LISBOA
SCHOOL OF
ECONOMICS &
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MASTER IN

FINANCE

MASTER'S FINAL WORK

PROJECT

EQUITY RESEARCH – SONANGOL E.P.

HENRIQUE JORGE DE CARVALHO SETAS FERREIRA

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TUTOR:

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RESUMO

Titular de uma posição preponderante no sector petrolífero, a Sonangol E.P. (designada daqui para frente como "Sonangol" ou "Grupo") é a maior empresa pública a operar em Angola e umas das maiores a operar em África. Esta, detém uma linha de negócios que integra toda a cadeia de valor referente ao negócio petrolífero, nomeadamente, desde a extracção de petróleo e gás natural, até a sua transformação, distribuição e venda ao consumidor final.
Com uma carteira de investimentos muito diversificada, o Grupo possui interesses e investimentos em outros sectores de actividade, que colocam a empresa no topo das maiores em termos de receitas e activos em África.

Contudo, sendo o principal veículo de desenvolvimento económico-financeiro em Angola, fruto dos avultados investimentos que realiza tanto no mercado doméstico como no internacional, a Sonangol E.P. depara-se com inúmeros desafios futuros consequentes da actual conjuntura macroeconómica vivida no País bem como a recente queda dos preços do petróleo.

Assim, este Trabalho Final de Mestrado tem como objetivo avaliar a Sonangol E.P. e determinar o valor intrínseco das suas acções, através de um processo exaustivo de análise do Grupo, da indústria e das previsões de crescimento. A avaliação foi realizada pelo método do *Free Cash Flow to the Firm (FCFF)* que de acordo com a revisão de literatura abordada pretende conciliar a teoria e prática de modo a se apurar o valor intrínseco das acções da empresa. Como resultado desta avaliação, foi possível concluir que a Sonangol detém um valor empresarial *(enterprise value)* de aproximadamente 15 mil milhões de euros, estando o valor intrínseco de cada acção a rondar os 9.23 euros.

Para finalizar, este trabalho providencia uma base sólida de análise para uma possível venda parcial ou total da empresa pelo estado Angolano, assim como para o lançamento de um possível *IPO (initial public offer).*

Palavras-chave: Avaliação de Empresas, Free Cash-Flow to Firm, Enterprise Value, Petróleo, Angola, África, IPO.

ABSTRACT

With a Key position in the sector of Energies, Sonangol E.P. (hereinafter "Sonangol" or "Group") is the largest state-run oil company operating in Angola, the Africa's second-largest crude producer. Holder of a business line that integrates the entire value chain of oil & gas business, since its extraction to its distribution and sale to the final costumer, Sonangol holds investments and interests in other sectors (transportation, real estate, education, healthcare, etc) which places the company on top of the largest firms in terms of assets and revenues operating in Angola. However, as the main driving force of the Angolan economy, Sonangol presents large future challenges due to the current macroeconomic situation lived in the country as well as the actual fall in oil prices.

This Master's Final Work aims to determine the underlying enterprise value of Sonangol, through a thorough analysis of the Group and the industry as well as its growth prospects. The valuation was based on *Free Cash Flow to the Firm* methodology, which according to the established in the literature review, conciliate the theory and practice to reach the real value of Sonangol's share price.

With this evaluation it was possible to conclude that Sonangol's enterprise value is EUR 15.566bn, being the intrinsic value of each share EUR 9.23.

Therefore this study provides a solid basis of analysis, for possible sale of the company by the Angolan state, as well as turning the Group public through an *IPO process (Initial Public Offer).*

Keywords: Equity Valuation; Free Cash Flow To The Firm; Enterprise Value; Energy Sector; Angola; Sonangol E.P.

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LIST OF TERMS AND ABBREVIATIONS

APT – Arbitrage Pricing Theory

APV – Adjusted Present Value

BMI – Business Monitor International

BV – Book Value

CAGR – Compound Annual Growth Rate

Capex – Capital expenditures

CAPM – Capital Asset Pricing Model

CDS – Credit Default Swap

D – Debt

DCF – Discounted Cash Flow

D/E- Debt to equity ratio

DDM – Dividend Discount Model

DPS – Dividend per share

E – Equity

EBIT – Earnings before Interest and Taxes

EBITDA – Earnings before Interest, Taxes, Depreciation and Amortization

EIA – Energy Information Administration

EPS – Earnings per share

EV – Enterprise Value

EVA – Economic Value Added

FCFE – Free Cash Flow to Equity

FCFF – Free Cash Flow to Firm

g- Perpetual Growth

IMF – International Monetary Fund

IWC – Investments in Working Capital

OECD – Organization for Economic Cooperation and Development

OPEC – Organization of the Petroleum Exporting Countries

PEG – Price/earnings to growth

PER – Price-to-earnings ratio

Re – Cost of Equity

Rd – Cost of Debt

Rf – Risk Free Rate

ROA – Return on Assets

ROE – Return on Equity

SOTP – Sum-of-the-Parts

WACC – Weighted Average Cost of Capital

WB – World Bank

WC – Working Capital

1. INTRODUCITON

The recent drop in oil prices was reflected in the deterioration of the main economies dependent on exports of this commodity. Angola, the second largest oil producer in Africa and holder of a very dependent economy on exports of oil was no exception. Therefore, Sonangol the national company that manages the hydrocarbon resource exploration in Angola whose operational and strategic performance in the past has been outstanding, presents now a lot of obstacles.

The aim of this project is to evaluate Sonangol and determine the intrinsic value of its shares, with the aim of proposing a possible sale of the company by the Angolan government. The dissertation structure addresses the most relevant issues and a common analysis of *equity research* analysis, providing all the information available and necessary for an accurate and plausible result.

Firstly will be conducted the literature review, where it will systematize the main studies and publications relating to methods of business valuation, the advantages that underlie each method, as well as their applicability.

Additionally, will be developed a detailed analysis of Sonangol E.P., in order to know its history, as well as its strategy, its portfolio and evolution of its operational performance.

After that, the macroeconomic and industry outlook will be presented in order to anticipate the main trends and prospects of the industry and identify the critical success factors that could impact the performance of Sonagol and therefore its intrinsic value. For the industry analysis a SWOT and Porter Strengths study will be presented.

At the end will be developed an economic-financial model based on a *Free Cash Flow to the Firm* method (FCFF), which translate the collected information and assumptions in numbers and, ultimately, the price target of Sonangol.

2. LITERATURE REVIEW

2.1. Brief Overview

Value is the defining dimension of measurement in a market economy. People invest in the expectation that when they sell, the value of each investment will have grown by a sufficient amount above its cost to compensate them for the risk they took. Therefore a company valuation is the process of determining the current worth / price of an asset or a company. According to Damodaran (2006) the value of any asset is a function of the cash flows generated by that asset, the life of the asset, the expected growth in the cash flow, and the riskiness associated with them.

In the world of corporate finance, understanding the mechanisms of company valuation is an indispensable requirement because "valuing the company and its business units helps identify sources of economic value creation and destruction within the company" (Fernández 2007)[1]. The valuation of companies is essential in many business contexts, particularly in active portfolio management and investment analysis (Damodaran 2002) where analysts and investors seek to identify companies whose shares are being traded below their intrinsic value in the hope of generating capital gains; mergers and acquisitions (Fernández 2007) identifying the maximum price the buyer is willing to pay, as well as the minimum price the seller is willing to receive; corporate finance (Goedhart 2005) it enables CEOs to "focus on long-term value creation confident that their stock's market price will eventually reflect their efforts"[2], litigation / bankruptcy proceedings (Jonathan Berk and Peter deMarzo 2013) intending to calculate the value of company assets to later proceed to its sale and meet commitments to creditors and shareholders.

In light of different valuation outcomes (Koller, Goedhart, & Wessels, 2005) argue that the final valuation depends on the subjectivity of the assumptions considered, as well as, the way that expectations are managed by the analyst/investor making all valuations biased

[1] Fernández, P. (2007), Company Valuation Methods. The Most Common Errors in Valuations, IESE Business School
[2] Goedhart, M., Koller, T. Wessels,D.(2005a), Measuring and Managing the Value of Companies, 4th Edition - The McKinsey Quarterly: John Wiley & Sons, Inc

(Damodaran 2002). The author stresses the fact that there are no precise valuations, and the direction and magnitude of the bias in valuations are directly proportional to who pays/required the service and how much it is paid.

2.2. Valuation Methods

The existing valuation methods are grouped according to their authors. Fernández (2007) basis his valuation on 6 different groups, while Damodaran (2006) basis his valuation on 4 different groups – *i)* Discounted Cash-Flow Valuation, *ii)* Liquidation and Accounting Valuation, *iii)* Relative Valuation and *iv)* Contingent Claim Valuation.

Table I - Valuation Approaches

Discounted Cash Flow Valuation	Relative Valuation	Contingent Claim Valuation	Asset Based Valuation
Equity Valuation Models:	**Multiples:**	Binomial	Book Value
DDM – Dividend Discount Model	EV/EBITDA	Black and Scholes	Liquidation Value
FCFE – Free Cash Flow to Equity	EV/EBIT		Replacement Cost
Firm Valuation Model:	Price/Earnings		
FCFF – Free Cash Flow to Firm	Price/Book Value		
EVA – Economic Value Added	Price/Sales		
APV – Adjusted Present Value			

Source: Damodaran, A. (2006), Valuation Approaches and Metrics: A Survey of the Theory and Evidence, Stern School of Business, New York University

2.2.1. Discounted Cash Flows – DCF

Discounted Cash Flow Valuation is a method that estimates the value of any asset by discounting back the expected cash flows on that asset at a rate that reflects their riskiness (Damodaran 2006). As mentioned by the author an evaluation process measures the intrinsic value of an asset and the actual value of a company, and points out that "there are literally thousands of discounted cash flow models in existence"[3] 1e, to work around this, chooses to categorize it into three groups: *i) Equity Valuation; ii) Firm Valuation; iii) Adjusted Present Value (APV) Valuation.*

2.2.1.1. Equity Valuation Models

In equity valuation models, analysts/investors attempts to assess the company from the shareholders perspective where the cash flows are considered belonging to the equity holders and discounted at the rate of return required by them (cost of equity).

[3] Damodaran, A. (2002), Investment Valuation: Tools and Techniques for Determining the Value of Any Asset, 2nd Edition – University Edition, New York: John Wiley & Sons, Inc.

In this category it can be found two different models: *i) Dividend Discount Model (DDM)*, in which the expected cash flow to the equity is equivalent to the expected shareholders dividends in perpetuity; *ii) Free cash flow to the equity (FCFE)*, which are considered all cash flows distributed to shareholders, as well as the potentials, i.e. those that the company generates, but for some reason chooses not to distribute.

- **Dividend Discount Model (DDM)**

Dividend Discount Model (DDM) is a method for valuing the price of a stock for a company which pays out dividends, assuming that the price of a stock is equivalent to the sum of all of its future dividend payments discounted to the present value. In general, the value of each action is given by:

[1] $Stock\ Value = \sum_{i=1}^{i=\infty} \frac{E(dividends\ per\ share)i}{(1+ke)^i}$

Various theories and variants of this base model have been developed to include the fact that companies distribute an amount of dividends depending on the development stage they are in.

In 1962, Gordon developed a model (Gordon Growth Model or Constant Growth Model) which states that, for companies with a stable growth and no dividend retain, the value of their equity can be represented as a growing perpetuity based on the expected dividend of the next period (Foerster and Sapp, 2005), confirming the need to estimate the annual dividends in perpetuity.

[2] $Stock\ Value = \sum_{i=1}^{i=\infty} \frac{E(dividends\ per\ share)i}{(1+ke)^i}$

In this method still stands out the development of two models that circumvent the limitations imposed by the general DDM and Gordon Growth Model. The first model mentioned by Damodaran (2006) is a natural extension of Gordon model data which includes two stages of growth: i) an initial period where the growth rate is not stable dividend and then ii) stabilizes and is expected to remain in perpetuity.

The second model, made by Fuller and Hsia (1984), is also a two-stage model, but initially assumes that the growth rate of the dividend increases linearly until a sustainable growth.

- **Free cash flow to the equity – FCFE**

FCFE values a company's equity by computing future cash flows to equity and discounting them at the expected cost of equity. Traditional CFE represent what is available for distribution to shareholders after capital expenditures and net working capital needs have been met, as well as, financial obligations (Damodaran, 2002 and 2006).

[3] *Free Cash Flow to Equity = Net Income – Capital Expenditures + Depreciations* - Δ *Non-Cash Working Capital + (New Debt Issued – Debt Payments)*

Damodaran (2006) compares DDM with FCFE, renaming the latter "potential dividend model"[4], it means that if a company was to pay out to its shareholders all its cash flows after debt payment and reinvestment needs, both DDM (considering company doesn't inflate dividends by borrowing) and FCFE methods would yield the same value for the company.

2.2.1.2. Firm Valuation Models

These models develops another approach to valuation where the entire firm is valued, by discounting the cumulated cash flows to all claim holders (shareholders or creditors) in the firm by the weighted average cost of capital (the cost of capital approach) (Damodaran, 2006) or by adding the marginal impact of debt on value to the unlevered firm value (adjusted present value approach) (Kaplan and Ruback, 1995). Within this category of evaluation, the main models are the Free Cash Flow to Firm – FCFF and the Economic Value Added – EVA. In this project is only referenced the first model that will be used to assess Sonangol.

- **Free Cash Flow to Firm – FCFF**

The *FCFF* model correspond to the sum of the cash flows that all holders of the company (e.g. common and preferred shareholders and creditors) are entitled.

[4] Damodaran, A. (2006), Valuation Approaches and Metrics: A Survey of the Theory and Evidence, Stern School of Business, New York University

Damodaran (2002) defends that the cash flow to the firm can be measured in two ways. One is to add up the cash flows to all the different claim holders in the firm. Thus, the cash flows to equity investors (which take the form of dividends or stock buybacks) are added to the cash flows to debt holders (interest and net debt payments) to arrive at the cash flow to the firm. The other approach to estimating cash flow to the firm, which should yield equivalent results, is to estimate the cash flow to the firm prior to debt payments but after reinvestment needs have been met.

[4] $Free\ Cash\ Flow\ to\ the\ Firm\ (FCFF) = EBIT\ (1 - Tax\ Rate) - (Capital\ Expenditures - Depreciation) - Change\ in\ Noncash\ Working\ Capital$

The difference between capital expenditures and depreciation (net capital expenditures) and the increase in noncash working capital represent the reinvestments made by the firm to generate future or contemporaneous growth.

Another way of representing the same equation is to sum up the net capital expenditures and the change in working capital, and state that value as a percentage of the after-tax operating income. This ratio of reinvestment to after-tax operating income is called the reinvestment rate, and the free cash flow to the firm can be written as:

[5] $Free\ Cash\ Flow\ to\ the\ Firm\ (FCFF) = EBIT\ (1 - Tax\ Rate) - Capital\ Expenditures + Amortizations + Depreciation - \Delta\ Working\ Capital \pm other\ Non\ cash\ items$

Many authors argue that this model can serve multiple purposes. According to Goedhart et al (2005a), this model should be used in the evaluation of investment projects and in the evaluation of companies with multiple businesses; contrary to Damodaran (2002 and 2006) and Fernández (2009) who argue that this model should only be used in the evaluation of companies that claim to have a fixed capital structure.

- **Terminal Value or Continuity/Perpetuity Value**

According to Kaplan & Ruback (1996), the FCFF Model is the most commonly-used DCF approach, on which the value of a leveraged firm can be calculated by discounting the unleveraged cash flows to the firm at the firm weighted average cost of capital (WACC).

Thus:

[6] $Firm\ Value = \sum_i^n 1 \frac{FCFFi}{(1+WACC)^i} + \frac{FCFFn+1/(WACC-TGR)}{(1+WACC)^1}$

Indeed, this formula is composed by two stages: the first is computed the present value of cash-flows up to some preselected horizon date (n), which according to Ohlson & Zhang (1999) is rarely superior to 15 years; and the second is calculated to the present value of cash-flows beyond the horizon date referred as the terminal value (TGR represents the terminal growth rate).

