Valuation of a Hydro-Electricity Power Project: An Emerging Market Investment Proposal

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Abstract

We present a real options technique to evaluate a project financing scheme in an emerging market setting. Our model shows clearly how to estimate risks, forecast cash flows, and account for contingencies in emerging market valuations. In the model, manager-entrepreneurs who are the equity holders of the enterprise initiate a non-recourse financing investment. We find that whenever the project is wholly equity financed, equity holders have a higher probability to default during construction the smaller the investment installment cost. Under leveraged financing, the value of the option of equity holders to default decreases. In particular, the option value goes down substantially as debt holders demand a higher return. Thus, the ability to share project risk with the creditors gives the shareholders extra premium to participate in the project. Additionally, increasing leverage means an increasing proportion of risk will be borne by the creditors, causing the value of the option of equity holders to default to drop. However, further increases in leverage in excess of 70% for rates of return on debt of up to 25% increase the value of default option since shareholders find their diminishing stake of project value is not sufficient to compensate them for the risks being borne.
1. Introduction

What are the twin forces considered to be among the most pressing issues in the world today? According to the recent multinational surveys, growing energy needs and climate change are both on the list of top global threats.\(^1\) Spurred by historically high oil prices, dwindling oil reserves, and recognition of the adverse effect of climate change, several governments and regional bodies around the world are currently engaged in energy policy debates and efforts to address these problems. In 2005 the European Union adopted a cap-and-trade approach to controlling carbon dioxide emissions and now 11,000 power plants and industrial facilities across Europe are covered under the European policy.\(^2\) Now in the U.S., some of the biggest industrial companies, including General Electric, British Petroleum, Alcoa, DuPont, Duke Energy and Caterpillar, have joined with environmental groups and asked the U.S. Congress for legislation to limit greenhouse gas emissions.\(^3\)

As is now widely understood, energy demand and supply balances will remain a major factor influencing global economic growth and social stability in the coming decades. For almost every nation, the demand for electricity – for commercial, industrial and consumer usage – is far outstripping the available supply. The U.S. Department of

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Energy estimates that global energy consumption will rise from 14,781 billion kilowatt-hours ($KWH$) in 2003 to 21,699 billion $KWH$ in 2015 and to 30,116 billion $KWH$ by 2030.\footnote{Energy Information Administration, “World Energy Outlook (DOE/EIA-0484),” June 2006.} The most rapid growth for electricity demand is projected for developing nations who will account for more than half of the increase in worldwide power generation capacity over the next 25 years. For the U.S., total electricity consumer demand is expected to grow by 19 percent over the next 10 years.\footnote{Rebecca Smith, Wall Street Journal, December 21, 2006.}

A sustainable economic management strategy therefore would require a three-pronged approach: meeting energy demands, curbing carbon dioxide emissions (mainly blamed for global-warming), and maintaining economic growth. Such a solution would lie in securing and developing adequate sources of renewable energy which is lauded for being carbon-neutral. Renewable energy resources include wind turbines, solar panels, hydrogen power, ethanol plants, geothermal, biomass and hydro power, and their successful developments would depend on the availability of four key factors: (1) natural resources (2) technology (3) investment capital, and (4) the market.

This study is motivated by the current shift of climate-change debate from science to economics, which has direct implications for global investments and valuations in emerging markets. To support participation of investors and corporations in pollution-credit trading, valuation should be transparent and thorough. It is true that many developing nations are opening up their economies but internal constraints remain and valuation still poses a challenge. For developing and emerging economies with natural resource endowments, access to capital and technology remains the biggest obstacles to power generation. In the last decades the predominant source of foreign investments in
these markets has been through project finance, asset-based financing mainly channeled by multilateral financial institutions, notably the World Bank, the European Bank for Reconstruction and Development, and the regional Development Banks. However, most governments are now turning to private capital as multilateral funding becomes scarce and restrictive, and investment opportunities vastly expand. This trend is also being propelled by two other factors: the increasing globalization of capital markets and the growth of privatization programs in emerging economies. The entry of a new set of international investors namely, private equity and hedge funds, with interests in these markets, further raises the issue of how best project finance should be evaluated. In particular, the employment of equity capital in such developing and less liquid capital markets is challenging the usefulness of traditional valuation techniques.

