

# Teach Yourself Economic Evaluation

## 1 f. Hands On Modelling Algorithms & Calculations

Spend only a few seconds on most slides.

# A. Economic evaluation has three levels ...

Level 3: Decision making

Level 2: Evaluating the business/project

## Level 1: Hands-on economic modelling

**Use rigorous modelling practices to create an easy-to-understand, transparent, robust and audited working tool**

NPV, IRR & payback are just a few of the outcomes

Your model may become long and detailed but must always remain easy for others to follow.



# The purpose of this module is to ...

Level 3: Decision

Work through  
calculations and  
algorithms

Level 2: Economic project

**Level 1: Hands-on economic modelling**

# Contents ...

## Mastering Excel

### Make your workings intuitive:

1. Use small steps to make calculations visually obvious.
2. Use simple algorithms.
3. Begin as simply as possible
4. Make changes to the model strictly follow the rules and appear obvious  
Colour coding

### Take control

| Life of Mine  | units               | Total     | 2015 | 2016 | 2017 | 2018    | 2019      | 2020      | 2021      | 2022    | 2023  |
|---|---------------------|-----------|------|------|------|---------|-----------|-----------|-----------|---------|-------|
| <b>Cashstream 1: Production and Revenue</b>                               |                     |           |      |      |      |         |           |           |           |         |       |
| <b>Production</b>   |                     |           |      |      |      |         |           |           |           |         |       |
| 13 Aug 12 J Benson mine schedule "Mine Plan for new technology 12 Aug 11" |                     |           |      |      |      |         |           |           |           |         |       |
| Ore Production  | tonnes              | 4,300,000 |      |      |      | 600,000 | 1,000,000 | 1,000,000 | 1,000,000 | 700,000 |       |
| Head grade  | grams/tonne         | 1.5       |      |      |      | 1.3     | 1.5       | 1.6       | 1.7       | 1.1     |       |
| Contained gold mined  | ounces              | 204,180   | 0    | 0    | 0    | 25,080  | 48,232    | 51,647    | 54,662    | 24,759  | 0     |
| Processing Recovery   | % of contained gold |           |      |      |      | 75%     | 80%       | 80%       | 80%       | 80%     |       |
| Gold produced   | ounces              | 162,090   | 0    | 0    | 0    | 18,810  | 38,585    | 41,158    | 43,730    | 19,807  | 0     |
| <b>Sales</b>  |                     |           |      |      |      |         |           |           |           |         |       |
| 23 Aug 12 J Gomachie "Sales Plan: July 2012"                              |                     |           |      |      |      |         |           |           |           |         |       |
| Gold in circuit   | weeks               | 0         | 3    | 3    | 3    | 3       | 3         | 3         | 3         | 3       | 3     |
| Gold in circuit   | ounces              | 0         | 0    | 0    | 0    | 1,085   | 2,225     | 2,374     | 2,523     | 1,143   | 0     |
| Gold sold   | ounces              | 162,090   | 0    | 0    | 0    | 17,725  | 37,444    | 41,009    | 43,581    | 21,187  | 1,143 |
| <b>Revenue</b>  |                     |           |      |      |      |         |           |           |           |         |       |

Most of us who work in economic evaluation go through the phase of feeling powerful in Excel and love using our prowess in modelling.

1. We are able to combine several computations into one complex algorithm.
2. We are capable of using the sophisticated Excel functions that do quite amazing sorting, arranging, comparing, seeking, draw-down menu, etc.
3. Our workbooks can become intellectual powerhouses that only a handful of specialists could build.
4. We go home thinking of the workings inside our "trophy" model, and feel proud of our achievements.

|   |                 |                   |                   |              |              |                  |                   |                   |                   |                   |                  |
|---|-----------------|-------------------|-------------------|--------------|--------------|------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| <b>Cashflows</b>  |                 |                   |                   |              |              |                  |                   |                   |                   |                   |                  |
| Cashstream 1: Revenue - Alternative A   | A\$ Real        | 266,633,502       | 0                 | 0            | 0            | 29,282,804       | 61,045,783        | 65,453,608        | 69,392,117        | 36,844,578        | 4,614,612        |
| Cashstream 2: Capital Costs - Alternative A   | A\$ Real        | 98,000,000        | 3,000,000         | 40,000,000   | 40,000,000   | 6,000,000        | 6,000,000         | 2,000,000         | 1,000,000         | 0                 | 0                |
| Cashstream 3: Operating Costs - Alternative A   | A\$ Real        | 103,000,000       | 0                 | 0            | 0            | 14,900,000       | 22,500,000        | 23,500,000        | 24,500,000        | 18,200,000        | 0                |
| Cashstream 4: Taxes - Alternative A   | A\$ Real        | 28,942,223        | 0                 | 0            | 0            | 3,003,286        | 7,782,875         | 7,460,638         | 8,104,842         | 2,053,404         | 405,228          |
| <b>Cashflow - Alternative A</b>   | <b>A\$ Real</b> | <b>36,191,279</b> | <b>-3,000,000</b> | <b>#####</b> | <b>#####</b> | <b>5,379,568</b> | <b>24,762,908</b> | <b>32,460,971</b> | <b>35,787,275</b> | <b>16,591,175</b> | <b>4,209,383</b> |
| <b>IRR - Alternative A</b>  | <b>Real</b>     | <b>9.7%</b>       |                   |              |              |                  |                   |                   |                   |                   |                  |
| <b>Discounting</b>  |                 |                   |                   |              |              |                  |                   |                   |                   |                   |                  |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012 |                 |                   |                   |              |              |                  |                   |                   |                   |                   |                  |
| Discount Rate   | % Real          |                   | 8%                | 8%           | 8%           | 8%               | 8%                | 8%                | 8%                | 8%                | 8%               |
| Discount Factor   |                 |                   | 0.96              | 0.89         | 0.82         | 0.76             | 0.71              | 0.65              | 0.61              | 0.56              | 0.52             |
| Discounted Cashflow - Alternative A   | A\$ Real        | 4,561,833         | -2,886,751        | -35,638,906  | -32,998,987  | 4,109,266        | 17,514,379        | 21,258,413        | 21,700,724        | 9,315,346         | 2,188,349        |
| Cumulative NPV - Alternative A  | A\$             |                   | -2,886,751        | -38,525,657  | -71,524,643  | -67,415,378      | -49,900,999       | -28,642,585       | -6,941,861        | 2,373,484         | 4,561,833        |
| <b>NPV - Alternative A</b>  | <b>A\$</b>      | <b>4,561,833</b>  |                   |              |              |                  |                   |                   |                   |                   |                  |

| Life of Mine   | units               | Total     | 2015 | 2016 | 2017 | 2018    | 2019      | 2020      | 2021      | 2022    | 2023 |
|--|---------------------|-----------|------|------|------|---------|-----------|-----------|-----------|---------|------|
| <b>Cashstream 1: Production and Revenue</b>  |                     |           |      |      |      |         |           |           |           |         |      |
| <b>Production</b>  |                     |           |      |      |      |         |           |           |           |         |      |
| <small>13 Aug 12 7 Benson mine schedule "Mine Plan for new technology 12 Aug 11"</small> |                     |           |      |      |      |         |           |           |           |         |      |
| Ore Production   | tonnes              | 4,300,000 |      |      |      | 600,000 | 1,000,000 | 1,000,000 | 1,000,000 | 700,000 |      |
| Head grade   | grams/tonne         | 1.5       |      |      |      | 1.3     | 1.5       | 1.6       | 1.7       | 1.1     |      |
| Contained gold mined   | ounces              | 204,180   | 0    | 0    | 0    | 25,080  | 48,232    | 51,647    | 54,662    | 24,759  | 0    |
| Processing recovery  | % of contained gold |           |      |      |      | 75%     | 80%       | 80%       | 80%       |         |      |
| Gold produced  | ounces              | 162,090   | 0    | 0    | 0    | 18,810  | 38,585    | 41,158    | 43,730    | 19,807  | 0    |
| <b>Sales</b>   |                     |           |      |      |      |         |           |           |           |         |      |

This sort of modelling is fine for expert engineers and scientists working in their own specialist niche, but it is totally inappropriate for economic evaluation in a team.

These sophisticated models become the 'private domain' of its creator and perhaps a couple other specialists. It is too tedious for colleagues to plough through the complex algorithms and functions.

Imposing that sort of modelling on your colleagues is arrogant.

History proves that lots of mistakes lie dormant in 'sophisticated' /complex models until the project goes bad and the model is thoroughly audited.

Too often, a horribly complex model is audited by professionals from a respected accounting company who can verify the mechanics. But they do not have the expertise to audit the practicality and usability of the model. The boss says "Yes it has been properly audited!" and an poorly constructed model is inflicted on the Team. People work away hoping all is OK, and become a little apathetic.