- **WACC Rate**

As mentioned above, one of the commonly-used discount rate in cash flow calculation approaches is the tax-adjusted discount rate or weighted average cost of capital (Kaplan & Ruback, 1996)[5]. According to this "method", WACC represents a weighted average of the after-tax costs of different sources of capital (equity and debt), in which each one is weighted by the fraction of the capital structure it represents (Luehrman, 1997).

The weighted average cost of capital – WACC combines the rates of return required by shareholders and creditors and is calculated as follows:

[7] $WACC = \frac{E}{E+D} re + \frac{D}{E+D} rd(1 - Tc)$; where R_e is the cost of equity and R_d is the cost of debt, E is the equity and D the debt, and Tc is the corporate tax rate.

Indeed, WACC's main advantage is that it bundles the two sources of capital together in order to discount them only once.

- **<u>WACC variables:</u>**

  - *<u>Cost of Equity (Re)</u>*

The cost of equity is the rate of return investors require on an equity investment in a firm (Damodaran, 2002). The most common theories to measure the cost of equity is the Capital Asset Pricing Model (CAPM) (Sharpe 1964), Fama-French Three-Factor Model (Fama e

[5] Kaplan, S. N., and R. S. Ruback. "The Market Pricing of Cash Flow Forecasts: Discounted Cash Flow vs. the Method of Comparables." Journal of Applied Corporate Finance 8, no. 4 (winter 1996): 45–60

French, 1992) and the Arbitrage Price Theory (APT) (Ross 1976), being the most used the CAPM model which according to Damodaran (2002) is "the risk and return model that has been in use the longest and is still the standard in most real world analyses"[6].

According to Kaplan and Peterson (1998), the CAPM defines linear relationship between the cost of equity and the slope coefficient (beta) in a regression of the company's equity returns. In other words, the CAPM embodied by Sharpe (1964), Lintner (1965) and Black (1972) conclude that the return of an asset is the sum of the risk-free rate and the risk-premium, which depends on beta. In order to calculate the expected return one needs the following inputs; risk free rate, security's beta, equity risk premium and country risk premium if applicable.

[8] $Cost\ of\ Equity = Rf + \beta i\ (Rm - Rf)$ + CRP

- *Risk Free Interest Rate (Rf)*

In theory, a riskless asset can be defined as one for which the investor knows the expected returns with certainty, meaning that there is no default risk or risks associated with reinvestment. Damodaran (2008) considers that the only assets that meet these criteria are zero-cupon government bonds, without risk of bankruptcy, whose maturity is equal to the cash flows being discounted. Another important aspect to note is the fact that the risk-free interest rate and the cash flows must be in the same currency, otherwise the assessment may be biased by the inflation value. This is particularly severe in economies with high inflation rate (Damodaran, 2008).

- *Beta (β)*

Beta is the risk parameter of an individual asset, according to (Fama & French, 2004) "the market beta of asset *I* is the covariance of its return with the market return divided by the variance of the market return"[7].

[6] Damodaran, A. (2002), Investment Valuation: Tools and Techniques for Determining the Value of Any Asset, 2nd Edition – University Edition, New York: John Wiley & Sons, Inc.
[7] Fama, Eugene F., and Kenneth R. French. 2004. "The Capital Asset Pricing Model: Theory and Evidence." Journal of Economic Perspectives, 18(3): 25-46

As beta is not directly observed on the market, it has to be estimated, which means developing a set of assumptions and methodologies.

According to Damodaran (2002), the conventional approach to estimating the beta of an investment is a regression of returns on the investment against returns on a market index over a reasonable time period. In practice there is a tendency to use a stock index, such as for example S&P500, as a proxy for the market portfolio, and estimate betas for stocks against the index.

The standard procedure for estimating betas is to regress stock returns against market returns, where the slope of the regression corresponds to the beta of the stock and measures the riskiness of the stock.

As an alternative to linear regression, may be used the beta of the unlevered beta of industry as an operating company – βu, since companies operating in the same industry are exposed to similar operational risks (Goedhart et al 2005a). In turn, the beta of a leveraged company – βl can be obtained from its operating beta, using one of the three theories presented in the following table:

Table II - Beta Approaches

Fernández (2003)	Damodaran (2002)	Goedhart et al (2005[a])
$\beta l = \beta u + (\beta u - \beta d) \times D/E \times (1-T)$	$\beta l = \beta u + (\beta u) \times D/E \times (1-T)$	$\beta l = \beta u \times (1 + D/E)$

Source: Fernández (2003)

- *Risk Premium*

The risk premium is a significant input in all the asset pricing models. According to Damodaran (2002) the risk premium measures the "extra return" that would be demanded by investors for shifting their money from a riskless investment to an average risk investment". In the standard approach to estimating equity risk premiums three basic approaches are used – the survey approach, where investors or managers are asked to provide estimates of the equity risk premium for the future, the historical return approach, where the premium is based upon how well equities have done in the past and the implied approach, where we use future

cash flows or observed bond default spreads to estimate the current equity risk premium (Damodaran, 2012 and Fernández, 2004).

The most common approach to estimating the risk premium is to base it on historical data by looking to the difference between average returns on stocks and average returns on riskless securities over an extended period of history.

- *Cost of Debt (Rd)*

The cost of debt measures the current cost to the firm of borrowing funds to finance projects.

The simplest scenario for estimating the cost of debt occurs when a firm has long-term bonds. The market price of the bond, in conjunction with its cupon and maturity can serve to compute a yield which is used as the cost of debt.

When no rating is available to estimate the cost of debt, Damodaran (2002) suggests checking the recent bank borrowing history or estimating a synthetic rating using interest coverage ratio.

2.2.1.3. Adjusted Present Value Model – APV

The Adjusted Present Value (APV), as developed by Myers (1974), defines the value of a levered firm as the value of an otherwise identical but unlevered firm plus the value of any "side effects" due to leverage. These side effects often include the tax shield of debt, expected bankruptcy costs, and agency costs. The APV provides a powerful framework for analyzing a variety of issues in corporate finance, and is especially useful in applications of corporate valuation.

$$[9] Entreprise\ Value = \sum_{t=1}^{i=n} \frac{FCFFt}{(1+rd)^t} + \frac{FCFFn+1\,(rd-g)}{(1+rd)^n} + PV(\,Tax\ Shield) - \ PV\ (Bankruptcy\ Costs)$$

According to Luehrman (1997), APV is highly helpful in the valuation of cross-border takeovers, although the use of the correct valuation approach depends on the nature of a firm's capital structure (Kaplan & Ruback, 1996). Indeed, the APV represents a model which can incorporate easily the impact of dividend policy, or even transaction costs in financing, and is extraordinarily transparent concerning in adjustments to the discount rate (Myers, 1974).

Notwithstanding, the APV concept presents certain handicaps: first of all, the income from stocks can be taxed in a different way, when the investor files a personal tax return; in addition, analysts usually ignore the use of other financing side effects in order to avoid complexity in getting the APV estimation (Luehrman, 1997).

According to Damodaran (2002) there are many authors who believe that adjusted present value is a more flexible way of approaching valuation than traditional discounted cash flow models. This may be true in a generic sense, but APV valuation in practice has significant flaws. The first and most important is that most practitioners who use the adjusted present value model ignore expected bankruptcy costs. Adding the tax benefits to unlevered firm value to get to the levered firm value makes debt seem like an unmixed blessing. Firm value will be overstated, especially at very high debt ratios, where the cost of bankruptcy is clearly not zero and, in some instances, the cost of bankruptcy is higher than the tax benefit of debt.

2.2.2. Relative Valuation

In discounted cash flow valuation, the objective is to find the value of assets, given their cash flow, growth, and risk characteristics. In relative valuation, the objective is to value assets, based on how similar assets are currently priced in the market.

To compare the values of "similar" assets in the market, it needs to standardize the values in some way. They can be standardized relative to the earnings they generate, to the book value or replacement value of the assets themselves, or to the revenues that they generate (Damodaran, 2002).

Damodaran (2002) argued that evaluations based on multiple *i)* require fewer assumptions, so they become more rapid than the DCF valuations; *ii)* are simpler to present to clients; *iii)* reflect the state of the market, given that assess the relative value of assets rather than its intrinsic value.

Kaplan and Ruback (1995) add that the relative valuation presents better performance than the DCF valuation, as it incorporates the market expectations of the future cash flows and

interest rates. However, these authors found that the absence of similar companies can be a counter of this method.

Damodaran (2002) also added that the facility associated with this method may result in an inconsistent estimate because critical variables such as the level of risk, growth and cash flow potential, can be ignored. In addition, this author also emphasizes the ease of manipulation of some multiple (via the lack of transparency relative to the underlying assumptions) and the fact that market context is directly reflected in the evaluation, which can cause the (sub) or overestimate.

Therefore, Fernández (2002) defended that multiples are useful in a second stage of the valuation: after performing the valuation using another method, a comparison with the multiples of comparable firms enables analysts to gage the valuation performed and identify differences between the firms valued and the firms it is compared with.

Table III - Multiples Valuation Approaches

Earnings Multiples	Book Value Multiples	Revenue Multiples	Sector-Specific Multiples
Price/Earnings Ratio (PE)	Price/Book value (of equity)(PBV)	Price/Sales per Share	Price/kwh
Value/EBIT	Value/Book Value of Assets	Value/Sales	Price per ton of steel
Value/EBITDA	Value/Replacement Costs		
Value/FCFF			

Source: Damodaran, A., 2002, Investment Valuation: Tools and Techniques for Determining the Value of Any Asset, Second Edition, New York: John Wiley & Son

2.2.3. Contingent Claim Valuation

Contingent claim valuation, most commonly known as option theory, "uses option pricing models to measure the value of assets that share option characteristics" (Damoradan, 2006). For Luehrman (1997) "Option Pricing methods are most adequate to be used when valuing opportunities"[8]. For some companies (e.g. new technologies or fast-growing markets) opportunities are their most valuable "asset". Option valuation is used to decide whether or not to make a decision, having in mind the specific circumstances involved. This flexibility that options give are of great value and its impact on a company's valuation is not considered in the methodologies explained before. The most widely used option pricing models are the

[8] Luehrman, T. A., 1997, What's it Worth? A General Manager's Guide to Valuation, Harvard Business Review, May-June 1997, 132-142

binomial and the Black-Scholes model. However, due to the complexity of these models and given the fact that they will not be applied on Sonangol's valuation due to the lack of information, no further analysis will be presented.

2.2.4. *Asset Based Valuation*

In the asset-based approach, primary emphasis is placed on the fair market value of the assets and liabilities of a business (Damodaran, 2006). As a result, this approach uses three methods that consider the value of individual assets and liabilities. The first is the Liquidation Value, where the company's value is determined by the sum of recipes developed with the liquidation of its assets. The second one is the Replacement Cost in the company's value and represents the full costs that the company would have to replace all of its assets. The latest model is the book value, where it is considered that the company's value corresponds to the book value of its assets.

Considering that there are several accounting standards (e.g. GAAP and IFRS), comparability between companies from different sectors and countries may be called into question as well as the ease with which some companies accounting purposes manipulate cash flows and thus the value of the company.

3. COMPANY PRESENTATION

Established in 1976 Sonangol – ("Sociedade Nacional de Combustíveis de Angola, E.P.") is an integrated oil and gas Angolan state-owned company whose mission is the management of hydrocarbon resource exploration in the country while maintaining its ongoing commitment to the development and growth of Angola. Despite having the government as the sole shareholder, Sonangol has always been governed as a private company and is under strict performance standards to ensure efficiency and productivity.

Sonangol's activities include exploration, development, marketing, production, transportation and refining of hydrocarbons and its derivatives. Those activities can be performed independently or in association with other companies - national or foreign. As the concessionaire, in 2014 Sonangol held stakes in 17 of the 26 blocks explored in Angola, reaching an average daily production of 1.6mn barrels of oil and 1.2mn bcm's per year of dry natural gas. The Group holds 18 subsidiaries and exports oil and its derivatives mainly to 16 countries, namely: Brazil, Canada, Chile, China, France, Japan, India, Italy, Netherland, Portugal, South Africa, Spain, Sweden, USA, Uruguay and Taiwan.

As the country's main investment vehicle, Sonangol owns a diversified portfolio of investments both in domestic and international market, operating at this point in several other industries beyond the Energy Industry, namely: air services, telecommunications services, financial services, real estate, medical and medicines services, education and training services.

Sonangol E.P. is based in Luanda, Angola with additional offices in Brazzaville, Congo; Hong Kong; Houston, Texas; London, United Kingdom; and Singapore.

3.1 Business Portfolio

Sonangol's business model consists of five primary business segments:

Table IV - Sonangol Business Portfolio

Corporate & Finance	Upstream	Midstream	Downstream	Non-Core
▪ This Segment includes the funding's and investments of the Sonangol's Group. ▪ It has a total assets worth of USD 14bn and it has a revenue value of approx. EUR1.2bn. ▪ In this segment, Sonangol owns two subsidiaries namely, Sonangol E.P. and Sonangol Finance.	▪ This Segment develops research activities and production of Oil&Gas in onshore and offshore, either as operator or as not operator in a joint venture. ▪ This is the most important segment of the group, responsible for presenting about EUR 18bn of Revenues and a Total Assets value of EUR 17bn. ▪ The Sonangol's subsidiaries on this segments are: Sonangol Drilling, Sonangol Exploration and Production; Sonangol International Hydrocarbons and Sonangol Natural Gas.	▪ This segment includes activities of transport and delivery of derivatives and refining of crude oil and natural gas. ▪ Despite recorded revenues of EUR 1.7bn, this segment presented in FY2014 a negative net income due to the negative amount verified in the financial results and high operational costs. ▪ The company owns 35 subsidiaries on this segment being the most important the Sonangol Shipping and Sonangol Refining.	▪ This Segment includes the storage activities, marketing and distribution of products to the final costumer. The company recorded on this segment Revenues of approx.EUR 7.6bn and has a total assets value of EUR 4bn. ▪ The subsidiaries on this segment are: Sonangol Logistics, Sonangol Distributor and Sonangol International Marketing. ▪ Sonangol is the leading company operating on this segment.	▪ This segment includes all "non-core" segments of the Group namely air services, healthcare, telecommunication and real estate investments. This segment contributed with revenues of approx. EUR 9.5mn. ▪ Sonangol E.P. owns 10 different subsidiaries, being the most important the following: - Sonair, MsTelecom, Sonangol Holding, Sonangol Industrial Investments, Sonangol Real Estate Investments..

Source: Company Filings

3.2 Strategy and Future Goals

The Angolan government is targeting a daily average production of 1.8mn barrels (bbl) of oil in 2015. This is an increase of 10% relative to the growth rate foreseen in the General State Budget (OGE). Meanwhile, Sonangol E.P. plans to spend USD 8.8bn on exploration in the next decade, targeting an output of 2mn barrels per day (b/d) by 2017. China will lend USD 2bn to Sonangol to aid in the expansion of oil and gas projects. The financing agreement will last for 10 years, and the first project that will benefit from the fund will be the 200,000 b/d SonaRef oil refinery in Lobito.

Sonangol is planning to launch a bidding round for exploration of 12 new offshore oil blocks in 2015. Sonangol can sit back confidently and watch its international oil company operated projects begin to haul in impressive returns. Through careful placing of JV contracts, the firm benefits from the most up-to-date exploration and production (E&P) techniques, and the group's reserves and profits look set to grow organically, without the need for any policy change or acquisition moves. The announcement that Angola is now China's largest supplier of oil is encouraging news for Sonangol. Meanwhile, JVs will lead to the transfer of know-how, technical equipment and financial backing, benefiting production levels. Amid strong

exploration activity, output will continue to rise with the government increasingly building relations with China, Beijing stands to benefit, while Angola's membership of OPEC should bring significant technological and financial benefits, as well as increasing the government and Sonangol's influence in international energy markets.

