Teach yourself how to build a Business Case for any industry including mining

1d Hands On Modelling – a typical worksheet

This module is absolutely fundamental!!!

Aspendale Beach: Richard Newton

This module is absolutely fundamental!!!

Spend only a few seconds/minutes on each page

This website may contain errors so always check your own work and have it audited by a competent person.

Aspendale Beach: Richard Newton

Building a business case has activities on three levels …

Level 3: Decision making

Level 2: Evaluating the business/project

Level 1: Hands-on business modelling

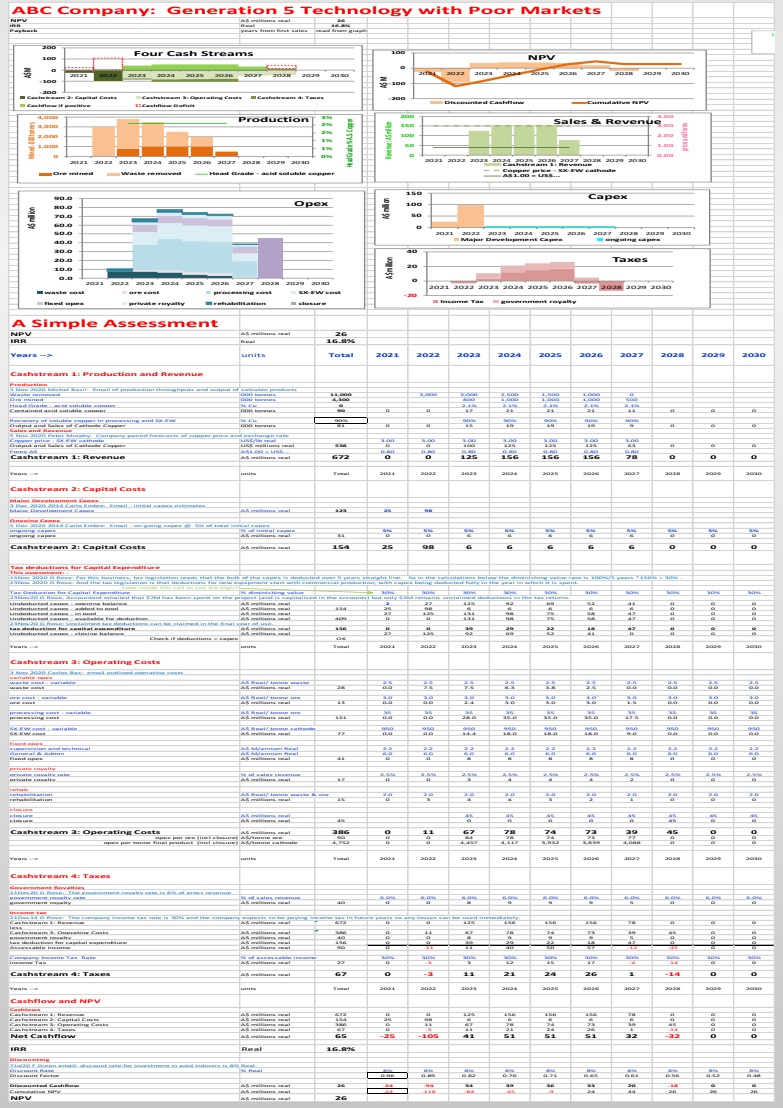
The purpose of this module is to show how to layout a worksheet

