Financial Modeling Project

Enterprise Value Estimation and Discounted Cast Flow Forecast

Pacific Gas and Electric Corporation (PG&E)

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Executive Summary

Pacific Gas & Electricity Corporation (PG&E) operates throughout the value chain of energy industry from generation, transmission to distribution. All of these utility sectors are capital-intensive investment and regulated by federal and state-level authorities (FERC, CAISO, and California Public Utility Commissions). The key characteristic of utility sector is that electricity is a necessary goods, thus, the demand is inelastic and growing stably over recent years. The forecasted revenue for the next five years is projected to be increasing slightly compared with that during historical periods (2015 and 2016).

The fact that utility investment requires a huge amount of upfront capital. Therefore, it can be noticed that the capital expenditures (Capex) of PG&E as the percentage of revenues are fairly high, accounting for approximately 50% of total revenue. A constant new Capex will significantly affect the cash flow to the Company. Moreover, the estimated WACC of PG&E is fairly low due to the low cost of equity (3.96%), which is consistent with the industry average. This is because the beta is low at 0.21, compared with the Google Finance beta of 0.23), indicating that the company has low sensitivity to market risks. The beta used in the model is statistically significant at 1% significance level. Additionally, R square is 1.75%, which means that only 1.75% movements of PG&E stock price are explained by the movements of the market index. This also indicates that 98.25% fluctuations depend on the company's risks.

Terminal growth rate of 2% is chosen because the terminal growth rate is typically between the historical inflation rate of 2-3% and the historical GDP growth rate of 4-5%. Furthermore, utility industry is fairly mature one. PG&E seems to reach its electricity production capacity and the demand is expected to grow stably. Therefore, 2% growth rate is a reasonable pace for a mature company like PG&E.

My estimated enterprise value is around $103.49 billion with total equity value of $53.09 billion. Compared with the 2016 equity fair value of $30.8 billion, my estimation is fairly close to the actual market capital. The year-end stock price of 2016 was $60.77 while my estimation is $104.7. I hold to understand that my projected cash flow and enterprise value are slightly different, compared to the actual numbers. This could be due to the fact that utility industry are regulated industry with numerous restrictions on pricing and generation capacity bidden in the wholesale electricity market. Probably, it could also be the unreasonable estimation of the discount rate, WACC. Specifically, for the cost of debt, I had to account for all long-term debts with different maturities, different interest rates, and tax rates of each year. The public information I can access on PG &E's debt financing is very limited; therefore, it is very challenging to get down to an accurate estimation. Lastly, the tax rate of utility companies often changes dramatically every year; this might be they are subsidized by the Government or public utility. Hence, estimating an appropriate tax rate was another challenge in this corporate financial modeling project.

Overall, PG&E presents to be a mature company operating in a stable and regulated industry. Though the Company is currently exposed to different market and business risks, it has adopted strategies to diversify services to mitigate those risks. PG&E is also having many potential business opportunities to capitalize on its monopoly ownership of electricity transmission system and well-established expertise in energy generation technologies to secure a sound financial performance in the next few years.

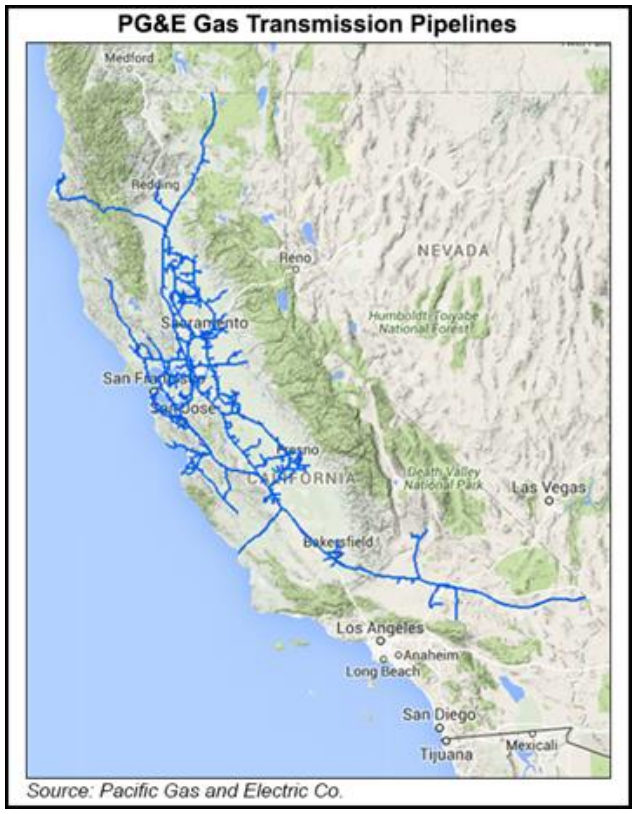
I. Company Introduction and SWOT analysis

1.1. Company introduction

Pacific Gas and Electricity (PG&E) was founded in 1905 and is headquartered in San Francisco, California. The Corporation is one of the well-established utility companies in the West Coast and has core competence in two main products: electricity and natural gas. PG&E operates in both midstream and downstream segments of the energy industry from generating electricity to transmitting electricity and natural gas to the wholesale market and distributing them to retailers and end-users in California.