**If you want to create "trophy" models then stop reading!**

|  |          |            |            |             |             |             |             |             |            |            |           |
|--|----------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-----------|
| Cashflow - Alternative A   | A\$ Real | 36,191,279 | -3,000,000 | #####       | #####       | 5,379,568   | 24,762,908  | 32,460,971  | 35,787,275 | 16,591,175 | 4,209,383 |
| IRR - Alternative A  | Real     | 9.7%       |            |             |             |             |             |             |            |            |           |
| <b>Discounting</b>   |          |            |            |             |             |             |             |             |            |            |           |
| <small>17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012</small> |          |            |            |             |             |             |             |             |            |            |           |
| Discount Rate  | % Real   | 8%         | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         | 8%        |
| Discount Factor  |          | 0.96       | 0.89       | 0.82        | 0.76        | 0.71        | 0.65        | 0.61        | 0.56       | 0.52       |           |
| Discounted Cashflow - Alternative A  | A\$ Real | 4,561,833  | -2,886,751 | -35,638,906 | -32,998,987 | 4,109,266   | 17,514,379  | 21,258,413  | 21,700,724 | 9,315,346  | 2,188,349 |
| Cumulative NPV - Alternative A   | A\$      |            | -2,886,751 | -38,525,657 | -71,524,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484  | 4,561,833 |
| NPV - Alternative A  | A\$      | 4,561,833  |            |             |             |             |             |             |            |            |           |

# Make your workings intuitive:

1. Use small steps to make calculations visually obvious.
2. Use simple algorithms.
3. Begin as simply as possible
4. Make changes very obvious

| Life of Mine  | units                | Total       | 2015        | 2016        | 2017        | 2018        | 2019        | 2020       | 2021       | 2022       | 2023      |
|---|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|-----------|
| <b>Cashstream 1: Production and Revenue</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| <b>Production</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| 13 Aug 12 T Benson mine schedule "Mine Plan for new technology "12 Aug 11"                              |                      |             |             |             |             |             |             |            |            |            |           |
| Ore Production  | tonnes               | 4,300,000   |             |             |             |             |             |            |            |            |           |
| Head grade  | grams/tonne          | 1.5         |             |             |             | 600,000     | 1,000,000   | 1,000,000  | 1,000,000  | 700,000    |           |
| Contained gold mined  | ounces               | 204,180     | 0           | 0           | 0           | 25,080      | 48,212      | 51,447     | 54,662     | 24,759     | 0         |
| Gold produced   | ounces               | 162,000     | 0           | 0           | 0           | 18,810      | 35,585      | 41,158     | 41,730     | 19,800     | 0         |
| <b>Sales</b>  |                      |             |             |             |             |             |             |            |            |            |           |
| 21 Aug 12 J Green email "Sales Plan July 2012"  |                      |             |             |             |             |             |             |            |            |            |           |
| Gold in circuit   | ounces               | 0           | 0           | 0           | 0           | 0           | 0           | 0          | 0          | 0          | 0         |
| Gold sold   | ounces               | 162,000     | 0           | 0           | 0           | 1,085       | 2,220       | 2,274      | 2,274      | 1,143      | 0         |
| Gold sales Forecast   | AS/ounce Real        | 3682.57685  | 1800        | 2000        | 1900        | 1800        | 1700        | 1600       | 1600       | 1600       | 1600      |
| Gold Revenue  | AS Real              | 266,633,502 | 0           | 0           | 0           | 31,905,140  | 63,603,392  | 63,614,643 | 63,790,376 | 18,895,910 | 3,828,345 |
| 21 Aug 12 J Green email "Sales Plan July 2012"  |                      |             |             |             |             |             |             |            |            |            |           |
| Debtors - Opening   | AS Real              | 0           | 0           | 0           | 0           | 0           | 0           | 0          | 0          | 0          | 0         |
| Debtors - Closing   | AS Real              | 0           | 0           | 0           | 0           | 2,622,343   | 5,231,950   | 5,392,984  | 5,731,266  | 2,796,247  | 0         |
| Cashstream 1: Revenue - A   | AS Real              | 266,633,502 | 0           | 0           | 0           | 29,282,804  | 61,045,783  | 65,453,608 | 69,392,117 | 36,844,578 | 4,614,612 |
| <b>Cashstream 2: Capital Cost</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| 10 Aug 12 G Dawson email "Capital Cost Estimate - Indicative Estimates for New Technology mine"         |                      |             |             |             |             |             |             |            |            |            |           |
| Initial Capital Costs   | AS Real              | 98,000,000  | 3,000,000   | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 2,000,000  | 1,000,000  | 0          | 0         |
| Proposed Capital Costs  | AS Real              | 98,000,000  | 3,000,000   | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 2,000,000  | 1,000,000  | 0          | 0         |
| Cashstream 2: Capital Cost  | AS Real              | 98,000,000  | 3,000,000   | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 2,000,000  | 1,000,000  | 0          | 0         |
| <b>Tax deductions for Capital Expenditure</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| 10 Aug 12 G Dawson email "Capital Cost Estimate - Indicative Estimates for New Technology mine"         |                      |             |             |             |             |             |             |            |            |            |           |
| Capital Expenditure   | AS Real              | 98,000,000  |             |             |             |             |             |            |            |            |           |
| % of contained gold   |                      |             |             |             |             | 1.5%        | 1.5%        | 1.5%       | 1.5%       | 1.5%       | 1.5%      |
| Capital Expenditure   | AS Real              | 98,000,000  |             |             |             | 3,716,624   | 22,638,938  | 24,734,236 | 26,349,473 | 12,809,852 | 690,889   |
| Cashstream 3: Operating Costs   | AS Real              | 103,600,000 | 0           | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000 | 24,500,000 | 18,200,000 | 0         |
| <b>Cashstream 4: Taxes</b>  |                      |             |             |             |             |             |             |            |            |            |           |
| <b>Government Royalties</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| 21 Aug 12 J Green email "Royalty Rates for New Technology mine"   |                      |             |             |             |             |             |             |            |            |            |           |
| Royalty Rate  |                      |             | 0.0%        | 0.0%        | 0.0%        | 0.0%        | 0.0%        | 0.0%       | 0.0%       | 0.0%       | 5.0%      |
| Gold Revenue  | AS Real              | 18,895,910  | 0           | 0           | 0           | 1,095,257   | 3,182,770   | 3,280,731  | 3,486,520  | 1,694,979  | 91,417    |
| Royalty   | AS Real              | 0           | 0           | 0           | 0           | 4,693,264   | 15,333,685  | 14,039,685 | 15,394,406 | 1,134,749  | 1,046,039 |
| Assessable Income   | AS Real              | 18,895,910  | 0           | 0           | 0           | 1,095,257   | 3,182,770   | 3,280,731  | 3,486,520  | 1,694,979  | 91,417    |
| Company Income Tax Rate   | % of assessable inc: | 0.0%        | 30.0%       | 30.0%       | 30.0%       | 30.0%       | 30.0%       | 30.0%      | 30.0%      | 30.0%      | 30.0%     |
| Income Tax  | AS Real              | 0           | 0           | 0           | 0           | 4,693,264   | 15,333,685  | 14,039,685 | 15,394,406 | 1,134,749  | 1,046,039 |
| Income tax payment  | AS Real              | 0           | 0           | 0           | 0           | 4,693,264   | 15,333,685  | 14,039,685 | 15,394,406 | 1,134,749  | 1,046,039 |
| Cashstream 4: Taxes - Alter   | AS Real              | 28,842,223  | 0           | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638  | 8,104,842  | 2,053,404  | 405,229   |
| <b>Cashflow and NPV</b>   |                      |             |             |             |             |             |             |            |            |            |           |
| <b>Cashflows</b>  |                      |             |             |             |             |             |             |            |            |            |           |
| Cashstream 1: Revenue - Alternative A   | AS Real              | 266,633,502 | 0           | 0           | 0           | 29,282,804  | 61,045,783  | 65,453,608 | 69,392,117 | 36,844,578 | 4,614,612 |
| Cashstream 2: Capital Costs - Alternative A   | AS Real              | 98,000,000  | 3,000,000   | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 2,000,000  | 1,000,000  | 0          | 0         |
| Cashstream 3: Operating Costs - Alternative A   | AS Real              | 103,600,000 | 0           | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000 | 24,500,000 | 18,200,000 | 0         |
| Cashstream 4: Taxes - Alternative A   | AS Real              | 28,842,223  | 0           | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638  | 8,104,842  | 2,053,404  | 405,229   |
| Cashflow - Alternative A  | AS Real              | 36,191,279  | -3,000,000  | #####       | #####       | 5,379,568   | 24,762,908  | 32,460,971 | 35,787,275 | 16,591,175 | 4,209,383 |
| IRR - Alternative A   | Real                 | 9.7%        |             |             |             |             |             |            |            |            |           |
| <b>Discounting</b>  |                      |             |             |             |             |             |             |            |            |            |           |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012 |                      |             |             |             |             |             |             |            |            |            |           |
| Discount Rate   | % Real               |             | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         | 8%         | 8%        |
| Discount Factor   |                      |             | 0.96        | 0.89        | 0.82        | 0.76        | 0.71        | 0.65       | 0.61       | 0.56       | 0.52      |
| Discounted Cashflow - Alternative A   | AS Real              | 4,561,833   | -2,886,751  | -35,638,906 | -32,998,987 | 4,109,266   | 4,109,266   | 21,258,413 | 21,700,724 | 9,315,346  | 2,188,349 |
| Cumulative NPV - Alternative A  | AS                   | -2,886,751  | -38,525,657 | -71,524,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484  | 4,561,833  |           |
| NPV - Alternative A   | AS                   | 4,561,833   |             |             |             |             |             |            |            |            |           |



# Make your workings intuitive:

## 1. Use small steps to make calculations visually obvious.

The logic should unfold visually in little steps

- Just like a mathematics exercise at primary school

For example, if the computation was  $X = A\% * F / G$

1. It would be in a small discrete block of computations
2. It might start with a brief row note of its source (date, who, what) in blue font.
3. Then it would show the parameters A, F and G in three rows
  - If any of these three parameters were fresh inputs then they would be coloured blue on a pale blue background
  - If any were referenced from another worksheet then the complete row would first be referenced across as green font on a pale green background.
  - If any were referenced down from the same worksheet they would be black font on white
4. Lastly would be the algorithm – in black font on white

|  |                       |    |      |      |      |      |
|--|-----------------------|----|------|------|------|------|
| <b>Consumption of sulphuric acid</b>                         |                       |    |      |      |      |      |
| 5 Sep 14 G Dawson email "chemical reaction in the digester." |                       |    |      |      |      |      |
| A  | %                     |    | 78%  | 78%  | 78%  | 78%  |
| F  | flow rate in digester |    | 344  | 344  | 344  | 344  |
| G  | urea in stream        |    | 22   | 22   | 22   | 22   |
| Acid consumption in  | tonne acid            | 49 | 12.2 | 12.2 | 12.2 | 12.2 |

**Cashstream 1: Production and Revenue**

# 1. Use small steps to make calculations visually obvious.

The sequence of little steps must be in order of calculation. Rarely should an algorithm refer to a cell in a row below.

