# Valuation Report

Prepared for Company

**Period**:   1 Aug 15 to 31 Oct 15

**Ticker**:   XXXX

**Method**:  Binomial

Note that this report is comprised of this document, exhibit 1, an attached Excel® workbook of the detailed inputs to the valuation software, and exhibit 2, an attached Excel® workbook of results, both of which this document will make significant reference for specific details.

Statement of Financial Accounting Standard ASC 820–10–35–37 *Fair Value in Financial Instruments,* Statement of Financial Accounting Standard ASC 815 *Accounting for Derivative Instruments and Hedging Activities* require that instruments with embedded derivative features be valued at their market values. Clear Power Derivatives has valued the noted instruments as derivatives, but not hedges, and makes NO representation as to the correctness of the decision to value these instruments in this manner or even if derivative accounting treatment is correct at all.  We have relied on the customer's assertions in all cases.  Note that none of these standards specify any particular valuation method or methods.

Clear Power Derivatives only warrants that the instruments have been valued in accordance with the algorithms and assumptions listed herein.

## Instruments Valued

Clear Power Derivatives valued all Convertible notes and warrants that were issued during the period noted, or previously issued with a non-zero balance (for notes) or prior to their expiry date (for Warrants).  The *Notes* sheet in Exhibit 1 lists all the notes that were valued.  The I**ssue Date, Maturity Date**, and **Face Value** columns are self-explanatory.  The **OID Value, Interest Rate**, and **Interest Convention** are listed only in preparation for future features of the application, and are ignored for now.

The next 6 columns are parameters that determine how to compute conversion prices.  The **Conversion Rate** is specified in the Note.  The **Pricing Method** specifies the daily price to use.  **Volume Weighted?** determines if the prices are averaged using trading-volume weights (if TRUE), or simple averaging (FALSE).  **Average Lookback Days** is the length of the window in trading days to lookback from the valuation date for prices to average, together with **Number of Lowest**, which is the number of lowest prices in the window to average for the conversion price.  The **Ceiling** is the maximum value that the conversion price can take.

If the specific language in a note for the conversion price was:

*The term "Conversion Price" shall mean the lower of (i) 58% (42% discount) of the average of the 3 lowest reported sale prices for the Common Stock for the 10 Trading Days immediately prior to the Issuance Date or (ii) 58% (42% discount) of the average of the 3 lowest reported sale prices for the 10 Trading Days immediately prior to the Voluntary Conversion Date.*

Then this would be translated to input in this fashion:

| Conversion Rate | Pricing Method | Volume-Weighted? | Average Lookback days | Number of Lowest | Ceiling |
|---|---|---|---|---|---|
| 0.58 | Low | FALSE | 10 | 3 | 0.0273 |

Specifically, the 58% is converted to a fraction.  Since the language of the note was "lowest reported sale prices," then we use the "Low" price print from the stock price history.  There is no reference to volume weighting, so we use the plain meaning of the word "average," and do not volume-weight.  The note states to use "the 3 lowest reported sale prices for the 10 Trading Days immediately prior to the Voluntary Conversion Date," so we use a 10-day lookback period (window) and 3 for the number of lowest prices to average. The ceiling was calculated IAW the noted language ("58% (42% discount) of the average of the 3 lowest reported sale prices for the Common Stock for the 10 Trading Days immediately prior to the Issuance Date") and directly input.

Finally, the last three columns contain the information for the end of the previous period for balance, OID balance (ignored) and the derivative valuation.

The *Transactions* sheet in Exhibit 1 contains the information for all conversions, repayments, or negative repayments (fees, & penalties customarily).  Conversions must have shares issued.  Note that for every transaction, only the amount listed in the **Principal Amount** columns is applied to principal balance of the note.  This value can be negative, indicating an INCREASE in the principal balance of the note.  Values listed in the **Interest Amount** or **Other Amount** columns are not applied to the principal balance, nor are they used to determine the derivative value of the transaction.

The *Notes* sheet in Exhibit 2 recaps this information for all Convertible Notes valued, the Transactions applicable to those notes, and Transactions ignored because there were out of the valuation period, and pertinent information for them.  Notes colored in green are new for this period.

The *Warrants* sheet in Exhibit 1 lists the warrants to be valued.  The **Issue Date** and **Maturity Date** columns are self-explanatory.  The Shares column is the original amount of shares authorized under this warrant and the Warrant price is the exercise price of these.  The **Previous "as of date"**, **Remaining Shares**, and **Derivative Value** columns list the status of the warrants at the end of the previous period.