Typical worksheet architecture …

i. Title

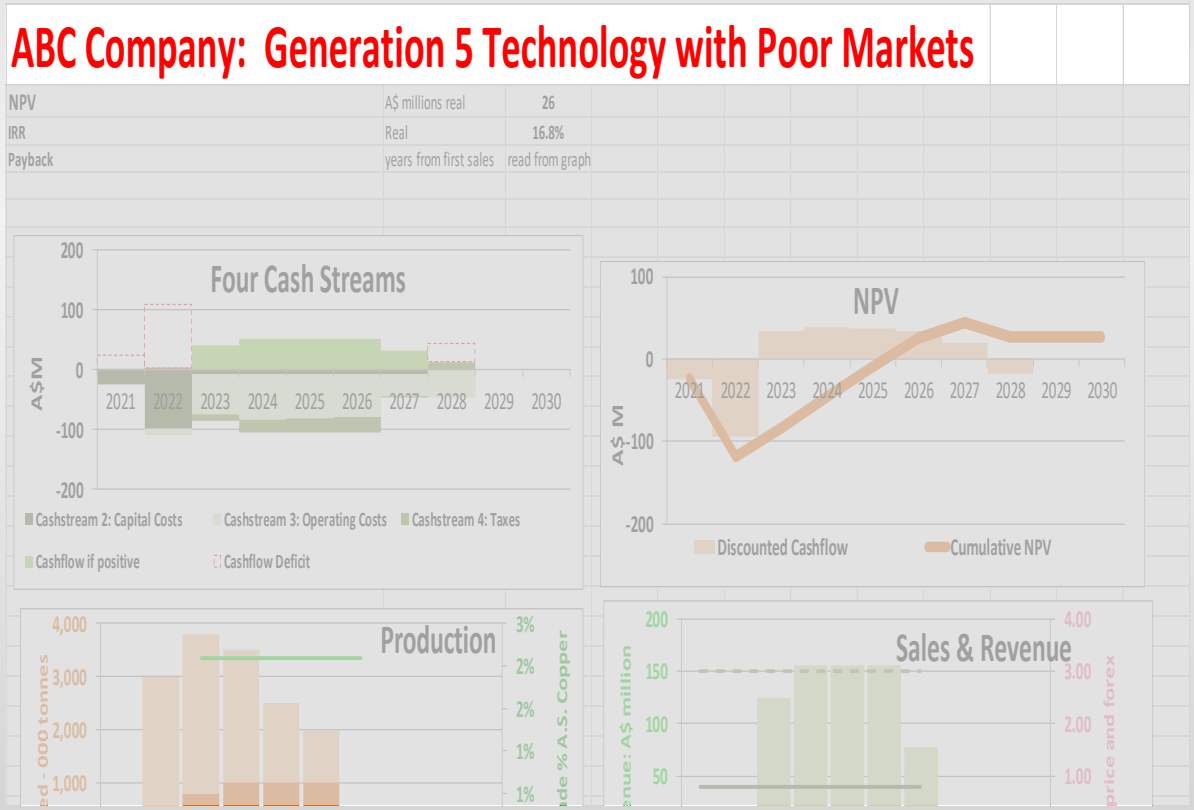
ii. Summary

iii. Workings



Typical worksheet architecture…

i. **Title** = bold and descriptive ·····>



Typical worksheet architecture…

i. **Title** – bold and descriptive

ii. Summary …

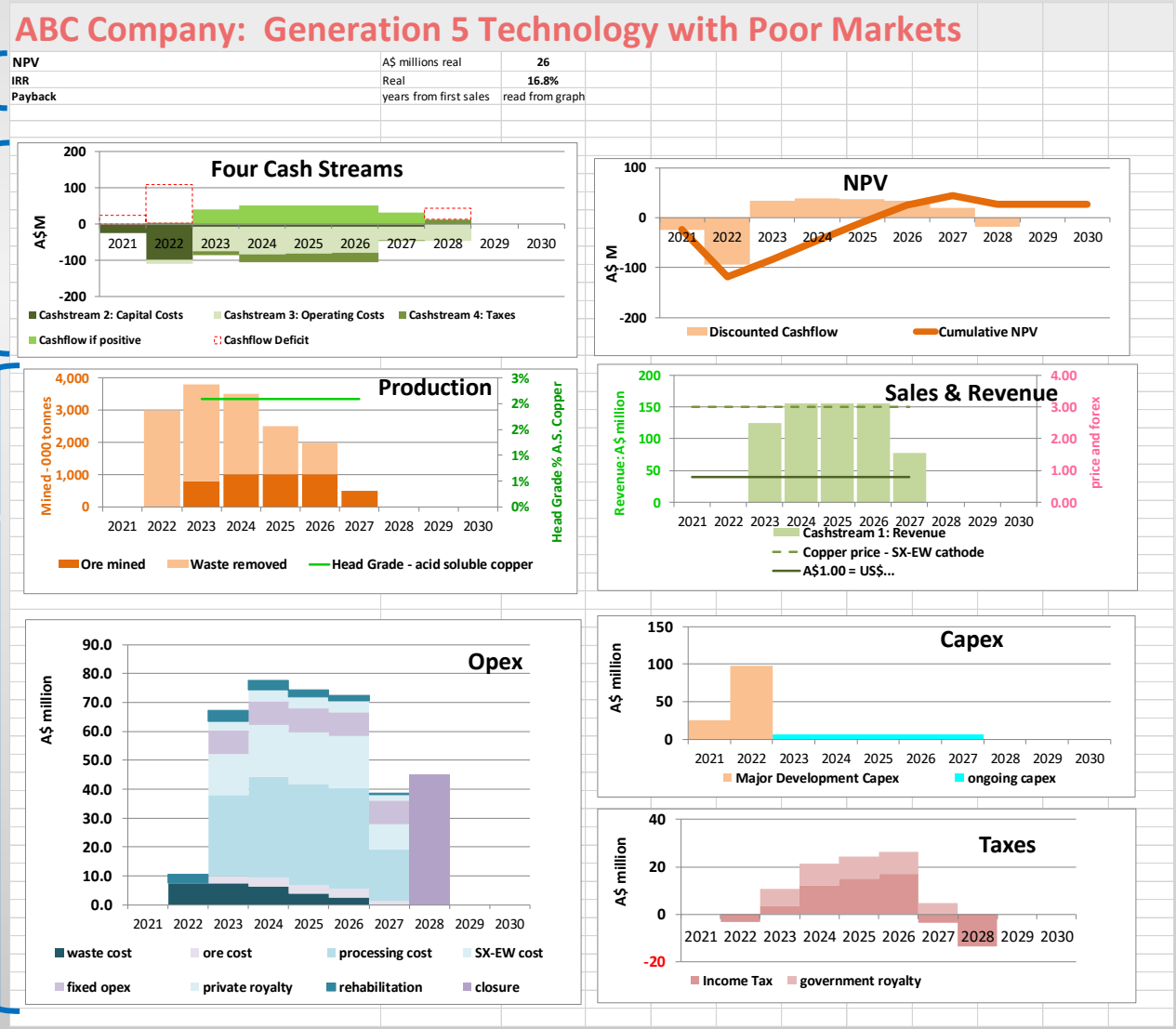
Numeric Summary

(Key metrics … NPV, IRR, Payback, key prices …)

Visual Summary

These graphs instantly reveal the viability of the business/project with these underlying input assumptions.

- outputs
- Inputs



Typical worksheet architecture…

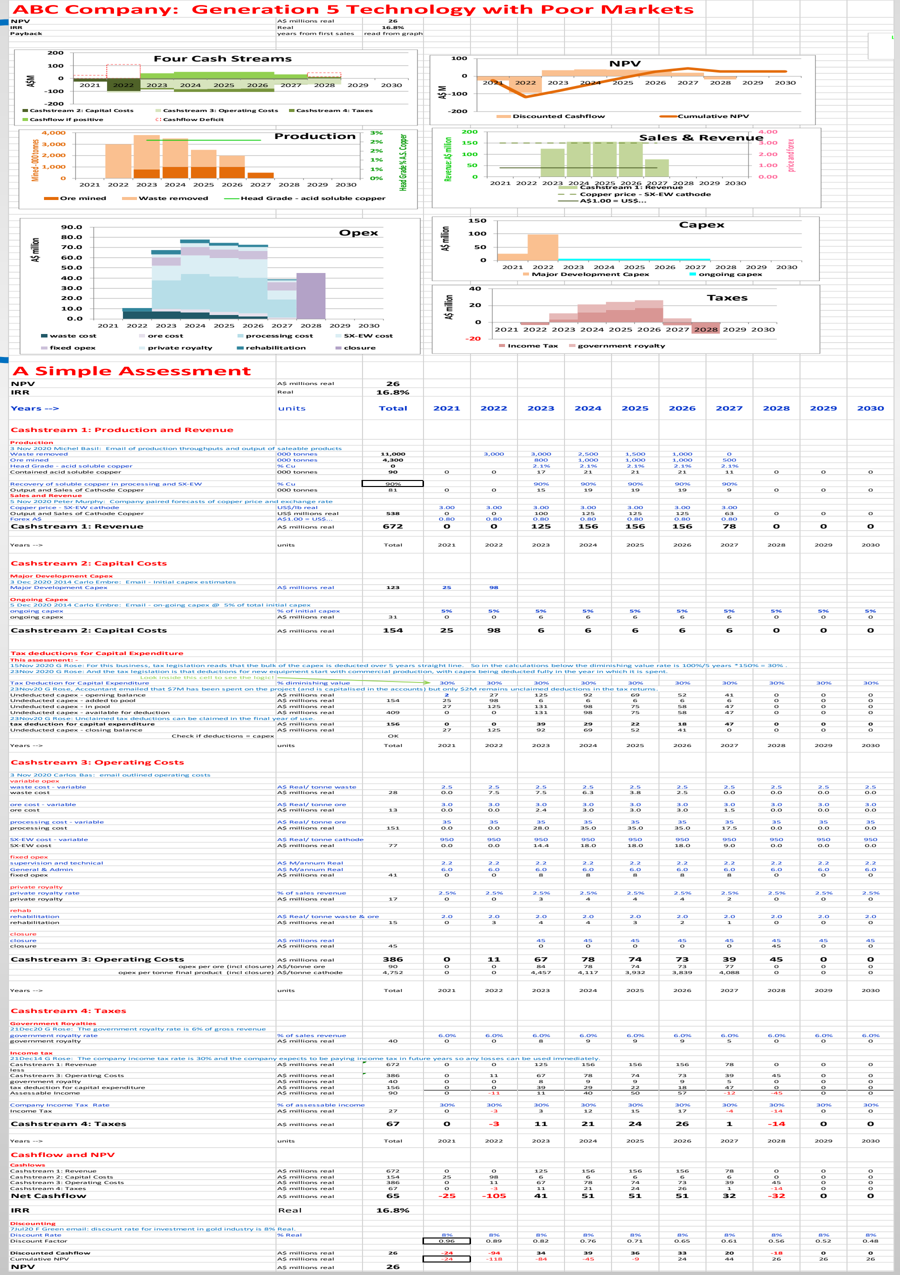
ii Summary

Some managers and colleagues will want a quick overview of the business/project/idea and will go straight to this **Summary** of key metrics and graphs of key inputs and outputs. They will not want to work through the computations.

Unfortunately, **hack modellers** will be in frantic rush to report the NPV/IRR. They will feel too pressed to take a few extra minutes to create these graphs.

Competent and efficient professionals will use graphs to:

1. find their own errors
2. find colleagues' errors, and
3. to give rapid understanding to others



ABC Company: Generation 5 Technology with Poor Markets

NPV	A$ millions real	26
IRR	Real	16.8%
Payback	years from first sales	read from graph