An example of what not to model is: -

|                    |                      |      |      |      |  |
|--------------------|----------------------|------|------|------|--|
| Cost of processing | US\$ real/ tonne ore | 20   | 21   | 23   |  |
| Exchange rate      | A\$1 = US\$....      | .80  | .80  | .80  |  |
| Cost of processing | A\$ real/ tonne ore  | 16.0 | 16.8 | 18.4 |  |

Because when you look at the algorithms you find that the cost of processing was first computed in A\$ and then converted into US\$ two rows above. This is bad modelling because the visual presentation is misleading and upside down

It of course should have been

|                    |                      |      |      |      |
|--------------------|----------------------|------|------|------|
| Cost of processing | A\$ real/ tonne ore  | 16.0 | 16.8 | 18.4 |
| Exchange rate      | A\$1 = US\$....      | .80  | .80  | .80  |
| Cost of processing | US\$ real/ tonne ore | 20   | 21   | 23   |

| Cashstream 4: Taxes - Alternative A   | A\$ Real | 28,842,223 | 0          | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638   | 8,104,842  | 2,053,404  | 405,229   |
|---|----------|------------|------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-----------|
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| IRR - Alternative A   | Real     | 9.7%       |            |             |             |             |             |             |            |            |           |
| <b>Discounting</b>  |          |            |            |             |             |             |             |             |            |            |           |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012 |          |            |            |             |             |             |             |             |            |            |           |
| Discount Rate   | % Real   | 8%         | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         | 8%        |
| Discount Factor   | % Real   | 0.96       | 0.89       | 0.82        | 0.76        | 0.71        | 0.65        | 0.61        | 0.56       | 0.52       |           |
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| NPV - Alternative A   | AS       |            |            |             |             |             |             |             |            |            |           |

| Life of Mine                                | units | Total | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|-------|-------|------|------|------|------|------|------|------|------|------|
| <b>Cashstream 1: Production and Revenue</b> |       |       |      |      |      |      |      |      |      |      |      |

# 1. Use small steps to make calculations visually obvious.

**Most Important:** Any algorithm should refer to cells **ONLY** on the same worksheet. It never directly references a cell in another worksheet.

This means that if you click on to any algorithm and trace its precedents then it will show arrows only to cells in the same worksheet.

For example =K41\*K23

It never would show arrows to another worksheet, or worse show links to another workbook.

For example it should not show = 'Worksheet2!K13\*K23



This means you first have to reference the whole row across from worksheet2, and position it immediately above where you need to use it in the algorithm.

| <b>Discounting</b>  |         |           |            |             |             |             |             |             |            |           |           |
|---|---------|-----------|------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|-----------|
| <small>17 July 10 F Green e-mail: discount rate for investment in gold is 8% Real. The base date is 1 July 2012</small> |         |           |            |             |             |             |             |             |            |           |           |
| Discount Rate   | % Real  | 8%        | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%        | 8%        |
| Discount Factor   |         | 0.96      | 0.89       | 0.82        | 0.76        | 0.71        | 0.65        | 0.61        | 0.56       | 0.52      |           |
| Discounted Cashflow - Alternative A   | AS Real | 4,561,833 | -2,886,751 | -35,638,906 | -32,998,987 | 4,109,266   | 17,514,379  | 21,258,413  | 21,700,724 | 9,315,346 | 2,188,349 |
| Cumulative NPV - Alternative A  | AS      |           | -2,886,751 | -38,525,657 | -71,524,643 | -47,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484 | 4,561,833 |
| <b>NPV - Alternative A</b>  |         |           |            |             |             |             |             |             |            |           |           |

| Life of Mine                                | units | Total | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|-------|-------|------|------|------|------|------|------|------|------|------|
| <b>Cashstream 1: Production and Revenue</b> |       |       |      |      |      |      |      |      |      |      |      |
| Production                                  |       |       |      |      |      |      |      |      |      |      |      |

# Make your workings intuitive:

## 2. Use simple algorithms

Resist the temptation of creating one comprehensive algorithm.

- Use several simple algorithms in small steps
- 98% of your algorithms should be short and easy to follow.

Avoid using sophisticated Excel functions

- Yes, some advanced Excel Functions are very economical with rows and are intellectually rewarding but your colleagues will not easily audit/follow them. They will be a ‘trust me’ section of your model that will destroy other’s confidence in your results.
- Instead use several simpler algorithms to visually display the logic

Avoid using draw-down menus

- They work well but are too hard to backtrack and audit
- They are another “trust me because I know what I am doing!”

Make you model easy for non-experts to follow and use


- You are leading them through the business/project so they gain immediate and total confidence in your model.
- Make them respect the way your intellect can convert complexity into simple concepts

|           |
|-----------|
| 0         |
| 0         |
| 3         |
| 1,143     |
| 1500      |
| 3,828,345 |
| 30        |
| 0         |
| 4,614,612 |
| 0         |
| 1%        |
| 690,889   |
| 0         |
| 0         |
| 0         |
| 0         |
| 5.0%      |
| 91,417    |
| 3,828,345 |
| 0         |
| 690,889   |
| 91,417    |
| 1,046,039 |
| 30.0%     |
| 313,812   |
| 313,812   |
| 405,229   |
| 4,614,612 |
| 0         |
| 0         |
| 405,229   |
| 4,209,383 |


| Discount Rate                       | % Real     | 8%               | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         | 8%        |           |
|-------------------------------------|------------|------------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-----------|-----------|
| Discount Factor                     |            | 0.96             | 0.89        | 0.82        | 0.76        | 0.71        | 0.65        | 0.61       | 0.56       | 0.52      |           |
| Discounted Cashflow - Alternative A | A\$ Real   | 4,561,833        | -2,886,751  | -35,638,906 | -32,998,987 | 4,109,266   | 17,514,379  | 21,258,413 | 21,700,724 | 9,315,346 | 2,188,349 |
| Cumulative NPV - Alternative A      | A\$        | -2,886,751       | -38,525,657 | -71,524,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484  | 4,561,833 |           |
| <b>NPV - Alternative A</b>          | <b>A\$</b> | <b>4,561,833</b> |             |             |             |             |             |            |            |           |           |


| Life of Mine   | units | Total | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|--|-------|-------|------|------|------|------|------|------|------|------|------|
| <b>Cashstream 1: Production and Revenue</b>  |       |       |      |      |      |      |      |      |      |      |      |
| <b>Production</b>  |       |       |      |      |      |      |      |      |      |      |      |
| <small>13 Aug 12 Y Benson mine schedule "Mine Plan for new technology 12 Aug 11"</small> |       |       |      |      |      |      |      |      |      |      |      |


## 2. Use simple algorithms

 Here is an example of a terrible algorithm of which its creator was very proud but should have been absolutely ashamed: –  

$$=IF(K14=0,0,IF(K244<Max(\$H\$241:\$A\$241)*\$D75,IF(OR(SUM(\$H13:M13)=0,SUM(S15:\$A15)=0),K244/MAX(\$G\$244:\$A\$244),1)1)$$

 The ‘Index Function’ alienates other users – Why should they put up with your inability to express yourself in a straight forward sequence? Someone asked to do an audit should refuse! (explaining “My life is too short to waste it on that!”)

 Can all your colleagues easily trace their ways through your draw-down menu? You think it is clever and fast but others have to accept that everything that happens is 100% correct – perhaps they loose trust.

