

## **Art Berman: Comparative Inventory draws spell higher oil prices**

**October 19, 2017**

**Erik:** Joining me next on the program is petroleum geologist Art Berman. Art prepared a fantastic slide deck to accompany this interview that you're definitely going to want to download, because we'll be referring to it throughout most of the interview. Registered users at macrovoices.com will find the download link in your Research Roundup email. If you're not registered yet, just go to macrovoices.com. On the home page, right next to Art Berman's picture, look for a red button that says "looking for the download" and click on it.

Art, thanks so much for joining us. Let's go ahead and start with your slide deck. Starting on Page 2 here, after your title slide. I just love your charts, the way that you are so visual and the way that you describe things. Go ahead and tell us what this chart is about on Page 2.

**Art:** All right, Erik, thanks for the compliment on the charts, and it's great to be back with you. It's been a while. I'm always glad to talk to you.

I talk a lot about comparative inventory, and I do it because I think it's really important. You don't hear a lot about it. You hear people sometimes reference the five-year average etc. But to me this is the main tool that cuts through most if not all of the confusion about why oil prices are doing what they're doing, and where they might be going.

Slide 2 is just a history of comparative inventory. Again, that's the current stock levels minus the five-year average. And in this case I'm using crude plus a basket of refined petroleum products which I think are the most diagnostic. So it's comparative inventory (CI) in blue, versus WTI spot price in gold.

What you can see, looking at this thing, is that there's an awfully good negative correlation between comparative inventory and WTI spot price. And that's the reason that it's important.

The salient features on this chart are that back in mid-February we were not at an all-time high comparative inventory, which is actually back in March-April of 2016, but we were pretty darn high. We were second-highest: 213 million barrels by my count. And we have dropped as of yesterday to 74 million barrels.

That is huge. That's a 139 million barrel drop over a period of 30-some-odd weeks. And there have been a couple of weeks where it went up a little or went sideways. But that is consistent,

that's a trend. We have to pay attention to it.

What's also important and interesting is that, typically we see a pretty big price response – again, just looking at this time period since the price collapse in '14 – you see a pretty good price response whenever comparative inventory goes down. And it's really striking how we've had the biggest drop in comparative inventory ever, and prices have just kind of hung in there between \$45 and \$55 a barrel. I'm showing \$40 to \$50.

And so an astute observer would say, your correlation doesn't really work. And I would argue that, actually, it does, that an awful lot of those price responses were based on sentiment. And we had some price run-ups, particularly in early '16, that proved to be vapor and went away in a big hurry.

So those are the key points in this. And as we get on to the next slide or two, I'll explain exactly why price is responding exactly as it should. It still is an awfully good negative correlation. It's just the amplitude has been suppressed, as it should be.

**Erik:** Now, before we move on to the next slide, which is one of my favorite charts of all the ones that you do, I've got a question on this one. Because I can't help but notice this period that you have in the dark red rectangle here, where price appears not to be responding to rapidly declining comparative inventory. It's also roughly the same time period that exports have been legal.

And some people have argued that, with the legalized export of US crude, basically, the oil that was being put in storage before is now being exported. If you were to adjust your comparative inventory to say let's pretend all exported oil got added to inventory, then it would be a vastly different picture.

So do you think that there's any truth to that? And how do you reconcile that? Because we're really kind of apples to oranges when we talk about comparative inventory. It's based on a five-year average when, for all of those five years, it was illegal to export crude oil from the United States during that period.

Does that change your view at all?

**Art:** No, it really doesn't. Your point is well taken, and we do need to talk about it. But the theory and the practical application of comparative inventory – this was all developed by Mike Bodell, who is a dear friend and colleague of mine. He put it together when he was at Unocal (Unocal Midstream & Trade) back in the early 2000s, has done a couple of proprietary publications, but really hasn't put a lot out there in the public domain.

So, first of all, let me give credit to Mike. I didn't invent this. It took me a long time to really catch on to why it was so important. But more importantly, it really doesn't matter where the inventories go. The point is that price is responsive to inventory levels. And whether inventories

are being reduced because of crude oil exports – which is the basis of your question – or whether they're being reduced because of increased consumption in the United States, or lower crude oil production. Whatever the reason, the fundamental precept is that price responds to inventory.

And this is so important, Erik. We think in terms of supply and demand, and that's the way it should be. But inventory is part of both. It's part of supply because it's available. The whole idea of inventory is that when you don't have enough field production to meet demand, where do you get it from?