A Simple Assessment

NPV	A$ millions real	26										
IRR	Real	16.8%										
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashstream 1: Production and Revenue												
Production												
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products												
Waste removed	000 tonnes	11,000		3,000	3,000	2,500	1,500	1,000	0			
Ore mined	000 tonnes	4,300			800	1,000	1,000	1,000	500			
Head Grade - acid soluble copper	% Cu	0			2.1%	2.1%	2.1%	2.1%	2.1%			
Contained acid soluble copper	000 tonnes	90	0	0	17	21	21	21	11	0	0	0
Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%	90%	90%	90%			
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19	19	9	0	0	0
Sales and Revenue												
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate												
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.00	3.00			
Output and Sales of Cathode Copper	US$ millions real	538	0	0	100	125	125	125	63	0	0	0
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.80	0.80			
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**	**156**	**78**	**0**	**0**	**0**
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashstream 2: Capital Costs												
Major Development Capex												
3 Dec 2020 2014 Carlo Embre: Email - Initial capex estimates												
Major Development Capex	A$ millions real	123	25	98								
Ongoing Capex												
5 Dec 2020 2014 Carlo Embre: Email - on-going capex @ 5% of total initial capex												
ongoing capex	% of initial capex		5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
ongoing capex	A$ millions real	31	0	0	6	6	6	6	6	0	0	0
Cashstream 2: Capital Costs	A$ millions real	**154**	**25**	**98**	**6**	**6**	**6**	**6**	**6**	**0**	**0**	**0**
Tax deductions for Capital Expenditure												
This assessment: -												
15Nov 2020 G Rose: For this business, tax legislation reads that the bulk of the capex is deducted over 5 years straight line. So in the calculations below the diminishing value rate is 100%/5 years *150% = 30% .												
23Nov 2020 G Rose: And the tax legislation is that deductions for new equipment start with commercial production, with capex being deducted fully in the year in which it is spent.												
Look inside this cell to see the logic!												
Tax Deduction for Capital Expenditure	% diminishing value		30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
23Nov20 G Rose, Accountant emailed that $7M has been spent on the project (and is capitalised in the accounts) but only $2M remains unclaimed deductions in the tax returns.												
Undeducted capex - opening balance	A$ millions real		2	27	125	92	69	52	41	0	0	0
Undeducted capex - added to pool	A$ millions real	154	25	98	6	6	6	6	6	0	0	0
Undeducted capex - in pool	A$ millions real		27	125	131	98	75	58	47	0	0	0
Undeducted capex - available for deduction	A$ millions real	409	0	0	131	98	75	58	47	0	0	0
23Nov20 G Rose: Unclaimed tax deductions can be claimed in the final year of use.												
tax deduction for capital expenditure	A$ millions real	**156**	**0**	**0**	**39**	**29**	**22**	**18**	**47**	**0**	**0**	**0**
Undeducted capex - closing balance	A$ millions real		27	125	92	69	52	41	0	0	0	0
Check if deductions = capex		OK										
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashstream 3: Operating Costs												
3 Nov 2020 Carlos Bas: email outlined operating costs												
variable opex												
waste cost - variable	A$ Real/ tonne waste		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
waste cost	A$ millions real	28	0.0	7.5	7.5	6.3	3.8	2.5	0.0	0.0	0.0	0.0
ore cost - variable	A$ Real/ tonne ore		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ore cost	A$ millions real	13	0.0	0.0	2.4	3.0	3.0	3.0	1.5	0.0	0.0	0.0
processing cost - variable	A$ Real/ tonne ore		35	35	35	35	35	35	35	35	35	35
processing cost	A$ millions real	151	0.0	0.0	28.0	35.0	35.0	35.0	17.5	0.0	0.0	0.0
SX-EW cost - variable	A$ Real/ tonne cathode		950	950	950	950	950	950	950	950	950	950
SX-EW cost	A$ millions real	77	0.0	0.0	14.4	18.0	18.0	18.0	9.0	0.0	0.0	0.0
fixed opex												
supervision and technical	A$ M/annum Real		2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
General & Admin	A$ M/annum Real		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
fixed opex	A$ millions real	41	0	0	8	8	8	8	8	0	0	0
private royalty												
private royalty rate	% of sales revenue		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
private royalty	A$ millions real	17	0	0	3	4	4	4	2	0	0	0
rehab												
rehabilitation	A$ Real/ tonne waste & ore		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
rehabilitation	A$ millions real	15	0	3	4	4	3	2	1	0	0	0
closure												
closure	A$ millions real				45	45	45	45	45	45	45	45
closure	A$ millions real	45			0	0	0	0	0	45	0	0
Cashstream 3: Operating Costs	A$ millions real	**386**	**0**	**11**	**67**	**78**	**74**	**73**	**39**	**45**	**0**	**0**
opex per ore (incl closure)	A$/tonne ore	90	0	0	84	78	74	73	77	0	0	0
opex per tonne final product (incl closure)	A$/tonne cathode	4,752	0	0	4,457	4,117	3,932	3,839	4,088	0	0	0
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashstream 4: Taxes												
Government Royalties												
21Dec20 G Rose: The government royalty rate is 6% of gross revenue												
government royalty rate	% of sales revenue		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
government royalty	A$ millions real	40	0	0	8	9	9	9	5	0	0	0
Income tax												
21Dec14 G Rose: The company income tax rate is 30% and the company expects to be paying income tax in future years so any losses can be used immediately.												
Cashstream 1: Revenue	A$ millions real	672	0	0	125	156	156	156	78	0	0	0
less												
Cashstream 3: Operating Costs	A$ millions real	386	0	11	67	78	74	73	39	45	0	0
government royalty	A$ millions real	40	0	0	8	9	9	9	5	0	0	0
tax deduction for capital expenditure	A$ millions real	156	0	0	39	29	22	18	47	0	0	0
Assessable Income	A$ millions real	90	0	-11	11	40	50	57	-12	-45	0	0
Company Income Tax Rate	% of assessable income		30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Income Tax	A$ millions real	27	0	-3	3	12	15	17	-4	-14	0	0
Cashstream 4: Taxes	A$ millions real	**67**	**0**	**-3**	**11**	**21**	**24**	**26**	**1**	**-14**	**0**	**0**
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashflow and NPV												
Cashlows												
Cashstream 1: Revenue	A$ millions real	672	0	0	125	156	156	156	78	0	0	0
Cashstream 2: Capital Costs	A$ millions real	154	25	98	6	6	6	6	6	0	0	0
Cashstream 3: Operating Costs	A$ millions real	386	0	11	67	78	74	73	39	45	0	0
Cashstream 4: Taxes	A$ millions real	67	0	-3	11	21	24	26	1	-14	0	0
Net Cashflow	A$ millions real	**65**	**-25**	**-105**	**41**	**51**	**51**	**51**	**32**	**-32**	**0**	**0**
IRR	Real	**16.8%**										
Discounting												
7Jul20 F Green email: discount rate for investment in gold industry is 8% Real.												
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	0.48
Discounted Cashflow	A$ millions real	26	-24	-94	34	39	36	33	20	-18	0	0
Cumulative NPV	A$ millions real		-24	-118	-84	-45	-9	24	44	26	26	26
NPV	A$ millions real	**26**										

Typical worksheet architecture…

i. Title

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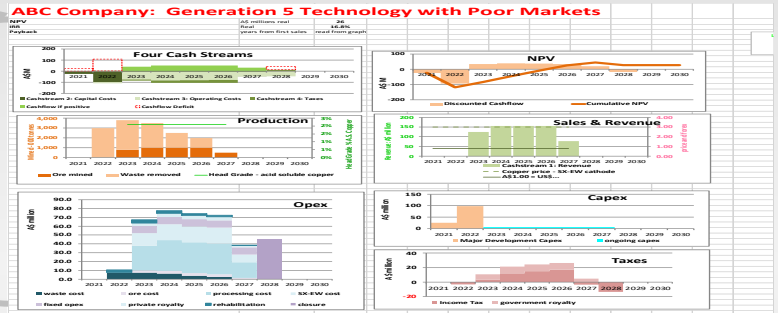
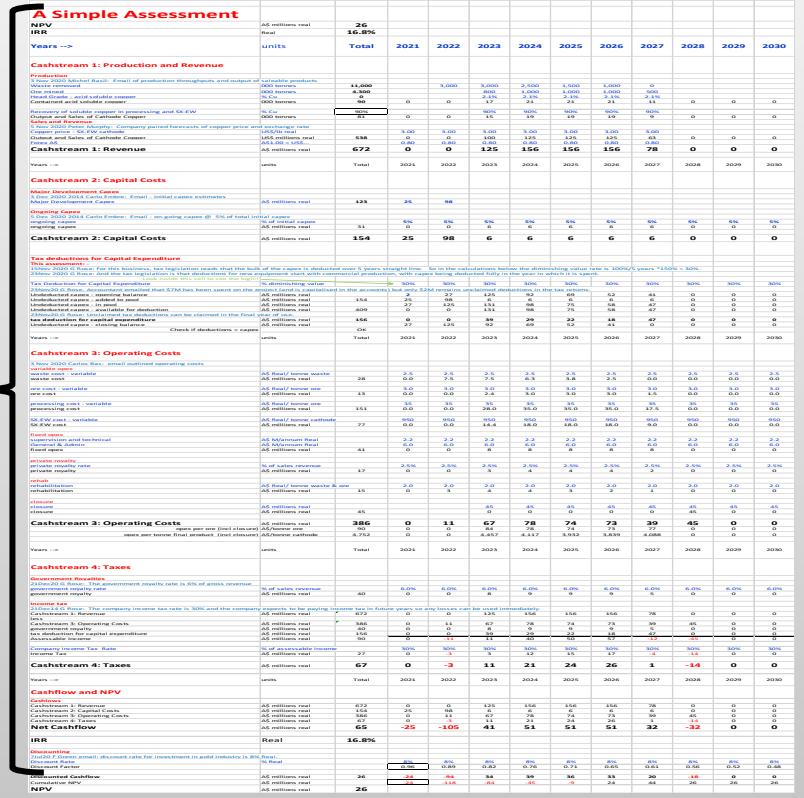