 Why use any of the Excel NPV functions when others can better follow exactly what is happening if you make it visible in ‘longhand’ in a few simple rows. Again it is you taking care of others. (But ‘IRR’ must be used)

|   |          |           |            |             |             |             |             |             |            |           |           |
|---|----------|-----------|------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|-----------|
| IRR - Alternative A   | Real     | 9.7%      |            |             |             |             |             |             |            |           |           |
| <b>Discounting</b>  |          |           |            |             |             |             |             |             |            |           |           |
| <small>17 July 10 F Green e-mail: discount rate for investment in gold is 8% Real. The base date is 1 July 2012</small> |          |           |            |             |             |             |             |             |            |           |           |
| Discount Rate   | % Real   | 8%        | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%        | 8%        |
| Discount Factor   |          | 0.96      | 0.89       | 0.82        | 0.76        | 0.71        | 0.65        | 0.61        | 0.56       | 0.52      |           |
| Discounted Cashflow - Alternative A   | A\$ Real | 4,561,833 | -2,886,751 | -35,638,906 | -32,998,887 | 4,109,266   | 17,514,379  | 21,238,413  | 21,700,724 | 9,315,346 | 2,188,349 |
| Cumulative NPV - Alternative A  | A\$      |           | -2,886,751 | -38,525,657 | -71,525,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484 | 4,561,833 |
| NPV - Alternative A   | A\$      | 4,561,833 |            |             |             |             |             |             |            |           |           |

| Life of Mine   | units               | Total       | 2015       | 2016        | 2017        | 2018        | 2019        |             |            |            |           |
|--|---------------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-----------|
| <b>Cashstream 1: Production and Revenue</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Production</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 13 Aug 12 T Section mine schedule "Mine Plan for new technology 12 Aug 11"   |                     |             |            |             |             |             |             |             |            |            |           |
| Ore Production   | tonnes              | 4,300,000   |            |             |             | 600,000     | 1,000,000   |             |            |            |           |
| Head grade   | grams/tonne         | 1.5         |            |             |             | 1.3         | 1.5         |             |            |            |           |
| Contained gold mined   | ounces              | 204,180     | 0          | 0           | 0           | 25,080      | 42,232      |             |            |            |           |
| Processing Recovery  | % of contained gold |             |            |             |             | 75%         | 80%         |             |            |            |           |
| Gold produced  | ounces              | 162,090     | 0          | 0           | 0           | 18,810      | 38,585      |             |            |            |           |
| <b>Sales</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 23 Aug 12 J Gomachie: "Sales Plan: July 2012"  |                     |             |            |             |             |             |             |             |            |            |           |
| Gold in circuit  | weeks               | 0           | 3          | 3           | 3           | 3           | 3           |             |            |            |           |
| Gold in circuit  | ounces              | 0           | 0          | 0           | 1,085       | 2,226       |             |             |            |            |           |
| Gold sold  | ounces              | 162,090     | 0          | 0           | 0           | 17,725      | 37,644      |             |            |            |           |
| <b>Revenue</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 23 Aug 10 ABC Company Forecast of gold price   |                     |             |            |             |             |             |             |             |            |            |           |
| Gold price forecast  | A\$/ounce Real      | 1643.57085  | 1800       | 2000        | 1900        | 1800        | 1700        |             |            |            |           |
| Gold Revenue   | A\$ Real            | 266,633,502 | 0          | 0           | 0           | 31,905,145  | 63,655,392  |             |            |            |           |
| 23 Aug 12 J Gomachie: "Sales Plan: July 2012"  |                     |             |            |             |             |             |             |             |            |            |           |
| Debtors  | days                | 0           | 0          | 30          | 30          | 30          | 30          |             |            |            |           |
| Debtors - Closing  | A\$ Real            | 0           | 0          | 0           | 2,622,341   | 5,231,950   |             |             |            |            |           |
| Cashstream 1: Revenue - A  | A\$ Real            | 266,633,502 | 0          | 0           | 0           | 29,282,804  | 61,045,783  |             |            |            |           |
| <b>Cashstream 2: Capital Costs</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 10 Aug 12 G Dawson email "Capital Cost Estimate: Indicative Estimates for New Technology route"  |                     |             |            |             |             |             |             |             |            |            |           |
| Initial Capital Costs  | A\$ Real            | 82,000,000  | 3,000,000  | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   |             |            |            |           |
| Ongoing Capital Costs  | A\$ Real            | 15,000,000  |            |             |             |             |             |             |            |            |           |
| Cashstream 2: Capital Cost   | A\$ Real            | 98,000,000  | 3,000,000  | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   |             |            |            |           |
| <b>Tax deductions for Capital Expenditure</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 3 May 12 E Hermi Assume all capital is deducted in proportion to the gold sold over the life of mine.  |                     |             |            |             |             |             |             |             |            |            |           |
| Tax Deduction for Capital Expenditure  | % of contained gold |             |            |             |             | 13%         | 23%         |             |            |            |           |
| Tax deduction for capital expenditure  | A\$ Real            | 98,000,000  |            |             |             | 10,716,624  | 22,638,938  |             |            |            |           |
| <b>Cashstream 3: Operating Costs</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 25 May 12 G Dawson email "Operating Cost Estimate: Indicative Estimates for new technology." There is no waste to be mined.                                  |                     |             |            |             |             |             |             |             |            |            |           |
| mining cost per tonne  | A\$ Real/tonne ore  | 25          |            |             |             | 4           | 4           |             |            |            |           |
| mining cost  | A\$ Real            | 21,600,000  |            |             |             | 2,400,000   | 4,000,000   |             |            |            |           |
| processing cost per tonne  | A\$ Real/tonne ore  | 75          |            |             |             | 15          | 15          |             |            |            |           |
| processing cost  | A\$ Real            | 64,500,000  |            |             |             | 9,000,000   | 15,000,000  |             |            |            |           |
| fixed costs  | A\$ Real            | 17,500,000  |            |             |             | 3,500,000   | 3,500,000   |             |            |            |           |
| Cashstream 3: Operating C  | A\$ Real            | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  |             |            |            |           |
| cost per ounce   | A\$/ounce Real      |             |            |             |             | 792         | 583         |             |            |            |           |
| <b>Cashstream 4: Taxes</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Government Royalties</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 2 June 12 R Toply: SA State Royalty is 1% of revenue paid monthly  |                     |             |            |             |             |             |             |             |            |            |           |
| State Royalty  | % of revenue        | 0.0%        | 5.0%       | 5.0%        | 5.0%        | 5.0%        | 5.0%        |             |            |            |           |
| State Royalty  | A\$ Real            | 13,331,675  | 0          | 0           | 0           | 1,595,257   | 3,182,770   |             |            |            |           |
| <b>Company Income Tax</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 2 June 10 R Toply: Company income tax rate is 30%. The cash payment averages mid year. Assume operating cost cashstream approximates the cost of goods sold. |                     |             |            |             |             |             |             |             |            |            |           |
| Gold Revenue   |                     | 266,633,502 | 0          | 0           | 0           | 31,905,145  | 63,655,392  |             |            |            |           |
| Cashstream 3: Operating Costs - Alternative A  | A\$ Real            | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  |             |            |            |           |
| Tax deduction for capital expenditure  |                     | 98,000,000  | 0          | 0           | 0           | 10,716,624  | 22,638,938  |             |            |            |           |
| State Royalty  |                     | 13,331,675  | 0          | 0           | 0           | 1,595,257   | 3,182,770   |             |            |            |           |
| Assessable income  |                     | 51,701,827  | 0          | 0           | 0           | 4,693,264   | 15,333,685  |             |            |            |           |
| Company Income Tax Rate  | % of assessable inc |             | 30.0%      | 30.0%       | 30.0%       | 30.0%       | 30.0%       |             |            |            |           |
| Income Tax   | A\$ Real            | 15,510,548  | 0          | 0           | 0           | 1,407,979   | 4,600,105   |             |            |            |           |
| Income tax payment   |                     | 15,510,548  | 0          | 0           | 0           | 1,407,979   | 4,600,105   |             |            |            |           |
| Cashstream 4: Taxes - Alter  | A\$ Real            | 28,842,223  | 0          | 0           | 0           | 3,003,236   | 7,782,875   |             |            |            |           |
| <b>Cashflow and NPV</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Cashflows</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| Cashstream 1: Revenue - Alternative A  | A\$ Real            | 266,633,502 | 0          | 0           | 0           | 29,282,804  | 61,045,783  | 65,453,608  | 69,392,117 | 36,844,578 | 4,614,612 |
| Cashstream 2: Capital Costs - Alternative A  | A\$ Real            | 98,000,000  | 3,000,000  | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 0           | 0          | 0          | 0         |
| Cashstream 3: Operating Costs - Alternative A  | A\$ Real            | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000  | 18,200,000 | 0          | 0         |
| Cashstream 4: Taxes - Alternative A  | A\$ Real            | 28,842,223  | 0          | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638   | 8,104,842  | 2,053,404  | 405,229   |
| Cashflow - Alternative A   | A\$ Real            | 36,191,279  | -3,000,000 | #####       | #####       | 5,379,568   | 24,762,908  | 32,460,971  | 35,787,275 | 16,591,175 | 4,209,383 |
| IRR - Alternative A  | Real                | 9.7%        |            |             |             |             |             |             |            |            |           |
| <b>Discounting</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012  |                     |             |            |             |             |             |             |             |            |            |           |
| Discount Rate  | % Real              |             | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         |           |
| Discount Factor  |                     |             | 0.96       | 0.89        | 0.82        | 0.76        | 0.71        | 0.65        | 0.61       | 0.56       | 0.52      |
| Discounted Cashflow - Alternative A  | A\$ Real            | 4,561,833   | -2,886,751 | -35,638,906 | -32,998,987 | 4,109,266   | 17,514,379  | 21,258,413  | 21,700,724 | 9,315,346  | 2,188,349 |
| Cumulative NPV - Alternative A   | A\$                 |             | -2,886,751 | -38,525,657 | -71,524,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,373,484  | 4,561,833 |
| NPV - Alternative A  | A\$                 | 4,561,833   |            |             |             |             |             |             |            |            |           |

# Make your workings intuitive:

## 3. Begin the model as simply as practical

For example this is a complete cash flow model in <100 rows.

