



Equity Valuation of Public Sector Enterprises: Power Grid Corporation of India Limited & ONGC Limited

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ABSTRACT

The objective of the paper is to find the equity value of public sector enterprises i.e. Oil and Natural Gas Corporation Limited (ONGC) and Power grid Corporation of India Limited. The DCF valuation method was used for valuing the two companies. The cash flows were projected by analysing the income statement, capital expenditure and changes in working capital and were discounted to present value. The paper concludes that the current position of the companies from investment prospects is positive. After analysis and valuation of companies, a buy rating for POWERGRID and for ONGC was recommended for investor having investment horizon of 5-6 years.

Keywords: Valuation, Power Grid, ONGC, DCF, Weighted Average Cost of Capital, Terminal Value, Enterprise Value

1. Introduction

Company Overview

1.1 Power Grid Corporation of India Limited:

The Power Grid Corporation of India Limited (POWERGRID) is an Indian ‘Navaratna’ Central Public Sector Enterprise, established in 1989. POWERGRID is a central transmission Utilities Company headquartered in Gurgaon, India. It is India’s largest electric power transmission utility, listed in 2007. Government of India holds 57.90% stake in POWERGRID and rest 42.10% by public. Company is listed in both NSE and BSE and paying dividend since 1993.

Business Divisions: POWERGRID has mainly 3 divisions –

- a) **Power System Management:** POWERGRID owns and operates more than 1,25,475 Ckt. kms network of transmission lines, 203 number of stations, 2,45,744 MVA transformation capacity that constitutes most of India’s interstate and inter-regional electric power transmission system and carries electric power across India. Total Inter-regional power transfer capacity is 53,150 MW.
- b) **Telecom:** under the brand name ‘POWERTEL’. The overhead optic fibre network that employs Optical Ground Wire on power transmission lines is possessed exclusively by POWERTEL in the country. Approximately, 36,563 km of Telecom network is owned and operated by POWERGRID.
- c) **Domestic Consultancy:** Advancing on its excellent techno-managerial expertise in various field of power system, POWERGRID has been providing one stop consultancy services to State Owned Utilities, Central Public Sector Undertakings, Private Utilities, and Government departments. A client base of about 145 exists for it in the power sector and which is still expanding.

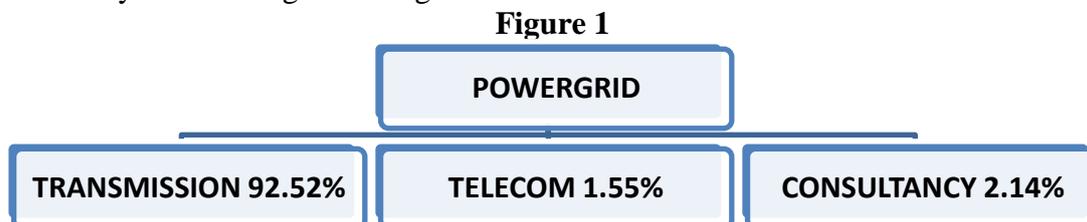
POWERGRID group is consisting of 13 Joint Ventures and 10 Subsidiaries. POWERGRID is dominant in national transmission, operating around 90% of inter-state / inter-regional networks.

POWERGRID’s national grid is managed through its wholly owned subsidiary Power System Operation Corporation Limited (POSOCO).

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POWERGRID has leveraged its transmission business by exploring telecom market through the union of power sector with telecom sector by facilitating low cost and high quality telecom infrastructure on its existing and planned transmission infrastructure. POWERGRID is providing consultancy services in the field of Power Transmission, Sub-transmission, Distribution, Load Dispatch & Communication and Telecom sectors. Revenue Break-up as per financial year 2015 is given in figure 1 below

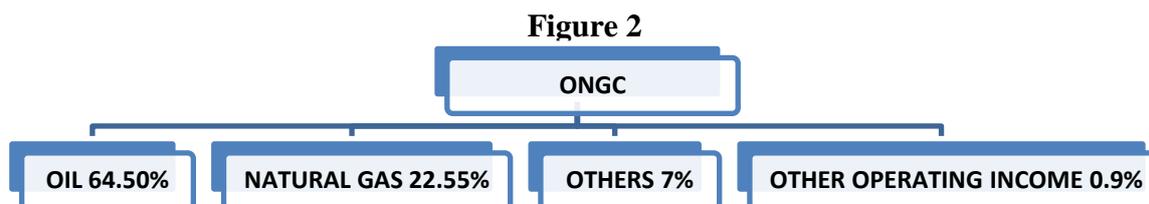


1.2 Oil & Natural Gas Corporation Limited:

Oil and Natural Gas Corporation Limited (ONGC), incorporated in 1956 is an Indian multinational oil and gas company. ONGC is a Public Sector Enterprise under Government of India, headquartered in Dehradun, India. Government of India holds 68.94% of stake and rest by public. ONGC is listed in both NSE and BSE with market capitalization of over INR 2 trillion.