It's like your savings account. I don't have enough money to pay this major medical bill this month. How am I going to pay for it? Well, I could put it on the credit card I suppose. But the wise way to do it is to say I'll take some money out of savings. That's what inventory is. Inventory is your savings.

So my view on supply and demand and all these discussions of market balance is you better tell me how inventory is responding to both supply and demand. Because if you're not talking about inventory then I don't know what you're talking about. You're talking about production and consumption, which is different than supply and demand. Demand and supply involve the buffer of inventory between production and consumption.

So bottom line, Erik, is I don't think it makes a difference. It's a great question and one that I'm sure is on a lot of people's minds. But to me it doesn't matter.

**Erik:** Let's go ahead and move on to Slide 3. This is one of my favorites. You're basically animating, or showing us the historic picture of where comparative inventory has been in the past and where it's going and what it means with respect to price.

Before we move off from that last slide, I should mention we have in past interviews when you've been on the show gone into much more detail about the theory of comparative inventory and why it's so important. If anybody's looking for more depth on that, go back and listen to prior interviews.

Let's go ahead now to Slide 3. Talk us through this, how the yield curve works and what it predicts.

**Art:** Sure. The yield curve is the black line, it's the fit through all of those data points. The data points are a simple cross-plot of comparative inventory on the x-axis and WTI spot price on the y-axis. It's important to show the previous slide and this slide, because the previous slide includes time. And, while this does, there's no axis that shows it. I've connected the dots. You can see there's a light blue line. And if your eyesight's better than mine you can probably see the time progression unless the data points get real tight.

The logic here, behind the yield curve, is the y-axis is the five-year average. So where that yield

curve intersects the y-axis is where prices should be when we're at the five-year average, obviously. And that's what Bodell calls the mid-cycle price. The mid-cycle price is what it says. It's the median value of all the price versus comparative inventory cross-plots over the life of this particular cycle.

Now, a lot of people will look at that fit, and they'll say it's not a perfect regression fit. And that's absolutely right. Because there's a lot of points, and I'm showing the March through June 2015 unwarranted optimism, the effect of the OPEC production cut optimism. Those are elevated values that are based on sentiment and are not based on the actual cross-plotted data. So, fair enough, there's an interpretation that goes into where to put that yield curve. It's not a mathematically-defined regression. Though you'll see that it does match an awful lot of those points quite well.

The bottom line, Erik, is that every week – you can see I've got October 13<sup>th</sup>, which was the data that came out yesterday, in yellow. There's a blue dot just to its right. That was October 6<sup>th</sup>, the previous storage report. And you can see that we're moving toward the y-axis, we're reducing comparative inventory, and the yield curve is climbing. Which means that the price should be somewhat higher because of that large move in comparative inventory.

The important thing here, and the reason that we haven't seen a lot of price response, is we've got so much oil stored up in inventory that the yield curve has been incredibly flat up until just very recently, like the last couple of weeks. So the yield curve predicts that price shouldn't change very much, because you've still got so much storage to work through before you even begin approaching the five-year average.

Now we're getting into an area of the graph where the curvature, or the inflection of that yield curve, is starting to increase. What that means is that if we continue drawing down inventory and comparative inventory as we have for the last 30-some-odd weeks, we're now going to start seeing a more pronounced price response with every incremental reduction in comparative inventory.

So this is a very simple thing. You tell me what you think comparative inventory will be by the end of this year, or by the first quarter of next year, a value. Read up to the yield curve and then read across to the y-axis, and that's what the yield curve predicts that the WTI spot price should be.

Based on all of this, and the rate that we're drawing down inventory, I'm saying by the end of this year we should be certainly above \$55. And by some time in the first quarter of 2018 – again, assuming that this trend continues – \$60 wouldn't shock me at all.

**Erik:** I think it's important to point out there's almost a double-bullish argument here. One, as you said, is that we're at this inflection point where the curve gets steeper so the same amount of draw on inventory causes more price response in this section of the curve.

The other part of this that you didn't mention yet is that a lot of people are predicting that this trend around exports is going to increase. So, if we take at face value what you said earlier, which is it doesn't matter if it went to export or consumption or where it went, there's a good argument that this growth in exports is going to cause the rate of draw in inventory to accelerate from here. And that could really move us very quickly to higher prices, according to what you're showing here.

Is that right?

**Art:** That's right. Now, there are two important disclaimers that I'm going to put in there. The first one is, let's understand what the nature of the composition of US crude oil is compared to the world norm. We are producing a whole lot of super-light oil. Okay? The world norm, and what most refineries need, is a whole lot heavier than what we're producing.