- ***Angola LNG***

Regarding the natural gas sector, Angola LNG project is a JV of the major producers in the country including Sonangol, Chevron, BP, Eni and Total. Angola LNG plant has a processing capacity of 7.2n cubic meters (bcm) per annum and it is now under a massive reconstruction to fix design defects and corrosion of almost-new equipment. Officially, the plant will remain closed until mid-2015. However, extension of the closure could reportedly extend into 2016, depending on the scale of the renovation work.

- ***Discoveries and Surveys***

Italian oil and gas company Eni has encountered a new deep-water oil discovery offshore in Angola with an estimated capacity to produce 300mn bbl of oil.

The Spain's Repsol will provide Sonangol with the tools for a seismic survey of the oil reserves in the so-called pre-salt layer. Under the terms of an agreement signed between the two companies, Sonangol's engineers will have the right to use the advanced technology designed by Repsol, to use it to survey oil reserves in the pre-salt layer.

3.3. Operational Performance

Analyzing the historical financial statements of Sonangol, it was possible to draw briefly the company's performance in terms of operational profit, debt capacity and realized investment as referenced below.

- **Turnover**

Until an alternative fuel source becomes readily available, oil will be in high demand allowing vertically integrated oil companies to generate astronomical revenues. In addition, the oil and gas production is capital intensive, especially when fuel costs are high. Given that, on the last

three years of analysis, Sonangol E.P. presented a compounded annual growth rate (CAGR) of 3.6% in the Total Turnover. The fiscal year ("FY") of 2014 Sonangol recorded a total Turnover of approx. EUR 28.6bn, a decrease of 4.4% compared to the FY2013 due to the declining of oil prices registered on last quarter of the year as well as the decrease of 2.56% in the total production.

Sonangol's Net Income in 2014 was approx. EUR 1.1bn, a decrease of 49% comparing to the previous year.

- **EBITDA**

Regarding EBITDA, in FY2014 the company totaled EUR 4.9bn compared to EUR 5.2bn in FY2013, a decrease of 5.6%. This decrease influenced by the serious "crise" recorder in oil prices, resulted in an EBITDA margin of 17.1% in FY2014, strengthening the company's EBITDA with a CAGR of 2.3%.

Analyzing EBITDA margins by business segment it is possible to highlight that upstream segment was the largest contributor to the positive EBITDA margin with approx. 16%, followed by the Downstream and Midstream segment with EBITDA margin of 3.7% and 0.4% respectively.

It should be noted that Sonangol is the market leader in the downstream segment in Angola, because it is the only company responsible for the distribution of O&G products to the final customer. In what concerns to the upstream segment, Sonangol holds approx. 44% market share being the market leader in Angola.

- **Investments**

In terms of investment, in FY2014 the company comprised 88% of its investments in mining activity (research, development and exploration) and 12% in other financial investments (real estate projects and financial markets, more specifically energy funds) accounting for a total amount of EUR 14bn. This value had presented an increase of approx. 16% compared to FY2013 where the company recorded an investment amount of EUR 12bn.

It is notable that until the year 2014 Sonangol E.P. had about 80 participations in other companies. Highlighting the most important, it is to point out the majority stake in 8 banks (4 in Angola and 2 in Portugal) making it quite accessible the company's recourse to bank credit. The net value of the investment in subsidiaries in 2014 was approx. of EUR 4.4bn.

- **Leverage**

Following the investments growth recorded in 2014 the company increased its debt to approx. EUR 12bn, an increase of 30% regarding FY2013 with approx. EUR 9.9bn. Nearly 82% of the Sonangol's debt was from long-term debt and the remaining 18% short-term debt. The Sonangol's current debt ratio for FY2014 was 29.5%. The net debt value presented in FY2014 was c. EUR 7.2bn and the Leverage ratio was 1.47x (Net Debt to EBITDA).

- **Financial Structure**

Analyzing Sonangol's Financial Structure it is possible to highlight that the company has been aggressive in financing its growth with debt. Most of this funding was resorted to long term debt (Debt Structure of 30%), reducing the treasury cash pressure. The financial strength seems ensured, because it has 36% more Equity than the Total Debt subscribed. Sonangol presented in FY2014 a positive Working Capital value, showing that the company is in equilibrium in the short term, once the current assets are sufficient to pay current liabilities. The company has a financial solvency ratio of 1.36x a high value that proves the financial soundness of Sonangol.

- **Treasury**

In 2014 Sonangol E.P., permanent capital only covered 87% of the value of fixed assets, with the remaining 13% being financed by short-term debt. It is aware that this situation only occurred in the FY2014, and despite this, the company achieved a positive net treasury value of EUR 3.4bn. It is noteworthy that despite this problem of financial structure, Sonangol has access to short-term credit and generate sufficient cash to support the interests.

4. INDUSTRY AND MACROECONOMIC OVERVIEW

On this chapter it will be analysed the macroeconomic scenario in countries[9] where Sonangol EP concentrates its activities mainly through exports, using as main sources statistical data of the International Monetary Fund (IMF), World Bank and Business Monitor International (BMI).

4.1 Macroeconomic Outlook

- **Angola**

Angola's economy is strongly dependent on hydrocarbons, with oil comprising 38% of GDP, more than 70% of fiscal revenues and more than 90% of merchandise export earnings. This has served the nation well during periods of rising commodity prices but could again become a handicap, especially after oil output begins to decline from 2014 onwards.

Economic diversification is proceeding but at a slow pace. Angola thus experienced a sharp slowdown in 2009, followed by a strong rebound in 2010 and 2011. The currency is heavily managed against the US dollar, which creates a structural rigidity that reduces the ability of the economy to respond to macroeconomic shocks and makes it difficult for local producers to compete with cheap imports.

Despite falling oil prices, headline economic growth in Angola will continue to be supported by the non-oil economy and it is predictable that real GDP growth will expand by 4.50% in 2015 and 3.90% in 2016, driven by capital-intensive industries such as energy, construction and transport.

Table V - Angola's GDP Δ%

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	Δ %	6,80	4,22	4,50	3,94	5,13	5,28	5,61	5,84

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **China**

As the largest economic partner of Angola and the largest customer of Sonangol representing approx. 47% of the Group exports, has recently present alarming indications. Analysts predict

[9] Countries that represent more than 5% of Sonangol total sales. The macroeconomic data from other countries will be reflected on the Appendix 2

that economic growth in China will continue to fall in 2015, with GDP growth estimated to be between 6.0%-7.0%. Rather than experiencing an abrupt crash, the economy is slowly downshifting from high to medium growth. By category, manufacturing activities seemed to lose steam whereas the service sector held up well.

A confluence of growth headwinds led to the slowdown: first, persistent external uncertainty, arising from the imbalanced recovery in advanced countries, continued to weighed on China's exports; second, the enforcement of the new budget law has led to fiscal consolidation at the local government level and thereby depressed aggregate demand; third, the recently implemented easing measures, including two interest rate cuts and two RRR cuts. Deflation risk is on the rise. Moreover, a number of factors could exacerbate the price stability, including the potential burst of property bubble, the over-capacity in certain industries, the high debt level of the corporate sector and the ageing of population. Given the size of the Chinese economy in absolute terms, this slowdown is natural, and unlike after previous slowdowns, a significant rebound in growth should not be expected.

Table VI - China's GDP Δ%

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	Δ %	7,75	7,36	6,76	6,30	6,00	6,10	6,33	6,33

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **India**

India the second largest Sonangol's client, comprises 13% of its exports. The outlook for India is for economic strengthening through higher infrastructure spending, increased fiscal devolution to states, and continued reform to financial and monetary policy. The government underscored its intention to move steadily to tackle politically difficult structural issues that have stalled investment and limited economic performance in recent years. Growth in the gross domestic product is expected to accelerate to 7.4% in FY2015 on improved performance in both industry and services as policy addresses structural bottlenecks and external demand improves. In 2014 India recorded a GDP growth of 7.1%, with industry growing 5.8%. In macroeconomic terms India has excellent indicators, with this beneficial way for business Sonangol.

Table VII - India's GDP Δ%

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	Δ %	6,90	7,17	7,46	7,47	7,55	7,65	7,70	7,75

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Canada**

Canada is the third largest customer of the Group comprising c. 6.0% of its exports of crude. Despite the financial and economic strength of the country the macroeconomic forecast for this country is not the most favourable. The negative effects of the oil shock on Canada's economy are expected to have a more immediate effect than previously estimated. The impact on household spending, terms of trade and investment, particularly in the oil and gas sector are already becoming apparent. As for the external sector the bank of Canada has estimated that Canada's term of trade will fall 9.0% by the end of 2015 as a result of suppressed oil export values. Meanwhile, figures for GDP 2015 showed that it is expected an increase of 2.16%.

Table VIII - Canada GDP Δ%

Subject Descriptor	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	Δ%	2,00	2,53	2,16	2,03	1,97	1,90	1,88	1,85

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Spain**

Comprising c. 6.0% of Sonangol's exports, a robust growth is projected in Spain over the next two years, driven by very supportive financial conditions, as well as the depreciation of the euro, lower oil prices and strengthening trading partner growth. Renewed consumer confidence and increasing fixed investment drove the economy to record its largest expansion since 2007, consolidating the country's place as one of the fastest growing economies in the Eurozone. Meanwhile, figures for GDP 2015 showed that it is expected an increase of 2.5%.

- **South Africa and Taiwan**

Both countries share approximately 5% of Sonangol's exports. Regarding South Africa GDP growth is expected to pick up marginally in 2015. The continued recovery in the mining and manufacturing sectors after the strike-affected first half of 2014 should support growth to some extent. However, infrastructure bottlenecks (mainly electricity), subdued private sector fixed investment and muted growth in consumer and government consumption spending

means that a meaningful acceleration is not on the cards. Therefore it is expected a growth of 2.00% in GDP in FY2015.

In the other hand, Taiwan's economy slowed slightly in the first quarter of 2015, growing 3.4% over the same period of the previous year. However the slowdown came largely on the back of falling government spending's. Moreover, recent data paint a hazy picture of the economy with exports recorded the largest drop in over a year and the manufacturing fell into contractionary territory for the first time since 2013. The GDP expected for 2015 is presents an increase of 3.81%.

Table IX - South Africa GDP Δ%

Subject Descriptor	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	**Δ%**	2,21	1,53	2,00	2,10	2,40	2,70	2,80	2,80

Source: International Monetary Fund, World Economic Outlook Database, April 2015

Table X - Taiwan GDP Δ%

Subject Descriptor	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	Δ%	2,23	3,74	3,81	4,07	4,11	4,16	4,19	4,22

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Other Countries**

Sonangol holds commercial and economic links with many other countries in Europe and Americas whose exports to these countries does not weigh more than 3%. (Appendix 2). Economic growth in the EU remains sluggish, however the fall in crude oil prices are should provide a welcome boost to growth. Regarding Americas, with especial attention to the Latin America the grow will be low in 2015 and 2016, mainly influenced by the financial volatility in China, the impact of lower commodity prices and internal economic and political problems in prioritizing and speeding up fixed capital investments and productivity.

4.2 Industry Overview

- **Energy Market Overview**

After colossal growth in 2011, the global market fell in to marginal decline in 2012 followed by weak growth in 2013. Due to a huge fall in oil prices beginning in late 2014, 2015 has seen a dramatic decline within the market followed by very weak growth for the remainder of the forecast period (Appendix.9)

On November 27th 2014, OPEC (Organization of the Petroleum Exporting Countries) failed to reach an agreement over the curbing of production of oil which in turn sent prices tumbling. This has had such an effect due to the fact that OPEC controls approximately 40% of the global market. The market is dictated partly by supply and demand and energy is very closely related to economic activity. There are a number of factors that have played a part in the oil price slump. The poor global economic performance as well increased efficiency and alternative energy sources has led to reduced demand plus with OPEC deciding not to curb production, there is almost a surplus of oil. To add to this, the US has become the world's largest producer of oil and has no need for the level of imports as it previously had in the past. Finally, Gulf oil producers have decided not to reduce production to restore price to what is classed as normal today.

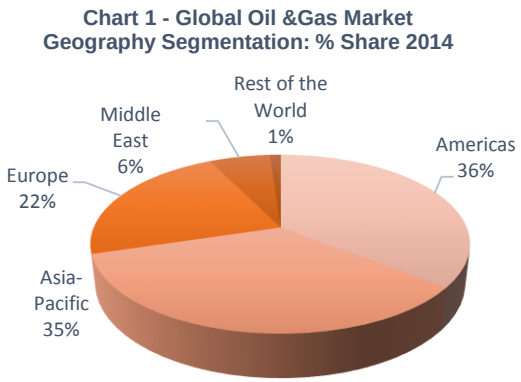
The global oil and gas market generated in 2014 a total revenue of USD 3,073.4bn, representing a CAGR of 6.7% between 2010 and 2014. In comparison, the European and Asia-Pacific markets grown with CAGRs of 3.8% and 8% respectively, over the same period, to reach respective values of USD 689.5bn and USD 1,065.8bn in 2014. Market consumption volume is forecast to increase with a CAGR of 1.2% between 2010-2014, to reach a total of 46,792.5 million barrels equivalent (BOE) in 2014. The market's volume is expected to rise to 49,097.2 million barrels equivalent (BOE) by the end of 2019, representing a CAGR of 1% for the 2014-2019 period.

Table XI - Global Oil&Gas Market Volume

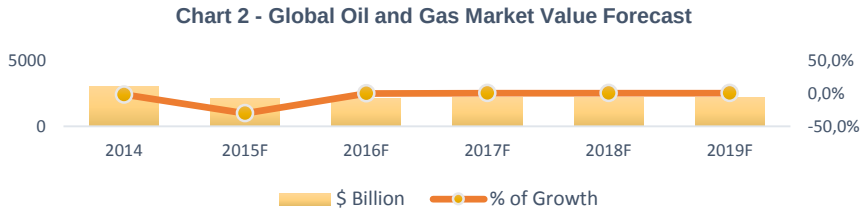
Year	Production (mn BOE)	Δ%	$ Billion	Δ%
2010	44 581	n.a.	2.376 USD	n.a.
2011	45 197	1,4%	3.089 USD	30,0%
2012	45 630	1,0%	3.061 USD	-0,9%
2013	46 296	1,5%	3.123 USD	2,0%
2014	46 793	1,1%	3.073 USD	-1,6%

Source: MarketLine - Industry Profile Global Oil&Gas (Dec. 2014)

Crude oil sales had the highest volume in the global oil and gas market in 2014, with total sales of 29,632.9 million barrels, equivalent to 63.3% of the market's overall volume. In comparison, sales of natural gas reached a volume of 17,159.7 million barrels equivalent (BOE) in 2014, equating to 36.7% of the market total.



The performance of the market is forecast to decline, CAGR of -6.5% for the five-year period 2014 - 2019, which is expected to drive the market to a value of USD 2,196.7bn by the end of 2019. Comparatively, the European and Asia-Pacific markets will decline with CARCs of -7% and -7.2% respectively, over the same period, to reach respective values of USD479bn and USD734.7bn.



- **Angola**

The outlook for Angola's oil sector remains broadly positive, with highly prospective offshore acreage and a number of major projects under development. However, sustained lower oil prices pose downside risk to production growth post-2020, as rapid natural decline rates and a slowdown in investment combine to undercut output levels. Gas production will remain limited throughout 10-year forecast period due to low domestic consumption, unfavorable pricing dynamics and demand constraints in key export markets.

- **Central and Eastern Europe**

Russia will remain the dominant force in all areas of oil and gas in the Central and Eastern European region over the next 10 years despite sanctions and weak oil prices. The bulk of both oil and gas production growth will come from Caspian countries and head to China. It is expected that the refining sector would struggle, with only Turkey and Turkmenistan expected to build new facilities, though significant investments will go into modernization across the region.