- ONGC being an India's largest oil and gas exploration and production company contributes about 79% (about 25% of India's total demand) to the India's crude oil production and about 60% to its natural gas production. ONGC limited owns and operates more than 26,600 km of pipelines, largest route length in India. Major Products and services of ONGC are crude oil, natural gas supplies and other value added products to oil and gas marketing companies.
- ONGC has several subsidiaries and an international subsidiary ONGC Videsh Limited operating in international markets having projects in 15 countries. ONGC has two joint ventures: ONGC Tripura Power Company (OTPC) and ONGC Petro Additions Limited. ONGC employs best-in-class infrastructure and facilities and efficient technology in its operations.
- ONGC has 7.59 billion tones of In-place hydrocarbon reserves, largest share of hydrocarbon reserve in India. ONGC has 1/10th of total refining capacity of India. ONGC produces over 3 million tons per year of value added products such as LPG, , Naphtha, C2 - C3, MS, Aviation Fuel, HSD SKO etc. ONGC has cumulatively produced 851 Million Metric Tons (MMT) of crude and 532 Billion Cubic Meters (BCM) of Natural Gas, from 111 fields.
- ONGC in its roadmap for plan 2030 has mentioned that it aims to increase its production by double to 130 million metric tons of oil and oil equivalent gas annually over the period with 4%-5% growth rate. To increase ONGC Videsh limited production by six times by 2030 it must generate over 6.5 GW power from nuclear, wind and solar and 9 MTPA of LNG; and scale up refining capacity to over 20 MTPA.

Initiatives for future - ONGC has taken structured steps to use unconventional energy sources through unconventional gases like Underground Coal Gasification, Coal Bed Methane, Shale Gas and Gas Hydrates, or unconventional energy sources like wind, solar etc. ONGC has already commissioned a 50 MW Wind Farm in Gujarat and plan is to set up another 100 MW Wind Farm in Rajasthan. Company has also set up three Solar Thermal Engines at Solar Energy Centre. Revenue Break-up as per financial year 2015 is given in figure 2 below :



2. Objective & Methodology

The objective of the paper is to find the equity value of POWERGRID and ONGC Ltd. using DCF approach and contrast it with the current spot price in the stock market. In order to conduct equity valuation, we have analysed the current and expected future financial position of Power Grid Corporation of India Ltd. & ONGC Ltd.

2.1 Methodology

The DCF method was used to value two companies. The status of the company's business was estimated by analysing its operational performance and financial indicators. Essentially, the financial position of the company was predicted by projecting their income statements for future until 2022.

The study predicts the future income statements of company on standalone basis and identified the capital expenditure and working capital requirements in order to arrive at the free cash flows. First, the free cash flow to firm was calculated and from it the value of the debt was subtracted in order to obtain the equity value of company.

$$FCFF = EBIT(I - t) + Depreciation - Change\ in\ Working\ Capital - Capital\ Expenditure$$

$$FCFE = FCFF - Market\ Value\ of\ Debt$$

Two-stage growth model is used to find out the value of company. The first phase of the forecast is based on company's historical growth and industry's & India's growth. In terminal phase, the paper assumes that cash flows would grow by a constant growth rate.

Discounted Cash Flow Method

DCF can be summarized in following three major steps:

- a. Forecasting the Free Cash flows
- b. Cost of Capital Estimation
- c. Terminal Value Estimation

The forward looking characteristic appropriately defines the DCF method. This necessitates the evaluator to predict the future position of the company and their business along with the economy in general. The caution is however advised in making assumption as even small changes in them translate into significant difference in the company value. The assumptions therefore form an intricate and most important base of the analysis due to its substantial influence on the outcomes. Consequently, the key input factors were introduced in this paper for proceeding with DCF Analysis followed by the objective to study the effect of changes in assumptions on the value of the relevant company.