The aim of this paper is to provide a more consistent and complete valuation model that captures the risk-return and contingency measurements for a project under conditions of risk and uncertainty. To demonstrate the model’s tractability we value a hydropower project for which Uganda, an emerging market, is seeking financing. Our analysis puts heavy emphasis on the application of market data despite the often known constraints in these markets. In attempting to recognize the actions of all market participants that have a bearing on valuation, we answer several questions: What are the relevant cash flows for this project and how are they determined? How would we estimate the project risk and the required rate of return? Should risk adjustments be made to the cash flows or to the required rate of return? What are the strategic interests and implications of possible actions of the key players: government, private investors, and the local community on valuation? Are financing and investment decisions independent?
And finally, what is the overall value of this hydro project denominated in a global currency such as the U.S. dollar?

Generally, project financing is considered to be the funding of a specific economic unit where the cash flows of the project are earmarked as the source of investments from which investors will be repaid, and where the assets of the project serve as collateral. Assets and cash flows associated with the project are accounted for separately from those of the sponsoring investors or company. Whenever funding for the project is negotiated from external sources investors have recourse only to the cash flows and assets of the project. We maintain that investment and financing decisions are thus related. This is in contrast to the pure Modigliani-Miller world where corporate financing and investment decisions are independent and management can roll over capital generated by the new enterprise into yet newer ventures within the company at a later date without submitting them to the discipline of the capital markets.

The most important aspect of our study is that we are able to determine the value of the project predominantly using market data. This is a significant contribution to the understanding of valuation in developing and emerging markets, which should be of interest to the global investing public, policy makers, and academics. In the process, we also document several results. We find that financing the hydro power project entirely with equity capital is not optimal. Debt has a powerful effect in mitigating the underinvestment problem. However, the positive role of debt has limits and is inversely related to the yield on debt. One possible solution is to partially structure an equity-debt swap instead of straight debt. We also establish that equity holders, who are assumed to
manage the project, have a higher propensity to abandon the project during construction the smaller the required capital expenditures.

The rest of the paper is organized as follows. Section 2 describes the literature related to this study. Section 3 presents our model and highlights the techniques in cash flow forecasting and risk estimation. The data collection and analysis are outlined in Section 4. Section 5 examines the valuation of the project and presents results of our model analysis, and Section 6 concludes.

2. The Related Literature

This paper takes the direction of a large body of real options literature that recognizes the inadequacy of the traditional discounted cash flow (DCF) methods of capital budgeting because DCF inherently compounds the underinvestment problems. We agree with the major criticism of these traditional techniques – that they cannot properly capture management’s flexibility to adapt and revise later decisions in response to unexpected market developments. However, while we provide better parameter estimations, we still maintain that DCF has a role to play (along the lines of Copeland and Antikarov (2001)) especially in determining non-flexibility valuation that should precede any good real options valuation analysis.

Trigeorgis (2000) provides an excellent survey of studies illustrating the valuation of managerial flexibility in the case of various real and financial options in the context of the Options Pricing Theory. A number of authors, including McDonald and Siegel (1986), Paddock, Siegel and Smith (1988), Trigeorgis (1993), and Kemna (1993), have examined the valuation of the option to wait or defer a project.
Many capital projects usually require many years to develop and complete. Investment decisions and cash outlays occur sequentially. The investment program is thus a contingent claim and becomes productive only after the entire sequence is completed. Carr (1988), Trigeorgis (1993), and Grenadier (1995) discuss valuing sequential investments. At every stage, management can choose whether to invest and expand or minimize funding and contract the project. More specifically, Trigeorgis and Mason (1987), and Pindyck (1988) examine the option to alter operating scale or capacity choice. An opportunity to expand is a valuable option. If market conditions turn out to be more favorable than anticipated, the project can step up resource utilization at different times during its life by incurring follow-on investment outlays. The option to expand is thus analogous to a call option to acquire an additional proportion of the base-scale project. However, if market conditions deteriorate management will let the option expire unexercised. On the other hand, the option to contract or scale back can be viewed as a put option on the part of the project with a strike price equal to the potential cost savings. If the market is much less favorable than initially expected, management may exercise the option to contract production and forego planned future expenditures.