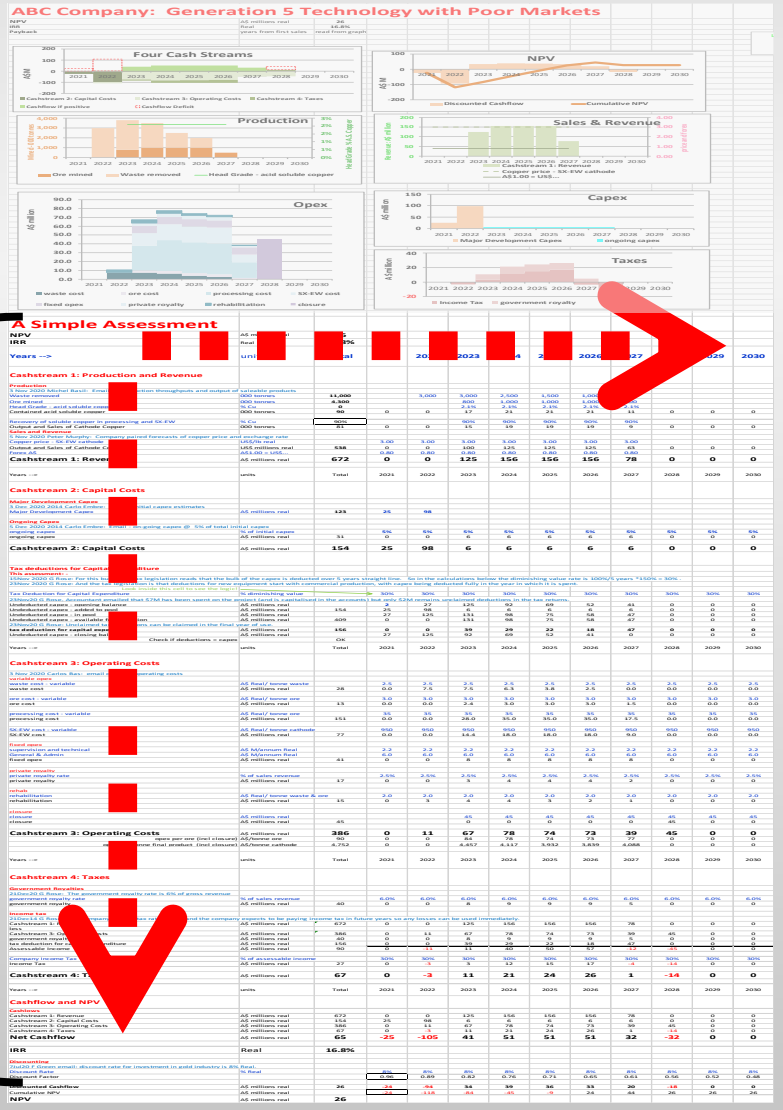


Typical worksheet architecture…

iii Workings

It is essential that the Workings be intuitive:-

- **down the worksheet** and
- **across the worksheet**



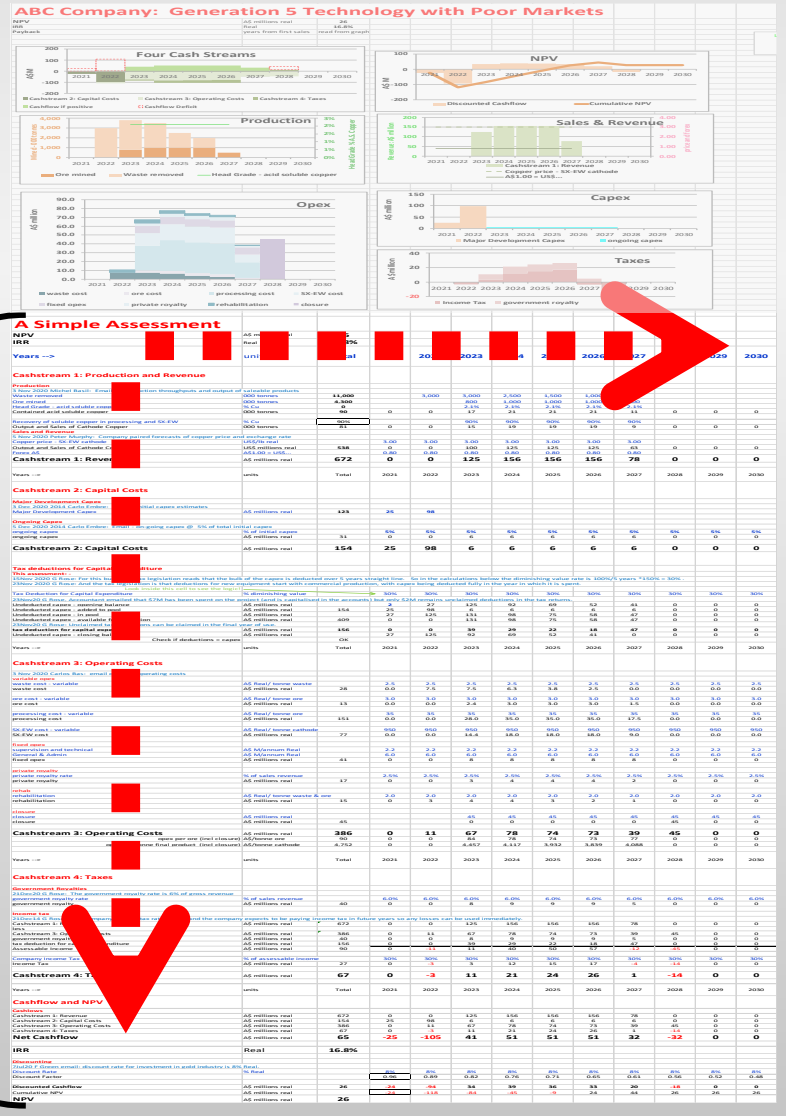
The Workings will be intuitive if you do this:-

Down the worksheet use …

i. Discrete work blocks
ii. Bold headings
iii. Obvious totals
iv. Colour coding
v. Row notes above input data
vi. Small steps

Across the worksheet use …

i. No set-backs of columns
ii. Every descriptor & unit is given full meaning
iii. Totals always are visible on the left hand side
iv. Columns D and E are prime locations
v. Years are consistent in every worksheet
vi. No hidden rows or columns and nor hidden worksheets
vii. Try modelling with the window split



Making your model intuitive down each worksheet: -

i. Discrete major work blocks.

In this example, the whole evaluation down to cash flows is in five discrete & self-contained work blocks: -