The value of the company was estimated by discounting the free cash flows of the company by employing weighted average cost of capital (WACC). All the operating expenses along with other expenses viz., taxes, changes in working capital and taxes were deducted from the operating profit prior to debt distribution to arrive at the free cash flow. It is due to this reason free cash flow is also known as residual cash flows.

$$Value\ of\ Firm = \sum_{t=1}^{t=n} \frac{(CF\ to\ Firm)_t}{(1 + WACC)^t}$$

Where

CF to Firm_t = Expected Cash Flow to firm in period t

WACC = Weighted Average Cost of Capital

2.1.1 Calculation of Free Cash Flow (FCF)

The cash flows for DCF valuation can be estimated using two ways:

- i. First, by employing free cash flows to firms (FCFF) facilitating cash flows to both the debt and equity holders, or
- ii. Secondly by employing free cash flow to equity (FCFE) facilitating cash flows to only the equity holders of the company.

The difference between FCFF and FCFE is that the former, FCFF employs inputs based upon accounting figures which had been estimated before the distribution of interest to the debt holders. Alternatively, FCFE employs inputs from which interest payments have already been deducted. Further, FCFF yields the enterprise value of the company whereas FCFE yields the equity value. Since, all liabilities, debt and equity of a company holds relevance for the acquirer, FCFF emerges as a more appropriate and favoured approach than FCFE.

The FCFF is estimated by subtracting taxes from earnings before interest and taxes (EBIT) of the company which yields net operating profit after tax (NOPAT). It is followed by the subtraction of capital expenditure and any increase in net working capital (NWC). Increase in NWC is subtracted because it does not signify actual cash flows. Further, capital expenditure represents the cost incurred i.e., cash outflow to acquire the capital asset for the company and accordingly is found on the asset side of the balance sheet.

The formula for calculating the FCFF is shown below:

$$FCFF = EBIT (1 - t) + D\&A - \text{Increase in Net Working Capital} - \text{Capex}$$

Where, FCFF = Free Cash Flow for firms,

EBIT = Earning before interest and tax

t = tax rate in percentage

D&A = Depreciation and Amortization

Capex = Capital Expenditure

2.1.2 Weighted Average Cost of Capital

An extensive analysis of both the company's financial structure and current market situation is required for the effective estimation of the discount rate. This discount rate employed for discounting the FCFF is known as Weighted Average Cost of Capital (WACC). The firm value is highly sensitive to changes in WACC underling its immense significance in the DCF model. A small change in WACC would yield significant change in firm's value. WACC is estimated by multiplying the cost of source of capital with their proportionate weight in the company's overall capital structure.

Therefore the formula for the WACC calculation is:

$$WACC = \frac{\text{Equity}}{\text{Debt} + \text{Equity}} \times \text{Cost of Equity} + \frac{\text{Debt}}{\text{Debt} + \text{Equity}} \times \text{Cost of Debt}$$

Cost of Equity

The cost of equity (K_e) is calculated with the help of the capital asset pricing model (CAPM). The CAPM reveals the return that investors require for bearing the risk of holding a company's share. This required return is the return on equity (ROE) that investors demand to bear the risk of holding the company's share, and is therefore equivalent to the company's cost of equity.

According to the CAPM, the required ROE, or in this case the K_e is derived with the following formula

$$K_e = r_f + \beta (r_m - r_f)$$

Where, K_e = is the cost of equity

r_f = is the risk-free rate of return

r_m = Expected market returns

β = refers to systematic risk of a security or a portfolio

Cost of Debt

The interest rate which a company is obliged to pay to its investors on its outstanding debt is known as cost of debt (K_d). The company's credit rating significantly influences its K_d . Credit worthiness estimated through credit rating along with the market conditions together determines the credit spread of the company. Credit spread indicates as the difference between risk-free interest rate and interest rate offered by the company on its borrowed capital. Consequently, dependence of overall market conditions forms an essential feature in the calculation of K_d , particularly during the period when the company has a high leverage ratio.