5. STRATEGIC ANALYSIS

5.1 SWOT

S Strengths

- Control of all key hydrocarbons interests;
- Unrivalled access to exploration acreage;
- Substantial production upside potential;
- International oil companies provide much project funding;
- National market leader in the upstream and downstream segments;
- Sonangol has a number of subsidiaries and retail brands which provide the company with diversified revenue portfolio rather than simply relying on its energy business;
- Positive and consolidate working capital, where current assets cover short-term obligations;
- Integrated business operations enable the company to respond more effectively to changes in the business environment;
- Strong capacity to invest in training, equipment and new technologies;
- Strong operational and profit margins;

W Weakness

- Limited financial or operational freedom;
- Cost and efficiency disadvantages;
- Lack of geographic diversification;
- High costs in the refining of crude oil, and importing the same refined oil due to low refining capacity in Angola;
- No developed alternative energy products to the extent that it could and continue to rely on oil as its main business segment, which is not a sustainable strategy;
- Little diversified funding sources;
- The permanent capital only cover 87% of the value of fixed assets, putting pressure on the treasury, requiring short-term debt to compensate it.

O Opportunities

- Substantial output growth as a result of international firms' investment;
- Considerable untapped gas export potential;
- Large areas of unexplored territory;
- Easy access to credit, as holds majority stakes in 8 Banks;
- Expansion through several acquisitions will improve its asset position and strengthen its top-line growth;
- Potential of becoming a market leader in many alternative fuel and energy markets if it can invest in research and reposition is strategy. These markets opportunities include wind, solar and hydrogen;
- Significant opportunity to meet increasing

T Threats

- Delays to LNG exports;
- Substantial additional costs;
- Local political unrest;
- Changes in national and international energy policy;
- Strong dependence on China, since China purchase 43% of Sonangol's oil;
- Currency fluctuations with AOA/USD, USD/EUR and USD/YUAN;
- Economic pressure, especially in terms of volatile oil prices around the world, furthering the need to focus on the migration to alternative fuel for its energy solutions;
- Exploratory drilling risks and environmental issues may be a threat if the company does not formalize its corporate social responsibility and put it at the forefront of its strategy, including revising workplace safety issues in order to reduce refinery explosions, oil leaks and spills,

5.2. PORTER'S FIVE FORCES

Figure 1 – Industry Analysis Using Porters Five Forces

The analysis of Porter's five forces is discussed in detail in Appendix 8.

6. EVALUATION

6.1 Methodology

To assess the value of Sonangol EP two different valuation methods were used: *Free Cash Flow to the Firm (FCFF)* and *Multiples valuation*. The first, as explained in the Literature Review, is a *Discounted Cash-Flow (DCF)* based method, while the latter involves relative valuation.

This methodology besides being the most widely used by investors and managers in the evaluation of companies is also the most appropriate to evaluate the Sonangol EP, given the firm's current capital structure of approximately 40% debt. At the beginning the idea was to evaluate Sonangol in separate by the SOTP (Sum of the Parts) methodology, considering the company's different business units. However, due to lack of available information about the different companies that comprise the Sonangol's business lines, the option was considered to evaluate the company as a whole.

Relative to the time horizon of the projections was set an explicit period of five years. For the projection of the value in perpetuity was assumed a growth rate (g) of 0.7%. All cash-flows will be determined in Euros.

6.2 Assumptions

To determine the value of Sonangol E.P. was defined a set of assumptions about the projection of FCFF and the discount rate, which will be presented below.

6.2.1 Operational Assumptions

- **Revenues**

The initial approaches in the estimation of Sonangol's revenues was based on two reports from BMI "*Angola Oil and Gas report Q2 2015",* EIA "*Annual Energy Outlook 2015 with projections to 2040"* as well as the macroeconomic data designed to Angola by the International Monetary Fund. The BMI report discloses a wide range of data concerning the current Energy Sector in Angola, highlighting in particular the evolution of production, competitiveness and exports of oil and natural gas derivatives. On the other hand the report

based on EIA has been used to analyze the evolution of the Energy Sector in the world. Alongside, it's was important to forecast the consumption of the refined petroleum products in the world specifically in the OPEC countries.

Furthermore, given Sonangol's EP long-term strategies, the investments in capital expenditures (CAPEX) and the crude oil *contango*[10] market situation, the expected growth rate for sales are not very promising at the moment compared to previous years. According to the study performed, it was found that negative growth rates are forecasted in the short-run, with an ongoing average growth rate of -5% in revenues for the years of 2015/16. For the remaining periods, a higher growth rate is forecasted mainly influenced by the growth of the exports of dry natural gas in Angola as well as the inauguration of the new Lobito's refinery that will have the capacity to refine c. 200.000 barrels of oil per day. However, opposing to the slowdown of Angola's GDP growth and the industry's growth decline, the current forecasting model expects a CAGR of c. 7% up to the year 2020.

Table XII - Forecast Revenues Key Assumptions

Items	Assumptions
Crude Oil and Dry Natural Gas Exports	BMI - *Crude and Other Liquids Net Exports USD*
Refined Products Sales	EIA - *Petroleum and Other Liquids Consumption in Africa*
Non-Core Segments	World Bank Database - *Angola Real GDP Growth*

Table XIII - Sonangol's Turnover Forecast

EUR Millions

	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Crude Oil and Dry Natural Gas Exports	27.462	22.699	23.795	27.353	28.783	29.694	31.917	33.060
% of Growth	*n.a.*	*-17,3%*	*4,8%*	*15,0%*	*5,2%*	*3,2%*	*7,5%*	*3,6%*
Refined Products Sales	890	907	937	972	1.011	1.074	1.127	1.166
% of Growth	*n.a.*	*1,9%*	*3,3%*	*3,8%*	*4,0%*	*6,2%*	*5,0%*	*3,4%*
Non-core Segments	303	309	319	331	344	365	384	397
% of Growth	*n.a.*	*1,9%*	*3,3%*	*3,8%*	*4,0%*	*6,2%*	*5,0%*	*3,4%*
Total Revenues	**28.655**	**23.914**	**25.051**	**28.656**	**30.138**	**31.133**	**33.429**	**34.622**
% of Growth	*n.a.*	*-16,5%*	*4,8%*	*14,4%*	*5,2%*	*3,3%*	*7,4%*	*3,6%*

Source: Company fillings, BMI Q2 2015 O&G report and EIA Energy Sector Outlook 2015

[10] A situation where the future price of a commodity is above the expected future spot price.

- **Operating Costs**

Regarding the operational costs, Sonangol EP doesn't dispose segmented information by business units which resulted the importance of taking into consideration additional assumptions. It was found that, in the historical period, the variable costs (cost of sales, cost of supplies and external services, provisions and impairment losses and other costs) accounted for approx. 88% of the total costs of Sonangol's expenditures.

Table XIV - Operating Costs Assumptions

Items	Assumptions	Value
Cost of Sales	% of Sales	18.5%
Selling and Administrative Expenses	% of Sales	54.3%
Provisions and Impairment Losses	% of Sales	27.0%
Personnel Costs	% of Sales	3.60%
Other Costs	% of Sales	6.00%

Source: Company's fillings

Thereby, the operational costs have been estimated based on a percentage of Sonangol's total revenues, assuming an average representation similar to the registered between the FY2012/14 (Table XIV).

- **EBITDA Margin**

Despite all the adverse highlighted conditions with oil market prices registered in the last quarter of FY2014, Sonangol has managed to present a historical average of 16% growth over the last three years.

For the forecast period, it is awaited that Sonangol achieves a CAGR of approx. 6.9%, which is a positive outcome given the actual macroeconomic "panorama" lived in Angola and in the Energy Sector.

6.2.2. Investment in Fixed Assets and Depreciation

Between FY2013 and FY2014, investment in Capital Expenditures (CAPEX) ranged between EUR 5.769bn and EUR 2.958bn. In this period, on average, capex amounted to 15% of revenues.

To estimate the value of capex it was considered the following assumptions:

I. Forecast the value of tangible and intangible net assets using the average rate of the last three years, resulting their values as a function of Sonangol's total turnover. It was found a ratio of c. 19% for tangible assets and c. 0.7% for intangible assets.

It was decided to adopt a more conservative approach, considering until the end of the planned period the same growth rate recorded.

II. Estimate the value of depreciations and amortizations (D&A) using the average rate of the last three years, resulting their values depending on the value of Fixed Assets in the previous period.

III. CAPEX was calculated with the following formula:

[10] $CAPEX = (Net\ Fixed\ Assets_t - Net\ Fixed\ Assets_{t-1}) + (Amortizations_t + Depreciations_t)$

Table XV - Sonangol's CAPEX Forecast (EUR Million)

'000 EUR Million	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Fixed Asset	4 748	5 562	4 642	4 862	5 562	5 849	6 043	6 488	6 720
% of Revenue	*16%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*	*19%*
Intangible Assets	140	195	163	170	195	205	212	227	235
% of Revenue	*0.5%*	*0.7%*	*0.7%*	*0.7%*	*0.7%*	*0.7%*	*0.7%*	*0.7%*	*1%*
TOTAL	**4 888**	**5 756**	**4 804**	**5 032**	**5 757**	**6 054**	**6 254**	**6 715**	**6 955**
D&A	(1 399)	(2 144)	(1 790)	(1 875)	(2 145)	(2 255)	(2 330)	(2 502)	- (2 591)
% of Fixed Assets	*-29%*	*-39%*	*-39%*	*-39%*	*-39%*	*-39%*	*-39%*	*-39%*	*-39%*
CAPEX	**(5 769)**	**(2 958)**	**(870)**	**(2 095)**	**(2 844)**	**(2 543)**	**(2 523)**	**(2 947)**	**(2 823)**
% of Revenue	*-19%*	*-10%*	*-9%*	*-9%*	*-9%*	*-9%*	*-9%*	*-9%*	*-9%*

6.2.3. Investments in Working Capital

For the purposes of free cash flow and Sonangol's valuation, the calculation of the investments in working capital was based on historical data and the company's management practices.

Table XVI - Key Assumption Regarding IWC

Items	Reference Value	Assumptions
Current Assets		
Receivables	Total Revenues	57 > days receivable
Inventories	Cost of Gods	72 > Inventory turnover days
Other Current Assets	Other Operational Costs	22 > Days prepaid
Current Liabilities		
Accounts payable	Total Revenues	83 > Days payable
Accrued liabilities (Other Current Liabilities)	General, Selling and Administrative Expenses	11 > Days payable

Source: Company's fillings

6.2.4 Cost of Equity

Concluded the analysis of the variables that will impact on estimates of cash flows from Sonangol and its financing structure, it is essential to determine the cost of equity. As noted in the literature review, methodology, the cost of equity was calculated based on the Capital Asset Pricing Model (CAPM), taking into account the following assumptions:

- **Risk Free**

As its name implies, a risk-free assets should not be associated with any risk of bankruptcy or reinvestment. However, as Sonangol EP is a company that operates in an emerging market, additional assumptions must be considered. In many emerging markets, the local currency is volatile, both in terms of what it buys of developed market currencies (exchange rates) and in its own purchasing power (inflation). In some emerging market economies, the exchange rate for foreign currencies is fixed, creating the illusion of stability, but there are significant shifts every time the currency is revalued or devalued.

Therefore, it was decided to convert the currency of analysis from AOA to EUR, using an annual exchange rate provided by the Angolan Central Bank.

Currently the financial markets consider in a European level that the German Government bonds are close to be considered without risk. Thus, it was considered a risk-free rate of 0.78% according to the yield on German 10-year bonds on Sep 8 of 2015[11].

- **Beta**

In order to compute the beta of the capital of Sonangol EP it was first estimated the average unlevered beta for comparable firms. For Sonangol oil and gas segment, it was used the average unlevered beta for integrated oil and gas companies listed globally using the argument that oil and gas are commodities that are bought and sold on a world market. For the non-core segment it was used the unlevered beta estimated by looking at only emerging market comparable firms (including real estate, air transportation, education, telecom and healthcare facilities firms), since it is very likely that those companies are far more discretionary in emerging markets than in developed markets (and that emerging market firms should therefore have higher betas than developed market firms).

After this, it was used the debt to equity ratio and marginal tax rate for Sonangol to estimate the levered beta for the firm. (Appendix 12)

[11] Source: Bloomberg, German Government Bonds (online). Available in: http://www.bloomberg.com/markets/rates-bonds/government-bonds/germany/. Accessed September 8, 2015.

- **Market Risk Premium**

Typically, investment banks, consultants and international organizations estimate that in countries with mature capital markets as is the case of the US and Germany, the risk premium is between 4.5% and 5.5 % (Koller, Goedhart and Wessels, 2005).

In the case of Angola an emerging market, is expected that investors require an additional return for investing in domestic companies. Thus, the equity risk premium (Damodaran, 2009)[12] shall be determined as follows:

Table XVII - Cost of Equity Inputs

	Inputs
Risk-Free Rate	0,78%
Beta	2,36
Mature market premium (Germany)	5,81%
Country risk premium	4,50%
Total risk premium	*10,31%*
Cost of Equity	**25,11%**

[11]$Equity\ Risk\ Premium = Base\ premium\ for\ mature\ equity\ market + Country\ risk\ premium$

To calculate the risk premium of Sonangol EP was used the methodology of default risk spreads. To this end, the German risk premium (5.81% on an Aaa rating, according to ratings agency Moody's) was added the product of a default spread of 300 basis points associated with the Moody's rating for Angola (Ba2). Thus, we obtained a total risk premium of 10.31%, which is associated with a premium country risk 4.50%.

- **Cost of Equity**

Considering the inputs described above, the cost of equity corresponds to 25.11%, constant over definite period and in perpetuity.

6.2.5 Cost of Debt

Usually it may be hard to observe a cost of debt for an emerging market company, since these companies often do not have publicly traded bonds. Therefore the cost of the debt was estimated using a default spread.

[13] Cost of debt = Risk-free Rate + Default Spread$_{Country}$ + Default Spread$_{Company}$

[12] Damodaran, A.(2009), Volatility Rules: Valuing Emerging Market Companies, Stern School of Business, New York University

To compute the cost of debt it was estimated the interest coverage ratio using information from Sonangol's financial statements, and a synthetic rating based on the interest coverage ratio[13]. It was added the default spreads based on these rating to the country default spreads for Angola to obtain pre-tax cost of debt. The cost of debt for Sonangol is 4.78% (Appendix 11).

6.2.6 WACC

Table XVIII - WACC Rate Inputs

WACC	
Risk-free Rate	0,78%
Beta factor	2,36
Market risk premium	10,31%
Cost of equity	**25,11%**
Cost of Debt	**4,78%**
Tax rate	30,00%
Assumed [D/(D+E)] ratio	42,44%
WACC	**15,29%**

6.2.7 FCFF

After applying all assumptions, the value of Sonangol E.P. was estimated at EUR 15.566 billion euros, with EUR 7.151bn corresponding to the continuing value *(perpetuity period)* and 8.416bn to the amount of time horizon *(explicit period).*

Table XIX - Sonangol E.P. FCFF Model (EUR Million)

000 Eur Million	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Turnover	23 914	25 051	28 656	30 138	31 133	33 429	34 622
EBIT (1-Tc)	2 309	2 418	2 766	2 910	3 006	3 227	3 342
(-) Tc	286	291	365	384	444	530	583
(+) Depreciation	1 790	1 875	2 145	2 255	2 330	2 502	2 591
(-) Change Working Capital	(237)	57	180	74	50	115	60
(-) Capex	870	2 095	2 844	2 543	2 523	2 947	2 823
FCFF	**3 180**	**1 850**	**1 522**	**2 164**	**2 319**	**2 137**	**2 468**
WACC Rate	***15%***	***15%***	***15%***	***15%***	***15%***	***15%***	
(1+WACC)	1.15	1.33	1.53	1.77	2.04	2.35	
Discounted FCF	2 758	1 391	993	1 225	1 138	910	

PV Explicit Period	8 416
PV Perpetuity	7 151
Total Present Value of Cash Flows	**15 566**

[13] A debt ratio used to determine how easily a company can pay interest on outstanding debt. The interest coverage ratio may be calculated by dividing a company's earnings before interest and taxes (EBIT) during a given period by the amount a company must pay in interest on its debts during the same period.