The Warrants Exercise sheet in Exhibit 1 lists the information for exercise of warrants.  The column names are mostly self-explanatory, save the last two.  If the exercise was cashless, the **Is Cashless?** column should be True, and the price used for cashless exercise listed in the **Cashless Price** column.

The *Warrants* sheet in Exhibit 2 recaps this information for all Warrants valued, the Exercises applicable to those notes, and Exercises ignored because there were out of the valuation period, and pertinent information for them.  Warrants colored in green are new for this period.

# Valuation Methodology

Clear Power Derivatives uses one of two methods to value the optionality in the notes and warrants, as specified by the client and noted on page one of this report.  Both are commonly used and understood in the industry, and the specific details and assumptions are not listed unless they are in some way unique to our implementation.

## Assumptions

The future is uncertain, and Clear Power Derivative believes that the best assumption about the future is no assumption at all:  Consequently we do not assume any exercises, repayments, penalties, conversions or refinancing of any notes or warrants.  We presume that the balance of all instruments stay constant from the end of period until expiration.

For notes that are already expired but show a positive principal balance, we use the option intrinsic value, which is simply the difference between the conversion price and the current stock price.

We assume that historical daily volatility is an appropriate measure of future volatility.  If the stock has less than a year's of active trading history, volatility must be estimated separately and entered on the *Company* sheet of exhibit 1.  Its absence from there indicates that historical volatility was used.

Almost all of these notes are precisely American options, in that they can be exercised at any time.  In this case, Binomial option pricing models are more accurate, though customers may choose either.

## Black-Sholes

The Black-Sholes options valuation formula is well-understood and not further described here.

## Binomial (Cox-Ross-Rubinstien)

Though the Binomial lattice method is also well-described in the literature, every implementation has its own flavor.  Owing to our "constant future value" assumption, above, we use a single-step binomial.  There is no need to alter the valuation tree at future points, so need to add extra complexity.

# Results

The valuation results are shown in Exhibit 2.

The *Principal Roll Forward* sheet shows the balances and changes to principal for individual notes and the sum.

The *Derivative Roll Forward* sheet shows the balances and changes to derivative values for individual notes and the sum. In addition, there are some foot note disclosures, which are principal-balance weighted, except for the Total Outstanding shares, which are the amount of shares that could be issued if all notes were converted at the end of the period. As a convenience, the journal entries required for the notes are noted on the bottom of the page.

The *Warrant Roll Forward* sheet shows the balances and changes to derivative values for individual warrants and the sum.

**Exhibit I**

| Company Name | Stock Ticker | Month that FY starts | Note Methdology | StartDate | EndDate |
|---|---|---|---|---|---|
| Company | XXXX | Nov | Binomial | 1-May-15 | 31-Jul-15 |

| Note ID | Note Name | Issue Date | Maturity Date | Face Value | OID Value | Interest Rate | Interest Convention | Conversion Rate | Pricing Method |
|---------|-----------|------------|---------------|------------|-----------|---------------|---------------------|-----------------|----------------|
| 1 | Investors | 8-May-15 | 8-May-16 | 56000 | 5061 | 0.08 | FIXED365 | 0.58 | Low |
| 2 | Investors | 9-Oct-15 | 9-Oct-16 | 61600 | 5600 | 0.08 | FIXED365 | 0.58 | Low |
| 3 | Investors | 10-Sep-15 | 10-Sep-16 | 30250 | 2750 | 0.08 | FIXED365 | 0.58 | Low |
| 4 | Investors | 4-Aug-15 | 4-Aug-20 | 20350 | 1850 | 0.08 | FIXED365 | 0.58 | Low |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |

| Note ID | Note Name | Volume-Weighted? | Average Lookback days | Number of Lowest | Ceiling | Previous as Of date | Principal Bal | OID Balance |
|---|---|---|---|---|---|---|---|---|
| 1 | Investors | FALSE | 10 | 3 | 0.0273 | 30-Apr-15 | 56000 | 0 |
| 2 | Investors | FALSE | 10 | 3 | 0.0965 | | | |
| 3 | Investors | FALSE | 10 | 3 | 0.1436 | | | |
| 4 | Investors | FALSE | 10 | 3 | 0.063916 | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |

| Note ID | Note Name | Derivative Value |
|---|---|---|
| 1 | Investors | 239,269 |
| 2 | Investors | |
| 3 | Investors | |
| 4 | Investors | |
| 5 | | |
| 6 | | |

| Note ID | Note Name | Effective Date | Principal Amount | Interest Amount |
|---------|-----------|----------------|------------------|-----------------|