In term of geographic location for electricity market, PG&E mainly operates in the Northern and Central California, but it has a well-connected and statewide natural gas pipeline transportation system throughout California territory.

Map of PG&E gas transmission pipelines



Map of electrical transmission system in California

Source: PG&E's website

In the transmission sector, PG&E has natural monopoly in transmitting electricity in Northern and Central California and dominant market power in transporting natural gas through California via its state-wide pipeline system. According to the company's annual report, its electricity distribution network consists of approximately 142,000 circuit miles of distribution lines, 59 transmission switching substations, and 606 distribution substations; and electricity transmission network comprises approximately 18,400 circuit miles of interconnected transmission lines and 92 electric transmission substations. Its natural gas system consists of approximately 42,800 miles of distribution pipelines, approximately 6,700 miles of backbone and local transmission pipelines, and various storage facilities.

In the electric generation sector, PG&E has a well-established presence in the hydro-power and nuclear power which accounts for more than 60% of its total capacity generation of the company. PG&E

is the only company owning two nuclear power plants that meets about 7% of electricity demand of California. The current generation mixture of PG&E is shown in the exhibit 1.

Regarding the revenue performance, PG&E achieved the total revenue of $16.8 billion and $17.6 billion USD in 2015 and 2016 respectively, in which electric utility segment respectively accounts for 81% and 78% of PG&E's total revenue of 2015 and 2016 (PG&E 10K report, dated Feb 17, 2017). This is because PG&E has a long history of actively involving in electricity market from producing to transporting and delivering electricity to various customers including residential, commercial and industrial ones while it just operates in transmitting and distributing natural gas to certain segments of customers.

1.2. SWOT analysis

STRENGTHS (Success Factors)	WEAKNESSES (Internal Problems)
*Well-recognized brand name as a giant utility company in California, over 100 year history in utility business with a wide customer base *Vertical integrated value chain through fuel supply to electric generation, transmission to distribution. *Advanced technological capacity, highly-skilled workforce, and experience management. *Monopoly in electric transmission sector and nuclear power generation. * Dominant market power in natural gas delivery services, hydropower and thermal generation.	*High debt and interest coverage ration due to high fixed costs of infrastructure and construction projects. *Strong reliance on hydro-power (46% of total generation capacity) has made PG&E fairly vulnerable to weather, particularly droughts and floods in California.
THREAT (External Risks)	**OPPORTUNITIES (Future Direction)**
PG&E is faced with business and market risks: *****Declining demand for electricity because of more energy efficiency, advanced technology innovation, better demand-side response programs *Interest risk on debts is unpredictable and inflation rate is floating during a long project cycle of a power plants from 25 to 40 years. *Commodity price risk: natural gas price is greatly affected by the price of its substitute commodities such as oil, propane… *Regulatory risk: electricity price is regulated by the rate-making system of CAISO and California Public Utility Commissions. *Stringent environment and climate change policies will increase marginal production costs or pollution taxes for power plants, particularly the fossil fuel plants.	* The remarkable growth in solar (PV), wind power and other customer-sited and distributed energy resources create more business opportunities for PG&E's electric transmission sector. This is because there will be more demand for getting connected with state and regional transmission lines. * PG&E can utilize the current transmission infrastructure to offer cross-industry delivery. PG&E has partnered with high-speed internet service providers and cable TV providers on network linkage sharing. *PG&E can invest in developing clean and renewable energy and more energy efficiency equipment and appliances to earn more tax credits from state government and promote a "green power producer" image in the public.

II. Industry Competition Analysis

The industry competition is analyzed by applying the Porter Five Force model for two main business segments of PG&E which are electricity generation and gas and electricity transmission.