7. VALUATION RESULT

After the calculation of the Sonangol *Enterprise Value* through the sum of the present values of explicit and perpetual periods, it was estimated the *Firm Value* of the company. In order to compute the *Firm Value* of the company it was added the value of non-operating assets including financial investments, investments in subsidiaries and the amounts in cash and cash equivalents.

Subsequently the company's *Equity Value* was obtained by removing from the *Firm Value* the Sonangol's financial liabilities, particularly with financial debt and provisions.

Table XX - Sonangol E.P. Valuation Result (EUR Million)

Present Value of Explicit Period	8 416
Present Value of Perpetuity Period	7 151
Entreprise Value	**15 566**
(+) Cash and Equivalents	5 729
(+) Investments in Subsidiaries and Associates	4 452
(+) Financial Investments	1 668
Firm Value	**27 415**
(-) Debt	12 947
(-) Provisions	5 237
Equity Value	**9 231**
Shares Outstanding	1 000
Price Target	**9.23 €**

The intrinsic value of each share of Sonangol obtained in the evaluation was €9.23. It is important to mention that the value obtained wasn't precise due to the valuation based in the determined economic and sector assumptions. Furthermore, a sensibility analysis will then be performed to allow greater certainty estimations with a wide range of values in which the given price can take.

8. SENSITIVITY ANALYSIS

The company valuation was based on the assumptions which may not verify in the near future. Therefore, consequently, the price target obtained may not correspond to the intrinsic value of the shares. In this sense it is crucial to assess the level of exposure of the *Enterprise Value* of Sonangol in conjunction to the relevant impact variables in the share price.

Furthermore, recognizing the current instability in the markets, It has been considered the possibility of deviation occurrence from the given assumptions stated in the base scenario.

In this context a sensitivity analysis was carried to the most significant macroeconomic and operational variables in a *Ceteris Paribus* basis (Appendix 14). In terms of operational assumptions, the EBITDA margin is the variable with the greatest impact on the price target of Sonangol. A variation of the EBITDA margin of 2 p.p. compared to the base scenario represents a positive or negative impact of 31.5% and 30.2% in the price of the Sonangol shares. Continuously, the second most sensitive variable is the WACC rate. A 2% variation in WACC rate generates a negative impact of 20.9%in the price of the company shares. The following table describes the impact on the stock price of Sonangol against a joint variation of perpetual growth rate (g) as well as WACC rate.

Table XXI - Cross Sensitivity Analysis Between WACC and g Rate

		g (perpetual growth)								
	9.23	**-6.0%**	**-4.0%**	**-2.5%**	**-1.5%**	**0.0%**	**1.5%**	**2.5%**	**4.0%**	**6.0%**
WACC Rate	**22%**	5.83	6.12	6.37	6.55	6.86	7.21	7.47	7.92	8.65
	20%	6.12	6.46	6.75	6.97	7.33	7.76	8.08	8.65	**9.59**
	15%	7.08	7.61	8.08	8.45	9.09	**9.86**	**10.49**	**11.63**	**13.76**
	10%	8.65	**9.59**	**10.49**	**11.22**	**12.59**	**14.44**	**16.09**	**19.59**	**28.35**
	8%	**9.59**	**10.84**	**12.09**	**13.14**	**15.21**	**18.25**	**21.18**	**28.35**	**54.62**

The sensitivity analysis solidly confirms the results obtained from the Sonangol's valuation. The relative valuation of Sonangol and its comparable companies (Peer Group) utilizing the multiples EV/EBITDA and P/E has permitted to succeed the successful conclusions. (Appendix. 15)

9. CONCLUSION

The company's valuation is not an exact science due to being greatly dependent on the set assumptions. Against a backdrop of economic/financial instability as well as the current volatility of the markets, the uncertainty is greater. To mitigate the constraints, this Dissertation seeks to bring together the best practices of business valuation, combining a solid theoretical knowledge with the different market perspectives to assess Sonangol E.P. valuation.

Sonangol is a reference company in the O&G sector in Angola, as well as in Africa, being actively monitoring the market and historically evidenced a careful management in the face of adversity that has felt in recent years. Since Sonangol's strategy is to increase revenues at national level by increasing the sales of refined products and at internationally level through the increase of exports of oil and dry natural gas, it is expected to sustainable and continued growth in the coming years, albeit with strong threats and uncertainties surrounding the sector.

The current drop in oil prices alongside the recent macroeconomic difficulties encountered in Angola, presents great challenges in which may arise in the Sonangol's near future. This may lead into reducing and strictly controlling all policies regarding expenses, investments and leverage.

Therefore, despite the inability to determine the value of the company by the STOP method, the intrinsic value calculated for Sonangol was €9.23. The sensitivity analysis performed in the main valuation assumptions alongside with the market multiples of Sonangol which are lower than the average of peers (EV / EBITDA 3.17x) corroborate the evidence that there is a possibility of growth, presenting itself as an attractive investment opportunity for investors.

To conclude, this dissertation can be useful to study and measure a potential Sonangol privatization. Therefore, turning into a dispersion of capital, the company can further optimize its strategic objectives as well as relieving the pressure on the Angolan state of running and funding a very complex company.

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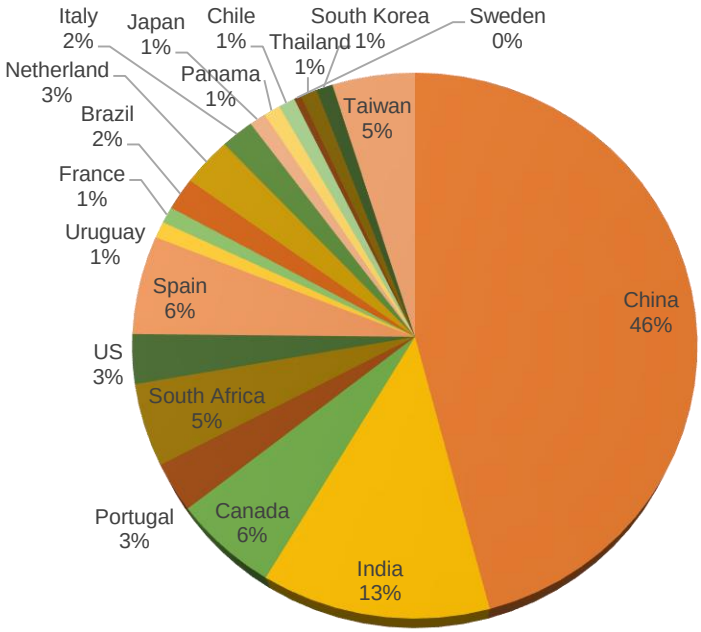
- Business Monitor International Research: http://www.bmiresearch.com/
- International Monetary Fund: http://www.imf.org
- McKinsey on Finance: https://www.mckinseyquarterly.com/Corporate_Finance
- Reuters: http://www.reuters.com/
- Yahoo Finance: http://www.finance.yahoo.com/

Database:

- Bloomberg;
- Damodaran – spreadsheets and datasets;
- FMI – World Economic Outlook Database
- BMI – Industry and Countries Outlook Database
- EIA - Energy Sector Outlook Database

APPENDIXES

Appendix 1 – Sonangol Geographical Presence



Source: Company filings at the end of FY2014

Appendix 2 – Economic Indicators

- **Angola**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	AOA	1 563.2	1 629.2	1 702.5	1 769.6	1 860.4	1 958.7	2 068.5	2 189.3
GDP, constant prices	Δ %	6.80	4.22	4.50	3.94	5.13	5.28	5.61	5.84
GDP, current prices	U.S. dollars	124.2	128.6	106.1	118.0	130.7	144.2	158.1	173.4
Total investment	% of GDP	14.8	14.1	9.2	10.4	10.8	11.1	11.4	12.1
Inflation, average consumer prices	Δ %	8.8	7.3	8.4	8.5	7.7	7.2	6.7	6.5
Current account balance	%t of GDP	6.7	-0.8	-6.3	-4.2	-2.6	-2.5	-2.5	-2.5

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Brazil**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	BRL	1 247	1 248	1 236	1 248	1 276	1 305	1 337	1 370
GDP, constant prices	Δ %	2.74	0.15	-1.03	0.98	2.25	2.31	2.43	2.50
GDP, current prices	U.S. dollars	2 391	2 353	1 904	1 928	2 030	2 132	2 241	2 354
Total investment	% of GDP	21.0	20.0	19.0	19.2	19.5	19.9	20.2	20.6
Inflation, average consumer prices	Δ %	6.2	6.3	7.8	5.9	5.0	4.7	4.6	4.5
Unemployment rate	% of total labor force	5.4	4.8	5.9	6.3	5.9	5.7	5.6	5.5
Current account balance	% of GDP	-3.4	-3.9	-3.7	-3.4	-3.3	-3.2	-3.2	-3.2

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Canada**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	CAD	1 706	1 749	1 786	1 823	1 858	1 894	1 929	1 965
GDP, constant prices	Δ %	2.00	2.53	2.16	2.03	1.97	1.90	1.88	1.85
GDP, current prices	CAD	1 894	1 976	2 016	2 110	2 205	2 298	2 393	2 492
GDP, current prices	U.S. dollars	1 839	1 789	1 615	1 684	1 769	1 856	1 945	2 044
GDP, deflator	Index	111.03	113.01	112.83	115.74	118.65	121.36	124.05	126.79
Total investment	% of GDP	24.5	24.1	23.9	23.7	23.8	23.9	23.9	23.9
Inflation, average consumer prices	Δ %	1.0	1.9	0.9	2.0	2.2	2.1	2.1	2.0
Unemployment rate	% of total labor force	7.1	6.9	7.0	6.9	6.8	6.7	6.6	6.6
Current account balance	% of GDP	-3.0	-2.2	-2.6	-2.3	-2.3	-2.3	-2.1	-1.8

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **China**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	CNY	7.8	7.4	6.8	6.3	6.0	6.1	6.3	6.3
GDP, current prices	National currency	58 667	63 761	68 986	73 596	79 052	85 676	93 324	101 720
GDP, current prices	U.S. dollars	9 469	10 380	11 212	11 968	12 864	13 876	14 969	16 157
GDP, deflator	Index	327.0	331.0	335.5	336.7	341.2	348.5	357.0	365.9
GDP per capita, current prices	U.S. dollars	6 959	7 589	8 154	8 659	9 259	9 936	10 662	11 449
Total investment	% of GDP	47.8	46.9	45.4	44.7	44.2	43.7	43.2	42.8
Inflation, average consumer prices	Δ %	2.6	2.0	1.2	1.5	2.0	2.5	3.0	3.0
Unemployment rate	% of total labor force	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
Current account balance	% of GDP	1.9	2.0	3.2	3.2	3.1	3.1	3.1	3.0

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **France**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	EUR	2 053	2 060	2 084	2 115	2 151	2 189	2 230	2 272
GDP, constant prices	Δ %	0.29	0.36	1.16	1.49	1.70	1.79	1.86	1.86
GDP, current prices	EUR	2 114	2 142	2 181	2 229	2 292	2 362	2 441	2 525
GDP, current prices	U.S. dollars	2 807	2 847	2 470	2 526	2 623	2 735	2 861	3 013
GDP, deflator	Index	103.0	104.0	104.7	105.4	106.6	107.9	109.5	111.2
GDP per capita, current prices	U.S. dollars	44 104	44 538	38 458	39 164	40 482	42 016	43 749	45 861
Total investment	% of GDP	22.0	22.0	21.4	21.5	21.8	22.0	22.2	22.4
Inflation, average consumer prices	Δ %	1.0	0.6	0.1	0.8	1.1	1.2	1.5	1.7
Unemployment rate	% of total labor force	10.3	10.2	10.1	9.9	9.7	9.5	9.4	9.4
Current account balance	% of GDP	-1.4	-1.1	-0.1	-0.3	-0.4	-0.4	-0.3	-0.3

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **India**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	INR	99 211	106 323	114 255	122 787	132 063	142 169	153 119	164 987
GDP, constant prices	Δ %	6.9	7.2	7.5	7.5	7.6	7.7	7.7	7.8
GDP, current prices	INR	113 451	126 540	141 095	159 582	179 877	203 187	229 623	259 617
GDP, current prices	U.S. dollars	1 875	2 050	2 308	2 511	2 756	3 013	3 312	3 640
GDP, deflator	Index	114.4	119.0	123.5	130.0	136.2	142.9	150.0	157.4
GDP per capita, current prices	U.S. dollars	1 508	1 627	1 808	1 942	2 104	2 270	2 463	2 672
Total investment	% of GDP	32.5	31.5	32.1	32.5	32.7	32.7	32.7	32.7
Inflation, average consumer prices	Δ %	10.0	6.0	6.1	5.7	5.6	5.2	5.0	5.0
Current account balance	% of GDP	-1.7	-1.4	-1.3	-1.6	-1.8	-2.0	-2.2	-2.5

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Italy**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	EUR	1 544	1 537	1 545	1 562	1 579	1 596	1 613	1 629
GDP, constant prices	Δ %	-1.70	-0.42	0.49	1.10	1.10	1.10	1.05	1.00
GDP, current prices	EUR	1 609	1 616	1 628	1 660	1 696	1 736	1 777	1 821
GDP, current prices	U.S. dollars	2 138	2 148	1 843	1 881	1 942	2 010	2 083	2 173
GDP, deflator	Index	104.3	105.1	105.4	106.3	107.5	108.7	110.2	111.8
GDP per capita, current prices	U.S. dollars	35 815	35 823	30 594	31 092	31 966	32 970	34 051	35 380
Total investment	% of GDP	17.31	16.53	15.00	14.94	15.35	15.72	16.09	16.28
Inflation, average consumer prices	Δ %	1.28	0.22	0.00	0.82	1.00	1.12	1.24	1.34
Unemployment rate	% of total labor force	12.16	12.80	12.60	12.30	12.00	11.60	11.20	11.00
Current account balance	% of GDP	0.96	1.81	2.63	2.50	2.05	1.54	1.07	0.57

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Japan**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	JPY	527 362	527 050	532 554	538 791	541 059	544 587	548 144	551 710
GDP, constant prices	Δ %	1.61	-0.06	1.04	1.17	0.42	0.65	0.65	0.65
GDP, current prices	JPY	480 128	487 882	500 737	509 304	514 912	520 891	526 950	534 397
GDP, current prices	U.S. dollars	4 920	4 616	4 210	4 348	4 489	4 592	4 751	4 933
GDP, deflator	Index	91.0	92.6	94.0	94.5	95.2	95.6	96.1	96.9
GDP per capita, current prices	U.S. dollars	38 633	36 332	33 223	34 414	35 655	36 608	38 040	39 675
Total investment	% of GDP	21.13	21.83	21.15	20.69	20.64	20.51	20.48	20.51
Inflation, average consumer prices	Δ %	0.36	2.74	1.01	0.88	1.75	1.28	1.21	1.45
Unemployment rate	% of total labor force	4.02	3.58	3.69	3.74	3.82	3.75	3.74	3.73
Current account balance	% of GDP	0.68	0.53	1.94	1.96	2.12	2.09	2.22	2.32