**Other**
**Amount          Shares**

| Warrant ID | Warrant Name | Issue Date | Maturity Date | Shares | Warrant Price | Previous as Of date | Remaining Shares | Derivative Value |
|---|---|---|---|---|---|---|---|---|
| 1 | Warrant 1 | 8-May-15 | 8-May-20 | 4388714 | 0.014 | 30-Apr-15 | 4388714 | 479592 |
| 2 | Warrant 2 | 8-May-15 | 8-May-20 | 2457680 | 0.014 | 30-Apr-15 | 2457680 | 268561 |
| 4 | Warrant 3 | 17-Aug-15 | 17-Aug-20 | 415094 | 0.068 | | | |
| 5 | Warrant 4 | 9-Oct-15 | 9-Oct-20 | 560000 | 0.011 | | | |
| 6 | Warrant 5 | 4-Aug-15 | 4-Aug-20 | 203500 | 0.011 | | | |

| Warrant ID | Warrant Name | Effective Date | Shares | IsCashless? | Cashless Price |
|---|---|---|---|---|---|

**Exhibit 2**

Discussion

The notes page repeats the information entered by the user, for verification. Notes that are new this period are highlighted in green.

Transactions are listed below Notes.  The base exercise price, call value per share and transaction derivative value.  A negative principal or transaction value indicates a transaction that increased the value of the note.

Transactions where the implied conversion is substantially different from the actual conversion price are noted in red.

Ignored notes are ones where the issue date is in the future.

Ignored transactions are out of the period in question.

Derivative Rollforward:

The footnote values are all weighted averages of the noted items, weighted by the principal balance, except for outstanding shares which is just the total possible shares that could be issued on the end date of the period.

Average Volatility and term do not include mature notes.

Change in liability is the sum of additions and price changes

**Notes and Note Transactions for Company**

For the Period 01 Aug 15 to 31 Oct 15

| NOTE | Issue Date | Maturity Date | Face Value | OID Value | Interest Rate | Interest Convention | Conversion Rate | Previous as Of date | Principal Bal | OID Balance | Derivative Value |
|------|-----------|---------------|-----------|-----------|---------------|---------------------|-----------------|--------------------|--------------|-------------|------------------|
| Investor | 8-May-15 | 8-May-16 | 56000 | 5061 | 0.08 | FIXED365 | 0.58 | 31-Jul-15 | 56000 | 0 | 239269 |
| Investor | 9-Oct-15 | 9-Oct-16 | 61600 | 5600 | 0.08 | FIXED365 | 0.58 | | 0 | 0 | 0 |
| Investor | 10-Sep-15 | 10-Sep-16 | 30250 | 2750 | 0.08 | FIXED365 | 0.58 | | 0 | 0 | 0 |
| Investor | 4-Aug-15 | 4-Aug-20 | 20350 | 1850 | 0.08 | FIXED365 | 0.58 | | 0 | 0 | 0 |

**Transactions**

| Note | Effective Date | Principal Amount | Interest Amount | Other Amount | Shares | Implied Conversion Price | Calc Conv Price | Call Value per share | Transaction Value |
|------|---------------|------------------|-----------------|--------------|--------|--------------------------|-----------------|----------------------|-------------------|

**Ignored Transactions**

| Note | Effective Date | Principal Amount | Interest Amount | Other Amount | Shares | Implied Conversion Price | Calc Conv Price | Call Value per share | Transaction Value |
|------|---------------|------------------|-----------------|--------------|--------|--------------------------|-----------------|----------------------|-------------------|

**Principal Roll Forward for Company**

For the Period 01 Aug 15 to 31 Oct 15

| NOTE | Principal Balance on 01 Aug 15 | + Additions | - Payments | - Conversions | Principal Balance on 31 Oct 15 |
|---|---|---|---|---|---|
| Investor | 56,000 | - | - | - | 56,000 |
| Investor | - | 61,600 | - | - | 61,600 |
| Investor | - | 30,250 | - | - | 30,250 |
| Investor | - | 20,350 | - | - | 20,350 |
| **Total** | **$ 56,000** | **$ 112,200** | **$ -** | **$ -** | **$ 168,200** |

