Brazilian Upstream – Getting into Deep-water

Industry estimates[1] suggest that Brazil will be one of the most important regions in developing global oil supply through 2035. Non-OPEC growth forecasts are dominated by increasing US tight-oil and Brazil deep-water production, in principle providing a much needed counterbalance to dependence on Middle East oil. What does this mean for the Brazilian oil and gas sector, if it is to fulfil its promise and become an important engine of global oil production development? It must not only face competition from other resource holders, but many other external challenges, among others: Brazil's political and economic crisis; major industry capital spending cuts; continued lower oil prices; regulatory complexity; and an anticipated shift away from fossil fuels. In analyzing how the Brazilian upstream environment might evolve; as Petrobras inexorably contracts, we ask how best to take advantage of numerous opportunities appearing; and venture what might be potential outcomes.

International oil companies are relentless in their search for reserves replacement and production growth. Even so, due to extended lead-times, it requires a long-term vision to stimulate investment in deep-water. Access to Brazil's highly-prized deep-water pre-salt resources has become an important strategic plank for prominent players like Shell, with its recent acquisition of the BG Group. Arguably the timing is right for others to now take advantage of the wide range of opportunities on offer in Brazil. However, many investors are hesitating to follow Shell's lead. Brazil's main rival in attracting capital remains the less capital intensive and lower risk – US tight-oil production, which if it resumes growth, as expected, can roar back to surpass even recent record levels.

While major international oil companies are pondering the huge pre-salt opportunities; there are also a variety of mid-market prospects opening-up in parallel in Brazil. However, a flawed divestment strategy by Petrobras and a shortage of competent independent operators with access to sufficient capital, is apparently limiting the uptake. Moreover, with increasing global competition for capital, we believe that a new strategy with a tough dose of market realism is needed by Petrobras and the authorities, if they are to capture the estimated trillion dollars or more necessary to achieve Brazil's true upstream potential. Hence, the key challenge facing policy makers is to create an attractive and stable environment necessary to encourage investment and fill the gap being left by Petrobras.

The Brazilian Pre-salt Prize

A recent study by Rystad Energy[2] provides the most likely estimate for Brazilian oil and gas reserves of 120 billion barrels, largely in the pre-salt deep-water fields within the Campos and Santos basins, and puts Brazil in sixth place globally in reserves potential. This includes the world's largest three discoveries over the last decade in the pre-salt: Lula, Libra and Buzios fields. Brazilian deep-water is

[1] BP 2016 Energy Outlook
[2] Rystad Energy Press Release - July 04, 2016

one of the most prolific resources globally, with the discoveries having very high well productivity when compared to other deep-water provinces.

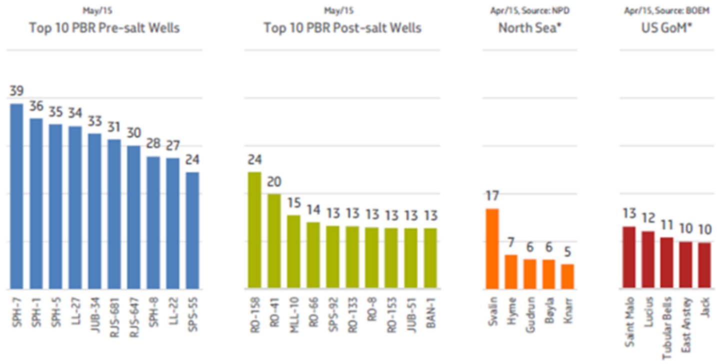

Figure 1 - Deepwater Production by Well

To date the Brazilian upstream has been dominated by Petrobras, which still represents around ninety percent of today's 2.3 million barrels per day oil production. Although Petrobras has found very large reserves, it has drilled relatively few wells and is now severely constrained by its current financial difficulties. Not only do many prospective areas remain unexplored or underexplored, but production investment and recovery rates are well below international levels.

Brazil has been plunged into a deep recession over the past year and a half, and it has been rocked by an unprecedented political and economic crisis. The Petrobras corruption investigation (*"Lava Jato"*) continues to expand to include many members of Brazil's political and business elite. It has virtually bankrupt and is paralysing Petrobras; which is losing its clout and shrinking in size and influence. In turn this will open space for new players, although the real opportunities are slow to materialize, due in part to the ensuing political inertia.