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Netherlands**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	EUR	627	633	643	653	664	675	688	700
GDP, constant prices	Δ %	-0.72	0.88	1.56	1.56	1.70	1.74	1.83	1.82
GDP, current prices	EUR	643	652	662	679	697	719	741	764
GDP, current prices	U.S. dollars	854	866	749	769	798	832	868	911
GDP, deflator	Index	102.5	103.0	103.0	104.0	105.1	106.4	107.7	109.1
GDP per capita, current prices	U.S. dollars	50 810	51 373	44 249	45 202	46 812	48 710	50 727	53 224
Total investment	% of GDP	18.29	18.67	19.02	19.34	19.67	20.00	20.34	20.70
Inflation, average consumer prices	Δ %	2.56	0.32	-0.15	0.85	1.11	1.42	1.49	1.55
Unemployment rate	% of total labor force	7.26	7.40	7.20	7.03	6.93	6.55	6.15	5.64
Current account balance	% of GDP	10.20	10.35	10.42	10.12	10.12	10.03	9.54	9.14

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Portugal**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	EUR	166	168	171	173	176	178	180	182
GDP, constant prices	Δ %	-1.61	0.90	1.60	1.54	1.40	1.25	1.16	1.15
GDP, current prices	EUR	169	173	178	183	188	193	198	203
GDP, current prices	U.S. dollars	225	230	201	207	215	223	232	242
GDP, deflator	Index	101.8	103.1	104.1	105.5	106.8	108.3	109.9	111.6
GDP per capita, current prices	U.S. dollars	21 514	22 130	19 324	19 881	20 608	21 391	22 214	23 196
Total investment	% of GDP	14.48	14.88	14.64	15.02	15.20	15.35	15.64	15.90
Inflation, average consumer prices	Δ %	0.44	-0.16	0.63	1.30	1.54	1.60	1.71	1.71
Unemployment rate	% of total labor force	16.18	13.89	13.07	12.56	12.10	11.66	11.22	10.78
Current account balance	% of GDP	1.42	0.60	1.43	1.01	0.72	0.40	0.18	0.12

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **South Africa**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	ZAR	2 963	3 009	3 069	3 133	3 209	3 295	3 388	3 483
GDP, constant prices	Δ %	2.21	1.53	2.00	2.10	2.40	2.70	2.80	2.80
GDP, current prices	ZAR	3 534	3 796	4 082	4 405	4 763	5 166	5 608	6 088
GDP, current prices	U.S. dollars	366	350	324	335	350	368	387	409
GDP, deflator	Index	119.3	126.2	133.0	140.6	148.5	156.8	165.5	174.8
GDP per capita, current prices	U.S. dollars	6 890	6 483	5 902	6 003	6 183	6 397	6 628	6 895
Total investment	% of GDP	20.12	20.36	20.73	22.21	21.87	21.79	21.67	21.42
Inflation, average consumer prices	Δ %	5.75	6.07	4.50	5.60	5.50	5.50	5.50	5.50
Unemployment rate	% of total labor force	24.73	25.10	25.12	24.92	24.77	24.62	24.40	24.18
Current account balance	% of GDP	-5.77	-5.44	-4.57	-4.69	-4.59	-4.43	-4.36	-4.18

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Spain**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	EUR	1 039	1 053	1 079	1 101	1 121	1 140	1 160	1 180
GDP, constant prices	Δ %	-1.23	1.39	2.46	2.05	1.77	1.75	1.74	1.75
GDP, current prices	EUR	1 049	1 058	1 087	1 112	1 139	1 171	1 207	1 247
GDP, current prices	U.S. dollars	1 393	1 407	1 230	1 260	1 303	1 356	1 414	1 487
GDP, deflator	Index	101.0	100.5	100.7	101.0	101.6	102.7	104.0	105.6
GDP per capita, current prices	U.S. dollars	29 907	30 278	26 517	27 195	28 178	29 364	30 663	32 288
Total investment	% of GDP	18.96	19.47	19.55	19.63	19.61	19.62	19.65	19.65
Inflation, average consumer prices	Δ %	1.53	-0.18	-0.73	0.68	0.81	1.15	1.32	1.51
Unemployment rate	% of total labor force	26.10	24.45	22.56	21.11	19.94	18.85	17.81	16.85
Current account balance	% of GDP	1.44	0.11	0.27	0.38	0.53	0.66	0.85	1.12

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Taiwan**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	TWD	14 934	15 492	16 082	16 736	17 423	18 148	18 907	19 706
GDP, constant prices	Δ %	2.23	3.74	3.81	4.07	4.11	4.16	4.19	4.22
GDP, current prices	TWD	15 221	16 082	16 482	17 047	17 704	18 446	19 279	20 178
GDP, current prices	U.S. dollars	511	530	528	566	612	663	717	776
GDP, deflator	Index	101.9	103.8	102.5	101.9	101.6	101.6	102.0	102.4
GDP per capita, current prices	U.S. dollars	21 874	22 598	22 464	24 042	25 910	27 983	30 194	32 607
Total investment	% of GDP	22.07	21.90	21.69	21.75	21.69	21.56	21.44	21.30
Inflation, average consumer prices	Δ %	0.79	1.20	0.70	1.30	1.50	1.80	2.00	2.00
Unemployment rate	% of total labor force	4.18	3.96	3.96	3.96	3.96	3.96	3.96	3.96
Current account balance	% of GDP	10.81	12.34	12.45	11.68	11.14	10.67	10.22	9.87

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **United States**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	USD	15 710	16 086	16 590	17 098	17 553	17 966	18 333	18 704
GDP, constant prices	Δ %	2.22	2.39	3.14	3.06	2.66	2.36	2.04	2.02
GDP, current prices	USD	16 768	17 419	18 125	18 959	19 865	20 769	21 615	22 489
GDP, deflator	Index	106.7	108.3	109.3	110.9	113.2	115.6	117.9	120.2
GDP per capita, current prices	U.S. dollars	52 939	54 597	56 421	58 625	61 013	63 366	65 506	67 697
Total investment	% of GDP	19.35	19.76	20.38	20.96	21.41	21.76	21.98	22.19
Inflation, average consumer prices	Δ %	1.46	1.61	0.10	1.49	2.37	2.54	2.33	2.31
Unemployment rate	% of total labor force	7.37	6.15	5.47	5.15	5.03	4.91	4.87	4.84
Current account balance	% of GDP	-2.39	-2.36	-2.26	-2.40	-2.59	-2.65	-2.65	-2.63

Source: International Monetary Fund, World Economic Outlook Database, April 2015

- **Uruguay**

Description	Units	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
GDP, constant prices	UYU	651	673	692	712	733	757	782	808
GDP, constant prices	Δ %	4.40	3.32	2.80	2.90	3.00	3.30	3.30	3.30
GDP, current prices	UYU	1 141	1 282	1 419	1 568	1 728	1 904	2 093	2 297
GDP, current prices	U.S. dollars	56	55	57	59	63	66	70	74
GDP, deflator	Index	175.2	190.5	205.1	220.2	235.7	251.5	267.5	284.3
GDP per capita, current prices	U.S. dollars	16 421	16 199	16 642	17 341	18 244	19 234	20 234	21 311
Total investment	% of GDP	23.59	22.08	21.11	20.49	20.06	19.85	19.75	19.66
Inflation, average consumer prices	Δ %	8.58	8.88	7.91	7.50	7.09	6.71	6.50	6.39
Unemployment rate	% of total labor force	6.51	6.49	6.77	6.95	7.04	7.17	7.20	7.21
Current account balance	% of GDP	-5.24	-4.74	-3.84	-4.13	-4.02	-3.81	-3.70	-3.56

Source: International Monetary Fund, World Economic Outlook Database, April 2015

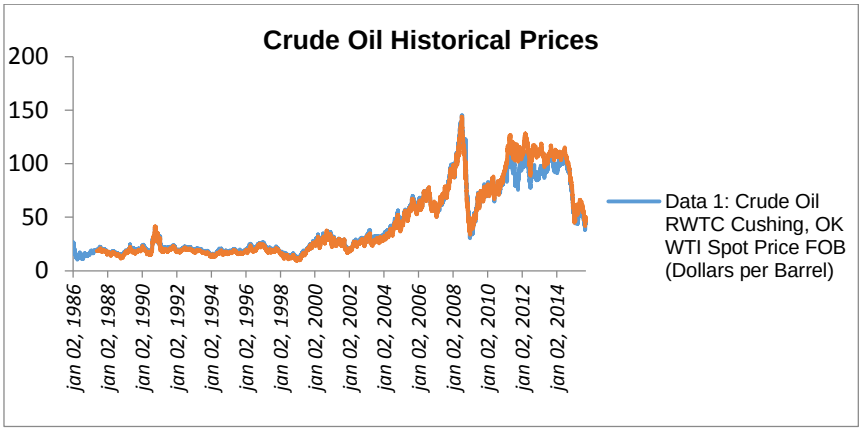
Appendix 3 – Oil and other Liquids Prices

Forecasting Sonangol future financial performance begins with looking at the oil futures market. As of November, 2015 the spot price per barrel of WTI Light Sweet Crude was trading at $46.20[14]. According to the CME Group, the daily settlement for WTI Light Sweet Crude futures contract for December 2015 closed at $46.72 per barrel and continues to incrementally increase each month to $48.50 in March 2012. The futures prices for 2016 will remain in the $50.00's per barrel for the duration of 2016. There are futures prices extending out to December 2020, however, the latest futures settlements have not extended further than $58.60 per barrel at December 2020. With the futures price of oil trading higher than the

[14] CME Group: Light Sweet Crude Oil Futures: http://www.cmegroup.com/trading/energy/crude-oil/light-sweet-crude_quotes_settlements_futures.html

current spot price of oil indicates the market is in *contango*. Even though the oil market is in *contango*, it is still hard to predict what oil will cost in the future, which is why looking at the futures market helps to forecast future revenue growth for oil companies.

- **Crude Oil Historical Prices**



Appendix 4 – AOA/EUR Exchange Rates

BNA Exchange Rate (Central Bank)	31-12-2012	31-12-2013	31-12-2014
AOA/EUR	0,00791	0,00744	0,00819

Appendix 5 – Sonangol Key Financial Ratios

		2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
Structure Ratios	*Financial Autonomy*	36%	40%	42%	38%	34%	31%	30%	28%
	Leverage	64%	60%	58%	62%	66%	69%	70%	72%
Debt Coverage Ratios	*Debt-to-Equity*	0,76	0,74	0,77	0,90	1,01	1,09	0,97	0,88
	Net Debt/Equity	0,35	0,41	0,08	0,02	(0,01)	(0,12)	(0,26)	(0,50)
	EBITDA/interest paid	9,27	8,30	5,93	5,50	5,55	5,35	6,19	7,21
	Debt/EBITDA	1,91	2,64	3,70	4,00	3,97	4,12	3,56	3,07
	Debt/EBIT	2,62	4,68	6,57	7,10	7,04	7,31	6,33	5,46
Profitability Ratios	*ROA*	6,2%	2,6%	1,4%	1,4%	1,5%	1,4%	1,6%	1,7%
	ROE	17,0%	6,5%	3,4%	3,6%	4,4%	4,6%	5,3%	6,2%
	Fixed Assets Turnover	6,31	5,15	5,67	5,67	5,67	5,67	5,67	5,67
	Net Income/Total Turnover	7,5%	4,0%	2,8%	2,7%	3,0%	3,0%	3,3%	3,7%
Liquidity Ratios	*General*	1,18	1,21	2,21	2,09	1,80	1,67	1,45	1,23
	Reduced	1,08	1,10	2,11	2,01	1,72	1,61	1,40	1,19
	Immediate	0,47	0,61	1,65	1,62	1,40	1,34	1,16	1,00

Appendix 6 – Sonangol E.P. Forecasted Balance Sheet

EUR Million	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
ASSETS										
NON-CURRENT ASSETS										
Tangible Fixed Assets	377	4.748	5.562	4.216	4.416	5.051	5.313	5.488	5.893	6.103
Intangible Assets	2	140	195	163	170	195	205	212	227	235
Investimentos da Actividade Mineira	2.076	11.093	12.365	10.319	10.809	12.365	13.005	13.434	14.424	14.939
Exploration and Evaluation Assets	-	-	3.446	3.446	3.446	3.446	3.446	3.446	3.446	3.446
Investments in Subsidiaries and Associates	11.246	3.988	4.452	3.716	3.892	4.453	4.683	4.837	5.194	5.380
Other Financial Assets	290	1.232	1.668	1.392	1.458	1.668	1.754	1.812	1.946	2.015
Other Non-Current Assets	8.983	1.618	4.853	5.046	4.452	4.853	5.319	5.777	6.621	7.167
Total Non-Current Assets	**22.975**	**22.819**	**32.540**	**28.297**	**28.644**	**32.031**	**33.724**	**35.006**	**37.751**	**39.286**
CURRENT ASSETS	-	-	-	-	-	-	-	-	-	-
Inventories	7	1.099	1.040	868	909	1.040	1.094	1.130	1.213	1.256
Accounts Receivables	5.661	6.940	4.453	3.717	3.893	4.453	4.684	4.838	5.195	5.381
Cash And Equivalents	3.551	5.332	5.729	13.595	16.852	19.768	23.647	24.220	27.639	31.879
Other Current Assets	-	127	110	92	96	110	115	119	128	133
Total current assets	**9.220**	**13.499**	**11.332**	**18.271**	**21.750**	**25.371**	**29.540**	**30.307**	**34.175**	**38.649**
TOTAL ASSETS	**32.195**	**36.318**	**43.872**	**46.569**	**50.394**	**57.402**	**63.264**	**65.314**	**71.927**	**77.935**
SHAREHOLDERS' EQUITY AND LIABILITIES	-	-	-	-	-	-	-	-	-	-
SHAREHOLDERS' EQUITY	-	-	-	-	-	-	-	-	-	-
Capital	7.910	7.440	9.970	9.970	9.970	9.970	9.970	9.970	9.970	9.970
Additional Benefits	924	869	-	-	-	-	-	-	-	-
Reserves and Retained Earnings	2.711	352	5.109	5.109	5.109	5.109	5.109	5.109	5.109	5.109
Other Reserves	-	992	-	-	-	-	-	-	-	-
Fundos e Resultados Transitados	-	557	-	2.484	2.012	2.025	2.197	2.241	2.380	2.582,23
Translation Adjustments (Financial Statement Conversion)	-	732	1.344	1.344	1.344	1.344	1.344	1.344	1.344	1.344
Income for the Year	5.072	2.244	1.140	667	681	852	896	1.036	1.238	1.362
Total shareholders' equity	**16.618**	**13.186**	**17.563**	**19.575**	**19.116**	**19.301**	**19.516**	**19.700**	**20.041**	**20.367**
LIABILITIES	-	-	-	-	-	-	-	-	-	-
NON-CURRENT LIABILITIES	-	-	-	-	-	-	-	-	-	-
Medium and Long Term Loans	211	7.559	10.650	12.780	14.698	16.902	18.592	16.733	15.897	15.102
Employee Benefit Liability	1	3.306	450	1.005	1.053	1.205	1.267	1.591	1.405	1.455
Provisions	759	236	5.237	4.371	4.578	5.237	5.508	5.690	6.109	6.327
Other Non-Current Liabilities	8.992	572	639	578	559	645	672	695	746	773
Total Non-Current Liabilities	**9.963**	**11.673**	**16.977**	**18.734**	**20.888**	**23.989**	**26.040**	**24.709**	**24.157**	**23.657**
CURRENT LIABILITIES	-	-	-	-	-	-	-	-	-	-
Acounts Payable	3.794	7.096	6.550	5.467	5.727	6.551	6.890	7.117	7.642	7.915
Short Term Loans	132	2.412	2.297	2.389	2.484	2.584	2.687	2.284	1.713	1.199,06
Provisions for other liabilities and charges	-	1.526	-	-	1.756	4.493	7.622	10.977	17.808	24.211
Other Current Liabilities	1.688	424	485	404	424	485	510	526	565	585
Total Current Liabilities	**5.613**	**11.458**	**9.332**	**8.260**	**10.390**	**14.112**	**17.708**	**20.905**	**27.728**	**33.911**
TOTAL LIABILITIES	**15.577**	**23.132**	**26.309**	**26.994**	**31.278**	**38.101**	**43.748**	**45.614**	**51.885**	**57.568**
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	**32.195**	**36.318**	**43.872**	**46.569**	**50.394**	**57.402**	**63.264**	**65.314**	**71.927**	**77.935**