Cost of debt is essentially lower than interest rate paid by a company to its debt holders because the interest rate costs are tax deductible in most economies. The K_d post-tax is computed as follows:

$$K_d = i(1 - t)$$

Where, K_d = Cost of Debt,

i = interest rate on outstanding debt, and

t = effective tax rate

Conclusively, K_e assists in the estimation of WACC. K_e , in turn is estimated through CAPM model with its underlying assumptions for beta. On the other hand, K_d is estimated through interest rate that the company pays to its debt holders along with the corporate tax rate applicable on profits. Thus, changing the assumptions for the cost of capital would significantly impact the value of the firm.

2.1.3 Calculation of Terminal Value

Terminal Value is estimated through the NPV of all future cash flow accruing after the time period covered by the scenario analysis. Terminal value is based on average growth expectations which are relatively easier to predict.

Thus, the assumption of constant growth rates for the time following the time period that was analysed more extensively holds much significance for the estimation of terminal value. Therefore, terminal value is determined by using simple dividend discount model that employs constant perpetual growth rate "g", and WACC as the discount rate "r". Correspondingly, the TV can be expressed as where the FCF is one period before the TV period:

$$TV = FCF_{tv} \times \frac{r + g}{1 - g}$$

Re-discounting of terminal value is required as these cash flows in entirety are discounted to a date in the future and also so as to obtain the NPV of all free cash flows that emerges for post-prediction period. Further, perpetual growth rate must be in line with nominal GDP growth.

2.1.4 Determining Firm Value

The terminal value is discounted to its NPV when both the NPV of cash flows accruing within the scenario period and terminal value itself had been determined. Using additive property of NPV, both NPV are added to yield enterprise value or equity value corresponding to the method of valuation employed i.e., FCFE or FCFE.

$$Company\ Value = \sum_{t=1}^{t=n} \frac{(FCF)_t}{(1+r)^t} + \frac{TV}{(1+r)^{n+1}}$$

Generally, the company value is estimated by employing different levels of leverage to discover an optimal financial structure. The company value estimated is then employed for

further analysis. For instance, the equity value obtained can be used to estimate a fair share price for listed companies by dividing it with the number of shares outstanding.

All financial data has been taken from company's annual report listed on website and all other information used which is available in public domain. Several assumptions were made based on the company's annual report, management outlook which was published in annual report, industry outlook.

The valuation is based on the following assumptions:

- i. Compounded quarterly growth rates were used to estimate the total revenues for the FY 2015 and onwards.
- ii. Revenues are assumed to grow at a constant positive rate every quarter.
- iii. Operating margins were assumed to be stagnant over the years reflecting no increase. In other words, a conservative measure of operating margin was considered.
- iv. It was assumed that the company did not issue new shares.
- v. Assumption was made that there was no change in number of debentures issued, number of preference shares issued, and thus impacting number of diluted shares.
- vi. Company was not found to be under any long-term debt burden and it was assumed to maintain this status-quo in near-future as well.
- vii. Correspondingly, no dividends were issued and it was assumed to maintain this status-quo in near-future as well. The shareholders earned their returns through an increase in market price of the shares.
- viii. No shares would be issued by the company in future.
- ix. It is assumed that fair value of assets and liabilities of the company is equal to its present book value.
- x. Company will continue to use straight line depreciation method.
- xi. Tax rate is assumed to be 25%.
- xii. After a substantial time gap, the long term growth rate of the company will reduce to long term economic growth rate. World Bank had estimated India's real GDP growth rate at 7.8%. It is assumed that the company will grow at around rate of 7.5%.

3. Equity Valuation: Power Grid Corporation of India Limited.

Analysis of growth figures

- 1. Revenue** – The revenue growth has been forecasted based on the historical growth rates and also power sector dynamics, industry competitiveness of company and country's growth. In previous years, demand for electricity has increased substantially and is expected to continue in the future as still large numbers of households are not electrified. Large number of households without electricity and rising income levels and large spending by the government in infrastructure in last one year is also driving the growth.
- 2. EBITDA Margin** – Operating Margin of the company has been increasing over last some years due to growth in electricity demand and India is emerging economy. With the current economic scenario and growth in power sector and optimistic market sentiments, we expect growth to continue. For each forecasted year operating margin has been calculated using the primary building blocks like operating expenses and depreciation. We expect long term operating margin to be 15% - 20%. Each of the following building blocks were calculated using relevant drivers such as historical data and company's future plans whose information was obtained from company's annual report.
- 3. Operating Expenses** – Operating expenses were obtained using company's historical expenses and future business plans and growth of operating expenses were calculated based on the growth of revenue. Mainly, operating expenses were derived from the transmission assets, administration and other expenses consist primarily of costs of the repair and maintenance of buildings, plant and machinery and power charges.