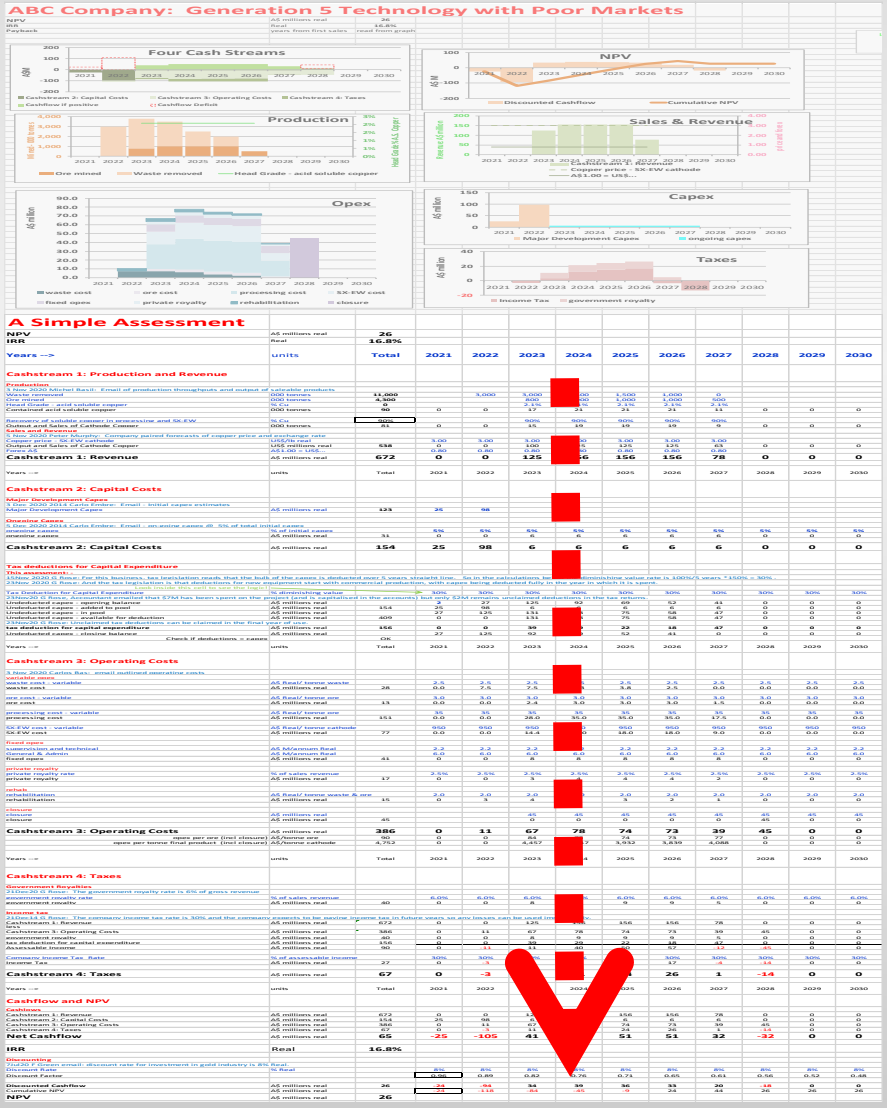
1) Sales, operations & revenue – self contained

2) Capital costs – self contained

3) Operating costs – self contained

4) Taxes – self contained

5) Net cash flows →NPV, IRR, payback, etc – self contained



Most important: Make each discrete work block 'self-contained' so the inputs, computations and results are visually obvious within each block

Making your model intuitive down each worksheet: -

i Discrete work blocks for sub-sections.

And **within** each major discrete work block, make each sub-section a discrete work block with:

- obvious inputs,
- obvious computations and
- obvious results.

- Sub-section #1 self contained work block
- Sub-section #2 self contained work block
- Sub-section #3 self contained work block
- Sub-section #4 self contained work block
- Sub-section #5 self contained work block

Bring these sub-sections into an obvious total

Undeducted capex - in pool	A$ millions real		27	125	131	98	75	58	47	0	0	0
Undeducted capex - available for deduction	A$ millions real	409	0	0	131	98	75	58	47	0	0	0
23Nov20 G Rose: Unclaimed tax deductions can be claimed in the final year of use.												
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Undeducted capex - closing balance	A$ millions real		27	125	92	69	52	41	0	0	0	0
Check if deductions = capex		OK										
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Cashstream 3: Operating Costs												
3 Nov 2020 Carlos Bas: email outlined operating costs												
variable opex												
waste cost - variable	A$ Real/ tonne waste		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
waste cost	A$ millions real	28	0.0	7.5	7.5	6.3	3.8	2.5	0.0	0.0	0.0	0.0
ore cost - variable	A$ Real/ tonne ore		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ore cost	A$ millions real	13	0.0	0.0	2.4	3.0	3.0	3.0	1.5	0.0	0.0	0.0
processing cost - variable	A$ Real/ tonne ore		35	35	35	35	35	35	35	35	35	35
processing cost	A$ millions real	151	0.0	0.0	28.0	35.0	35.0	35.0	17.5	0.0	0.0	0.0
SX-EW cost - variable	A$ Real/ tonne cathode		950	950	950	950	950	950	950	950	950	950
SX-EW cost	A$ millions real	77	0.0	0.0	14.4	18.0	18.0	18.0	9.0	0.0	0.0	0.0
fixed opex												
supervision and technical	A$ M/annum Real		2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
General & Admin	A$ M/annum Real		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
fixed opex	A$ millions real	41	0	0	8	8	8	8	8	0	0	0
private royalty												
private royalty rate	% of sales revenue		2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
private royalty	A$ millions real	17	0	0	3	4	4	4	2	0	0	0
rehab												
rehabilitation	A$ Real/ tonne waste & ore		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
rehabilitation	A$ millions real	15	0	3	4	4	3	2	1	0	0	0
closure												
closure	A$ millions real				45	45	45	45	45	45	45	45
closure	A$ millions real	45			0	0	0	0	0	45	0	0
Cashstream 3: Operating Costs	A$ millions real	**386**	**0**	**11**	**67**	**78**	**74**	**73**	**39**	**45**	**0**	**0**
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Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cashstream 4: Taxes												
Government Royalties												
21Dec20 G Rose: The government royalty rate is 6% of gross revenue												

Making your model intuitive down each worksheet: -

i. Discrete work blocks.

ii. **Bold headings for each major work block**

NPV	A$ millions real	**26**										
IRR	Real	**16.8%**										
Years -->	units	**Total**	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr7	Yr8	Yr9	Yr10
Cashstream 1: Production and Revenue												
Production												
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products												
Waste removed	000 tonnes	**11,000**		3,000	3,000	2,500	1,500	1,000	0			
Ore mined	000 tonnes	**4,300**			800	1,000	1,000	1,000	500			
Head Grade - acid soluble copper	% Cu	**0**			2.1%	2.1%	2.1%	2.1%	2.1%			
Contained acid soluble copper	000 tonnes	**90**	0	0	17	21	21	21	11	0	0	0
Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%	90%	90%	90%			
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19	19	9	0	0	0
Sales and Revenue												
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate												
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.00	3.00			
Output and Sales of Cathode Copper	US$ millions real	**538**	0	0	100	125	125	125	63	0	0	0
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.80	0.80			
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**	**156**	**78**	**0**	**0**	**0**
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Major Development Capex												
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Major Development Capex	A$ millions real	**123**	**25**	**98**								
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ongoing capex	% of initial capex		**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**	**5%**
ongoing capex	A$ millions real	31	0	0	6	6	6	6	6	0	0	0
Cashstream 2: Capital Costs	A$ millions real	**154**	**25**	**98**	**6**	**6**	**6**	**6**	**6**	**0**	**0**	**0**
Tax deductions for Capital Expenditure												
This assessment: -												
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Look inside this cell to see the logic!												
Tax Deduction for Capital Expenditure	% diminishing value		30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
23Nov20 G Rose. Accountant emailed that $7M has been spent on the project (and is capitalised in the accounts) but only $2M remains unclaimed deductions in the tax returns.												

Aspendale Beach: Richard Newton

Making your model intuitive down each worksheet: -

i. Discrete work blocks.

ii. Bold headings for each major work block

and bold headings for sub-sections

Years -->	units	Total	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Y
Cashstream 1: Production and Revenue								
Production								
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products								
Waste removed	000 tonnes	**11,000**		3,000	3,000	2,500	1,500	1,00
Ore mined	000 tonnes	**4,300**			800	1,000	1,000	1,00
Head Grade - acid soluble copper	% Cu	**0**			2.1%	2.1%	2.1%	2.1
Contained acid soluble copper	000 tonnes	**90**	0	0	17	21	21	21
Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%	90%	90
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19	19
Sales and Revenue								
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate								
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.0
Output and Sales of Cathode Copper	US$ millions real	**538**	0	0	100	125	125	125
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.8
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**	**15**
Years -->	units	Total	2021	2022	2023	2024	2025	202
Cashstream 2: Capital Costs								
Major Development Capex								
3 Dec 2020 2014 Carlo Embre: Email - Initial capex estimates								
Major Development Capex	A$ millions real	**123**	**25**	**98**				
Ongoing Capex								
5 Dec 2020 2014 Carlo Embre: Email - on-going capex @ 5% of total initial capex								
ongoing capex	% of initial capex		**5%**	**5%**	**5%**	**5%**	**5%**	**5%**
ongoing capex	A$ millions real	31	0	0	6	6	6	6
Cashstream 2: Capital Costs	A$ millions real	**154**	**25**	**98**	**6**	**6**	**6**	**6**

Aspendale Beach: Richard Newton

Making your model intuitive down each worksheet: -

i. Discrete work blocks.