Appendix 7 – Sonangol Pnl Summary

'EUR Million	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Revenues	**25.600**	**29.959**	**28.655**	**23.914**	**25.051**	**28.656**	**30.138**	**31.133**	**33.429**	**34.622**
%of Growth	*-0,7%*	*17,0%*	*-4,4%*	*-16,5%*	*4,8%*	*14,4%*	*5,2%*	*3,3%*	*7,4%*	*3,6%*
Cost of Sales	(1.403)	(4.940)	(5.298)	(4.421)	(4.631)	(5.298)	(5.572)	(5.756)	(6.180)	(6.401)
%of Revenues	*-5,5%*	*-16,5%*	*-18,5%*	*-18,5%*	*-18,5%*	*-18,5%*	*-18,5%*	*-18,5%*	*-18,5%*	*-18,5%*
Gross Profit	**24.198**	**25.020**	**23.357**	**19.493**	**20.419**	**23.358**	**24.566**	**25.377**	**27.248**	**28.221**
Gross Margin	*94,5%*	*83,5%*	*81,5%*	*81,5%*	*81,5%*	*81,5%*	*81,5%*	*81,5%*	*81,5%*	*81,5%*
Operating Expenses	(20.221)	(17.315)	(15.565)	(12.990)	(13.608)	(15.566)	(16.371)	(16.912)	(18.159)	(18.807)
%of Revenues	*-79,0%*	*-57,8%*	*-54,3%*	*-54,3%*	*-54,3%*	*-54,3%*	*-54,3%*	*-54,3%*	*-54,3%*	*-54,3%*
General Expenses	(272)	(1.675)	(1.837)	(1.533)	(1.606)	(1.837)	(1.932)	(1.996)	(2.143)	(2.219)
%of Revenues	*-1,1%*	*-5,6%*	*-6,4%*	*-6,4%*	*-6,4%*	*-6,4%*	*-6,4%*	*-6,4%*	*-6,4%*	*-6,4%*
Personnel Expenses	(280)	(822)	(1.044)	(871)	(913)	(1.044)	(1.098)	(1.135)	(1.218)	(1.262)
%of Revenues	*-1,09%*	*-2,74%*	*-3,64%*	*-3,6%*	*-3,6%*	*-3,6%*	*-3,6%*	*-3,6%*	*-3,6%*	*-3,6%*
EBITDA	**3.425**	**5.207**	**4.911**	**4.098**	**4.293**	**4.911**	**5.165**	**5.336**	**5.729**	**5.933**
EBITDA Margin	*13,4%*	*17,4%*	*17,1%*	*17,1%*	*17,1%*	*17,1%*	*17,1%*	*17,1%*	*17,1%*	*17,1%*
Amortization	(557)	(1.399)	(2.144)	(1.790)	(1.875)	(2.145)	(2.255)	(2.330)	(2.502)	(2.591)
EBIT	**2.868**	**3.809**	**2.766**	**2.309**	**2.418**	**2.766**	**2.910**	**3.006**	**3.227**	**3.342**
EBIT Margin	*11,2%*	*12,7%*	*9,7%*	*9,7%*	*9,7%*	*9,7%*	*9,7%*	*9,7%*	*9,7%*	*9,7%*
Financial Results	266	(82)	(283)	(691)	(781)	(884)	(965)	(861)	(795)	(733)
Non-Operating Results	(310)	(739)	(872)	(872)	(872)	(872)	(872)	(872)	(872)	(872)
Subsidiary Results	140	192	206	206	206	206	206	206	206	206
EBT	**2.963**	**3.179**	**1.818**	**952**	**971**	**1.216**	**1.279**	**1.478**	**1.767**	**1.944**
EBT Margin	*11,6%*	*10,6%*	*6,3%*	*4,0%*	*3,9%*	*4,2%*	*4,2%*	*4,7%*	*5,3%*	*5,6%*
Taxation	(1.253)	(936)	(679)	(286)	(291)	(365)	(384)	(444)	(530)	(583)
Tax Rate	*42%*	*29%*	*37%*	*-30,0%*	*-30,0%*	*-30,0%*	*-30,0%*	*-30,0%*	*-30,0%*	
Net Current Operating Activities	**1.710**	**2.243**	**1.139**	**666**	**680**	**851**	**895**	**1.035**	**1.237**	**1.361**
Extraordinary	3.362	1	1	1	1	1	1	1	1	1
Net Income	**5.072**	**2.244**	**1.140**	**667**	**681**	**852**	**896**	**1.036**	**1.238**	**1.362**
%of growth	*109,0%*	*-55,8%*	*-49,2%*	*-41,5%*	*2,1%*	*25,2%*	*5,1%*	*15,6%*	*19,5%*	*10,0%*
Income Margin	*19,8%*	*7,5%*	*4,0%*	*2,8%*	*2,7%*	*3,0%*	*3,0%*	*3,3%*	*3,7%*	*3,9%*

Appendix 8 – Sonangol E.P. Industry Analysis Using Porters Five Forces Result

The competitive force in the industry was evaluated by employing Porter's Five Forces Model. Porter's model measures competitive force through the means of; barriers to entry, bargaining power of suppliers, bargaining power of buyers, threat of substitutes, and degree of rivalry. These forces are used to measure opportunity with respect to the Integrated Oil and Gas environment Sonangol E.P. engages in.

Barriers to Entry: High

The threat of new businesses emerging within the integrated petroleum industry is quite high for several reasons. First of all, Sonangol E.P. is state-owned company, the only concessionaire of oil and gas in Angola and the only company in the industry capable of bringing the final product to the costumer. In addition start up costs for a new company would be astronomical. A new start-up company would have to have the finances or access to finances in order to compete with the "supermajors" such as Sonangol, Chevron, BP, Total, etc.

The integrated petroleum companies have a competitive advantage concerning; technical expertise for exploration and extraction of oil and gas, financial advantage of cash flow to operations, and investment-grade credit rankings. Investment grade rankings are necessary for financing debt. To conclude,, the integrated petroleum industry is highly capital intensive.

Bargaining Power of Suppliers: Medium

Suppliers to vertically integrated industries include services from companies such as Schlumberger and Halliburton for technical hardware. Since there is a limited amount of suppliers who provide technical equipment and the demand for technical supplies is high, means the suppliers wield some leverage regarding technical hardware and support.

Bargaining Power of Buyers: Low

Buyers of oil and gas products range from individual users to large corporations and governments. With the demand of fuel products extremely high at a current global consumption rate of 30 billion barrels of crude annually, and the price of fuel being driven by market factors oil industries have little control of demonstrates that customers have little bargaining power when it comes to the price of fuel. Until there is a proven fuel substitute, customers will continue to pay for the high cost of oil. In addition, as refining costs increase, oil companies can to pass these rising costs on to consumers who demand it.

Threat of Substitutes: Low

As of yet, there are very few substitutes for oil. Although technology is moving extremely fast in the area of renewable energy, no ready replacement for oil has been discovered as of yet. Bio-fuel is offering some competition to the traditional means of energy, however, bio-fuel, so far at the least is no real threat to the oil market or industry. Consequently, there is no immediate threat of substitution.

Degree of Rivalry: Medium

The vertically integrated oil and gas industry has many competitors which are spread out domestically, and internationally implying a high degree of rivalry. The degree of rivalry is medium and not high since most of the companies already have a specific market to sell to, and really do not have a definitive method to differentiate oil or brand name from competitors,

other than brand loyalty and price. Oil companies try to differentiate and market their oil with additives, however, these benefits are difficult to quantify by the customer and thus render little advantage. Until peak oil is a major concern, the degree of rivalry will be medium.

Five Forces Summary

The oil and gas industry is an attractive business opportunity. At this moment in time, and for the next decade as the world demands energy via crude oil, the vertically integrated oil companies will be able to meet the demand. With the barriers to entry and substitution risk remaining high there is little room in the near future for the threat of competition or substitution. The vertically integrated oil companies are in the best position to profit in the future as oil becomes scarcer. In the future, as oil becomes in short supply, the integrated companies will be in the best position to profit. Furthermore, the integrated companies can purchase the assets of smaller distressed oil companies as they deplete their reserves, and struggle to find new oil. As Sonangol E.P. business model is discussed, it will become clear that Sonangol, is in a nice position to gain advantage in relation to their competition.

Appendix 9 - Assumptions: Turnover Forecast

- **Turnover Historical Growth**

	2011	2012	2013	2014	Average	CAGR
Revenues	**25 786**	**25 600**	**29 959**	**28 655**		
Δ%	*n.a.*	*-0.7%*	*17.0%*	*-4.4%*	***3.98%***	***3.6%***

Source: Company's Fillings

	2014	2015	2016	2017	2018	2019	2020	Perpetuity
Crude, NGPL and other liquids production, 000b/d	1.805	1.886	1.911	1.985	2.052	2.182	2.287	2.308
- % change y-o-y	*-2,1%*	*4,5%*	*1,4%*	*3,9%*	*3,4%*	*6,3%*	*4,8%*	*0,9%*
Crude, NGPL and other liquids production, USDbn	**64**	**36**	**40**	**43**	**46**	**50**	**56**	**57**
- % change y-o-y	*-10,9%*	*-43,6%*	*11,2%*	*7,5%*	*8,4%*	*8,2%*	*11,4%*	*1,4%*
Crude and Other Liquids Net Exports 000b/d	1.767	1.847	1.873	1.869	1.867	1.966	2.068	2.080
- % change y-o-y	*-2,2%*	*4,5%*	*1,4%*	*-0,2%*	*-0,1%*	*5,3%*	*5,2%*	*0,6%*
Crude and Other Liquids Net Exports USD	**62,1**	**35,1**	**39**	**40,3**	**42,2**	**45,2**	**50,6**	**52,0**
- % change y-o-y	*-11,1%*	*-43,5%*	*11,1%*	*3,3%*	*5,0%*	*7,0%*	*11,8%*	*2,8%*
Dry natural gas net exports, USDbn	**0,50**	**0,00**	**1,00**	**1,40**	**1,50**	**1,50**	**1,60**	**1,69**
- % change y-o-y	*67%*	*-100%*	*n.a.*	*40,0%*	*7,1%*	*0,0%*	*6,7%*	*5,9%*
Refined Angolan Products Consumption 000b/d	**100,6**	**105,1**	**109,8**	**114,5**	**119,5**	**124,5**	**129,7**	**134,6**
- % change y-o-y	*3,0%*	*4,5%*	*4,5%*	*4,3%*	*4,4%*	*4,2%*	*4,2%*	*3,8%*
Nominal GDP, EUR	**128,6**	**106,1**	**118,0**	**130,7**	**144,2**	**158,1**	**173,4**	**179,3**
Real GDP growth, %y-o-y	*4,10%*	*1,9%*	*3,3%*	*3,8%*	*4,0%*	*6,2%*	*5,0%*	*3,4%*
GDP per capita, EUR	4.428	4.372	4.821	5.134	5.476	5.473	5.980	7500
Population, mn	22,1	22,8	23,5	24,2	25,0	25,7	26,5	30

Source: EIA, BMI 2015 and World Bank Database

- **International Petroleum and Other Liquids Supply, Disposition, and Prices**

  - Crude oil spot Prices

Crude Oil Spot Prices	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
(2013 dollars per barrel)									
Brent	113.31	108.64	97.47	55.62	71.07	76.35	76.25	77.69	79.13
Δ%	*n.a.*	*-4.1%*	*-10.3%*	*-42.9%*	*27.8%*	*7.4%*	*-0.1%*	*1.9%*	*1.9%*
(nominal dollars per barrel)									
Brent	111.65	108.64	99.02	57.58	75.00	81.99	83.41	86.58	89.75
Δ%	*n.a.*	*-2.7%*	*-8.9%*	*-41.8%*	*30.2%*	*9.3%*	*1.7%*	*3.8%*	*3.7%*

Source: EIA, Energy Outlook 2015

  - Petroleum and other liquids Consumption

Petroleum and Other Liquids Consumption	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
Total OECD Consumption	45.93	46.14	46.10	46.30	46.40	46.57	46.92	47.12	47.20
Total Non-OECD Consumption	43.41	44.60	45.92	46.39	47.39	48.49	49.43	50.32	51.20
Russia	3.20	3.30	3.41	3.37	3.37	3.36	3.34	3.33	3.31
Other Europe and Eurasia 3/	2.00	2.06	2.10	2.09	2.13	2.18	2.20	2.21	2.22
China	10.29	10.67	11.07	11.32	11.70	12.12	12.48	12.82	13.13
India	3.63	3.70	3.79	3.84	3.91	4.00	4.10	4.20	4.30
Other Asia 4/	7.35	7.37	7.46	7.58	7.86	8.16	8.46	8.77	9.08
Middle East	7.32	7.61	7.88	8.02	8.13	8.23	8.29	8.32	8.40
Africa	3.36	3.42	3.54	3.56	3.64	3.72	3.79	3.86	3.93
Δ%	*n.a.*	*1.8%*	*3.3%*	*0.8%*	*2.1%*	*2.2%*	*1.9%*	*1.9%*	*1.8%*
Brazil	2.9274	3.1074	3.2543	3.2318	3.2546	3.2789	3.2996	3.3176	3.3308
Other Central and South America	3.35	3.3769	3.4159	3.3892	3.4162	3.445	3.4673	3.4841	3.4898
Total Consumption	**89.34**	**90.74**	**92.02**	**92.69**	**93.79**	**95.07**	**96.35**	**97.43**	**98.40**
Δ%	*n.a.*	*1.6%*	*1.4%*	*0.7%*	*1.2%*	*1.4%*	*1.4%*	*1.1%*	*1.0%*

Source: EIA, Energy Outlook 2015

  - Petroleum and other liquids Production

Petroleum and Other Liquids Production	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
OPEC									
Middle East	26.292	26.317	26.172	24.032	24.064	23.756	23.979	24.286	24.557
North Africa	3.3705	2.898	2.5014	3.1101	3.4501	3.4641	3.4704	3.4886	3.505
West Africa	4.397	4.2626	4.2626	4.4904	4.6581	4.7976	4.8767	4.9576	4.9952
South America	2.9934	3.014	3.0718	3.00	2.9467	3.0409	3.0958	3.1108	3.1022
Total OPEC Production	**37.053**	**36.492**	**36.008**	**34.632**	**35.119**	**35.059**	**35.422**	**35.843**	**36.16**
Δ%	*n.a.*	*-1.5%*	*-1.3%*	*-3.8%*	*1.4%*	*-0.2%*	*1.0%*	*1.2%*	*0.9%*
Non-OPEC									
Total OECD Production	22.80	24.29	25.78	26.85	27.26	27.87	28.38	28.72	29.03
Total Non-OECD Production	30.38	30.63	31.01	31.41	31.54	32.14	32.55	32.87	33.21
Total Petroleum and Other Liquids Production	**90.24**	**91.41**	**92.80**	**92.90**	**93.92**	**95.06**	**96.36**	**97.43**	**98.40**
Δ%	*n.a.*	*1.3%*	*1.5%*	*0.1%*	*1.1%*	*1.2%*	*1.4%*	*1.1%*	*1.0%*
OPEC Liquids Market Share	*41.1%*	*39.9%*	*38.8%*	*37.3%*	*37.4%*	*36.9%*	*36.8%*	*36.8%*	*36.7%*