In an effort to address the issues, the interim President of Brazil, Michel Temer, has appointed Pedro Parente as the new President of Petrobras, with a reputation for effective crisis management. He faces major tests: servicing the world' largest corporate debt; while re-invigorating the stalled divestment process to de-leverage the company. It remains to be seen if he will be successful. Undoubtedly, Petrobras' primary objective today is to provide continuity of investment in the priority pre-salt development in order to secure its long-term future.

In any case, it is now clear that Petrobras can no longer do it all. The ability for the pre-salt to attract the massive amounts of capital necessary will be highly dependent upon generating the right conditions and levels of investor confidence in Brazil as a stable long-term investment destination. This requires a change from the resource nationalism of the previous government and a focus on exploiting the available resources, or much will likely be left in the ground.

Deep-water Challenges

After the dramatic fall in the oil price over the past two years we are now looking forward with a reasonable set of assumptions that the oil market is set to balance in the second half of this year and continue to get better in 2017. Nonetheless, the precipitous drop in oil prices put all capex and particularly higher-cost plays, such as deep-water, under the microscope. At current oil prices of around USD 50 per barrel most new deep-water projects are not economically viable. To maintain growth in deep-water in general over the long term requires both sustained higher oil prices and significant reductions in supply chain costs.

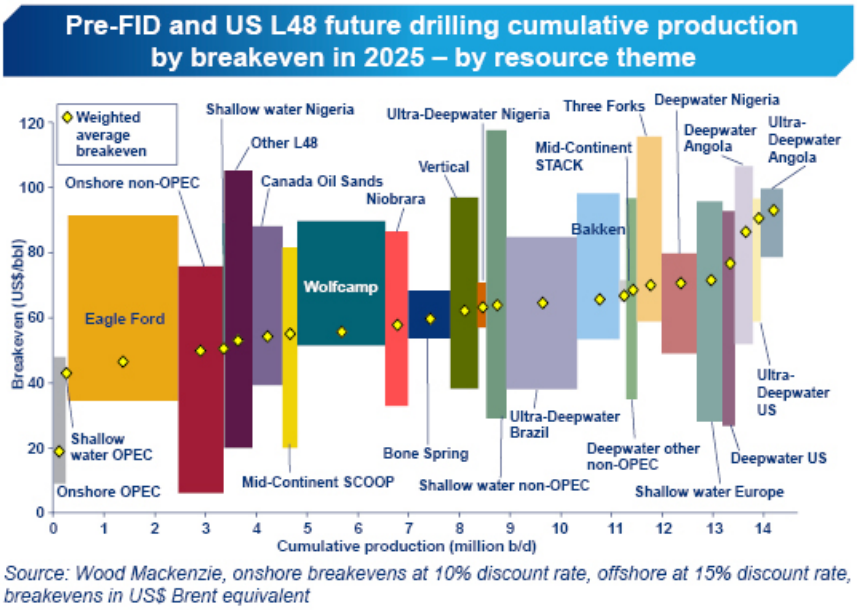

Figure 2 - Cost Curve by Resource

The good news is that low oil prices in some way are partly responsible for a more bullish longer-term outlook on oil price – *the cure for low oil prices is a low oil price*. Oil prices need to support the development of the next tranche of supply to maintain the global supply demand balance over the medium term. A breakeven analysis[3] by Wood Mackenzie suggests in future that an oil price floor will be established at around USD 70 per barrel, which will be essential to maintain potential deep-water development. This implies a positive outlook for deep-water investment, but probably only for the best assets and for investors prepared to take a long-term view, which is becoming less certain in a more volatile world.

In essence the Brazilian pre-salt fields are arguably the most productive deep-water assets globally. Last year Petrobras estimated that the Brazilian pre-salt would break even at oil prices in the range of USD 45 to 52 a barrel. New Brazilian projects, such as the giant Libra field, will need oil at prices of USD 55 per barrel in order to break even, according to the CEO of the country's oil-asset management firm Pre-Sal Petroleo (PPSA). This still compares favorably to GOM break-even costs for new developments, even taking into account reported cost decreases of 20 percent on average to USD 50 to 60 per barrel from the first quarter of 2014 to the first quarter of 2016.