4. Depreciation & Amortization – The depreciation charges have been obtained as an average percentage of historical data. The company has revised depreciation charge on certain fixed assets w.e.f. April'1st'2014. By charging depreciation at the revised depreciation rates, the depreciation charge for the year ended 31st March, 2015 is higher by Rs. 22.31 Cr. and profit before tax for the year is lower by Rs. 22.31 Cr.

5. Capital Expenditure – POWERGRID sets capital expenditure target on the basis of 5 year plan. POWERGRID increased its target capital expenditure (capex) for XIIth Five Year Plan from Rs. 1,00,000 Cr. to Rs. 1,10,000 Cr. Capital expenditure of 65,651 Cr. cumulatively has been achieved in first three years of 5 year plan. For the capex of FY 2014-15, 13,014 Cr. were mobilized through private placement of bonds & term loan, 3,070 Cr. were mobilized through External Commercial Borrowings (ECB)/Supplier credit and balance, 6372 Cr. was met through internal resources generated & Fellow on Public Offering proceeds. Company's capital expenditure is primarily for the installation of new transmission capacity and the expansion of existing capacity. We have assumed capital expenditure for the 13th Five Year plan of around Rs. 1,00,000 Cr. Net capex is calculated by deducting the depreciation from capital expenditure incurred for a particular year.

6. Working Capital – POWERGRID calculates its working capital as: (i) consisting of receivables equivalent to two months of fixed cost; (ii) maintenance spares at 15% of operation and maintenance expenses; and (iii) operation and maintenance expenses for one month.

7. Tax Rate – Tax rate is assumed to be 25%. Finance Minister of India in his budget for FY 2015 announced that corporate tax rate to be reduced from 30% to 25% in the next five years.

8. Free Cash Flows to Firm (FCFF) – calculated as:

FCFF = EBIT * (1-Tax rate) + Depreciation – Net Capex – Increase in Working Capital

Table 1
Profit and Loss Statement (Projected) (Rs., in Cr.) of PGCIL

Year	MAR' 14	MAR' 15 P*	MAR' 16 P*	MAR' 17 P*	MAR' 18 P*	MAR' 19 P*	MAR' 20 P*	MAR' 21 P*	MAR' 22 P*
Revenue	15230.28	17177.23	20269.131	23917.575	28461.914	33869.678	40304.917	47962.851	57555.421
YoY %	19.38%	12.78%	18.00%	18.00%	19.00%	19.00%	19.00%	19.00%	20.00%
Operating Expenses	2273.94	2378.81	2837.6784	3348.4605	3984.668	5419.1485	6448.7867	7194.4277	8057.759
YoY %	14.93%	13.85%	14.00%	14.00%	14.00%	16.00%	16.00%	15.00%	14.00%
EBITDA	12956.34	14798.42	17431.453	20569.115	244772.246	28450.53	33856.13	40768.423	49497.662
D&A	3870.0141	4914.4055	5878.0481	6936.0968	8253.952	9822.2066	11688.426	13909.227	16691.072
EBIT	9086.3259	9884.0145	11161.764	12836.029	14761.433	16522.446	19331.262	23028.805	26252.838
Depreciation	3870.0141	4914.4055	5878.0481	6936.0968	8253.9552	9822.2066	11688.426	13909.227	16691.072
Tax Rate%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
EBIT*(1-t)	6814.7444	7413.0109	8665.0537	10224.763	12167.468	13971.242	16625.778	20144.397	24604.943
Depreciation	3870.0141	4914.4055	5878.0481	6936.0968	8253.9552	9822.2066	11688.426	13909.227	16691.072
Less: Net Capex	19287.986	17541.594	16296.452	15238.403	14746.045	12177.793	8311.5741	6090.7732	4308.9278
Less: Increase in WC	250	565	822.44577	851.30352	1004.5382	1593.8672	1300.5956	1934.636	2158.3283
FCFF	-8628.227	-5779.178	-2604.654	917.91871	4081.5115	10315.06	18067.994	25804.523	34972.647

As visible in the above Table 1, the projected profit and loss statement was prepared up to FY 2021. The revenue was assumed to grow consistently from 18% in FY 2015 till FY 2021 with an assumed growth of 20%. The operating expense were assumed to be on a growth which oscillates from 14% during FY 2015- FY-2017 to 16% for next two FYs of 2018 and FY 2019 to decline consecutively to 15% in FY 2020 and back to 14% in FY 2021. The free cash flow of funds was found to increase persistently from Rs.917.91 crore in FY 2016 to Rs. 34972.65 crore by FY 2021.