2.1 Electric power generation – *a perfectly competitive market for non-fossil fuel energy but an oligopoly market for nuclear and thermal power sector*

Electric Power Generation		
Threat of New Entrants	* HIGH for nuclear and thermal power	*Each energy technology has different levelized cost of energy and is subject to government regulation differently; thus, the threat of new entrants varies. *For nuclear power and gas-fired power sectors, they require a huge amount of up-front capital investment, advanced technology, stable supply of fuel as manufacturing inputs and skilled engineering workforce. These sub-sectors are also strictly controlled by regulators.
	* LOW for other energy resources	*The renewable energy resources (wind, solar, biomass, geothermal and hydro-power) are less-capital intensive and require simple technology. These sub-sectors have no regulatory hurdles and receive favorable investment incentives (tax credits) from the local government; therefore, the entry barrier is low.
Competition	*HIGH for renewable energy *LOW for fossil fuel energy	*There is no competition in nuclear power sector as PG&E is the only firm owning two nuclear plants in California. The gas-fired generation is also very competitive as there are a small number of firms operating in gas-fired generation. * The energy market for hydro-electricity, biomass, geothermal, solar, and wind power are perfect competition one that has attracted a great number (more than 500 firms) of small generators and independent power producers (IPPs) participating in this market.
Bargaining Power of Buyers	LOW	*Electricity is a necessity and non-storable commodity and a crucial input for economic activities and human life. Therefore, the demand for electricity is inelastic; the end-users in residential, commercial and industrial sector have no bargaining power in purchasing electricity. *Generators sell electricity to the California Independent System Operator (CAISO) for the wholesale market price, then CAISO will decide the retailing price to be distributed to the end-users.
Bargaining Power of Suppliers	MEDIUM	*The power of suppliers for different energy technologies varies greatly. For market for electrical machines such as turbines, boilers and generators are freely competitive; thus, there are no bargaining power for those equipment suppliers. *For production inputs, hydro, wind and solar power use natural resources (water, wind and sun-shire) to generate electricity; thus, it significantly depends on the weather. * Fuel suppliers for fossil-fuel power plants of PG&E such as natural gas, oil and propane deliverers has a medium level of bargaining power as those commodities are substitution products.
Threat of Substitutes	VERY LOW	Electricity is a unique product; there is no other substitute product. It is a necessity goods and cannot be stored. Particularly, there is always a high demand for electricity in California as it is one of the most populated and urban states in the U.S.

2.2. Electric and Gas Transmission – *Monopoly market*

Electric and Gas Transmission System		
Threat of New Entrants	LOW	*There is no competition in the electricity transmission sector as the state government allows only a single firm owning transmission assets and operate in this segment. PG&E, thus, has natural monopoly in transmitting electricity to small distributors, marketers, retailers and end-users in the Northern and Central California. *The natural gas pipeline system is an oligopoly market; there are few firms participating this market. The entrance barrier is also very high as it is very capital-intensive and understand strict monitor and supervision of state regulators.
Competition	VERY LOW	Because of government regulation, the huge initial capital investment, advanced technology and technical manpower, the competition in sector is very low or not at all.
Bargaining Power of Suppliers	LOW	There is almost no bargaining power from suppliers
Bargaining Power of Buyers	LOW/ MEDIUM	There is almost no bargaining power from electricity buyers. The gas buyers can switch to other fuels such as oil, propane, biomass when the natural gas price is volatile.
Threat of Substitutes	LOW/ MEDIUM	There is no substitute threat for electricity. Natural gas product can be substituted by other fuels such as oil, propane, diesel and so forth

Basing on the above Porter's analysis, there is virtually no or little competition in the utility transmission industry and conventional energy generation such as gas-fired generation and nuclear power. Meanwhile PG&E is expected to have fierce competition with other independent power producers and other investor-owned utility companies in renewable energy sector.

III. PG&E's Business Strategies and Sustainability of Future Performance

3.1. Current business strategies driving future business performance

*Lessen the reliance on hydro-power sector by investing in or acquiring more renewable energy projects and non-fossil fuel assets.

*Mitigate fuel price volatility and adverse seasonal weather changes by developing dual-fuel power plants

*Build smart grid and advanced transmission system by buying new management software from IT companies such as Cisco System, General Electric and improving infrastructure quality.

*Establish partnership with other network service providers (internet service companies, media, and cable TV companies) to provide cross-industry delivery services and expand customer base.

*Purchase clean technology to comply with environmental regulations.

* Offer competitive benefit packages to retain the current 24,000 employees and recruit new qualified staff members.

3.2. Financial performance and sustainability of the current performance

3.2.1 *PG&E's current financial performance:*

Compared with the industry average, PG&E's performance has been strong. Regarding profitability, PG&E has higher gross margin, operating margin and EBITDA margin than the industry average (Exhibit 2b). Thus, PG&E retains more on each dollar of sales to pay for its costs and debts.