Management therefore has the flexibility to either invest and continue with the project or not. Such a sequential nature of outlays, for instance, creates a valuable option to "default" at any instant if, say, the output price drops substantially. The lower the uncertainty, the smaller is the value of this option, since each stage of investment is expected to yield information that reduces the uncertainty over the value of the completed project. Myers and Majd (1990), and Bjerksund and Ekern (1990) analyze the option to

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6 Majd and Pindyck (1987) and Trigeorgis (1993) value this time-to-build option, showing that the project is a compound option where each investment buys an option to make the next expenditure.
abandon the project for salvage value. They argue that should market conditions deteriorate so severely, management might permanently bail out of the project and resell existing assets for value in the secondhand market. Abandonment of a project can be caused by precipitous fall in consumer demand, creeping resource prices, or unexpectedly unfavorable political and environmental conditions, if there is no obligation to continue despite unprofitable results. Even during construction, if it turns out that current required outlays exceed the value of continuing the project, the project can be abandoned so as to save on subsequent investment outlays. The option to abandon is valued as an American put option on current project value, with an exercise price equal to the resale value of those assets, or the value of assets shifted to a more valuable use. As an analogy with securities put options, this operating flexibility provides insurance against failure.

In practice, it may be advisable for a business to temporarily shut down if operating revenues are not adequate to cover variable costs, until output prices rise sufficiently. This flexibility to operate or shut down is examined by McDonald and Siegel (1985), Brennan and Swartz (1985), and Dixit (1989, 1992). In any given period the value to temporarily shut down and restart operations can be seen as a call option to acquire that period’s cash revenue by paying the variable costs as the exercise price.

Entrepreneurs are sometimes faced with a difficult choice, whether to pursue risky projects that offer a below-target rate of return but could create valuable strategic opportunities later, or to stick with less risky and more immediately profitable ventures. Investments like R&D, mergers and acquisitions, power generation, roads and railways, lease on undeveloped land may have negative net present value (NPV) on the basis of

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7 Related studies of the abandonment flexibility include Myers and Majd (1990), Bjerksund and Ekem (1990), and Brealey and Myers (1991).
8 See McDonald and Siegel (1985) and Trigeorgis and Mason (1987).
their directly measurable cash flows but would still be justifiable because of their potential to open up subsequent new investment opportunities in future. Myers (1977), Kester (1984, 1993), Trigeorgis and Mason (1987), Kolbe, Morris, and Teisberg (1991), Willner (1993), Ottoo (1998), and Amran and Kulatilaka (1999), analyze investment opportunities as growth options. The growth opportunity is valued as a call option on real assets.\(^9\) The cost of the investment represents the option's exercise price. The value of the option is the present value of expected cash flows plus the value of any new growth opportunities expected. The time to maturity is the time it takes before the opportunity dissipates.

Just like operating options, a variety of financial instruments also have options embedded in them. To capture a project's growth opportunities, the project must be financed and executed. Project financing may come through equity, debt or hybrid instruments. Both equity and debt can be structured in various forms. Equity of the project can be viewed as a call option on its total assets. The position of the stockholders is equivalent to a European call option on the present value of the project cash flows plus a claim to all future dividends. At maturity of debt shareholders have the option to purchase the assets of the project from the bondholders at the face value of debt.

Additionally, throughout the project's life shareholders may receive dividends. The face value of all outstanding debt will be identical to the exercise price of the call. At any stage, if the value of the project falls below the amount of debt, shareholders will exercise their right to default on debt obligations, handing over the project to the creditors. They can only regain ownership of the project by paying off the debt. In a way,\

the shareholders have essentially purchased a call option on the value of the project, and the lenders have written this option.

A loan guarantee, on the other hand, can be viewed as an American put option written on the value of the firm. A loan guarantee is like insurance.\textsuperscript{10} It will pay any shortfall in the value of the firm necessary to fully repay the debt. At maturity date, if firm value is greater than the debt's promised principal, the guarantor will pay nothing since the firm is sufficiently valuable to retire the debt. However, if the value of the firm is less than the promised principal, the guarantor must pay the difference in order that the debt is fully repaid. A loan guarantee may take several forms, such as tax exemption, output price guarantee, provision of undeveloped land for project site, or securing utilization of established marketing network of a parent company.