[3] Pre-FID oil projects: global breakeven analysis Wood Mackenzie - 21 Jan 2016:

Tied-up in Red Tape

There are three regulatory regimes currently existing within the Brazilian upstream: royalty-tax concessions, for all exploration contracts signed before 2012 and new exploration blocks that are not part of the pre-salt; hybrid (transfer of rights), under which the federal government granted exclusive rights to Petrobras to explore a number of pre-salt blocks; and Production Sharing Contracts (PSC), for all pre-salt blocks granted after 2010, under which Petrobras is the sole operator with a minimum 30 percent interest in all PSC blocks. The mere existence of these three different types of contract creates unnecessary uncertainty, potential confusion and is a disincentive for investment.

There has been much debate about the mandatory operatorship for Petrobras in the pre-salt. It is perceived not only to limit the company's options for raising cash from existing upstream assets, but also increases its potential capital outlay at a time when it can ill afford it. In Petrobras' current circumstances this effectively creates a cap on new pre-salt development. The Senate recently approved a bill to remove this obligation in the PSC model, which is still in making its way through Congress. While it should be a significant step forward in making pre-salt investments more attractive for international oil companies, it is not the only measure required to streamline the regulatory framework to stimulate investment.

A new set of unitization rules Brazil is now urgently needed to define how to develop oil fields that span more than one single operating concession in order to encourage investments. With the mega-fields of the pre-salt, companies often discover deposits that extend beyond their licensed areas, and need to negotiate with the operators of adjacent blocks to set a development plan. It is estimated that Brazil has as much as 8 to 10 billion barrels that companies are unable to develop because there are no regulations on how to share the output from such fields.

At the same time the targeted global cost efficiencies can only be replicated in Brazil if the industry gets to grips with reforming the existing directives that contribute to the high *Brazil Cost*. Among these, it is proving difficult for operators to comply with local content rules that require a minimum percentage of goods and services to be acquired from Brazilian sources. These rules have become progressively more prescriptive and bureaucratic over the years; and impose significant fines for failure to achieve local content commitments. On the other hand, the fragile home-grown supplier base, incentivised through these local content rules, is already uncompetitive and has been decimated by the falling oil price and the resultant Petrobras cost-cutting and many of the larger local players are involved in *Lava Jato* and restricted from participating in tenders. This is undermining government objectives to expand the local supplier base. In the face of these pressures there has been a recent attempt to create more flexible rules and provide waivers on local content, which is a step in the right direction. Yet there is still a need for greater pragmatism by policy makers.

Meanwhile, Rio de Janeiro state, which accounts for 70 percent of Brazil's oil and gas activity is faced with the threat of bankruptcy and has approved two new taxes on production. These were set to become effective in April 2016 and apply to all fields in the state. However, regulations required for their implementation have not yet been approved and are being challenged by the industry as unconstitutional. This unsurprisingly generates additional uncertainty as to how and when new taxes would come into effect and brings into question the stability of the fiscal regime, which is traditionally a major concern for international oil companies.

In order escape the unintended impacts of such clumsy actions on long-term pre-salt development; we believe it is important for the authorities to harmonize regulation and have a consistent approach to taxation, thereby avoiding added uncertainties and major investment disincentives. So far the regulators, such as the ANP, have been slow to react and establish a new set of transparent rules. This is vital to ensure Brazil is competitive with other major resource holders in attracting investment. In particular, Brazilian authorities need to compare to US tight oil plays, which are the main alternative in terms of capital allocation. These can be expected to continue to be disruptive to oil markets, because of their much shorter lead times and significantly lower risk.

Getting Back to Black

With supply and demand rebalancing, Rystad projections[4] are for an average Brent price of USD 67 per barrel in 2017 - rising above USD 90 by 2020. Based upon this forecast, more than 90% of Petrobras value is in 20 highly productive fields, mainly in the pre-salt. With current oil prices at around USD 50 per barrel Petrobras is again generating operating profits, but needs an oil price of USD 75 per barrel to fully service and repay its debt. Under this oil price scenario we could see a leaner and fitter and profitable Petrobras emerging, possibly in 2018 or beyond, assuming it succeeds in its strategy of restructuring around its core assets.