WACC Analysis

Weighted Average Cost of Capital (WACC) is the firm's cost of capital where capital of each type is proportionately weighted. Cost of equity (K_e) has been calculated using the Capital Asset Pricing Model (CAPM). The risk free rate is based on the current yield of 10-year Indian Government bond. Beta of 1.398 was calculated using Covariance method. The market risk premium is taken as 8.75%. Applying CAPM to the components above resulted in a cost of equity of 19.9825%. The after tax cost of debt of 6.94% is based on the interest rate paid by company on bonds issued by it.

1. Current Debt to Equity ratio = 1.27
2. Current market value of equity in the company = 74,916.2 (current market capitalization)
3. Current book value of debt in the company = 95338.75 (from balance sheet)

Table 2 and 3 below depicts the cost of debt and cost of equity.

Table 2
Debt Contribution

Before Tax Cost of Debt	9.25%
After Tax Cost of Debt	6.94%
Weight of Debt	56%
Contribution	3.89%

Equity Contribution

Beta Calculation

Beta of POWERGRID stock has been calculated using the 5 year historical price of share and benchmark index Nifty50. Calculation of beta is simply the Covariance of historical prices of stock and index divided by historical prices of index.

$$Beta (\beta) = \frac{Cov (Stock Index)}{VAR(Index)}$$

Once we have beta estimate, cost of equity can be obtained as:

Table 3
Equity Contribution, Cost of Equity

Weight of Equity	44%
Risk Free Rate (10 Yr Yield)	7.75%
Equity Risk Premium	8.75%
Beta(β)	1.398
K_e	19.98%
Contribution	8.79%

Now, combining the debt and equity contribution, we arrive at WACC of 12.68% shown in table 4 below.

Table 4
WACC Computation

Debt Contribution	3.89%
Equity Contribution	8.79%
WACC	12.68%

Terminal Phase

In terminal phase, the paper assumed that company would grow at constant rate and terminal value of a company was calculated using the above cited formula. Terminal growth rate has been calculated based on the GDP growth rate of Indian economy. World Bank had estimated India's real GDP growth rate at 7.8%. It is assumed that the company will grow at around rate of 7.5%. The terminal value is shown in table 5 below. The equity value and the enterprise value on the basis of the relevant inputs is shown in table 6 below.

Table 5
Estimation of Terminal Value

FCFF (2023)	46642.81
WACC-g	0.05
TV (2023)	353528.6
TV (2015)	136057.84

The terminal value was found to be Rs. 353528.6 crore for the year 2023 whereas a higher terminal value was estimated for the year 2015 at Rs 136057.84 crore.

Table 6
Estimation of Total Enterprise Value(Rs., in Crore)

Total Enterprise Value	181443.57
Total Debt	95338.75
Total Equity Value	86104.82
Total Outstanding Shares	523.16
Equity Value	164.58

The above analysis yielded the total enterprise of Rs. 181443.57 crore whereas the equity value of each share was found to be Rs.164.58.