Its size would be appropriate for preliminary assessments and smaller tasks and simpler evaluations.

This model may allow you to make a decision either to abandon an idea or to evaluate further in a more advanced evaluation.

| Life of Mine  | units               | Total       | 2015       | 2016        | 2017        | 2018        | 2019        | 2020        | 2021       | 2022       | 2023      |
|---|---------------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|------------|------------|-----------|
| <b>Cashstream 1: Production and Revenue</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Production</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 13 Aug 12 T Section mine schedule "Mine Plan for new technology 12 Aug 11"  |                     |             |            |             |             |             |             |             |            |            |           |
| Ore Production  | tonnes              | 4,300,000   |            |             |             |             |             |             |            |            |           |
| Head grade  | grams/tonne         | 1.5         |            |             |             | 6.0         | 1.5         | 1.4         | 1.7        | 1.1        |           |
| Contained gold mined  | ounces              | 206,180     | 0          | 0           | 0           | 25,080      | 48,232      | 51,447      | 54,662     | 24,759     | 0         |
| Processing Recovery   | % of contained gold |             |            |             |             | 75%         | 80%         | 80%         | 80%        | 80%        |           |
| Gold produced   | ounces              | 162,090     | 0          | 0           | 0           | 18,810      | 38,585      | 41,158      | 43,730     | 19,807     | 0         |
| <b>Sales</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 23 Aug 12 J Gomachie: "Sales Plan: July 2012"   |                     |             |            |             |             |             |             |             |            |            |           |
| Gold in circuit   | weeks               | 0           | 3          | 3           | 3           | 3           | 3           | 3           | 3          | 3          | 3         |
| Gold in circuit   | ounces              | 0           | 0          | 0           | 0           | 1,085       | 2,226       | 2,374       | 2,523      | 1,143      | 0         |
| Gold sold   | ounces              | 162,090     | 0          | 0           | 0           | 17,725      | 37,444      | 41,009      | 43,581     | 21,187     | 1,143     |
| <b>Revenue</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 23 Aug 10 ABC Company Forecast of gold price  |                     |             |            |             |             |             |             |             |            |            |           |
| Gold price Forecast   | AS/ounce Real       | 1643.57085  | 1800       | 2000        | 1900        | 1800        | 1700        |             |            |            |           |
| Gold Revenue  | AS Real             | 266,633,502 | 0          | 0           | 0           | 31,905,145  | 63,655,392  |             |            |            |           |
| 23 Aug 12 J Gomachie: "Sales Plan: July 2012"   |                     |             |            |             |             |             |             |             |            |            |           |
| Debtors - Closing   | days                | 0           | 0          | 30          | 30          | 30          | 30          |             |            |            |           |
| Debtors - Closing   | AS Real             |             |            | 0           | 0           | 2,622,341   | 5,231,950   |             |            |            |           |
| Cashstream 1: Revenue - A   | AS Real             | 266,633,502 | 0          | 0           | 0           | 29,282,804  | 61,045,783  |             |            |            |           |
| <b>Cashstream 2: Capital Costs</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 10 Aug 12 G Dawson email "Capital Cost Estimate: Indicative Estimates for New Technology route"   |                     |             |            |             |             |             |             |             |            |            |           |
| Initial Capital Costs   | AS Real             |             | 3,000,000  | 40,000,000  | 40,000,000  |             |             |             |            |            |           |
| Ongoing Capital Costs   | AS Real             | 15,000,000  |            |             |             | 6,000,000   | 6,000,000   |             |            |            |           |
| Cashstream 2: Capital Cost  | AS Real             | 98,000,000  | 3,000,000  | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   |             |            |            |           |
| <b>Tax deductions for Capital Expenditure</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 3 May 12 E Hermit Assume all capital is deducted in proportion to the gold sold over the life of mine.  |                     |             |            |             |             |             |             |             |            |            |           |
| Tax Deduction for Capital Expenditure   | % of contained gold |             |            |             |             | 13%         | 23%         |             |            |            |           |
| Tax deduction for capital expenditure   |                     | 98,000,000  |            |             |             | 10,716,624  | 22,638,938  |             |            |            |           |
| <b>Cashstream 3: Operating Costs</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 25 May 12 G Dawson email "Operating Cost Estimate: Indicative Estimates for new technology." There is no waste to be mined.                                   |                     |             |            |             |             |             |             |             |            |            |           |
| mining cost per tonne   | AS Real/tonne ore   | 25          |            |             |             | 4           | 4           | 5           | 6          | 6          |           |
| mining cost   | AS Real             | 21,600,000  |            |             |             | 4,000,000   | 5,000,000   | 5,000,000   | 6,000,000  | 4,200,000  | 0         |
| processing cost per tonne   | AS Real/tonne ore   | 75          |            |             |             | 15          | 15          | 15          | 15         | 15         |           |
| processing cost   | AS Real             | 64,500,000  |            |             |             | 9,000,000   | 15,000,000  | 15,000,000  | 15,000,000 | 10,500,000 | 0         |
| fixed costs   | AS Real             | 17,500,000  |            |             |             | 3,500,000   | 3,500,000   | 3,500,000   | 3,500,000  | 3,500,000  | 0         |
| Cashstream 3: Operating C   | AS Real             | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000  | 24,500,000 | 18,200,000 | 0         |
| cost per ounce  | AS/ounce Real       |             |            |             |             | 792         | 583         | 571         | 560        | 919        | 0         |
| <b>Cashstream 4: Taxes</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Government Royalties</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 2 June 12 R Torply: SA State Royalty is 1% of revenue paid monthly  |                     |             |            |             |             |             |             |             |            |            |           |
| State Royalty   | % of revenue        | 0.0%        | 5.0%       | 5.0%        | 5.0%        | 5.0%        | 5.0%        | 5.0%        | 5.0%       | 5.0%       | 5.0%      |
| State Royalty   | AS Real             | 13,331,675  | 0          | 0           | 0           | 1,595,257   | 3,182,770   | 3,280,732   | 3,486,520  | 1,694,979  | 91,417    |
| <b>Company Income Tax</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| 2 June 10 R Torply: Company income tax rate is 30%. The cash payment averages mid year. Assume operating cost cashstream approximates the cost of goods sold. |                     |             |            |             |             |             |             |             |            |            |           |
| Gold Revenue  |                     | 266,633,502 | 0          | 0           | 0           | 31,905,145  | 63,655,392  | 65,614,643  | 69,730,398 | 33,899,580 | 1,828,345 |
| Cashstream 3: Operating Costs - Alternative A   |                     | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000  | 24,500,000 | 18,200,000 | 0         |
| Tax deduction for capital expenditure   |                     | 98,000,000  | 0          | 0           | 0           | 10,716,624  | 22,638,938  | 24,794,226  | 26,349,473 | 12,809,852 | 690,889   |
| State Royalty   |                     | 13,331,675  | 0          | 0           | 0           | 1,595,257   | 3,182,770   | 3,280,732   | 3,486,520  | 1,694,979  | 91,417    |
| Assessable Income   |                     | 51,701,827  | 0          | 0           | 0           | 4,693,264   | 15,333,685  | 14,039,885  | 15,394,006 | 1,994,749  | 1,046,039 |
| Company Income Tax Rate   | % of assessable inc |             | 30.0%      | 30.0%       | 30.0%       | 30.0%       | 30.0%       | 30.0%       | 30.0%      | 30.0%      | 30.0%     |
| Income Tax  |                     | 15,510,548  | 0          | 0           | 0           | 1,407,979   | 4,600,105   | 4,211,905   | 4,618,322  | 598,425    | 313,812   |
| Income tax payment  |                     | 15,510,548  | 0          | 0           | 0           | 1,407,979   | 4,600,105   | 4,211,905   | 4,618,322  | 598,425    | 313,812   |
| Cashstream 4: Taxes - Alter   | AS Real             | 28,842,223  | 0          | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638   | 8,104,842  | 2,053,404  | 405,229   |
| <b>Cashflow and NPV</b>   |                     |             |            |             |             |             |             |             |            |            |           |
| <b>Cashflows</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| Cashstream 1: Revenue - Alternative A   | AS Real             | 266,633,502 | 0          | 0           | 0           | 29,282,804  | 61,045,783  | 65,453,608  | 69,392,117 | 36,844,578 | 4,614,612 |
| Cashstream 2: Capital Costs - Alternative A   | AS Real             | 98,000,000  | 3,000,000  | 40,000,000  | 40,000,000  | 6,000,000   | 6,000,000   | 2,000,000   | 3,000,000  | 0          | 0         |
| Cashstream 3: Operating Costs - Alternative A   | AS Real             | 103,600,000 | 0          | 0           | 0           | 14,900,000  | 22,500,000  | 23,500,000  | 24,500,000 | 18,200,000 | 0         |
| Cashstream 4: Taxes - Alternative A   | AS Real             | 28,842,223  | 0          | 0           | 0           | 3,003,236   | 7,782,875   | 7,492,638   | 8,104,842  | 2,053,404  | 405,229   |
| Cashflow - Alternative A  | AS Real             | 36,191,279  | -3,000,000 | #####       | #####       | 5,379,568   | 24,762,908  | 32,460,971  | 35,787,275 | 16,591,175 | 4,209,383 |
| IRR - Alternative A   | Real                |             |            |             |             |             |             |             |            |            | 9.7%      |
| <b>Discounting</b>  |                     |             |            |             |             |             |             |             |            |            |           |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012   |                     |             |            |             |             |             |             |             |            |            |           |
| Discount Rate   | % Real              |             | 8%         | 8%          | 8%          | 8%          | 8%          | 8%          | 8%         | 8%         | 8%        |
| Discount Factor   |                     |             | 0.96       | 0.89        | 0.82        | 0.76        | 0.71        | 0.65        | 0.61       | 0.56       | 0.52      |
| Discounted Cashflow - Alternative A   | AS Real             | 4,561,833   | -2,886,751 | -35,638,906 | -32,998,987 | 4,109,266   | 17,514,379  | 21,258,413  | 21,700,724 | 9,315,346  | 2,188,349 |
| Cumulative NPV - Alternative A  | AS                  |             | -2,886,751 | -38,525,657 | -71,524,643 | -67,415,378 | -49,900,999 | -28,642,585 | -6,941,861 | 2,375,484  | 4,561,833 |
| NPV - Alternative A   | AS                  | 4,561,833   |            |             |             |             |             |             |            |            |           |



When you start a model do not build in extra rows of computations "in case they will be needed in the near future".