We talk about something called API gravity, which is just a variant on specific gravity. The average refinery in the world, including the US, likes to have about 30 API gravity. The average type of oil that's produced in the US is about 45 to 50 API gravity. So it's a whole lot lighter.

That presents a problem, because global refineries are not engineered – they can't just put 40 API gravity into a refinery. They have to blend it with much heavier oil, like 20. Like from Canada's oil sands or Mexican Mayan crude. They have to blend it with heavier oil to get it to equal what the refinery is capable of taking.

That's kind of technical, but it's important. The whole reason we're exporting oil is because we can't refine it all. And you might say, why don't we just fix the refineries so that they can take it? Well, that's a real expensive fix. And refineries, those are long-term investments. So, first of all, you've got to believe, or you've got to convince the refiners, that there's going to be enough supply of this ultra-light oil from title-owned reservoirs to last thirty years, or whatever the life cycle of that investment is.

So that's number one.

The US, and the world, doesn't have infinite capacity to refine ultra-light oil from the United States. And global capacity, while the absolute number of barrels per day is higher, as a percent it's no greater than the US. So there are limits to how much US ultra-light oil can be, that there's even demand for in the world.

And an awful lot of the reason that we're able to export as much as we can right now is because other sources of light oil, like Nigeria, have been going through all kinds of outages and disruptions. So we're basically taking refinery space from Bonny Light from Nigeria. Otherwise, we're going to have to compete. And the only way to get it into limited refinery capacity is to take a big discount.

Second disclaimer is that, okay, this is great, we're reducing US comparative inventory by

exporting a whole bunch overseas. But in a world that's oversupplied with oil, there are limits to that. And the world can't just continue to absorb as much oil as the United States wants to send it, unless its supply is also going down or its demand is also going up.

So, it's not a black hole that you can just throw as much oil into as you like. And until this overall oversupply phenomenon that we've been dealing with since 2014 is cured – and we're not there yet, by a long shot – you can't just put as much oil out there as you want. Eventually, the world is going to say, enough. You're just compounding our own problems with oversupply.

**Erik:** Let's go ahead and move on to Slide 4 where you're showing us – the background is the oil price, shown in grey there, and then we have inventories as well as the five-year history. Talk us through this chart.

**Art:** Again, here we're showing absolute inventory in gold, five-year average in blue. So you can imagine that the comparative inventory is somewhere in between. And this really – if you want to understand why oil prices collapsed in 2014, this graph says it all. It's because we were producing so much oil that we just started putting it all into storage. We couldn't use it. So that gigantic buildup in inventories between early 2015 and sometime about a year later is a perfect negative correlation to the oil price collapse.

We were producing too much oil, and then the price got down so low that it wasn't worth selling it. It was cheaper to put it into storage. So, to me, this graph explains exactly how we got to where we are with low oil prices and how we're going to get out of it.

Now, I'm showing that there was a 213 million barrel gap between inventory levels and the five-year average earlier this year. And that's way down to 74. But historically, 74 is still huge. I'm showing back in 2010 on the left-hand side of the graph – one of the biggest discrepancies or gaps was 99 million barrels. So we've dropped a little bit below that.

But I don't want to trivialize the fact that we've still got a pretty big distance to go before we actually get to the five-year average. We're making good progress, but I don't want people to start popping champagne bottles. If they think that higher oil prices are good – not everybody does by the way – we've still got some distance to go. We're making good progress.

That's the essence of this graph.

**Erik:** And the next slide, Slide 5, we're looking at refinery intakes. Talk us through this one.

**Art:** Refinery intakes, which are shown in green on here, have been at record levels for most of 2017. We've been above 17 million barrels of oil per day – that's crude oil going into refineries, cranking out all kinds of refined products on the other side – which is way above levels that we've been at any time recently.

What's going on? Well, the markets are there for those refined products, both at home and

overseas. The way you make money on oil, unless you're a tight oil company that's locked in to commodity prices, is you refine it into something that has more value. That was the whole idea behind Exxon and Chevron, the majors. It wasn't the product itself that was so valuable, it was the gasoline, the jet fuel, the diesel, all the things – you add value to a relatively cheap commodity by refining it.

What we're seeing here is that refinery levels were super-high, and then they dropped way off. And that was the combined effect, mostly of Hurricane Harvey, but also of the subsequent hurricanes that hit Florida and Puerto Rico and whatever. That shut down an awful lot of refineries. Some of them were flooded, they had to do a bunch of maintenance. It also disrupted a lot of pipelines that deliver oil, both to and take products from those refineries.

