27088**	**28118**	**29068**	**1251**	**1030**	**950**
OECD demand	**45967**	**45301**	**46625**	**46745**	**46225**	**44546**	**46012**	**46695**	**45894**	**44351**	**45861**	**46333**	**45648**	**46159**	**45870**	**45610**	**512**	**-290**	**-260**
non-OECD demand	**40582**	**40855**	**41924**	**42426**	**42652**	**42318**	**43671**	**43319**	**43858**	**44284**	**44788**	**45184**	**39640**	**41447**	**42990**	**44529**	**1807**	**1543**	**1539**
World Demand	**86550**	**86155**	**88548**	**89171**	**88876**	**86864**	**89683**	**90014**	**89752**	**88635**	**90649**	**91517**	**85287**	**87606**	**88859**	**90138**	**2319**	**1253**	**1279**

Source: IEA, GS Global ECS Research.

Financial advisory disclosure

Goldman Sachs is acting as financial advisor to Southern Union Company in an announced strategic transaction.

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We, David Greely, Stefan Wieler, CFA and Johan Spetz, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

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