### 3. Begin the model as simply as practical

The above example is less than 100 rows. If you look inside you will see that the operating costs are just three simple components: two variable costs and one fixed cost.

| Life of Mine   | units               | Total              | 2015     | 2016     | 2017     | 2018              | 2019              | 2020              | 2021              |
|--|---------------------|--------------------|----------|----------|----------|-------------------|-------------------|-------------------|-------------------|
| <b>Cashstream 3: Operating Costs</b>   |                     |                    |          |          |          |                   |                   |                   |                   |
| <small>25 May 14 G.Dawson email "Operating Cost Estimate: Indicative Estimates for new technology." There is no waste to be mined.</small> |                     |                    |          |          |          |                   |                   |                   |                   |
| mining cost per tonne  | A\$ Real/ tonne ore | 25                 |          |          |          | 4                 | 4                 | 5                 | 6                 |
| mining cost  | A\$ Real            | 21,600,000         |          |          |          | 2,400,000         | 4,000,000         | 5,000,000         | 6,000,000         |
| processing cost per tonne  | A\$ Real/ tonne ore | 75                 |          |          |          | 15                | 15                | 15                | 15                |
| processing cost  | A\$ Real            | 64,500,000         |          |          |          | 9,000,000         | 15,000,000        | 15,000,000        | 15,000,000        |
| fixed costs  | A\$ Real            | 17,500,000         |          |          |          | 3,500,000         | 3,500,000         | 3,500,000         | 3,500,000         |
| <b>Cashstream 3: Operating C</b>   | <b>A\$ Real</b>     | <b>103,600,000</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>14,900,000</b> | <b>22,500,000</b> | <b>23,500,000</b> | <b>24,500,000</b> |
| cost per ounce   | A\$/ounce Real      |                    |          |          |          | 792               | 583               | 571               | 560               |



| Life of Mine | units | Total | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|--------------|-------|-------|------|------|------|------|------|------|------|------|
|--------------|-------|-------|------|------|------|------|------|------|------|------|

### Cashstream 3: Operating Costs

1Jun14 P Card: Match the detail of the operating costs with their materiality. In Scopng and PreFea

| <b>Mining</b>   |                            |               |              |              |              |  |  |  |  |  |
|---|----------------------------|---------------|--------------|--------------|--------------|--|--|--|--|--|
| 5 May 14 G Dawson "Operating Cost Estimate: Indicative Estimates."                                  |                            |               |              |              |              |  |  |  |  |  |
| <b>waste cost per tonne</b>   | <b>A\$ Real/ tonne ore</b> |               |              |              | <b>5</b>     |  |  |  |  |  |
| waste opex  | A\$ 000                    | 13,350        | 0            | 0            | 4,250        |  |  |  |  |  |
| <b>mining cost per tonne</b>  | <b>A\$ Real/ tonne ore</b> |               |              |              |              |  |  |  |  |  |
| ore opex  | A\$ 000                    | 16,180        | 0            | 0            | 0            |  |  |  |  |  |
| <b>mining fixed costs - rate</b>  | <b>A\$ 000/annum R</b>     | <b>1,250</b>  | <b>1,250</b> | <b>1,250</b> |              |  |  |  |  |  |
| mining fixed costs  | A\$ 000                    | 6,250         | 0            | 0            | 0            |  |  |  |  |  |
| <b>mining opex</b>  |                            | <b>35,780</b> | <b>0</b>     | <b>0</b>     | <b>4,250</b> |  |  |  |  |  |
| <b>Processing</b>   |                            |               |              |              |              |  |  |  |  |  |
| 5 May 14 G Dawson "Operating Cost Estimate: Indicative Estimates."                                  |                            |               |              |              |              |  |  |  |  |  |
| <b>processing cost per tonne - rat</b>  | <b>A\$ Real/ tonne oi</b>  | <b>22</b>     | <b>22</b>    | <b>22</b>    |              |  |  |  |  |  |
| processing opex - ore   | A\$ 000                    | 45,540        | 0            | 0            | 0            |  |  |  |  |  |
| <b>processing cost per ounce of gr</b>  | <b>A\$ Real/ ounce gr</b>  | <b>15</b>     | <b>15</b>    | <b>15</b>    |              |  |  |  |  |  |
| processing opex - gold  | A\$ 000                    | 1,796         | 0            | 0            | 0            |  |  |  |  |  |
| <b>processing fixed costs - rate</b>  | <b>A\$ 000/annum R</b>     | <b>750</b>    | <b>750</b>   | <b>750</b>   |              |  |  |  |  |  |
| processing fixed costs  | A\$ 000                    | 0             | 0            | 0            | 0            |  |  |  |  |  |
| <b>processing opex</b>  | <b>A\$ 000</b>             | <b>47,336</b> | <b>0</b>     | <b>0</b>     | <b>0</b>     |  |  |  |  |  |
| <b>General &amp; Administration</b>   |                            |               |              |              |              |  |  |  |  |  |
| 5 May 14 G Dawson email with prelim estimate which needs confirmation                               |                            |               |              |              |              |  |  |  |  |  |
| <b>G&amp;A cost per tonne - rate</b>  | <b>A\$ Real/ tonne oi</b>  | <b>1.20</b>   | <b>1.20</b>  | <b>1.20</b>  |              |  |  |  |  |  |
| G&A opex - ore  | A\$ 000                    | 2,484         | 0            | 0            | 0            |  |  |  |  |  |
| <b>G&amp;A fixed costs - rate</b>   | <b>A\$ 000/annum R</b>     | <b>1,500</b>  | <b>1,500</b> | <b>1,500</b> |              |  |  |  |  |  |
| G&A fixed costs   | A\$ 000                    | 7,500         | 0            | 0            | 0            |  |  |  |  |  |
| <b>General &amp; Administration</b>   | <b>A\$ 000</b>             | <b>9,984</b>  | <b>0</b>     | <b>0</b>     | <b>0</b>     |  |  |  |  |  |
| <b>Private Royalties</b>  |                            |               |              |              |              |  |  |  |  |  |
| 1Jun14 P Card: Include private royalties in 'Operating Costs' and government royalties in "Taxes".  |                            |               |              |              |              |  |  |  |  |  |
| 5 Jun 14 F Vectora: The previous leaseholders, GFD Mining Ltd, have a royalty of 1.25% of gross rev |                            |               |              |              |              |  |  |  |  |  |
| Gold Revenue  | A\$ 000                    | 171,292       | 0            | 0            | 0            |  |  |  |  |  |
| <b>Private Royalty - GFD</b>  | <b>% of gross revenu</b>   | <b>1.25%</b>  | <b>1.25%</b> | <b>1.25%</b> |              |  |  |  |  |  |
| G&A opex - ore  | A\$ 000                    | 2,141         | 0            | 0            | 0            |  |  |  |  |  |

## 3. Begin the model as simply as practical

### Calculations in moderately advanced models:

If it is decided to take the evaluation to the next phase then each of the four cashstreams will be given more detail and complexity.