And what you see on this graph is that we haven't recovered yet from those hurricane disruptions. In fact, this week refinery intakes took another drop down. And that's important. We also see a huge drop, this last week, this last data point, in production of crude oil. That's because of Hurricane Nate.

Nate didn't turn out to be a horribly destructive hurricane onshore in the US, but it shut down a tremendous amount of offshore oil production.

So we're seeing, really, from September onward, a lot of this graph is showing you the effect on refineries and distribution infrastructure of hurricanes in the Gulf of Mexico and the Atlantic Ocean. So, pretty powerful stuff. The Nate thing is temporary. We were recovering before Nate. In another couple of weeks we should be back to 17 million a day, or whatever the norm was earlier.

**Erik:** The thing that strikes me about the area that you have inside the red oval here – it's also refinery maintenance season, when most refineries go into partial shutdown in order to retool their equipment to produce winter grades of gasoline. Would that explain it? Could it be because of refinery maintenance that we're seeing this incomplete recovery, and as soon as turnarounds are done we're going to go back up to where the previous norm was? Or do you think there's more to it than that?

**Art:** That's part of it, certainly. But the spikiness, the big weekly drops, I think are certainly the big drop in refinery intakes. That was clearly hurricane. That was before the maintenance. Maintenance is a factor.

But, again, back to comparative inventory. Part of the reason comparative inventory is so powerful is that you're comparing something with the same time period in previous years. So if refinery maintenance is an issue, it was also an issue a year ago and over the last five years. So the fact that we're continuing to drop comparative inventory, despite refinery maintenance, is saying that we are moving through more inventory during this refinery maintenance season than we did last year and over the past five years.

Comparative inventory normalizes all that stuff out. Whereas just inventories alone might lead you to say, gosh, inventories went down a whole lot. Well, yeah, they always do. Fair point, Erik, it's part of it. But I still think the major effect we're looking at here is weather.

**Erik:** To summarize, it's really already baked into the chart, because comparative inventory, as you say, is reflective of previous refinery maintenance seasons.

Let's go ahead and move on to Slide 6. What's this one telling us about?

**Art:** Again, this is showing two things. It's showing comparative inventory again, the reference point. But now it's showing domestic consumption of everything that comes out of our refineries. And I have two curves here. The weekly variation, which is grey – it's a little transparent because that's distracting – and then the darker blue is the four-week average, which is really the important thing to a look at.

What we see here is that US consumption of refined products has increased. And that's a big source of the drop in comparative inventory. So we're talking about – well, in fact, consumption reached an all-time high over the summer compared to other summers when we had a lot of car driving and vehicle miles traveled, and all of that. So this is real important. It's saying that one of the big of two sources of inventory drawdown here is demand. Domestic demand.

Why is domestic demand up? Well, that's a question for economists. But part of it has to be that the US economy, at least superficially, seems stronger and is responding to lower oil prices, lower gasoline prices, lower refined product prices. People are buying more of it.

So, even though I'm a little bit skeptical about the health of the US and the global economy, you can't ignore or deny what the data is telling you. Particularly when it's a trend. If it's a couple of weeks, well maybe it will change. But consumption in the US for refined products is way up, and that's an important factor in inventory reductions.

If we go on and look at a related graph, Slide 7, here I'm showing net imports. So it's exports of refined products minus imports. Obviously, if we're making more of our own product at home, and consuming more, then our net imports are going to drop. And that's what this is showing. This is showing that we, in fact – and I'm quantifying it – that our decrease in refined products this year compared to last is almost half a million barrels a day.

If you take half a million barrels a day and multiply by seven days of the week, which is how we measure inventories or stocks, you end up with almost three and a half million barrels a week of added demand on inventory that didn't exist last year.

So you can account for almost all of the comparative inventory reduction just by increased domestic consumption and demand of refined products. Selected here, again, through net imports. That's a pretty big deal.



The other piece of the big deal, of course, is the exports, which you brought up. And that's Slide 8. So here I'm showing both crude oil exports and net crude imports. Net crude imports, which is imports minus what you export, is another measurement of exactly the same thing we're talking about.

The exports, which are shown in blue – same scheme as before. The weekly data is a little bit subdued. And four-week average is shown a little bit more boldly. Our average level of crude oil export this year are 320-or-so thousand barrels a day more than they were last year. Multiply by seven and you get 2.2 million barrels a week of increased exports going out of the country, therefore potentially reducing inventory.

So these are the two biggies. Now, you look at the last three weeks of exports. We exported almost two million barrels a day of oil three weeks ago. That's a record. Since we've been keeping records of this stuff, we've never exported – I think maybe during the Gulf of Suez Crisis, whenever that was – in the late 50s or early 60s, I don't remember – we might have come close to that. But that was a blip, an anomaly.