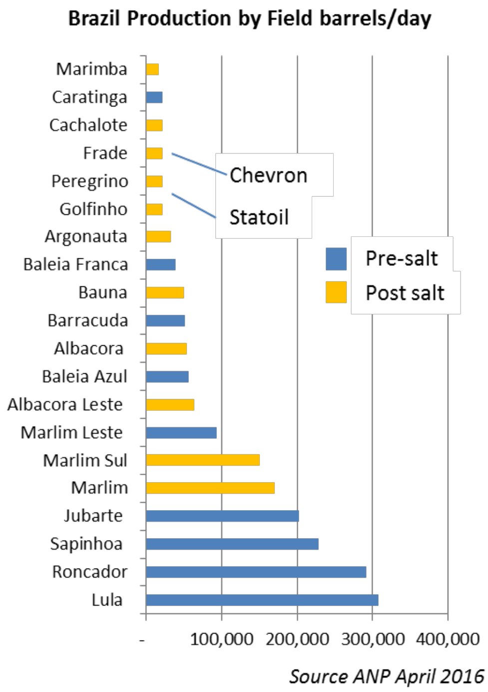

Figure 3 - 20 Most Productive Brazilian Fields

Meanwhile, Petrobras operates around 300 oil fields - 82 of them are major producers. Yet 65 of these 82 fields are now marginally profitable due to the low oil prices, lack of capital investment and high decline rates. There is a pressing need for Petrobras to refocus its portfolio; bringing new pre-salt fields on stream, and selling interests in older mature assets, mainly in the Campos basin, with continuing capital demands that are no longer consistent with its strategy. It should target a portfolio that is smaller but stronger, focused on the pre-salt, with less operating complexity, reduced risk, and better potential to increase and sustain returns.

So far its efforts to divest significant parts of its upstream portfolio have been largely unsuccessful. At the start of the divestment process in early 2015 it decided to put its share in Pão de Açúcar, Sagitário, Lebre, Carcará and Júpiter (all pre-development fields in the pre-salt) and Tartaruga Verde

[4] Rystad Energy

(post-salt) up for sale by invitation to larger players, including IOCs. It was hoping to raise USD 4 billion, yet failed to close on any transactions due to a combination of factors, including: lack of investor appetite for non-producing assets in the low oil price environment; and the bid-ask spread. At the same time there was little or no incentive for Petrobras to set realistic prices, as it carried too much political risk. Among these fields are some of the most interesting prospects within the pre-salt, although arguably some of the more complex and capital intensive fields to develop (… there would therefore appear to be a good reason why they were on the list).

Not the Only Game in Town

The Petrobras capex limitation has meant high depletion rates in its remaining maturing fields, which could soon overwhelm new production. The tail of less productive fields within the Petrobras portfolio is absorbing high cost, estimated to be USD 11 billion per year and thus is a major drain on profitability.

More recently Petrobras has been offering some of its larger producing fields – Marimba, Golfinho and Baúna, in a closed bid process, inviting local operators including: PetroRio, Karoon, Ouro Preto and Queiroz Galvão E&P, as potential buyers. Yet this process also appears to have stalled, partly driven by unrealistic price expectations. Moreover, local players are either not interested, or lack the ability to scale-up operations and raise the necessary capital.

Highlighting Petrobras' dilemma, in July 2016 it announced plans to sell nine small shallow-water fields that produce a total of 13,000 barrels per day, off the coast of Sergipe and Ceará states. This will do little to advance their divestment plans. Marketing the least attractive part of the portfolio, with associated labor liabilities and abandonment costs, offers little or no upside to potential buyers, so is unlikely to be successful. Until it decides to put together divestment packages, which are more in tune with the market, we believe the divestment process will continue to struggle.

The current economic stress in the "oil patch", at least in theory, creates opportunities for investors looking to buy at the bottom of the cycle. Furthermore, there is substantial international capital available from large financial buyers for the right projects; and even buyers willing to accept Brazil risk. However, Petrobras will fail to tap into this source of capital, while it continues to offer less attractive assets, or maintains unrealistic price expectations. And financial buyers are unable to move forward without an effective partnership with one of the few competent operators that would be essential to help them achieve success. We believe a more creative approach is required.

Despite this, Petrobras is making some better progress with its Project Topázio, for which Petrobras has invited bids for ninety-eight Brazilian onshore concessions in May, currently producing 44,000 barrels per day. The fields are distributed in ten clusters in the states of Ceará, Rio Grande do Norte, Sergipe, Bahia and Espírito Santo. The bid has provoked serious interest from a number of mid-size players. With a more realistic approach from Petrobras and significant upside potential, it is believed this divestment could generate up to USD 500 million. In the two-stage process, Petrobras is expected to selectively negotiate with chosen bidders in a second round, with award anticipated later in 2016.

Where to with the Pre-salt?