ii. Bold headings

iii. **Obvious totals for major work blocks**

Years -->	units	Total	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
Cashstream 1: Production and Revenue							
Production							
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products							
Waste removed	000 tonnes	**11,000**		3,000	3,000	2,500	1,500
Ore mined	000 tonnes	**4,300**			[illegible]	1,000	1,000
Head Grade - acid soluble copper	% Cu	**0**			[illegible]	2.1%	2.1%
Contained acid soluble copper	000 tonnes	**90**	0	0	[illegible]	21	21
Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%	90%
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19
Sales and Revenue							
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate							
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00
Output and Sales of Cathode Copper	US$ millions real	**538**	0	0	100	125	125
Forex A$	A$1.00 = US$...		0.80	0.80	[illegible]	0.80	0.80
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**
Years -->	units	Total	2021	2022	2023	2024	2025
Cashstream 2: Capital Costs							
Major Development Capex							
3 Dec 2020 2014 Carlo Embre: Email - Initial capex estimates							
Major Development Capex	A$ millions real	**123**	**25**	**98**			
Ongoing Capex							
5 Dec 2020 2014 Carlo Embre: Email - on-going capex @ 5% of total initial capex							
ongoing capex	% of initial capex		**5%**	**5%**	**5%**	**5%**	**5%**
ongoing capex	A$ millions real	31	0	0	6	6	6
Cashstream 2: Capital Costs	A$ millions real	**154**	**25**	**98**	**6**	**6**	**6**

Making your model intuitive down each worksheet: -

i. Discrete work blocks.

ii. Bold headings

iii. Obvious totals for major work blocks

and obvious sub-totals for sub-sections

Months -->	units	Total	Month 1	Month 2
Cashstream 3: Operating Costs				
3a. production of fertiliser				
2023 09 05 J Lemon telecon: Assume there will be three weeks of organic fertiliser in working stocks in the plant and in villages				
sales of organic fertiliser	kilograms	**2,640,537**	**0**	**18,000**
working stocks of processer uniits	**days**		**21**	**21**
fertiliser - working stocks closing	kilograms		12,600	14,000
fertiliser - increase/(decrease) in working stocks	kilograms		12,600	1,400
production of fertiliser	kilograms	**2,640,537**	**12,600**	**19,400**
3b. variable cost of production				
2023 09 05 T Chan: "Operation of the Organic Fertiliser Plant" pages 4 to 8				
collection	$/ kg Real		**0.03**	**0.03**
mulching, mixing, processing	$/ kg Real		**0.07**	**0.07**
logistics	$/ kg Real		**0.02**	**0.02**
repairs & maintenance	$/ kg Real		**0.01**	**0.01**
3b. variable cost of production	$/t Real		0.13	0.13
variable cost of production	$ Real	**343,270**	**1,638**	**2,522**
3c. fixed costs				
2023 09 05 T Chan: "Operation of the Organic Fertiliser Plant" pages 4 to 8. Fixed costs will start immediately to support construc				
employees	$ Real	**46,080**	**960**	**960**
telephones & computers	$ Real	**2,400**	**50**	**50**
insurance	$ Real	**480**	**10**	**10**
bookkeeping, accounting, legal, insurance	$ Real	**1,920**	**40**	**40**
local community	$ Real	**4,800**	**100**	**100**
other	$ Real	**2,400**	**50**	**50**
fixed costs	$ Real	**58,080**	**1,210**	**1,210**
3d. working capital needed				
2023 09 05 T Chan: "Operation of the Organic Fertiliser Plant" Approx 3 months of operating costs will be needed at the start of sa				
working capital needed	$ Real	**864,000**	**18,000**	**18,000**
3d. working capital needed	$ Real		0	0
working capital - increase/(decrease)	$ Real	**0**	0	**0**
Cashstream 3: Operating Costs	$ Real	**401,350**	**2,848**	**3,732**
Cashstream 4: Taxes				
Months -->	**units**	**Total**	**Month 1**	**Month 2**
4a. VAT "Value Added Tax"				

Making your model intuitive down each worksheet: -

i. Discrete work blocks.
ii. Bold headings
iii. Obvious totals
iv. **Colour coding of:**
   a) **Input data**
   b) **Referenced data**
   c) **Computations & results**

This example is very easy to understand: -

Green means the data is 'referenced' across from another worksheet in the same model

Blue means it is fresh data input

Black means it is a computation or output

Years -->	units	Total	Year 1	Year 2	Year 3
Cashstream 2: Operating Costs					
Sales					
From the 'Sales&Revenue' worksheet					
Direct units Sold	biodigester units	**12,943**	**136**	**480**	**990**
Supplier units sold	biodigester units	**60,703**	**170**	**560**	**2,680**
Partner units sold	biodigester units	**8,473**	**80**	**160**	**589**
Total biodigester units sold	biodigester units	**82,118**	**386**	**1,200**	**4,258**
Production					
Working stocks of biodigester units					
3Aug 2023 P Cardin: email of interim estimates					
Lead time between the sale of a unit and its production	Days		**30**	**30**	**30**
Additional working stock in distribution channels	Days		**60**	**60**	**60**
Total working stocks	Days		90	90	90
Biodigester units in working stocks	biodigester units		95	296	1,050
increase/(decrease) in working stocks	biodigester units	**0**	95	201	754
Production of biodigester units					
Production of biodigester units	biodigester units	**82,118**	**481**	**1,400**	**5,012**
CHECK: Sales = Production		OK			
Costs					
Variable Costs - manufacturing					
Production of biodigester units	biodigester units	**82,118**	481	1,400	5,012
1 Aug 2023: ABC model 'Variable Costs' row 5					
Tank ex-factory	US$ Real/unit		260	260	260
Tank manufacturing costs	US$ 000 Real		**125**	**364**	**1,303**
Variable Costs - selling direct units					

The following commonly used colour coding:

- ***is easy to adopt***
- ***greatly reduces errors***
- ***most importantly, it makes the model far easier for <u>others</u> to readily follow***

i. Input data

Sales	units	3085	3150	3246	3449

Many people use blue colouring for inputs of fresh data into the model. ***Most importantly:*** *Fresh data from outside is entered only ONCE in the entire model. It NEVER is re-entered in another part of the model. This includes defining the years or months only ONCE in the entire model!*

ii. Referenced data (not 'Links')

Sales	units	3085	3150	3246	3449

If fresh data has already been entered in one worksheet and is required in another worksheet, then it needs to be 'referenced' across. Similarly, results calculated in one worksheet that are needed in another worksheet need to be referenced across. Reference across the <u>whole</u> row including descriptor, units, total, etc). I use green font. (*This is not "LINKS" to another model or workbook – "LINKS" should be absolutely avoided!)*

(Easy method: when in the empty cell that will receive the referenced data, press the "=" key, move to the worksheet where the data has been entered and put the cursor on the cell with the data. Press "enter" key.

Once the years (or months) have been entered in one worksheet then every other worksheet must 'reference' that row of years (or months). Do not re-enter the years (or months) again.

Year	2024	2025	2026	2027

To avoid errors and to make the model intuitive: *When creating an algorithm in one worksheet, do not directly reference a cell in another worksheet so that it is hidden/covert in the algorithm. To be intuitive, every algorithm must only use cells that are already visible in that same worksheet. So reference the <u>whole</u> row across into an empty row above where it is needed in the algorithm. Make the logic visual.*

iii. Computations & Results

Revenue	$000	983	1256	1110	1344

Use black font on white.

iv. Colour coding of:

a) **Input data**

b) **Referenced data**

c) **Computations & results**

Evaluation specialists who love using sophisticated Excel, usually scoff at colour coding.

- *They are in too much of a rush to pump out results.*
- *They do not realise that the model is merely a working tool for other people, as well as for themselves.*
- *Ironically, they grow proud of their convoluted, 'leading edge' model in black & white that few, if anyone else, can bother trying to follow. Therefore almost no-one else can trust their model.*

Colour coding brings your work closer to your colleagues - once they understand its meanings

Aspendale Beach: Richard Newton

Making your model intuitive down each worksheet: -

v. A row note above each set of fresh input data

- State when, what, who (use blue font to match the input data)
- Make it visible

Other people can immediately recognise its validity and currency

(Do not use cell notes because they cannot be readily read by others trying to quickly understand your model and they tend to become unwieldy, out dated and forgotten.