Two weeks ago, we exported 1.3 million, which was huge. This past week, 1.8 million. Now, I don't expect those trends to stay at that level, but, again, three data points doesn't make a trend. So we'll keep watching it.

This is a big deal. Just based on the annual average, we're exporting almost twice as much as a year ago. That is a trend. And these last three data points: wow. I guess our producers and our refiners are figuring out how to make cracks in global market share.

And this gets really important when we start talking about OPEC and what are they trying to accomplish. If the US becomes able to erode market share by Saudi Arabia (or other OPEC countries) in Asia, Europe, that's a threat. I've been a proponent for a long time of saying I don't think the Saudis are at war with shale producers. I think there are other factors there. But if, because of all this, now we're getting into their home territory in Europe and Asia, well maybe now that becomes more of a factor.

**Erik:** I want to make sure that we point out for our listeners, when you're talking about 1.9 million barrels, 1.8 million barrels in exports, those are per day figures. So if we want to compare them to the weekly draw, and build number that we hear in EIA, we need to multiply by seven. So 1.8 million barrels exported this week, that's really 12.6 million barrels, multiplying by seven to get the amount of oil.

So, if you look at the drawdown that we saw in inventory this week, it would have been a massive build in the opposite direction if that oil had not been exported. Now, of course we can't make that assumption, because if that oil was not being exported it probably would change the amount that was being imported. So it's impossible to really know what the impacts of this are.

The other thing I wanted to point out is just my reaction, hearing you talk about this demand story, there's a narrative that you hear so much of these days. Not my view at all, but you'll hear a lot of people say the story for oil is over. Electric vehicles are the way of the future. They're already cutting into demand in a big way. That's going to continue. Demand is falling off a cliff, baby. It's electric vehicles all the way. We don't need oil anymore.

If that's true, it's not showing up in the data is it?

**Art:** No. And don't get me wrong just because I happen to be in the oil and gas business. I'm also a citizen of Planet Earth. And I think renewable energy is the direction we need to be going in. It's clearly part of the long-term solution. We can debate the details and the costs, and there are problems with that. But you're absolutely right, Erik. There is just no evidence that I see that demand for oil is showing any effect whatsoever from electric vehicles and renewable energy.

Of course, if you actually look at what percentage of primary energy consumption those sources are, they're almost too small to measure. In the United States, wind plus solar is something like two or two and a half percent of total primary energy consumption. Don't get me wrong, it's growing. It's going to have to grow an awful lot more before it becomes a factor that is important.

Oil, natural gas, coal – they power the world right now. I agree that the long-term trend is going to be more towards renewables, less towards fossil fuel. But I'd be shocked if we saw any measurable decrease in oil demand in the next 10 years, honestly.

I think people are getting a little ahead of themselves there. They're looking at annual rates of increase, which are high, but they're not looking at what the impact is on total. So whenever I go and talk to university students, they say electric vehicles are going to displace oil demand. And I ask – there might be a couple hundred people in the auditorium – how many people here drove to this meeting? And everybody raises their hand. How many drove an electric vehicle? And usually almost nobody raises their hand.

There's my point. It doesn't reflect a bias, it's just a fact. We've got a couple of hundred young people that are all very much in favor of renewable energy, and all you guys drove yourselves and you drove in gasoline- or diesel-powered cars. So, when I start seeing that demographic, then we'll pay attention.

**Erik:** Speaking of gasoline- and diesel-powered cars, moving on to Slide 9, you've got distillate and gasoline inventories. We should explain for our listeners who may not be familiar, distillates is a code word in the industry that means diesel fuel, jet fuel, and a number of other things, kerosene and so forth, that are all very similar in their chemical composition.

What's going on, particularly with distillates? I've been reading a lot about this. I understand there was a hurricane and everything, but, wow, look at how huge that drawdown has been. Is

there a problem with the ability to make more? Or what's going on?

**Art:** Not that I'm aware of. And I'm a geologist, not a chemical engineer, but my sense is that demand for diesel is huge, both in the US and in the world. So, some of what you're seeing here – and I'm showing the green box – some of what you're seeing here is that during hurricane disruption of refineries, we went from more than 17 million barrels a day down to about 13 million barrels a day. Big drop. Almost a quarter of refinery capacity went offline because of the hurricanes.

Well, there's still demand for diesel distillate in the world, so how are we going to get it to sell to all those hungry people ready to write checks or use their credit cards? Draw it out of inventory.