The operating costs, for example, may be:

- i. given a dedicated worksheet with a bold heading
- ii. broken into four sub-groups with bold sub-headings,
- iii. Each sub-group made a discrete work block and computed as fixed and variable costs
- iv. Each sub-group given an obvious sub-total

It would flow down in small obvious steps so it is intuitive for others.

|                           |                |               |          |          |              |               |               |               |               |               |
|---------------------------|----------------|---------------|----------|----------|--------------|---------------|---------------|---------------|---------------|---------------|
| <b>Cashstream 3: Opex</b> | <b>A\$ 000</b> | <b>95,241</b> | <b>0</b> | <b>0</b> | <b>4,250</b> | <b>15,632</b> | <b>21,162</b> | <b>23,076</b> | <b>20,952</b> | <b>10,170</b> |
|---------------------------|----------------|---------------|----------|----------|--------------|---------------|---------------|---------------|---------------|---------------|

1Jun14 P Card: The next three rows of computations are essential to understanding the business. How far below the selling price are the operating costs including gov't roy

|   |                |     |   |   |   |     |     |     |     |       |
|---|----------------|-----|---|---|---|-----|-----|-----|-----|-------|
| opex before royalty & taxes per ounce   | A\$/ounce      | 795 | 0 | 0 | 0 | 769 | 634 | 827 | 714 | 1,155 |
| opex including gov't royalty            | A\$/ounce      | 838 | 0 | 0 | 0 | 813 | 675 | 870 | 755 | 1,210 |
| operating margin after royalties before | A\$/ounce Real |     | 0 | 0 | 0 | 787 | 725 | 610 | 415 | 196   |

### 3. Begin the model as simply as practical

#### Calculations in long, detailed and complex models ...

Major operational, major business models and feasibility study models generally need to greatly increase the detail of the four cashstreams:

1. **Revenue** may require several worksheets to compute: –
  - Production, processing, products, stockpiles and logistics
  - Price forecasts and concentrate pricing
  - Revenue including sales, working stocks and debtors
2. **Capital costs** usually are estimated externally and so are entered in summary, with sufficient detail for broad tax classifications. Sustaining and expansion capex may have a separate worksheet
3. **Operating costs** may warrant several worksheets that reference the production worksheets, compute in fixed and variable costs and include working capital.
4. **Taxes and Royalties** could be modelled in very high detail over thousands of rows to be exactly correct. But usually this is not justified by its relative importance. Income tax, for example, can be sensibly simplified and still match the accuracy of the key parameters of price, sales volume and costs.

| Life of Mine   | units               | Total              | 2015              | 2016              | 2017              | 2018              | 2019              | 2020              | 2021              | 2022              | 2023             |
|--|---------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|
| <b>Cashstream 1: Production and Revenue</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| <b>Production</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 11 Aug 12 Henson mine schedule "Mine Plan for new technology 12 Aug 11"  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Ons Production   | tonnes              | 4,300,000          |                   |                   |                   | 600,000           | 1,000,000         | 1,000,000         | 1,000,000         | 700,000           |                  |
| Head grade   | grams/tonne         | 1.5                |                   |                   |                   | 1.3               | 1.5               | 1.6               | 1.7               | 1.1               |                  |
| Contained gold mined   | ounces              | 204,180            | 0                 | 0                 | 0                 | 25,080            | 48,232            | 51,447            | 54,662            | 24,759            | 0                |
| Processing Recovery  | % of contained gold |                    |                   |                   |                   | 75%               | 75%               | 80%               | 80%               | 80%               | 0                |
| Gold produced  | ounces              | 162,090            | 0                 | 0                 | 0                 | 18,810            | 38,585            | 41,158            | 43,730            | 19,807            | 0                |
| <b>Sales</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 23 Aug 12 J Gomachie "Sales Plan: July 2012"   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Gold in circuit  | weeks               | 0                  | 3                 | 3                 | 3                 | 3                 | 3                 | 3                 | 3                 | 3                 | 3                |
| Gold in circuit  | ounces              |                    | 0                 | 0                 | 0                 | 1,085             | 2,226             | 2,374             | 2,523             | 1,143             | 0                |
| Gold sold  | ounces              | 162,090            | 0                 | 0                 | 0                 | 17,725            | 37,444            | 41,009            | 43,581            | 21,187            | 1,143            |
| <b>Revenue</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 23 Aug 10 ABC Company Forecast of gold price   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Gold price Forecast  | A\$/ounce Real      | 1642.27985         | 1800              | 2000              | 1900              | 1800              | 1700              |                   |                   |                   |                  |
| Gold Revenue   | A\$ Real            | 266,633,502        | 0                 | 0                 | 0                 | 31,905,145        | 63,655,392        |                   |                   |                   |                  |
| 23 Aug 12 J Gomachie "Sales Plan: July 2012"   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Debtors  | days                | 0                  | 0                 | 30                | 30                | 30                | 30                |                   |                   |                   |                  |
| Debtors - Closing  | A\$ Real            |                    |                   | 2,622,341         | 5,231,950         |                   |                   |                   |                   |                   |                  |
| <b>Cashstream 1: Revenue - A</b>   | <b>A\$ Real</b>     | <b>266,633,502</b> | <b>0</b>          | <b>0</b>          | <b>0</b>          | <b>31,905,145</b> | <b>61,045,782</b> |                   |                   |                   |                  |
| <b>Cashstream 2: Capital Costs</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 10 Aug 12 G Dawson email "Capital Cost Estimate: Indicative Estimates for New Technology route"  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Initial Capital Costs  | A\$ Real            |                    | 3,000,000         | 40,000,000        | 40,000,000        |                   |                   |                   |                   |                   |                  |
| Ongoing Capital Costs  | A\$ Real            |                    |                   |                   |                   | 6,000,000         | 6,000,000         |                   |                   |                   |                  |
| <b>Cashstream 2: Capital Cost</b>  | <b>A\$ Real</b>     | <b>98,000,000</b>  | <b>3,000,000</b>  | <b>40,000,000</b> | <b>40,000,000</b> | <b>6,000,000</b>  | <b>6,000,000</b>  |                   |                   |                   |                  |
| <b>Tax deductions for Capital Expenditure</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 3 May 12 E Hermi Assume all capital is deducted in proportion to the gold sold over the life of mine.  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Tax deduction for Capital Expenditure  | % of contained gold |                    |                   |                   |                   | 15%               | 23%               |                   |                   |                   |                  |
| Tax deduction for capital expenditure  | A\$ Real            | 98,000,000         |                   |                   |                   | 10,716,624        | 22,638,938        |                   |                   |                   |                  |
| <b>Cashstream 3: Operating Costs</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 25 May 12 G Dawson email "Operating Cost Estimate: Indicative Estimates for new technology." There is no waste to be mined.                                  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| mining cost per tonne  | A\$ Real/ tonne ore | 25                 |                   |                   |                   | 4                 | 4                 |                   |                   |                   |                  |
| mining cost  | A\$ Real            | 21,600,000         |                   |                   |                   | 2,400,000         | 4,000,000         |                   |                   |                   |                  |
| processing cost per tonne  | A\$ Real/ tonne ore | 75                 |                   |                   |                   | 15                | 15                |                   |                   |                   |                  |
| processing cost  | A\$ Real            | 64,500,000         |                   |                   |                   | 9,000,000         | 15,000,000        |                   |                   |                   |                  |
| fixed costs  | A\$ Real            | 17,500,000         |                   |                   |                   | 3,500,000         | 3,500,000         |                   |                   |                   |                  |
| <b>Cashstream 3: Operating C</b>   | <b>A\$ Real</b>     | <b>103,600,000</b> | <b>0</b>          | <b>0</b>          | <b>0</b>          | <b>14,900,000</b> | <b>22,500,000</b> |                   |                   |                   |                  |
| cost per ounce   | A\$/ounce Real      |                    |                   |                   |                   | 792               | 583               |                   |                   |                   |                  |
| <b>Cashstream 4: Taxes</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| <b>Government Royalties</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 2 June 12 R Torpy: SA State Royalty is 1% of revenue paid monthly  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| State Royalty  | % of revenue        | 0.0%               | 5.0%              | 5.0%              | 5.0%              | 5.0%              | 5.0%              | 5.0%              | 5.0%              | 5.0%              | 5.0%             |
| State Royalty  | A\$ Real            | 13,331,675         | 0                 | 0                 | 0                 | 1,595,257         | 3,182,770         | 3,280,732         | 3,486,520         | 1,694,979         | 91,417           |
| <b>Company Income Tax</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 2 June 10 R Torpy: Company income tax rate is 30%. The cash payment averages mid year. Assume operating cost cashstream approximates the cost of goods sold. |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Gold Revenue   | A\$ Real            | 266,633,502        | 0                 | 0                 | 0                 | 31,905,145        | 63,655,392        | 65,614,643        | 69,730,398        | 33,890,580        | 1,828,345        |
| WSS  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Cashstream 3: Operating Costs - Alternative A  | A\$ Real            | 103,600,000        | 0                 | 0                 | 0                 | 14,900,000        | 22,500,000        | 23,500,000        | 24,500,000        | 18,200,000        | 0                |
| Tax deduction for capital expenditure  | A\$ Real            | 98,000,000         | 0                 | 0                 | 0                 | 10,716,624        | 22,638,938        | 24,794,226        | 26,349,473        | 12,809,852        | 690,889          |
| State Royalty  | A\$ Real            | 13,331,675         | 0                 | 0                 | 0                 | 1,595,257         | 3,182,770         | 3,280,732         | 3,486,520         | 1,694,979         | 91,417           |
| Assessable Income  | A\$ Real            | 51,701,827         | 0                 | 0                 | 0                 | 4,693,264         | 15,333,685        | 14,039,685        | 15,394,406        | 1,194,749         | 1,046,039        |
| Company Income Tax Rate  | % of assessable inc | 0.0%               | 30.0%             | 30.0%             | 30.0%             | 30.0%             | 30.0%             | 30.0%             | 30.0%             | 30.0%             | 30.0%            |
| Income Tax   | A\$ Real            | 15,510,548         | 0                 | 0                 | 0                 | 1,407,979         | 4,600,105         | 4,211,905         | 4,618,322         | 358,425           | 313,812          |
| Income tax payment   | A\$ Real            | 15,510,548         | 0                 | 0                 | 0                 | 1,407,979         | 4,600,105         | 4,211,905         | 4,618,322         | 358,425           | 313,812          |
| <b>Cashstream 4: Taxes - Alternative A</b>   | <b>A\$ Real</b>     | <b>28,842,223</b>  | <b>0</b>          | <b>0</b>          | <b>0</b>          | <b>3,003,236</b>  | <b>7,782,875</b>  | <b>7,492,638</b>  | <b>8,104,842</b>  | <b>2,053,404</b>  | <b>405,229</b>   |
| <b>Cashflow and NPV</b>  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| <b>Cashflows</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Cashstream 1: Revenue - Alternative A  | A\$ Real            | 266,633,502        | 0                 | 0                 | 0                 | 29,282,804        | 61,045,783        | 65,453,608        | 69,392,117        | 36,844,578        | 4,614,612        |
| Cashstream 2: Capital Costs - Alternative A  | A\$ Real            | 98,000,000         | 3,000,000         | 40,000,000        | 40,000,000        | 6,000,000         | 6,000,000         | 2,000,000         | 1,000,000         | 0                 | 0                |
| Cashstream 3: Operating Costs - Alternative A  | A\$ Real            | 103,600,000        | 0                 | 0                 | 0                 | 14,900,000        | 22,500,000        | 23,500,000        | 24,500,000        | 18,200,000        | 0                |
| Cashstream 4: Taxes - Alternative A  | A\$ Real            | 28,842,223         | 0                 | 0                 | 0                 | 3,003,236         | 7,782,875         | 7,492,638         | 8,104,842         | 2,053,404         | 405,229          |
| <b>Cashflow - Alternative A</b>  | <b>A\$ Real</b>     | <b>36,191,279</b>  | <b>-3,000,000</b> | <b>#####</b>      | <b>#####</b>      | <b>5,379,568</b>  | <b>24,762,908</b> | <b>32,460,971</b> | <b>35,787,275</b> | <b>16,591,175</b> | <b>4,209,383</b> |
| <b>IRR - Alternative A</b>   | <b>Real</b>         | <b>9.7%</b>        |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| <b>Discounting</b>   |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| 17 July 10 F Green email: discount rate for investment in gold is 8% Real. The base date is 1 July 2012  |                     |                    |                   |                   |                   |                   |                   |                   |                   |                   |                  |
| Discount Rate  | % Real              |                    | 8%                | 8%                | 8%                | 8%                | 8%                | 8%                | 8%                | 8%                | 8%               |
| Discount Factor  |                     |                    | 0.96              | 0.89              | 0.82              | 0.76              | 0.71              | 0.65              | 0.61              | 0.56              | 0.52             |
| Discounted Cashflow - Alternative A  | A\$ Real            | 4,561,833          | -2,886,751        | -35,638,906       | -32,998,987       | 4,109,266         | 17,514,379        | 21,258,413        | 21,700,724        | 9,315,346         | 2,188,349        |
| Cumulative NPV - Alternative A   | A\$                 |                    | -2,886,751        | -38,525,657       | -71,524,643       | -67,415,378       | -49,900,999       | -28,642,585       | -6,941,861        | 2,373,484         | 4,561,833        |
| <b>NPV - Alternative A</b>   | <b>A\$</b>          | <b>4,561,833</b>   |                   |                   |                   |                   |                   |                   |                   |                   |                  |