3. The Model

Our project is a hydro power investment proposal for Uganda where the government has announced a competitive bid for the successful investor to secure lease for a dam site to construct a power generation scheme and subsequently undertake the management of the electric utility business. We consider the following time lines. At date 0, denoted $t_0$, the investor wins the bid, the right – but not the obligation – to undertake the investment, and signs a lease. A year later, at $t_1$, the investor receives approval of the environmental impact assessment report and pays relocation costs to local households who are to be displaced by the project. Once all the necessary financing is assembled, construction must begin any time but not later than $t_3$ at which the lease would be cancelled. Construction is expected to be completed within 2 years, at $t_5$, when the

\textsuperscript{10} See Mason and Merton (1985).
project begins operating. At year ten ($t_{10}$) the investor decides to exit the investment in an initial public offering (IPO).

There are essentially three distinct phases of the project that span over ten periods (years). Phase one is the environ-social impact assessment stage, lasting three years. Construction follows as the second phase running for a period of two years. The final phase is the operating stage, which runs from the fifth year to termination of the project. From the beginning, choice is made for the possibility of plant capacity to produce at a stepped up rate whenever it turns out that the market demand for electricity is much higher than originally anticipated, thereby providing the option to expand at any appropriate time over the life of the project.

**Figure 1: Project Timeline**

During the construction phase, the project generates no cash flow. However, all investment outlays at construction are assumed covered by the financing package assembled. The production schedule of the plant is known and the electricity produced is
sold at a spot price, which fluctuates over time. The value of the project, $V$, is proportional to and is derived from the cash flows generated and its movement through time is described by a diffusion-type process:

$$dV = (\alpha V - K)dt + \sigma V dz$$

where: $\alpha \equiv$ the drift rate, the instantaneous expected rate of return to the project per unit time;

$\sigma^2 \equiv$ the variance of the return on the project per unit time;

$dz \equiv$ a standard Gauss-Wiener process;

$K \equiv$ the total net payments consisting of all the contractual outlays.

The market value of the project is assumed to fluctuate stochastically over time, reflecting new information about future cash flows. $V$ is considered to be the value of the project without flexibility, at $t_0$, and is computed as the sum of the discounted value of the cash flows over the forecast period.

If there is debt financing, all loan principal payments would be due at time $t_{10}$ when the productive life of the project is also assumed to end. Whenever cash flows are sufficient and project value is in excess of contractually due payments, equity holders may declare a dividend. If the value of the project falls below the amount of total debt, equity holders will choose to default on the payments. Limited liability allows stockholders to abandon the project, handing it over to the creditors.

### 3.1 The Binomial Framework

We follow the binomial tree method suggested by Cox, Ross and Rubinstein (1979) in representing the movements in the project value. This is undertaken within the principle
of risk-neutral valuation, which shows the value of a derivative security is independent of
the risk preferences of investors. We assume that the process followed by \( V \) in a risk-
neutral world is a simple two-state fashion, where the life of the option is divided into
equal time steps of length \( h = t_{i+1} - t_i \). If the project lasts until time \( T \), then the project
value must move a total of \( n \) steps, such that \( nh = T \). We assume a yearly interval, giving
\( h = 1 \). In time \( h \), \( V \) moves up (good state) a proportional amount \( u \) with risk-neutral
probability \( \theta \), or down (bad state) by a proportional amount \( d \) with risk-neutral
probability \( (1-\theta) \), where
\[
\begin{align*}
    u &= e^{\sigma \sqrt{h}} - 1 \text{ is the upward change,} \\
    d &= e^{-\sigma \sqrt{h}} - 1 \text{ is the downward change,} \\
    \theta &= \frac{(1 + r_f) - d}{u - d} \text{ represents the risk-neutral probability, and} \\
    r_f &= \text{the risk-free rate of interest.}
\end{align*}
\]

We determine the volatility of the project, \( \sigma \), from the following relationship:
\[
\sigma^2 = \sigma_x^2 + \sigma_w^2 + 2\sigma_x\sigma_w\rho_{xw}
\]
where:
\[
\begin{align*}
    \sigma_x^2 &= \text{the variance of the returns in operating cash flows;} \\
    \sigma_w^2 &= \text{the variance of the rate of change in rainfall;} \\
    \rho_{xw} &= \text{correlation coefficient between operating cash flow and rainfall.}
\end{align*}
\]