4. Equity Valuation: Oil & Natural Gas Corporation

- 1. Revenue:** ONGC's crude oil production has increased quarter on quarter (QoQ) around 1% and natural gas production declined around 2.5% QoQ. ONGC's net revenue has declined in last fiscal due to decline in crude oil prices. ONGC's future earnings depend on the subsidy sharing mechanism. Recently Government approved subsidy sharing mechanism for FY'2016 which will reduce the subsidy burden of ONGC substantially. The long term clarity on the subsidy sharing formula and higher oil prices will hold the key for future profitability of the company. We have assumed the approved subsidy sharing mechanism for long term which is giving share price of Rs. 251. We believe oil prices will recover in the next 2-3 years, which will drive earnings for ONGC, as the company's earnings are extremely sensitive to oil price. Moreover, domestic reforms continued with the implementation of Direct Benefit Transfer of LPG (DBTL) on LPG, which will likely to reduce under recovery (difference between subsidized price and actual price). Revenue growth has been forecasted based on the above facts and assumptions and industrial and economic dynamics.
- 2. EBITDA Margin:** With the current economic scenario in oil and gas industry, we expect ONGC's operating margins continue to grow. For each forecasted year operating margin has been calculated using the primary building blocks like operating expenses and depreciation. Each of the following building blocks were calculated using relevant drivers such as historical data and company's future plans whose information was obtained from company's annual report.
- 3. Operating Expenses:** Operating expenses were obtained using company's historical expenses and future business plans and growth of operating expenses were calculated based on the growth of revenue.
- 4. Depreciation & Amortization** – The depreciation charges have been obtained as an average percentage of historical data. Depreciation is stated using written down value method over the useful life of asset.
- 5. Capital Expenditure** – ONGC has incurred capex of Rs. 1,49,497 Cr. in last five years. Capital Expenditure has been calculated on the basis historical capex for forecasted years.
- 6. Working Capital** – working capital is forecasted on the basis of historical working capital.
- 7. Tax Rate** – tax rate is assumed to be 25%. Finance Minister of India in his budget for FY 2015 announced that corporate tax rate to be reduced from 30% to 25% in the next five years.

8. Free Cash Flows to Firm (FCFF) – calculated as:

$$\text{FCFF} = \text{EBIT} * (1 - \text{Tax rate}) + \text{Depreciation} - \text{Net Capex} - \text{Increase in Working Capital}$$

Table 7**Profit and Loss Statement (Projected) of ONGC Limited (Rs., in Crore)**

Year	MAR'14	MAR'15 P*	MAR'16 P*	MAR'17 P*	MAR'18 P*	MAR'19 P*	MAR'20 P*	MAR'21 P*	MAR'22 P*
Revenue	83890.27	82870.96	84263.192	93405.7485	108210.56	125361.933	145231.8	168251.04	194918.83
YoY %	1.0661%	-1.215%	1.68%	10.85%	15.85%	15.85%	15.85%	15.85%	15.85%
Operating Expenses	39816.44	39482.25	42643.29	46547.41	53529.522	61558.9497	70792.792	81411.711	93623.4677
YoY %	0.009393369	-0.0083933	0.0800623	0.09155297	0.15	0.15	0.15	0.15	0.15
EBITDA	44073.83	43388.71	41619.902	46858.3385	54681.038	63802.9836	74439.008	86839.329	101295.362
D&A	10925.89	11458.31	9774.5303	10835.0668	12552.425	14541.9843	16846.889	19517.121	22610.5843
EBIT	33147.94	31930.4	31845.372	36023.2717	42128.613	49260.9993	57592.119	67322.208	78684.7779
Depreciation	10925.89	11458.31	9774.5303	10835.0668	12552.425	14541.9843	16846.889	19517.121	22610.5843
Tax Rate%	0.25	0.3	0.3	25%	25%	25%	25%	25%	25%
EBIT*(1-t)	24860.955	23947.8	22291.76	27017.4537	31596.46	36945.7495	43194.089	50491.656	59013.5834
Depreciation	10925.89	11458.31	9774.5303	10,835.07	12,552.42	14,541.98	16,846.89	19,517.12	22,610.58
Less: Net Capex	21543.61	21011.19	22694.97	21,634.43	19,917.08	17,927.52	15,622.61	12,952.38	9,858.92
Less: Increase in WC	-2065.3	162	300	400	376	407	602	401	310
FCFF	16,308.54	14,232.92	9,071.32	15,818.09	23,855.81	33,153.22	43,816.37	56,655.40	71,455.25

For ONGC as well, the projected profit and loss statement was prepared up to FY 2021-2022. The growth rates of various variables were assumed to be different from what was assumed for the Power Grid Corporation of India Limited. The growth rate of revenue were assume to be 1.68% in FY 2015 increasing to 10.85% in FY 2016 and thereby assuming a constant growth rate of 15.85% from FY 2017 till FY 2021. Similarly, the operating expenses were also assumed to grow by 8% in FY 2015 to 15% in FY 2021. Correspondingly, the free cash flow generated also witness a consistent growth increasing from Rs. 9,071.32 crore in FY 2015 to Rs. 71,455 crore in FY 2021.