In a way it's kind of win-win because our refineries are down, we're not producing as much. But as a result we're drawing inventories down hugely because we want to make money, we want to sell the stuff.

Gasoline tends to be more seasonal. And you can see in the graph that the driving season is over in the United States. So gasoline inventories, or CI in this case, comparative inventories, they always go up. And distillates went up a little bit this week. But distillates is a big component of the growth in our exports.

The other one, interestingly, is liquids – natural gas liquid, liquefied petroleum gases, liquefied refinery gases. Those are the two huge components of export growth. Those gasses, or the liquefied form of those gases, and diesel. That's what this thing's showing.

**Erik:** Moving on to Slide 10, a subject very near and dear to my heart. I've just been amazed at how quickly backwardation has been developing in the term structure. What is this slide telling us?

**Art:** You're the expert on this, Erik, and you've taught me a lot of what I know about term structure. But, to me, this is saying that the term structure of WTI – and I'm not showing Brent, but it shows something similar – is reflecting the tightening of supply that I've been discussing and describing, through the mechanism of comparative inventory reduction.

Now, there are many other things going on here, but as you start working through this big overhang of storage, then that says you've got less in your savings account. If you have a big expense, then that moves the forward curve forward to say don't store, sell. If the price is higher in the very near term, and the couple of months, then the market, at least, thinks it's going to be 6 months, 12 months, 18 months out in the future.

Does that kind of reflect your view, Erik?

**Erik:** Yeah, it does. And the thing that really speaks to me – in this case we've moved from

September 5<sup>th</sup> \$47 and change for front-month oil all the way up to \$52 as we're speaking this week. That doesn't surprise me too much for a number of reasons beyond that. But the fact that in the very same time period we went up by \$5, the long-dated contracts out in December of '22 have gone down by \$5 in the very same period.

And what that really says to me is producer hedging is very actively happening. You've got producers hedging their forward production two years out or so, and that's causing a lot of selling further out in the curve. And that, to me, is the explanation. We don't see it on this particular graph, but these curves all do curve up a little bit more on a steep upwards slope back into contango as you move beyond '22 out towards '23–24–25. So I think it's really about two years out where the producer hedging is putting downward pressure on this while, at the same time, we've got upward pressure on the front month.

Let's move on to Slide 11. We're looking at OPEC and non-OPEC production cuts. This is something that has confounded me. The market just reacts so strongly to what they say they're going to do as opposed to what they're actually doing. What are you showing us here on Slide 11?

**Art:** Slide 11 is basically showing the magnitude of OPEC and Russia plus Mexico and a couple of other minor players – liquids production compared with when the cuts were announced in November. And what you see is that early on, in March–April, they'd actually removed more from the market than their target of 1.8 million a day. But in more recent months the compliance hasn't been as tight.

So, really, the point of this graph – and I don't want to dwell on it – is just to say the OPEC cuts matter. Taking a million barrels a day off the market matters. Is it absolutely the prime or the only mover in the market? No. They're just not capable, apparently, of complying with their own regulations or their own agreed-upon production cuts for more than a couple of months. That's the point of this graph.

**Erik:** The next one, Slide 12, really fascinates me, because it doesn't surprise me at all to see this deficit that you're showing through 2017, because that's what the whole front of your presentation was about. But I thought you were saying earlier on that you expected the drawdowns to continue, and that we would maybe be moving up in price going into 2018. But it looks like there is a supply surplus shown on this graph. Is that at odds with what you said earlier?

**Art:** I don't think so, Erik. Keep in mind that this includes forecasts, obviously. I'm showing out through the end of 2018. And so everything up through Q3, third quarter of '17, is data. I'm using an amalgamation of EIA consumption, IEA demand, and OPEC demand, plus some BP. You won't see a graph like this from too many other sources. Obviously there's some algorithms, formulas, that I've used to get between all of these different sources. But 2018 is a forecast, by everybody. The character of this whole graph has changed over time as this comparative inventory drawdown becomes more and more apparent.

Moving into 2018, first point, those surpluses are not that great. We're talking about, say, an average of half a million barrels a day. Compare that to where we were a year, a year and a half ago. Where we were two million barrels a day oversupplied. Supply versus demand. So is market balance the panacea? No. It doesn't turn out to be. Getting close to market balance is helpful.

I suspect that if this demand and therefore the comparative inventory trend continue, that these forecasts will change. But even if they don't, a half a million barrels a day of global liquid surplus, that's not an alarm bell for me.