We don’t require that our project be traded in the financial market but we believe that \( V \)
would be the exact price of the project if it was offered in an IPO today, yielding an
expected rate of return of \( \alpha \). Our method of estimating flexibility-free cash flows and risk
adjusted returns are consistent with the usual approaches in equity valuations. The
dynamics of the project value, implied in \( u \) and \( d \), represent project volatility of \( \sigma \). We denote the value of \( V \) at node \((i, j)\) by \( V_{i,j} \), where \( i=0, 1, 2, 3, 4; \) \( j=0, 1, 2, 3, 4 \), and \( i \) indicates the number of periods, \( j \) represents the number of up movements covered for the corresponding \( i \). Note that at each node, the sum of the up and down movements must equal the number of periods. Whenever \( i=j \), it is an all-good state, all periods. And if \( j=0 \), it is an all-bad state, all periods, implying that the states should not outgrow the periods.

The gross value of the project can thus be derived as:

\[
V_{i,j} = u^j d^{i-j} V_{0,0}
\]

For example, at nodes \( M \) and \( N \), \( V_{1,1} = uV_{0,0} \) and \( V_{1,0} = dV_{0,0} \), respectively.

\[\text{M}(V_{1,1} = uV_{0,0})\]

\[\text{N}(V_{1,0} = dV_{0,0})\]

3.2 Cash Flow Forecasts

To estimate the value of the project without flexibility \((V_{0,0})\), we operate a discounted cash flow analysis of the forecasted free cash flows. There are five distinct electricity revenue sources for the project: residential customers, commercial units, industrial units, public security facilities, and exports. Four neighboring countries, Tanzania, Kenya, Rwanda and Burundi are expected to be the export destinations for the project’s power supply.
3.2.1 Forecasting Residential Energy Consumption:

We forecast residential energy consumption \( (E_R) \) as follows:

\[
E_R = \sum_{k=1}^{2} \sum_{j=1}^{m} \sum_{i=1}^{n} H_{ijk} C_{ijk}
\]

where:

\( H = \) the number of residential electricity accounts, indexed by housing type \( i \), where \( i = 1, 2, \ldots, n \) represents apartments, duplex, or simple housing types;

\( C = \) the energy consumption rate per residential account, measured per energy appliance, which counts from \( j = 1 \) to \( j = m \);

\( k = \) is an index for the two area-locations, where \( k = 1 \) represents urban and \( k = 2 \) represents rural.

The growth in residential accounts is strongly influenced by the country’s population growth rate, as well as the employment levels and the growth in Gross Development Product (GDP). We can therefore determine a forecast of \( H \) by running the following time series regression model:

\[
H = \alpha_i + \beta_{1i} * POP_i + \beta_{2i} * GDP_i + \beta_{3i} * EMP_i + \epsilon_i
\]

where:

\( POP = \) is the population growth rate;

\( GDP = \) growth in the country’s Gross Domestic Product;

\( EMP = \) growth in employment; and

\( \alpha, \beta_1, \beta_2 \) and \( \beta_3 \) are the regression coefficients from a time series regression of growth in residential accounts on population, GDP,
and employment growth rates.

### 3.2.1 Forecasting Commercial Energy Consumption:

We forecast commercial energy consumption ($E_C$) as follows:

$$E_C = \sum_{j=1}^{m} \sum_{i=1}^{n} B_{ij} S_{ij} U_{ij}$$

where:

- $B$ = the number of commercial (business) spaces, indexed by $i$, where $i = 1, 2, .., n$, represents offices, shops, restaurants, hotels, schools, institutes, universities, churches/synagogues/mosques, amusement parks, markets, warehouses, farms, and hospitals);
- $S$ = share of the commercial space with a particular energy end-use $j$, $j = 1$ to $j = m$;
- $U$ = the electric intensity use per given end-use.