Source: EIA, Energy Outlook 2015

➢ Crude Oil Production

Crude Oil Production	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F
OPEC									
Middle East	23.24	23.13	23.16	20.97	20.94	20.58	20.72	20.98	21.20
North Africa	2.91	2.43	2.02	2.60	2.92	2.92	2.91	2.92	2.93
West Africa	4.34	4.20	4.19	4.40	4.57	4.70	4.78	4.86	4.89
Δ%	*n.a.*	*-3.1%*	*-0.4%*	*5.0%*	*3.8%*	*3.0%*	*1.6%*	*1.6%*	*0.7%*
South America	2.80	2.82	2.88	2.81	2.76	2.82	2.87	2.87	2.86
Total OPEC Production	**33.30**	**32.60**	**32.25**	**30.78**	**31.19**	**31.04**	**31.30**	**31.63**	**31.89**
Non-OPEC									
Total OECD Production	16.87	18.10	19.11	19.88	19.99	20.30	20.73	20.95	21.18
Total Non-OECD Production	27.18	27.24	27.59	27.94	28.03	28.46	28.74	28.93	29.11
Total Non-OPEC Production	**44.05**	**45.34**	**46.70**	**47.82**	**48.02**	**48.76**	**49.47**	**49.88**	**50.30**
Total Crude Oil Production	**77.35**	**77.93**	**78.95**	**78.60**	**79.22**	**79.79**	**80.77**	**81.52**	**82.19**
Δ%	*n.a.*	*0.8%*	*1.3%*	*-0.4%*	*0.8%*	*0.7%*	*1.2%*	*0.9%*	*0.8%*

Source: EIA, Energy Outlook 2015

➢ Turnover Forecast

EUR Millions

	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Crude Oil and Dry Natural Gas Exports	27.462	22.699	23.795	27.353	28.783	29.694	31.917	33.060
% of Growth	*n.a.*	*-17,3%*	*4,8%*	*15,0%*	*5,2%*	*3,2%*	*7,5%*	*3,6%*
Refined Products Sales	890	907	937	972	1.011	1.074	1.127	1.166
% of Growth	*n.a.*	*1,9%*	*3,3%*	*3,8%*	*4,0%*	*6,2%*	*5,0%*	*3,4%*
Non-core Segments	303	309	319	331	344	365	384	397
% of Growth	*n.a.*	*1,9%*	*3,3%*	*3,8%*	*4,0%*	*6,2%*	*5,0%*	*3,4%*
Total Revenues	**28.655**	**23.914**	**25.051**	**28.656**	**30.138**	**31.133**	**33.429**	**34.622**
% of Growth	*n.a.*	*-16,5%*	*4,8%*	*14,4%*	*5,2%*	*3,3%*	*7,4%*	*3,6%*

Source: Company fillings, BMI Q2 2015 O&G report and EIA Energy Sector Outlook 2015

Appendix 10 - Assumptions: Investment in Working Capital

	2012	2013	2014	2015F	2016F	2017F	2018F	2019F	2020F	Perpetuity
Current assets										
Receivables	5.661	6.940	4.453	3.717	3.893	4.453	4.684	4.838	5.195	- 5.381
Days receivable	*81*	*85*	*57*	*57*	*57*	*57*	*57*	*57*	*57*	*57*
Inventories	7	1.099	1.040	868	909	1.040	1.094	1.130	1.213	- 1.256
Inventory turnover days	*-2*	*-81*	*-72*	*-72*	*-72*	*-72*	*-72*	*-72*	*-72*	*-72*
Other Current Assets	-	127	110	92	96	110	115	119	128	- 133
Days prepaid		*-28*	*-22*	*-22*	*-22*	*-22*	*-22*	*-22*	*-22*	*-22*
Total current assets	**5.669**	**8.167**	**5.603**	**4.676**	**4.898**	**5.603**	**5.893**	**6.087**	**6.536**	**6.770**
% of Revenues	*22,1%*	*27,3%*	*19,6%*	*19,6%*	*19,6%*	*19,6%*	*19,6%*	*19,6%*	*19,6%*	*19,6%*
Current liabilities										
Accounts payable	3.794	7.096	6.550	5.467	5.727	6.551	6.890	7.117	7.642	- 7.915
Days payable	*54*	*86*	*83*	*83*	*83*	*83*	*83*	*83*	*83*	*83*
Accrued liabilities (Other Current Liabilities)	1.688	424	485	404	424	485	510	526	565	- 585
Days payable	*0*	*-9*	*-11*	*-11*	*-11*	*-11*	*-11*	*-11*	*-11*	*-11*
Total current liabilities	**5.482**	**7.520**	**7.035**	**5.871**	**6.150**	**7.035**	**7.399**	**7.644**	**8.207**	**8.500**
% of Revenues	*21,4%*	*25,1%*	*24,6%*	*24,6%*	*24,6%*	*24,6%*	*24,6%*	*24,6%*	*24,6%*	*24,6%*
Total operating working capital	**187**	**646**	**(1.432)**	**(1.195)**	**(1.252)**	**(1.432)**	**(1.506)**	**(1.556)**	**(1.671)**	**(1.731)**
Changes in Net Working Capital	n.a.	(459)	2.079	(237)	57	180	74	50	115	60

Source: Company Fillings

Appendix 11 - Assumptions: Cost of Debt

- **Cost of Debt Calculations, Synthetic Ratio Assumptions**

EBIT (1) (EUR Million)	**2 766**
Interest Paid (2)	**592**
Interest Coverage Ratio [(1)/(2)]	***4.68***
Firm Rating (Synthetic Ratio)	**A**
(+) Rf (German 10-years Government Bonds)	**0.78%**
(+) Default Spread Company (Rating A)	**1.00%**
(+) Default Spread Country	**3.00%**
Cost of Debt	**4.78%**

Source: Damodaran

Damodaran

For large manufacturing firms

If interest coverage ratio is			
>	*≤ to*	*Rating is*	*Spread is*
-100000	0.199999	D	15.00%
0.2	0.649999	C	12.00%
0.65	0.799999	CC	10.00%
0.8	1.249999	CCC	8.00%
1.25	1.499999	B-	5.25%
1.5	1.749999	B	5.00%
1.75	1.999999	B+	3.75%
2	2.2499999	BB	3.35%
2.25	2.49999	BB+	3.00%
2.5	2.999999	BBB	1.60%
3	4.249999	A-	1.10%
4.25	5.499999	A	1.000%
5.5	6.499999	A+	0.85%
6.5	8.499999	AA	0.65%
8.50	100000	AAA	0.50%

- **Default Spread Country**

Country	GDP (in billions)	Moody's rating	Adj. Default Spread	Total Risk Premium	Country Risk Premium	Region
Angola	124.2	Ba2	3.00%	10.3%	4.50%	Africa

Source: Damodaran, August 2015

Appendix 12 - Assumptions: Unlevered Beta and Beta Leverage Calculations

Industry Name	*Number of Firms*	*Beta*	*D/E Ratio*	*Cost of Equity*	*E/(D+E)*	*Cost of Debt*	*Tax Rate*	*D/(D+E)*	*Cost of Capital*
Oil/Gas (Integrated)	55	1.40	37.65%	12.19%	72.65%	4.13%	25.44%	27.35%	9.65%
Oil/Gas (Production and Exploration)	1140	1.48	47.02%	12.82%	68.02%	5.13%	7.19%	31.98%	9.87%
Oil/Gas Distribution	215	1.23	52.85%	11.02%	65.42%	4.13%	9.45%	34.58%	8.21%
Oilfield Svcs/Equip.	586	1.38	50.20%	12.11%	66.58%	4.63%	14.44%	33.42%	9.15%
Real Estate (Development)	703	1.16	90.20%	10.5%	52.6%	4.1%	18.3%	47.4%	6.9%
Real Estate (General/Diversified)	449	1.08	78.94%	9.9%	55.9%	4.1%	15.7%	44.1%	6.8%
Real Estate (Operations & Services)	577	0.92	89.56%	8.8%	52.8%	4.1%	13.2%	47.2%	6.0%
Telecom. Services	308	1.01	62.95%	9%	61%	5%	14%	39%	7%
Air Transport	158	1.09	96.31%	10%	51%	4%	15%	49%	7%
Education	170	1.14	27.79%	10.33%	78.25%	4.63%	15.44%	21.75%	8.79%
Hospitals/Healthcare Facilities	199	0.83	62%	8%	62%	4%	15%	38%	6%

Source: Damodaran, July 2015

- **Calculation of betas of the different business segments**

Beta Industry (Oil/Gas)	Beta L	D/E Ratio	Tax Rate	Beta U
Damodaran	1.37	47%	14%	0.98
Sonangol OIL/Gas Beta	**1.48**	**74%**	**30%**	**0.98**
Beta Industry (Real Estate)	**Beta L**	**D/E Ratio**	**Tax Rate**	**Beta U**
Damodaran	1.05	86%	16%	0.61
Sonangol Real Estate Beta	**0.92**	**74%**	**30%**	**0.61**
Beta Industry (Telecom)	**Beta L**	**D/E Ratio**	**Tax Rate**	**Beta U**
Damodaran	1.01	63%	14%	0.66
Sonangol Telecom Beta	**1.00**	**74%**	**30%**	**0.66**

Beta Industry (Air Transport)	Beta L	D/E Ratio	Tax Rate	Beta U
Damodaran	1.09	96%	15%	0.60
Sonangol Air Transport Beta	**0.91**	**74%**	**30%**	**0.60**
Beta Industry (Education)	**Beta L**	**D/E Ratio**	**Tax Rate**	**Beta U**
Damodaran	1.14	28%	15%	0.92
Sonangol Education Beta	**1.39**	**74%**	**30%**	**0.92**
Beta Industry (Hospitals/Healthcare Facilities)	**Beta L**	**D/E Ratio**	**Tax Rate**	**Beta U**
Damodaran	0.83	62%	15%	0.54
Sonangol Healthcare Facilities Beta	**0.82**	**74%**	**30%**	**0.54**

Summary			
Business Areas	**%**	**Beta**	**%*Beta U**
Oil/Gas	**97%**	1.48	1.44
Non-Core	**3%**	0.78	0.023
Real Estate	*4%*	*0.92*	
Air Transportation	*58%*	*0.91*	
Education	*1%*	*1.39*	
Telecom	*16%*	*1.00*	
Hospitals/Healthcare Facilities	*5%*	*0.82*	
Beta L Sonangol			**2.26**
Beta U			**1.46**

Appendix 13 - Assumptions: WACC Rate

WACC	
GERBT10	0,78%
Beta factor	2,36
Market risk premium	10,31%
Cost of equity	**25,11%**
Country Default Spread	3,00%
Company Default Spread	1,00%
GERBT10	0,78%
Cost of Debt	**4,78%**
Tax rate	30,00%
After tax cost of debt	**3,35%**
Assumed [D/(D+E)] ratio	42,44%
Equity component of WACC	14,46%
Debt component of WACC	1,42%
WACC	**15,29%**
D/(D+E) ratio	
Market value of equity	17.563
Debt	12.947
Assumed [D/E] ratio	73,72%
Assumed [D/(D+E)] ratio	42,44%

Appendix 14 - Assumptions: Sensitivity Analysis

	Variation of Share Price	-2% Δ%	Variation of Share Price	2% Δ%
Total Revenues	8.74	-5.9%	9.72	4.6%
EBITDA Margin	6.36	-31.5%	12.1	30.2%
Capex	9.56	2.9%	8.91	-4.1%
WC	9.24	-0.5%	9.23	-0.6%
rf	9.25	-0.4%	9.22	-0.8%
Beta	9.52	2.5%	8.95	-3.7%
Kd	9.9	6.6%	8.62	-7.2%
ke	10.57	13.8%	8.09	-12.9%
Wacc	11.72	26.2%	7.35	-20.9%
Tc	9.29	0.0%	9.17	-1.3%
% leverage	8.80	-5.3%	9.69	4.3%

Appendix 15 - Assumptions: Relative Valuation

Valuing Sonangol EP equity using comparable firms

In millions (except for per share items)

	Chevron[5]	British Petroleum[5]	Exxon Mobile[5]	ENI[5]	TOTAL SA[5]	SONANGOL (2014)[6]
Accountig data (December 31, 2014)	USD	USD	USD	EUR	EUR	EUR*
Balance sheet data						
1. Cash and Equivalents	210.859	116.772	4.616	6.947	22.355	5.729
2. Debt	27.818	52.845	29.121	25.891	45.850	12.947
3. Book value of equity	108.686	106.448	173.025	62.401	86.925	17.563
4. Number of shares outstanding	1.897	283	4.169	3.634	2.414	1.000
Income statement sheet data						
5. EBIT[1]	19.726	18.071	34.082	7.917	8.660	2.766
6. Sales	192.308	353.568	364.763	109.847	212.018	28.655
7. Depreciation expenses	19.793	15.163	17.297	9.970	14.970	2.144
8. EAT[2]	19.273	12.136	32.251	3.707	9.679	1.140
9. EBITDA[3] = EBIT + Depreciation expenses	39.519	33.234	51.379	17.887	23.630	4.911
On a per-share basis						
10. Earnings per share (EPS) = [(8)/(4)]	10,2	42,9	7,7	1,0	4,0	1,1
11. Book value of equity per share = [(3)/(4)]	57,3	375,9	41,5	17,2	36,0	17,6
Market-based data (September 18, 2015)						
12. Share price	78,55	345,85	74,29	15,11	42,13	Not available
13. Market capitalization[4] = [(12) x (4)]	148.992	97.932	309.707	54.913	101.717	Not available
14. Enterprise value (EV)[5]	168.450	123.097	334.212	73.652	127.414	15.566
Multiples						
15. Price-to-earnings ratio (P/E) = [(12)/(10)]	7,73	8,07	9,60	14,81	10,51	Not available
16. Price-to-book ratio (P/B) = [(12)/(11)]	1,37	0,92	1,79	0,88	1,17	Not available
17. EV-to-EBITDA ratio = [(14)/(9)]	4,26	3,70	6,50	4,12	5,39	3,17
18. EV-to-sales ratio = [(14)/(6)]	0,88	0,35	0,92	0,67	0,60	0,54
19. EV-to-EBIT ratio = [(14)/(5)]	8,54	6,81	9,81	9,30	14,71	5,63
20. Estimated price-to-earnings ratio[7] (forward P/E)	23,00	17,34	18,92	29,69	11,96	Not available

[1]EBIT = Earnings before interest and tax.

[2]EAT = Earnings after tax (same as net income).

[3]EBITDA = Earnings before interest, tax, depreciation and amortization (is an approximation of the firm's cash flow from assets).

[4]Market capitalization is the total market value of a company's equity at a given date; it is equal to its share price on that day multiplied by the total number of shares the company has issued.

[5]Data from Bloomberg

[6]Data from the most recent financial statements: Dec. 31, 2014

[7]Estimated values from Bloomberg (December 2015)

	Range			
	Low	Average		High
Multiples		**Arithmetic**	**Harmonic**	
P/E	7,73 x	10,15 x	9,61 x	14,81 x
Forward P/E	11,96 x	16,82 x	18,43 x	29,69 x
P/Book	0,88 x	1,23 x	1,15 x	1,79 x
EV/EBITDA	3,70 x	4,80 x	4,60 x	6,50 x
EV/Sales	0,35 x	0,68 x	0,61 x	0,92 x
EV/EBIT	6,81 x	9,83 x	9,24 x	14,71 x

	Price (€ millions)			
	Low	Average		High
Multiples		**Arithmetic**	**Harmonic**	
P/E	8.810	11.562	10.957	16.882
Forward P/E	13.630	19.167	21.004	33.836
P/Book	15.455	21.536	20.113	31.437
EV/EBITDA	10.971	16.335	15.378	24.725
EV/Sales	2.758	12.334	10.125	19.036
EV/EBIT	11.626	19.988	18.332	33.483

	Share price (€)			
	Low	Average		High
Multiples		**Arithmetic**	**Harmonic**	
P/E	8,81	11,56	10,96	16,88
Forward P/E	13,63	19,17	21,00	33,84
P/Book	15,46	21,54	20,11	31,44
EV/EBITDA	10,97	16,33	15,38	24,73
EV/Sales	2,76	12,33	10,13	19,04
EV/EBIT	11,63	19,99	18,33	33,48