Aspendale Beach: Richard Newton

row note

row note

row note

Years -->	units	Total	Year 1	Year 2	Year 3
Cashstream 2: Operating Costs					
Sales					
From the 'Sales&Revenue' worksheet					
Direct units Sold	biodigester units	**12,943**	**136**	**480**	**990**
Supplier units sold	biodigester units	**60,703**	**170**	**560**	**2,680**
Partner units sold	biodigester units	**8,473**	**80**	**160**	**589**
Total biodigester units sold	biodigester units	**82,118**	**386**	**1,200**	**4,258**
Years -->	units	**Total**	**Year 1**	**Year 2**	**Year 3**
Production					
Working stocks of biodigester units					
3Aug 2023 P Cardin: email of interim estimates					
Lead time from production to sale	Days		**30**	**30**	**30**
Working stock in distribution channels	Days		**60**	**60**	**60**
Total working stocks	Days		90	90	90
Biodigester units in working stocks	biodigester units		95	296	1,050
increase/(decrease) in working stocks	biodigester units	**0**	95	201	754
Production of biodigester units					
Production of biodigester units	biodigester units	**82,118**	**481**	**1,400**	**5,012**
CHECK: Sales = Production		OK			
Costs					
Variable Costs - manufacturing					
Production of biodigester units	biodigester units	**82,118**	481	1,400	5,012
1 Aug 2023: ABC model 'Variable Costs' row 5					
Tank ex-factory	US$ Real/unit		260	260	260
Tank manufacturing costs	US$ 000 Real		**125**	**364**	**1,303**
Variable Costs - selling direct units					
1 Aug 2023: ABC model 'Annualised P&L' and 'Variable Costs' many rows					
ore cost - variable	A$ Real/ tonne ore		**3.0**	**3.0**	**3.0**
ore cost	A$ millions real	182	0.5	1.7	8.0

Making your model intuitive down each worksheet: -

vi. Small steps

In this example, the operating cost are computed in nine simple steps.
They would be: -

easy to follow,
fast to check,
make errors obvious,
be intuitive and
leave everyone feeling confident!

Poor modellers would combine these nine steps into long and perhaps sophisticated algorithms: -

They would feel so clever and fast!
But colleagues could not immediately follow calculations.
The model would be tedious to check.
Errors would be hidden
→ other people would lose interest and trust.
Their models are liable to become irrelevant 'trophies'.

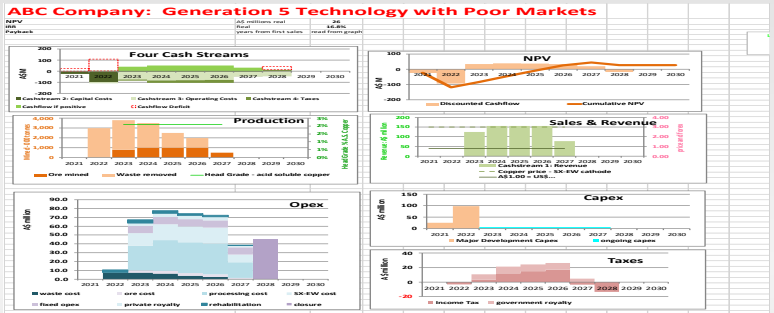
Years -->	units	Total	2021	2022	2023	2024
Cashstream 3: Operating Costs						
3 Nov 2020 Carlos Bas: email outlined operating costs						
variable opex						
waste cost - variable	A$ Real/ tonne waste		2.5	2.5	2.5	2.5
waste cost	A$ millions real	28	0.0	7.5	7.5	6.3
ore cost - variable	A$ Real/ tonne ore		3.0	3.0	3.0	3.0
ore cost	A$ millions real	13	0.0	0.0	2.4	3.0
processing cost - variable	A$ Real/ tonne ore		35	35	35	35
processing cost	A$ millions real	151	0.0	0.0	28.0	35.0
SX-EW cost - variable	A$ Real/ tonne cathode		950	950	950	950
SX-EW cost	A$ millions real	77	0.0	0.0	14.4	18.0
fixed opex						
supervision and technical	A$ M/annum Real		2.2	2.2	2.2	2.2
General & Admin	A$ M/annum Real		6.0	6.0	6.0	6.0
fixed opex	A$ millions real	41	0	0	8	8
private royalty						
private royalty rate	% of sales revenue		2.5%	2.5%	2.5%	2.5%
private royalty	A$ millions real	17	0	0	3	4
rehab						
rehabilitation	A$ Real/ tonne waste & ore		2.0	2.0	2.0	2.0
rehabilitation	A$ millions real	15	0	3	4	4
closure						
closure	A$ millions real				45	45
closure	A$ millions real	45			0	0
Cashstream 3: Operating Costs	A$ millions real	**386**	**0**	**11**	**67**	**78**
opex per ore (incl closure)	A$/tonne ore	90	0	0	84	78
opex per tonne final product (incl closure)	A$/tonne cathode	4,752	0	0	4,457	4,117
Years -->	units	Total	2021	2022	2023	2024