### 3.2.1 Forecasting Industrial Energy Consumption:

We forecast industrial energy consumption ($E_I$) as follows:

$$E_I = \sum_{k=1}^{m} \sum_{j=1}^{m} \sum_{i=1}^{n} N_{ij} S_{ijk} U_{ijk}$$

where:

- $N$ = the number of industrial facilities, indexed by $i$, where $i = 1, 2, .., n$ as categorized by the standard industrial classification (SIC) code;
- $S$ = share of an industrial facility space with a particular energy end-use $j$, $j = 1$ to $j = m$;
\[ U = \text{electric intensity use per given end-use indexed by } k = 1, 2, \ldots, m. \]

And,

\[ U = \alpha_i + \beta_{1i} \cdot GDP_i + \beta_{2i} \cdot PIG_i \]

where:

\[ GDP = \text{the country’s Gross Domestic Product}; \]

\[ PIG = \text{the industry-specific power intensity growth ratio, measured by electric intensity divided by per capital GIP growth rate, where GIP denotes real gross industrial output; and} \]

\[ \alpha, \beta_1 \text{ and } \beta_2 \text{ are the regression coefficients from a time series regression of industry electricity sales on GDP.} \]

6. Conclusion

There has recently been a big surge in interests in global investing, either due to requirements to meet planned portfolio objectives or in response to growing investment opportunities in countries whose economies had been closed for several decades and are now opening up. One such opportunity in emerging markets is energy production, which is directly linked to the current concerns over global climate change that is motivating investments in alternatives to fossil-based energy sources. Our study provides markedly improved valuation methods to be used in pricing deals in developing and emerging markets, especially for investments with embedded contingency claims. We apply a real options technique to evaluate a hydro-electric power project in Uganda. Our model shows clearly how to estimate risks, forecast cash flows, and account for the contingencies in emerging market valuations.
We focus on project financing, a form of structured non-balance sheet finance in which the investors to the project have recourse only to the cash flows of the project. We document several results. First, in project finance, equity-only capital structure is not optimal. Whenever the project is wholly equity financed, equity holders have a higher probability to default during construction the smaller the investment installment cost. Under leveraged financing, the value of the option of equity holders to default decreases. In particular, the option value goes down substantially as debt holders demand a higher return. Thus, the ability to share project risk with the creditors gives the shareholders extra premium to participate in the project. Additionally, increasing leverage means an increasing proportion of risk will be borne by the creditors, causing the value of the option of equity holders to default to drop. However, further increases in leverage in excess of 70% for debt returns of up to 25% increases the value of default option since shareholders find their diminishing stake of project value is not sufficient to compensate them for the risks being borne.

Second, the option to defer investments becomes more valuable as project risk increases. This would imply that merely adopting a project on the basis of its positive NPV while disregarding the increase in volatility could lead to a substantial loss of value. However, these gains may be eroded by a rising level of riskless rates which lower the value of this option since the postponed investment outlays, the exercise price, grows with an increase in the risk-free interest rates.

Third, the option to expand the project is found to possess significant value, especially if the additional investment outlays required to support this expansion is low. Furthermore, the option to expand is more valuable later than earlier in the life of the
project. Unlike debt, equity gets more valuable the higher the risk of the project.

Essentially, value additivity of the balance sheet items conforms to the put-call parity condition.
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### Table 1: Compounded Annual Growth Rates of Electricity Consumption in Uganda (from 1995 to 2003, Umeme Corporation)

<table>
<thead>
<tr>
<th>A. Number of Consumers</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Residential</td>
<td>10.23</td>
</tr>
<tr>
<td>Commercial</td>
<td>15.34</td>
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<tr>
<td>Industrial</td>
<td>43.20</td>
</tr>
<tr>
<td>Street and Public Lighting</td>
<td>7.40</td>
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<tr>
<td>Export (Kenya, Rwanda, Tanzania)</td>
<td>–</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. KWH Units Sold (Millions)</th>
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</thead>
<tbody>
<tr>
<td>Residential</td>
<td>5.86</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.03</td>
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<tr>
<td>Industrial</td>
<td>19.68</td>
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<tr>
<td>Street and Public Lighting</td>
<td>9.05</td>
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<tr>
<td>Export (Kenya, Rwanda, Tanzania)</td>
<td>1.40</td>
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</table>