Meanwhile, Petrobras is seeking to concentrate efforts in its existing portfolio in the prolific deep and ultra-deep-water pre-salt, which demands huge capex. Petrobras announced in May 2016 that oil production operated in the Brazilian pre-salt exceeded the level of 1 million barrels per day for the first time. In terms of a technical achievement this result is impressive; particularly considering it was accomplished in less than ten years after the first discovery. On its current growth trajectory the estimated 65 percent of Brazil's planned oil production coming from the pre-salt by 2020 looks achievable (around 1.8 million barrels); despite a significant reduction in the number of FPSOs to be brought online by 2019 in its current investment plans.

There are currently estimated to be 11.6 billion barrels of recoverable reserves from planned pre-salt projects. All the same, Petrobras is just scratching the surface, if we genuinely believe that there are 120 billion barrels to be exploited. Considering the company's present financial position, Petrobras no longer has the capital or the momentum to develop these resources at the required rate; and only the largest players in the industry are technically and financial capable. Diminishing Petrobras' role in the development of the pre-salt resources in favor of major oil and gas companies faces significant opposition from workers' unions and is the subject of on-going negotiation between key political parties. However, without the necessary trade-offs it will be impossible to create the potential production growth from pre-salt areas and could become a momentous missed opportunity for Brazil.

In response, the interim government of Michel Temer and the industry regulator ANP are currently proposing a new licensing round for operating concessions in the pre-salt in an effort to attract over USD 400 billion in fresh investment. It is expected that the unitized areas in Sapinhoá, Gato do Mato, Carcará e Tartaruga Mestiça will be in a new package to be offered in mid-2017. Possible interested parties are thought to include: Exxon, Chevron, Shell, BP, Total, Petronas and Saudi Aramco. This will become a key test of the long-term appetite for deep-water resources. However, there are emerging signs that this could be a challenging target.

Can you be sure of Shell?

Shell just completed the USD 53 billion acquisition of the BG Group. A big focus of the deal was BG's deep-water business, primarily offshore Brazil. Despite its involvement in deep-water, Shell's 2016 capital markets presentation revealed that Shell is now pivoting more towards shale and US tight-oil as part of its long-term strategic direction.

Nonetheless, Shell is already heavily committed to Brazilian deep-water projects, as an important part of its portfolio. Shell's CEO, Ben Van Beurden recently stated in the context of the BG acquisition that: *Shell still sees the Brazil deep-water assets it acquired with BG as highly attractive. Any potential delays in developing those assets due to political and economic problems in the country had been factored into Shell's valuation of BG. These are still fundamentally the best deep-water resources that are available on the planet. And that will not change.*

Undoubtedly Shell will continue to spend on deep-water in the medium-term, because - at the very least - it is not prudent to stop multi-billion dollar projects once you have started them. Particularly, taking into account that deep-water projects can typically take five to seven years from when they are initiated until production comes on line. However, now that the industry has been reminded that oil prices are volatile, committing billions of dollars to a multi-year deep-water development is becoming much less appealing. In the deep-water you drill a small number of very expensive wells, which doesn't allow for much trial and error. On the other hand shale or tight-oil production is more flexible; an order of magnitude cheaper per well; and technology and extraction methods keep improving. For example, Shell has brought down costs of drilling an US tight-oil onshore well by a staggering 50 per cent since 2013.

Black to Green

There is a growing threat that many analysts, investors and executives now see facing the oil and gas industry: the prospect of a long-term transition away from fossil fuels and towards renewable energy. This has particular importance when thinking about deep-water investment with the long-term horizons, such as the anticipated USD 400 million over the 35-year life of the Libra field in Brazil.

Exxon, which is the most bullish of the super-majors on oil, expects demand for fossil fuels can continue to grow. It projects that total world energy demand will grow by about 25 per cent in the next 25 years, compared to 59 per cent growth in the past, in part because climate policies will drive increased energy efficiency. Even though overall energy demand growth is slowing, it predicts oil use can rise by 19 per cent by 2040 and gas use by 51 per cent. Not much sign of a disappearing market for oil there. Although renewables such as wind and solar are growing very fast, Exxon still thinks that by 2040, excluding hydro power, they will provide just 4 per cent of the world's energy.

However, deep-water resources, which remain higher up the cost curve than other oil resource types are therefore the most susceptible to variations in the forecast. BP suggests that the comparable figure for renewables' share of primary energy demand is 8 percent in their projection to 2035 – double that of the Exxon forecast. Even in this more bearish case the anticipated growth of Brazil deep-water is still estimated to be an important factor providing an additional 3 million barrels per day by 2035. Hence, the outlook for oil at the margin has an important impact on how much of the Brazilian deep-water reserves are likely to be developed. At the same time, estimates only represent a small fraction of the true potential for the Brazilian pre-salt. Raising the question as to how much of the pre-salt will eventually be developed?