To me the important thing is the data. The forecasts are what they are, and I'm not going to dispute or argue with them. But I like to live in the present, and the present tells me we're moving in the direction of higher prices.

**Erik:** And, definitely confirmation, BNP Paribas just came out this morning saying 500 thousand barrels per day of surplus through 2018, very much matching what you show on this graph.

Let's move on to your final slide, Slide 13, because this is a subject that has really been preoccupying my brain. It's very easy to see why, after the hurricanes, or in the immediate wake of Hurricane Harvey, of course you had a bunch of US refinery shut-ins. And that meant less demand for US crude oil, more demand overseas, because we had to buy finished product to deal with the fact that we were taken offline. It makes perfect sense that that Brent-WTI spread blew out as dramatically as it did right after the hurricane.

But I am just confounded, Art, to understand why, as US refining capacity has come fully back online, that spread continues to widen. What are your thoughts?

**Art:** First of all, the average of the spread for all of 2017 has been about \$1.50. That's kind of where it's been for a long time. So the spread started to widen – the premium on Brent started way before the hurricanes. It started back in June, early July. Harvey didn't hit until late August. So something else is going on here.

And the two something else's that I'm showing on this graph – blue is that Brent-WTI spread, and I'm showing some current events. So we have this thing going on in the background where Qatar has been at odds with its Persian Gulf neighbors, largely Saudi Arabia, over its affinity to Iran and some of the Shiites. And they paid some ransom back in early June to get some of their hostages freed. Qatar restored diplomatic relations with Iran right about the time Hurricane Harvey hit the US. And then the Kurds in Iraq voted for independence in late September.

So I think some of this has got to do with a fear premium. Market concern about supply, mostly of Brent, based on Persian Gulf Middle Eastern tensions.

But the other thing that's fascinating and confusing to me is – I'm showing in orange, or gold, Cushing comparative inventories. So this whole discussion we've been talking about how US comparative inventories are going down. But look at what's been happening at Cushing. It's been going in the opposite direction. It's been building. And, of course, when Cushing get close to 80% of capacity – and we're pretty close to that right now, mid-70s I think – that always affects WTI to the negative. And, again, that started way before the hurricanes hit.

I don't really have a good explanation for why Cushing inventories are building. Maybe you do, Erik. I can punt and say it's got something to do with the fact that Cushing is landlocked versus the coastal sources, or near-coastal sources, can ship oil in other ways. Landlocked refineries have only a certain amount of capacity for light oil. I don't really know. But I think the point is that that spread is reducing. The last two weeks it's gone down. I expect it is going to go back to something closer to where it was the rest of the year. But I'm with you. There are aspects of this that I just can't explain.

**Erik:** Well, that definitely makes two of us on that one.

Let's move on. Again, fantastic slide deck, Art. I love the work that you do with all of your slides and your blog and so forth. Let's get a couple of questions in that we didn't get in the slide deck.

Aramco and the IPO: A lot of people have really felt that one of the things that was certain to support oil prices going into 2018 is they just figure Saudi Arabia is going to do whatever it takes in order to keep prices up leading up to the IPO of Saudi Aramco. Now a lot of people have been skeptics for a long time about whether that deal was ever really going to happen.

But now we've seen a lot of leaks coming out saying that they've actually instructed the consultant that was working on investor relations to cease work because they may pursue a private placement where they don't have to be as transparent about their accounting as they would have been in a public transaction.

To me this introduces – I call it the China syndrome – what happens where China is now apparently in direct negotiations with Saudi Arabia to buy a piece of Saudi Aramco. What happens if they make a deal behind closed doors and say, we're going to buy as much oil as you want to sell us. And you can store it inside Saudi Arabia so that you don't have to export it, and we'll send our Chinese military over to guard it secretly. But you can lie now and tell the world you're not exporting as much oil. And it's true. You're not exporting as much oil. You're still selling as much oil, you're just storing it for us as well, because we haven't built as much SPR capacity as we would like to in China.

And that's just one thought. So what do you think in general about the Aramco IPO. Is it going to happen? Is it not going to happen? And what are the various knock-on effects that you think about?

**Art:** I sure agree with some of your suspicions, Erik. This has got a lot to do with China. I was always skeptical. You know, the accounting is one thing, but reserve disclosure is another. We have had, the world has had, grave doubts about Saudi OPEC-proved reserve numbers forever. There's no independent audit, there's no way to know. And to think that Saudi Arabia in particular would be willing to open its books and actually show what it thinks its true reserves are for the relatively small percentage of Saudi Aramco IPO is just – they're not going to do that.