PG&E's leverage ratio is fairly similar to the industry average at around 2.83 (Exhibit 2c). The Company's quick ratio is significantly higher than the industry average at 1.9 difference, indicating its strong ability to meet its short-term obligations with its most liquid assets. However, its interest coverage ratio falls short behind the industry average at 2.67 compared to that of the industry benchmark of 4.8. The interest coverage ratio reflects the Company's ability to pay its current interest payment with its earnings, which negatively affects the Company's solvency and concerns shareholders most.

3.2.2. *The likelihood of performance sustainability:*

PG&E's performance is fairly sustainable in a sense that the Company earns a stable income with the natural gas and electricity transmission segment thanks to its natural monopoly and dominant market power. The company has also tried to diversify different energy types to increase the generation share of renewable and clean energy to mitigate business risks (decreasing electricity demand), market risk (interest rate, fuel price volatility, weather…) and regulatory risks. PG&E has strategically invested in building a modern and smart grid transmission, developed new energy efficiency technologies and partnered with other network service companies to provide cross-industry delivery and complementary services. All these strategies would help PG&E stay ahead in the competition and maintain a sound financial performance in the coming years.

IV. Conclusion

From the company and industry analysis, it can be referred that the electric generation, distribution and retailing segments are attractive markets to enter. In the next few years, PG&E is expected to encounter a more fierce competition with new generators and private electricity producers entering the California's wholesale electric power market. The company's financial performance might be subject to regulatory uncertainties in rate-making (decoupling), market and business risks in the electric generation sector. However, they are not threats to only PG&E; these are common threats or systematic risks for all utility companies operating in the electricity generation business, thereby affecting the performance and outlook of the whole industry.

Given that the company will still maintain its monopoly market power over the transmission sector, PG&E can leverage this ownership of the transportation system to establish the partnership with other cable, broadband service providers to expand customer basis and offer new network, data and delivery services. The company also have a great potential to tap into new business opportunities from the rising trend of renewable energy and customer-sited generation across California. Together with the well-established technical know-how and human resources, these risk mitigation and business strategies are the basis for me to make sound assumptions on future growth rate of PG&E in producing a realistic and robust financial projection for the company over the five year period (2017-2021).

List of Exhibits:

Exhibit 1. Generation Structure of PG&E until April 24th, 2017

Pacific Gas and Electric Corp (PG&E)		Capacity (MW)	Percentage
1	Hydro	4030.39	45.44%
2	Nuclear	2300	25.93%
3	Thermal	1282.08	14.45%
4	Wind	96.9	1.09%
5	Solar	152.5	1.72%
6	Biomass	206.7	2.33%
7	Cogeneration	794.32	8.95%
8	Others	7.65	0.09%
	Total	**8870.54**	**100.00%**

Source: From California ISO Wholesale Electricity Market Data-www.caiso.org

Exhibit 2. Recent Financial Performance of PG&E

Exhibit 2.a. Growth Rate

GROWTH RATE							
Year	2012	2013	2014	2015	2016	PG&E Average	Industry Average
Revenue Growth	0.56%	3.71%	9.57%	-1.50%	4.95%	3.46%	3.84%

Exhibit 2.b. Profitability

PROFITABILITY							
	2012	2013	2014	2015	2016	PG&E Average	Industry Average
Gross Margin	66.60%	61.64%	61.65%	65.77%	69.55%	65.02%	52.70%

Operating Margin	16.90%	18.33%	23.29%	13.62%	17.72%	17.97%	16.21%
EBITDA Margin	26.88%	24.93%	29.03%	25.22%	28.56%	26.92%	26.60%
Net Margin	5.52%	5.31%	8.48%	5.28%	7.96%	6.51%	7.74%
ROA	1.58%	1.49%	2.41%	1.40%	2.05%	1.79%	2.67%
ROE	6.35%	5.77%	9.21%	5.36%	7.84%	6.91%	10.2%

Exhibit 2.c.

FINANCIAL STRENGTH							
	2012	2013	2014	2015	2016	PG&E Average	Industry Average
Quick Ratio	0.43	0.41	0.42	0.35	0.36	0.39	0.20
Current Ratio	0.82	0.90	1.08	0.91	0.81	0.89	0.99
Leverage Ratio	3.01	2.88	2.82	2.82	2.82	2.87	2.83
Interest Coverage Ratio	2.52	2.53	3.45	2.11	2.76	2.67	4.8

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