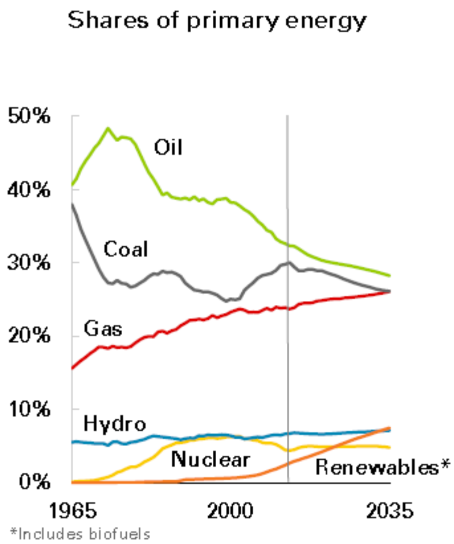

Figure 4 - BP Forecast 2035

What Next?

The greatest challenge to development facing Brazil's energy sector today is that Petrobras can no longer fulfil its critical role. Petrobras still lacks a viable plan to improve its finances and a clear vision of its future. It has cut capital expenditures, but is nearing the threshold necessary to maintain current production and revenues. Its divestment plan has made little progress on asset sales and it is behind in the essential re-structuring of its upstream portfolio among others.

There may be many new opportunities for private investment to fill the void left by Petrobras, but it requires important reforms to the sector first. Both interim President Michael Temer and Pedro Parente, the new CEO of Petrobras, support revising Petrobras' mandatory participation in the pre-salt. This would be a clear signal that Brazil is seeking to attract investment, but it is not all that is required to stimulate the massive amounts of capital required to achieve the full potential of the Brazilian upstream industry.

Meanwhile, lower oil prices have put all capex under scrutiny and in particular higher-cost plays, notably capital intensive long-term investments in deep and ultra-deep-water, as with the Brazilian pre-salt. In the global competition between major resource holders there would appear to be a paradigm shift toward lower risk and more flexible investment in US tight-oil, as the preferred source of future supply growth. Unless Brazilian policy makers and Petrobras can get to grips with this new reality and create the right conditions in the near-term to attract the bigger industry players with the right long-term vision, it has the potential to become a huge missed opportunity. Much of the resources may end-up left in the ground.

<u>About the author</u>

Mark McHugh - is a Managing Director and Co-Founder of OFSCap, LLC a boutique investment firm, with offices in Houston and Rio de Janeiro. He is focused on oil and gas in Brazil and Latin America and has successfully advised on major transactions in the sector. Mark is based in Brazil and has an extensive international senior level career in the oil industry in marketing, sales, strategy consulting, and general management; spending 26 years with Shell. During his distinguished career, Mark has held a variety of management team positions as VP Marketing Americas, GM Downstream International Consultancy, VP North Latin America and GM Shell Venezuela. He has an exceptional track-record in leading new business development, implementing global business strategies, M&A and managing start-ups. Mark graduated as a mechanical engineer from Imperial College, London and has a postgraduate qualification in finance and business administration from the University of Westminster.

For further information on this article or OFSCap, LLC, please contact: mmchugh@ofscap.com.

Disclaimers

Articles are provided for informational purposes only and do not constitute an offer to sell or a solicitation to buy any security or other financial instrument. The opinions, forecasts, assumptions, estimates, derived valuations and target price(s) contained in the Articles are as of the date indicated and are subject to change at any time without prior notice. The stated price of any securities mentioned in the Articles is as of the date indicated and is not a representation that any transaction can be effected at that price.

Information has been obtained from sources believed to be reliable but OFSCap, LLC its affiliates and/or subsidiaries do not warrant its completeness or accuracy. Neither OFSCap, LLC, nor other persons shall be liable for any direct, indirect, special, incidental, consequential, punitive or exemplary damages, including lost profits arising in any way from the information contained in the Articles.

The Articles are not intended for private or retail customers in any jurisdiction in which distribution of information contained in the Articles to private or retail customers would require registration or licensing of the author or OFSCap, LLC which the author or OFSCap, LLC does not currently have.