WACC Analysis

Weighted Average Cost of Capital (WACC) is the firm's cost of capital where capital of each type is proportionately weighted. Cost of equity (K_e) has been calculated using the Capital Asset Pricing Model (CAPM). The risk free rate is based on the current yield of 10-year Indian Government bond. Beta of 1.398 was calculated using Covariance method. The market risk premium of 8.75% is taken. Applying CAPM to the components above resulted in a cost of equity of 22.18%. The after tax cost of debt of 6.40% is based on the interest rate paid by company on bonds issued by it.

1. Current Debt to Equity ratio = 0.007
2. Current market value of equity in the company = 189934 (current market capitalization)
3. Current book value of debt in the company = 1393 (from balance sheet)

Table 8**DEBT Contribution for ONGC Limited**

Before Tax Cost of Debt	8.54%
After Tax Cost Of Debt	6.41%
Weight of Debt	0.96%
Contribution	0.06%

The analysis found the contribution of debt in the capital structure of ONGC Limited to be at 0.06%.

Equity Contribution

Beta Calculation

Beta of POWERGRID stock has been calculated using the 5 year historical price of share and benchmark index Nifty50. Calculation of beta is simply the Covariance of historical prices of stock and index divided by historical prices of index.

$$Beta = \frac{COV(Stock, Index)}{(VAR(Index))}$$

Once we have beta estimate, cost of equity can be obtained as:

Table 9
Cost of Equity and Contribution of Equity

Weight of Equity	99.04%
Risk Free Rate (10 Yr Yield)	7.75%
Equity Risk Premium	8.75%
Beta	1.65
K_e	22.19%
Contribution	21.97%

While the cost of equity, K_e was found to be 22.19%, the contribution of equity in ONGC's capital structure was found to be 22.97%

Table 10
WACC

Debt Contribution	0.06%
Equity Contribution	21.97%
WACC	22.03%

Now, combining the debt and equity contribution, we arrive at WACC of 22.03%

Table 11
Terminal Value Calculation

FCFF (2023)	88543.31
WACC-g	0.15
TV (2023)	588718.8
TV (2015)	119643.8

As relayed in the above Table, Terminal Value of Rs. 588718.8 crore emerged for the year 2023 when the free cash flow for the year 2023 of Rs. 88543.31 crore was employed. Further, terminal value of Rs. 119643.8 crore was obtained for the year 2015.

Table 12
Total Enterprise Value (Rs., in Crore)

Total Enterprise Value	216824.2
Total Debt	1393
Total Equity Value	215431.2
Total Outstanding Shares	523.16
Equity Value	251.8046

The enterprise value of ONGC was found to be Rs. 216824.2 crore as listed above in the Table 12. The equity value for the shares of the same company, ONGC was found to be Rs. 251.81.

5. Conclusion

POWERGRID: On the basis of equity valuation using free cash to firm method a buy signal for Power Grid Corporation of India Limited with the target price of Rs.164.64 is recommended which is higher than 17% from current market price. POWERGRID's monopoly situation can't be challenged as of now in the transmission segment, having more

than 50% market share. POWERGRID has doubled its capital expenditure plan for 12th plan over 11th plan to drive future growth. The company has been consistently providing around 20% profit growth every year driven by its capital expenditure.

Overall power sector is expected to show growth because of following reasons: Increase in electricity demand, Government's new initiative focusing on infrastructure development and electricity to all. In transmission segment, over the next few years, the demand for transmission capacity is expected to increase significantly, driven primarily by increase in generation capacity and also due to requirements of open access, inter-regional transfers and integration of in firm renewable power in the system.

ONGC: On the basis of equity valuation using free cash to firm method a buy signal for Oil and Natural Gas Corporation Limited with the target price of INR 251.80 is recommended which is higher than 14.45% from current market price. In past due to large decline in international crude oil price led to increase in under recoveries, ONGC stock price has taken a toll as a result of less net realization because of increased subsidy burden.

The paper assumes that ONGC's subsidy burden to reduce substantially in the next fiscal after government's recent approval of subsidy sharing mechanism. Long term subsidy sharing mechanism holds the key for future earnings. In upstream segment companies, ONGC has many times more oil and gas production capacity than other companies.

For ONGC, over last year crude oil prices have come down sharply which led to increase in under recoveries for Indian oil companies and thereby increasing subsidy burden on ONGC resulting in less net realization. In future, one expects crude oil prices to settle and long term subsidy sharing mechanism would be approved by the government which will decrease subsidy burden for ONGC.

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