<table>
<thead>
<tr>
<th>C. Revenues (UGS, Millions)</th>
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<tbody>
<tr>
<td>Residential</td>
<td>53.51</td>
</tr>
<tr>
<td>Commercial</td>
<td>9.09</td>
</tr>
<tr>
<td>Industrial</td>
<td>31.25</td>
</tr>
<tr>
<td>Street and Public Lighting</td>
<td>10.11</td>
</tr>
<tr>
<td>Export (Kenya, Rwanda, Tanzania)</td>
<td>34.76</td>
</tr>
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Table 2: Free Cash Flow Forecasts, 2008 – 2017 (in millions)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Total Sales</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,683,145</td>
<td>2,103,931</td>
<td>2,629,914</td>
<td>3,287,393</td>
<td>4,109,241</td>
<td>4,725,627</td>
<td>5,434,471</td>
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<tr>
<td><strong>less:</strong> Sales tax</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>138,859</td>
<td>173,574</td>
<td>216,968</td>
<td>271,210</td>
<td>339,012</td>
<td>389,864</td>
<td>448,344</td>
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<tr>
<td><strong>equals:</strong> Net revenues</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,544,286</td>
<td>1,930,357</td>
<td>2,412,946</td>
<td>3,016,183</td>
<td>3,770,229</td>
<td>4,335,763</td>
<td>4,986,127</td>
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<tr>
<td><strong>less:</strong> Cost of sales</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>757,415</td>
<td>946,769</td>
<td>1,183,461</td>
<td>1,849,158</td>
<td>1,849,158</td>
<td>1,653,970</td>
<td>1,902,065</td>
</tr>
<tr>
<td><strong>less:</strong> SG&amp;A expenses</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>67,326</td>
<td>84,157</td>
<td>105,197</td>
<td>164,370</td>
<td>189,025</td>
<td>217,379</td>
<td>217,379</td>
</tr>
<tr>
<td><strong>equals:</strong> EBIT</td>
<td>(53,867)</td>
<td>(53,867)</td>
<td>(53,867)</td>
<td>665,678</td>
<td>845,564</td>
<td>1,070,421</td>
<td>1,351,493</td>
<td>1,702,834</td>
<td>2,438,901</td>
<td>2,812,817</td>
</tr>
<tr>
<td><strong>less:</strong> Taxes</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>199,703</td>
<td>263,669</td>
<td>321,125</td>
<td>405,448</td>
<td>510,850</td>
<td>731,670</td>
<td>843,845</td>
</tr>
<tr>
<td><strong>equals:</strong> EAT</td>
<td>(53,867)</td>
<td>(53,867)</td>
<td>(53,867)</td>
<td>465,974</td>
<td>591,895</td>
<td>749,295</td>
<td>946,045</td>
<td>1,191,983</td>
<td>1,707,231</td>
<td>1,968,972</td>
</tr>
<tr>
<td><strong>less:</strong> Capital expenditures</td>
<td>300,000</td>
<td>100,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
<td>9,000</td>
</tr>
<tr>
<td><strong>less:</strong> Additions to WC</td>
<td>15,000</td>
<td>15,000</td>
<td>15,000</td>
<td>16,831</td>
<td>21,039</td>
<td>26,299</td>
<td>41,092</td>
<td>47,256</td>
<td>47,256</td>
<td>54,345</td>
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<tr>
<td><strong>plus:</strong> Depreciation expenses</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
<td>53,867</td>
</tr>
<tr>
<td><strong>equals:</strong> Free cash flow</td>
<td>(315,000)</td>
<td>(115,000)</td>
<td>(24,000)</td>
<td>494,010</td>
<td>615,722</td>
<td>767,863</td>
<td>958,038</td>
<td>1,195,758</td>
<td>1,704,842</td>
<td>1,959,494</td>
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<tr>
<td><strong>plus:</strong> Terminal value</td>
<td>148,361,689</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>equals:</strong> Free cash flow (UGS)</td>
<td>(315,000)</td>
<td>(115,000)</td>
<td>(24,000)</td>
<td>494,010</td>
<td>615,722</td>
<td>767,863</td>
<td>958,038</td>
<td>1,195,758</td>
<td>1,704,842</td>
<td>150,321,183</td>
</tr>
<tr>
<td><strong>Total Free Cash Flow (USD)</strong></td>
<td>(185)</td>
<td>(68)</td>
<td>(14)</td>
<td>291</td>
<td>362</td>
<td>452</td>
<td>564</td>
<td>703</td>
<td>1,003</td>
<td>88,424</td>
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