**Derivative Roll Forward for Company**
For the Period 01 Aug 15 to 31 Oct 15

**Footnote Disclosure (Principal Balance-weighted Averages)**

| | |
|---|---|
| Avg Market Value | 135762.128 |
| Avg Risk Free Rate | 0.00329209 |
| Avg Life of Note in years | 1.25010669 |
| Avg Expected Volatility (term) | 1.95058353 |
| Total Outstanding Shares | 6065161.52 |

| | | + | - | - | | |
|---|---|---|---|---|---|---|
| | **Value on 01** | | | | **Price** | **Final Value** |
| **NOTE** | **Aug 15** | **Additions** | **Payments** | **Conversions** | **Change** | **on 31 Oct 15** |
| Investor | 239,269 | - | - | - | 58,529 | 297,798 |
| Investor | - | 98,598 | - | - | (27,298) | 71,300 |
| Investor | - | 40,402 | - | - | (5,389) | 35,013 |
| Investor | - | 67,801 | - | - | (33,046) | 34,756 |
| **Total** | **$ 239,269** | **$ 206,801** | **$ -** | **$ -** | **$ (7,203)** | **$ 438,867** |

Change in derivative liability for the QE 31 Oct 15:     199,598

**Journal Entries**

| | | DR | CR |
|---|---|---|---|

To record derivative liability arising from issuance of new debt:

| | | | |
|---|---|---|---|
| PL | Change in derivative liabilit | 206,801 | |
| BS | Derivative liability | | 206,801 |

To record change in derivative liability due to repayments:

| | | | |
|---|---|---|---|
| PL | Gain on debt extinguishment | | - |
| BS | Derivative liability | - | |

To record change in derivative liability due to conversions:

| | | | |
|---|---|---|---|
| PL | Gain on debt extinguishment | | - |
| BS | Derivative liability | - | |

To record change in derivative liability due to price:

| | | | |
|---|---|---|---|
| PL | Change in derivative liabilit | (7,203) | |
| BS | Derivative liability | | (7,203) |

**Warrants and Warrant Exercises for Company**

For the Period 01 Aug 15 to 31 Oct 15

| Warrant | Issue Date | Maturity Date | Original Shares | Exercise Price | Previous As Of date | Remaining Shares | Derivative Value |
|---------|-----------|---------------|-----------------|----------------|---------------------|------------------|------------------|
| Investor | 8-May-15 | 8-May-20 | 4388714 | 0.014 | 31-Jul-15 | 4388714 | 479592 |
| Investor | 8-May-15 | 8-May-20 | 2457680 | 0.014 | 31-Jul-15 | 2457680 | 268561 |
| Investor | 17-Aug-15 | 17-Aug-20 | 415094 | 0.068 | | | |
| Investor | 9-Oct-15 | 9-Oct-20 | 560000 | 0.011 | | | |
| Investor | 4-Aug-15 | 4-Aug-20 | 203500 | 0.011 | | | |

**Exercises**

| Warrant | Effective Date | Shares | Cashless? | Cashless Price | Exercise Value |
|---------|----------------|--------|-----------|----------------|----------------|

**Ignored Exercises**

| Warrant | Effective Date | Shares | Cashless? | Cashless Price | Exercise Value |
|---------|----------------|--------|-----------|----------------|----------------|

**Warrant Derivative Roll Forward for Company**

For the Period 01 Aug 15 to 31 Oct 15

| NOTE | Value on 01 Aug 15 | + Additions | - Payments | - Exercises | Price Change | Final Value on 31 Oct 15 |
|---|---|---|---|---|---|---|
| Investor | 479,592 | - | - | - | (101,524) | 378,068 |
| Investor | 268,561 | - | - | - | (56,843) | 211,718 |
| Investor | - | 30,326 | - | - | (16,750) | 13,576 |
| Investor | - | 62,806 | - | - | (12,873) | 49,932 |
| Investor | - | 30,357 | - | - | (12,222) | 18,135 |
| **Total** | **$ 748,153** | **$ 123,488** | **$ -** | **$ -** | **$ (200,212)** | **$ 671,429** |

# Convertible Bond Derivative Valuation Explanation

## GENERAL DESCRIPTION

This app only values the derivative portion of convertible bonds and warrants. Though the options are, in general Asian options, they are valued as a European option, which is both conservative and in accordance with customary practice. This document describes both the calculation engine and the general process for using it.

## VALUATION METHODOLOGY

There are two commonly acceptable methods for valuing these types of instruments: Binomial and Black-Sholes. The app allows a user to select either method for the valuation of all their instruments, and default to that choice in all future runs.