Well, again, if they had all those reserves maybe they wouldn't care, but I don't think they do either. So, to me, it's always been a suspicious deal, just another thing to throw out there into the mix that maybe causes oil prices to go up. I couldn't imagine that they would ever want to actually show what they think the reserves are.

But I think that this gets to a bigger issue, and that is that the United States has moved away from, I think, regarding Saudi Arabia as crucial to our oil situation supply, with the boom in tight oil or shale oil or whatever you want to call it. I think that's a hugely misguided perception.

But, basically, Saudi Arabia has shown we don't think the United States is that great of an ally anymore. Certainly under Obama. Trump has made them feel better about it – at least his personal attention. But Saudi Arabia is having to go it alone in Yemen and – well, Obama made a deal with Iran against all the best instincts of Saudi Arabia, and they're saying maybe we need a better ally.

And China is coming over and saying we'd like to be that ally. Because, after all, we buy a heck of a lot of your crude oil in Asia.

So, to me, it's an alliance that makes a lot of sense for both China and for Saudi Arabia. I think it works very much against US interests. But this is the direction that our foreign policy has been taking for the last almost nine years now. The bottom line, for me, aside from reserves disclosure, I just think that Saudi Arabia is saying they think oil prices are going to recover on their own.

Now, how much collusion is going on – we've talked about that before, Saudi manipulating the market – but I've been showing you data that says I think higher prices are coming. If higher prices are coming, then maybe we want to rethink this IPO anyway. Maybe we don't need it as much.

**Erik:** Final question: I want to move on to the longer term. Something I know you and I agree on – whether or not you're right about higher prices coming right now or not is yet to be seen in the data – but someday the shale revolution is going to play out. And I think a lot of people in finance who don't understand what you understand about how these things work, and particularly depletion rates of shale wells, they think that shale just sells everything forever. Someday shale plays out.

And I saw a news story this week about Transocean scrapping rigs; they're not building any new ones. We're not ready to go back to deep water oil exploration and development because the equipment for doing that is basically rusting and being scrapped. It seems to me, at some point we hit this inflection point where all of a sudden shale's played out, you need to go back to deep water offshore, and you don't have the ability to do it. And you get a real big spike in prices. I can't figure out when though.

What are your thoughts on that?

**Art:** Well, nobody knows. And I would have probably put it out there in, maybe '22 or '23 or '21 if we'd had this conversation four or five months ago. Now, with the trending downward, and I didn't show OECD comparative inventory, but it shows a similar thing as WTI – it went down quite a bit just last month, they only report monthly – but all that does is, to me, it moves up the drop-dead date for when all the underinvestment in exploration, field development, rig maintenance, and production, it all comes crashing down and causes a price spike.

It's purely speculative, and I hope everybody understands that, but it wouldn't surprise me if we start to see prices building towards levels that we said were impossible a couple of years ago, like \$100, in 2019. To me it's just inevitable. There are all sorts of opinions out there to the contrary, and I'll refer you to Citi Research did a couple of pieces in August about how even without shale we've got plenty of oil for the 2020s.

But on the other side we've got the CEO of Schlumberger who's real worried about this. The top people in OPEC and Aramco, they've got some ulterior motives. But I think the smart people in the world are definitely worried about this. And if a few propeller heads in investment banks want to tell you otherwise, well, their motives aren't pure either. They're talking their book. They always are.

So to me it's always been a factor. I can't imagine how we could avoid a price spike. I wish we could. And I'm saying that it wouldn't shock me if we start to see a buildup towards that in a year or so. It doesn't mean we're going to be there. But the trend that we're on right now is supply is getting tighter.

And unless that changes in a hurry and we eventually reach the five-year average sooner than later, prices – because of the inflection in that yield curve have already by then gotten to \$70, unless something happens in the world, why wouldn't they go to \$100 or higher? Just because we're not prepared – we've had this "lower for longer" mantra going on for so long we actually believe it. So I'm with you Erik. It's out there, I think it's sooner than I would have thought six months ago.

**Erik:** Well, Art, we're going to have to leave it there in the interest of time. I can't thank you enough for another fantastic interview. I want to really make sure our listeners hear this one though. Art's blog is free. All of the fantastic charts that you see in this particular download are typical of what you'll find in Art's free blog posts. Be sure, it is just crazy not to sign up at



[artberman.com](http://artberman.com) for a free subscription to Art's blog. I certainly read it with great interest every time it comes out and I recommend it highly.

Art, thank you so much. Patrick Ceresna and I will be back as MacroVoices continues, right here at [macrovoices.com](http://macrovoices.com).