Make your workings intuitive:

4. Make changes to the model strictly follow the rules and appear obvious

| Revenue   |                |         |       |       |       |        |        |        |
|---|----------------|---------|-------|-------|-------|--------|--------|--------|
| 1Jun14P Card: For base metal concentrates and other commodities with complex price calculations, the workings must be shown here in : |                |         |       |       |       |        |        |        |
| 23 Aug 14 ABC Company Forecast of gold price in A\$   |                |         |       |       |       |        |        |        |
| Gold price forecast   | A\$/ounce Real |         | 1,800 | 1,700 | 1,600 | 1,600  | 1,400  | 1,400  |
| Gold Revenue  | A\$ 000 Real   | 144,687 | 0     | 0     | 0     | 34,596 | 31,234 | 28,919 |



## Changing the model:

Here is your original model with gold prices referenced in green font from the 'inputs' worksheet. Now you want to easily and visually test the impacts of higher and lower prices. Do this by: –


1. Go into the 'inputs' worksheet and alter the prices so they flow automatically back to here – this is the usual way OR
2. If you want a permanent change in one case you can convert the row to fresh data inputs, with a row note above. Use big font to make it obvious.

| Revenue  |                |         |       |       |       |        |        |        |
|--|----------------|---------|-------|-------|-------|--------|--------|--------|
| 2 Aug2014 PT Evans asked for a new 'what-if' case where the gold price was \$1000. (Mine schedule was reworked for t |                |         |       |       |       |        |        |        |
| Gold price forecast  | A\$/ounce Real |         | 1,000 | 1,000 | 1,000 | 1,000  | 1,000  | 1,000  |
| Gold Revenue   | A\$ 000 Real   | 114,527 | 0     | 0     | 0     | 21,623 | 22,310 | 20,656 |

3. Or if you want to repeatedly test percentage changes you may add an extra couple of rows and again use larger font to make the changes obvious.

| Revenue  |                |         |       |       |       |        |        |  |
|--|----------------|---------|-------|-------|-------|--------|--------|--|
| 12 Sep 14 L Avila requested testing at varying price increases/decreases |                |         |       |       |       |        |        |  |
| Gold price forecast  | A\$/ounce Real |         | 1,800 | 1,700 | 1,600 | 1,600  | 1,400  |  |
| Increase/decrease gold price by  |                |         | -15%  | -15%  | -15%  | -15%   | -15%   |  |
| Gold price after   | A\$/ounce Real |         | 1,530 | 1,445 | 1,360 | 1,360  | 1,190  |  |
| Gold Revenue   | A\$ 000 Real   | 122,984 | 0     | 0     | 0     | 29,407 | 26,549 |  |

**Do not** overwrite the 'referenced data' in any cell !!!



| <b>Revenue</b>  |                |         |       |       |       |        |        |        |
|---|----------------|---------|-------|-------|-------|--------|--------|--------|
| 1Jun14P Card: For base metal concentrates and other commodities with complex price calculations, the workings must be shown here in |                |         |       |       |       |        |        |        |
| 23 Aug 14 ABC Company Forecast of gold price in A\$   |                |         |       |       |       |        |        |        |
| Gold price forecast   | A\$/ounce Real |         | 1,000 | 1,000 | 1,000 | 1,000  | 1,000  | 1,000  |
| Gold Revenue  | A\$ 000 Real   | 114,527 | 0     | 0     | 0     | 21,623 | 22,310 | 20,656 |

People looking at this row must think/ expect/demand that it is exactly how it appears in the 'inputs' worksheet. They must not find that the algorithm has been overtyped as '1000'. They must not discover that the algorithm in Column A has been overtyped with words. This would make the whole model flawed. It is very poor and sloppy because it is misleading.

Instead, take a few minutes and do it properly – just in case you are run over by a bus and someone else takes over your modelling

Of all the mistakes made in modelling this is amongst the most common and worst.

# Make your workings intuitive:

**Colour coding** makes understanding much faster and you can make changes rigorously

| Life of Mine   | units               | Total              | 2015     | 2016     | 2017     | 2018              | 2019              | 2020              | 2021              |
|--|---------------------|--------------------|----------|----------|----------|-------------------|-------------------|-------------------|-------------------|
| <b>Cashstream 3: Operating Costs</b>   |                     |                    |          |          |          |                   |                   |                   |                   |
| <small>25 May 14 G Dawson email "Operating Cost Estimate: Indicative Estimates for new technology." There is no waste to be mined.</small> |                     |                    |          |          |          |                   |                   |                   |                   |
| mining cost per tonne  | A\$ Real/ tonne ore | 25                 |          |          |          | 4                 | 4                 | 5                 | 6                 |
| mining cost  | A\$ Real            | 21,600,000         |          |          |          | 2,400,000         | 4,000,000         | 5,000,000         | 6,000,000         |
| processing cost per tonne  | A\$ Real/ tonne ore | 75                 |          |          |          | 15                | 15                | 15                | 15                |
| processing cost  | A\$ Real            | 64,500,000         |          |          |          | 9,000,000         | 15,000,000        | 15,000,000        | 15,000,000        |
| fixed costs  | A\$ Real            | 17,500,000         |          |          |          | 3,500,000         | 3,500,000         | 3,500,000         | 3,500,000         |
| <b>Cashstream 3: Operating C</b>   | <b>A\$ Real</b>     | <b>103,600,000</b> | <b>0</b> | <b>0</b> | <b>0</b> | <b>14,900,000</b> | <b>22,500,000</b> | <b>23,500,000</b> | <b>24,500,000</b> |
| cost per ounce   | A\$/ounce Real      |                    |          |          |          | 792               | 583               | 571               | 560               |

As a refresher on colour coding: –

- The green colour shows data referenced from an another worksheet.
- The blue colour shows fresh data inputs (with the source visible above)
- The black shows a calculation

And the workings are contained within obvious work blocks.

# Be in control ...

You always must model with a 'helicopter view' of the business.

1. Put detail into the parameters that drive the cashflows:  
such as throughput, recovery, product quality, sales, prices, key operating costs, initial capital costs, perhaps ongoing capex.
2. Simplify the lesser parameters that essentially 'follow' the primary drivers listed above and therefore have secondary impact:  
such as income taxes, other direct taxes, tax deductions for capex, royalties, debtors, creditors.

With experience you will come to know which parameters warrant detail and which are less important.

**Take control of the model!**

# End