### Binomial

$$Value_{end} = \frac{Balance_{end}}{ConversionPrice} * CallValuePerShare$$

Where

$$ConversionPrice\ (or\ Exercise\ Price) = stockPrice\ Per\ Note * ConversionPercentage$$

*ExercisePrice* is determined per the note – sometimes lowest, sometime the volume-weighted average of all, or lowest in window. *Conversion Percentage* is as per note.

$$CallValuePerShare = StockFraction * StockPrice_{ValueDate} + BondPortion$$

CallValuePerShare is based on a Call-replicating portfolio of a stock and a fraction of a bond. The Stock price is the closing price on the valuation date.

$$BondPortion = \frac{CallPayoff_{lower} - StockPayoff_{lower} * StockFraction}{(1 + rate_{rf})}$$

Where the risk-free rate is the Tbill rate for the Tbill that is closest to, but less than, the remaining term of the note.

$$StockFraction = \frac{CallPayoff_{upper} - CallPayoff_{lower}}{StockPayoff_{upper} - StockPayoff_{lower}} = 1.0\ (by\ definition)$$

$$CallPayoff_{upper|lower} = StockPayoff_{upper|lower} - ExercisePrice$$

$$StockPayoff_{upper|lower} = StockPrice_{ValueDate} * (1 + P(up|down))$$

$$P(down) = \frac{1}{P(up)}$$

Where P(up) is the expected volatility over the remaining term of the note:

$$\sigma_{term} = \sigma_{historical} * \sqrt{round\left(\frac{term_{remaining}}{7} * 5\right)}$$

Where the historic volatility is the average daily volatility over the last year, and the term remaining is the days left until the maturity date as determined by standard 365 day year. If the term remaining is < 3 days, $\sigma_{term} = \sigma_{historical}$. If there is insufficient data to compute historical volatility, then other stocks will be examined to determine an appropriate value to use.

## Black-Scholes

There is extensive literature on the operation of the Black-Sholes formula and it is not repeated here. The exercise price and volatility are as defined above.

## OPERATION

The system requires information on the starting value and balance of all Notes and warrants at the beginning of the period, and all instruments issued during the quarter. In addition, the conversion information for each is also required, as well as all transactions during the quarter.

Notes with a floor, or fixed conversion price have NO derivative value and the value for those is not calculated.

## OUTPUT

The Notes and Warrants tabs echo the instruments and transactions highlighted. The transactions have derivative-related information for each listed. For each conversion transaction, the conversion price (strike price) used for valuation is the price implied from dividing the principal amount by the number of shares. For each repayment transaction, the conversion price is the one determined by algorithm on the transaction date.

The **principal roll-forward** consolidates the values and transactions by note for all notes that are "current" (i.e. whose issue date was before the end of the period). In all cases, the following formula should hold:

$$EndBal = StartBal + additions - payments - conversions$$

The **derivative rollfoward** page has 3 major sections:

- Financial Statement notes for all Bonds
- Derivative value rollforward
- Accounting system journal entries implied by the transaction activity.

The financial statement notes are principal balance-weighted averages of the following items for all current notes as of the end of the period:

- Avg Market Value
- Avg Risk Free Rate
- Avg Life of Note in years
- Avg Expected Volatility (term)

In addition, one item is the total shares that could be issued on the end of the period date, if all notes were converted on that date.

The derivative roll-forward consolidates the derivative values and transactions by note for all notes that are "current" (i.e. whose issue date was before the end of the period).   In all cases, the following formula should hold:

$$FinalValue = StartValue + additions - payments - conversions + priceChage$$

Additions are sum of call value of negative repayments (usually for penalties) and notes that originate in the period.  Payments are the sum of the call value of repayments that reduce the principal balance. The end balance is the call value on the end date.  **NB** *Price change is solved using the above formula* – it is calculated as a balancing item..

**NB** – bonds that continue to exist past their expiry date have a negative time to expiry, so their call value goes to their intrinsic value:

$$intrinsicValue = \frac{PrincipalBalance}{conversionPrice} * (1 - ConversionRate) * stockPrice$$

The change in derivative liability is :

$$\Delta liability = FinalValue - startValue$$

The change in liability from new debt is the sum of additions.

The change in liability from conversions is the sum of conversions.

The change in liability from price is the sum of the price change

The change in liability from repayments is the sum of repayments


The **Warrant derivative rollfoward** page only has the derivative roll forward.

The derivative roll-forward consolidates the derivative values and transactions by warrant for all warrants that are "current" (i.e. whose issue date was before the end of the period and expiration date is after the start of the period).   In all cases, the following formula should hold:

$$FinalValue = StartValue + additions - payments - exercises + priceChage$$

Additions are sum warrants that originate in the period.  Payments are the sum of the call value of redemptions that reduce the outstanding warrant shares.  The end balance is the call value on the end date.  **NB** *Price change is solved using the above formula* – it is calculated as a balancing item.  Note that Expired Warrants have 0 value.

In all cases the call value is just the value per share * the shares in question (i.e. balance, or transaction.)