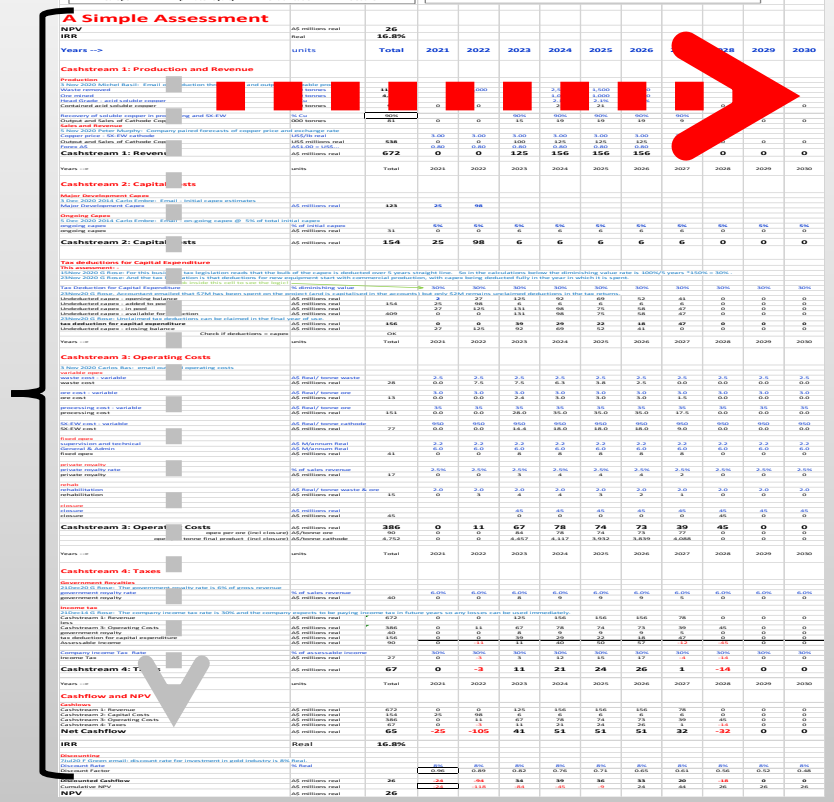
Typical worksheet architecture…

The Workings must be intuitive:-

- down the worksheet
- **across the worksheet**

Aspendale Beach: Richard Newton





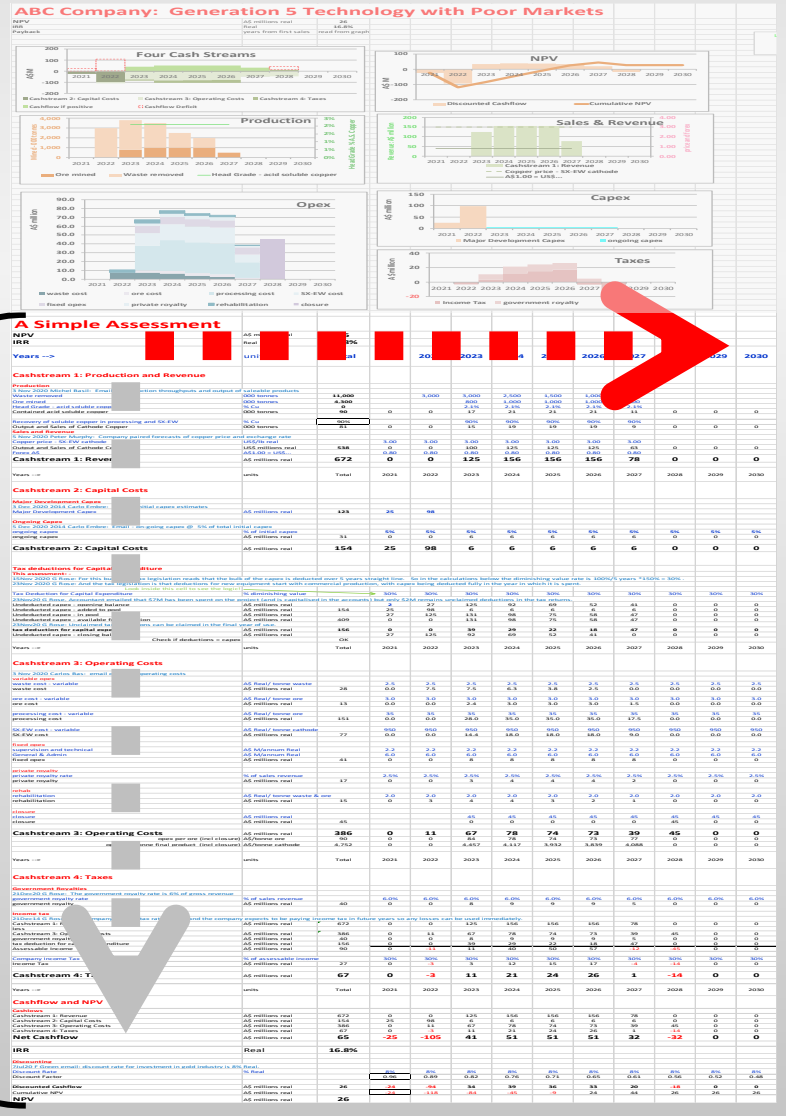
The Workings will be intuitive if you do this:-

Down the worksheet use …

i. Discrete work blocks
ii. Bold headings
iii. Obvious totals
iv. Colour coding
v. Row notes above input data
vi. Small steps

Across the worksheet use …

i. No set-backs of columns
ii. Every descriptor & unit is given full meaning
iii. Totals always are visible on the left hand side
iv. Columns D and E are prime locations
v. Years are consistent in every worksheet
vi. No hidden rows, columns or worksheets
vii. Try modelling with the window split



Making your model intuitive across each worksheet: -

i. Avoid column 'set backs'

Columns A and B should **not** be set-backs for headings and sub-headings.

		Years -->	units	Total	Yr 1	Yr 2	Yr 3	Yr 4
Cashstream 1: Production and Revenue								
	Production							
		3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products						
		Waste removed	000 tonnes	**11,000**		3,000	3,000	2,500
		Ore mined	000 tonnes	**4,300**			800	1,000
		Head Grade - acid soluble copper	% Cu	**0**			2.1%	2.1%
		Contained acid soluble copper	000 tonnes	**90**	0	0	17	21
		Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%
		Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19
	Sales and Revenue							
		5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate						
		Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00
		Output and Sales of Cathode Copper	US$ millions real	**538**	0	0	100	125
		Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80
		Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**
		Years -->	units	Total	2021	2022	2023	2024
Cashstream 2: Capital Costs								
	Major Development Capex							
		3 Dec 2020 2014 Carlo Embre: Email - Initial capex estimates						
		Major Development Capex	A$ millions real	**123**	**25**	**98**		
	Ongoing Capex							
		5 Dec 2020 2014 Carlo Embre: Email - on-going capex @ 5% of total initial capex						
			% of initial capex		**5%**	**5%**	**5%**	**5%**
			A$ millions real	31	0	0	6	6
			A$ millions real	**154**	**25**	**98**	**6**	**6**
		s business, tax legislation reads that the bulk of the capex is deducted over 5 years straight line. So in the calculations below the dimini						
		se. And the tax legislation is that deductions for new equipment start with commercial production, with capex being deducted fully in the year in w						
		Look inside this cell to see the logic!						
		Tax Deduction for Capital Expenditure	% diminishing value		30%	30%	30%	30%
		23Nov20 G Rose, Accountant emailed that $7M has been spent on the project (and is capitalised in the accounts) but only $2M remains unclaimed deductions in the						
		Undeducted capex - opening balance	A$ millions real		**2**	**2**	125	92

Some modellers think this offsetting of columns is organised and attractive. But it adds clutter, wastes vital columns, is unnecessary and therefore makes it harder for others to follow!

Making your model intuitive across each worksheet:

-

ii. Every descriptor & unit is given full meaning

Descriptors in Column A and units in Column B are clearly defined.

Do not use abbreviations or code. Do not make others guess. Do not be lazy or in a rush.

Use full meanings so others do not have to pause and try to work out the exact meaning of ‘sales’, ‘price’, ‘cost’, ‘M’, ‘m’ … etc

Column A is for headings, descriptors, row notes

Column B is for ‘units’

Years -->	units	Total	Year1	Year2
Cashstream 1: Production and Revenue				
Production				
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products				
Waste removed	000 tonnes	11,000		3,000
Ore mined	000 tonnes	4,300		
Head Grade - acid soluble copper	% Cu	0		
Contained acid soluble copper	000 tonnes	90	0	0
Recovery of soluble copper in processing and SX-EW	% Cu	90%		
Output and Sales of Cathode Copper	000 tonnes	81	0	0
Sales and Revenue				
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate				
Copper price - SX-EW cathode	US$/lb real		3.00	3.00
Output and Sales of Cathode Copper	US$ millions real	538	0	0
Forex A$	A$1.00 = US$...		0.80	0.80
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**
Years -->	units	Total	2021	2022
Cashstream 2: Capital Costs				
Major Development Capex				
3 Dec 2020 2014 Carlo Embre: Email - Initial capex estimates				
Major Development Capex	A$ millions real	123	25	98

Make your model intuitive across each worksheet: -

iii. Totals always are visible on the left hand side

In Column C the totals of the rows are obvious

and not hidden away in Column Z

Column C for 'Totals'

Years -->	units	Total	Year1	Year2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Cashstream 1: Production and Revenue										
Production										
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable products										
Waste removed	000 tonnes	11,000		3,000	3,000	2,500	1,500	1,000	0	
Ore mined	000 tonnes	4,300			800	1,000	1,000	1,000	500	
Head Grade - acid soluble copper	% Cu	0			2.1%	2.1%	2.1%	2.1%	2.1%	
Contained acid soluble copper	000 tonnes	90	0	0	17	21	21	21	11	0
Recovery of soluble copper in processing and SX-EW	% Cu	90%			90%	90%	90%	90%	90%	
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19	19	9	0
Sales and Revenue										
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate										
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.00	3.00	
Output and Sales of Cathode Copper	US$ millions real	538	0	0	100	125	125	125	63	0
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.80	0.80	
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**	**156**	**78**	**0**
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028

Make your model intuitive across each worksheet: -

iii. and every row of data must be totalled:

Input Data: Do a rigorous check of the total of each row of input data against the corresponding total in the source of that data. This is a vital, quick check to eliminate errors in your input data

Output Totals: Do a sense check of each output total. Does it seem reasonable?

So many models have been created where the modeller was in too much of a hurry to complete these simple row totals.

Without these simple totals how do you know if each row of input data is correct?

Years -->	units	Total	Year1	Year2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Cashstream 1: Production and Revenue										
Production										
3 Nov 2020 Michel Basil: Email of production throughputs and output of saleable produc										
Waste removed	000 tonnes	11,000		3,000	3,000	2,500	1,500	1,000	0	
Ore mined	000 tonnes	4,300			800	1,000	1,000	1,000	500	
Head Grade - acid soluble copper	% Cu	2.1%			2.1%	2.1%	2.1%	2.1%	2.1%	
Contained acid soluble copper	000 tonnes	90	0	0	17	21	21	21	11	0
Recovery of soluble copper in processing and SX-EW	% Cu				90%	90%	90%	90%	90%	
Output and Sales of Cathode Copper	000 tonnes	81	0	0	15	19	19	19	9	0
Sales and Revenue										
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exchange rate										
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.00	3.00	
Output and Sales of Cathode Copper	US$ millions real	538	0	0	100	125	125	125	63	0
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.80	0.80	
Cashstream 1: Revenue	A$ millions real	**672**	**0**	**0**	**125**	**156**	**156**	**156**	**78**	**0**
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028

Make your model intuitive across each worksheet: -

Too many models have been created in a rush where row totals have been omitted. The model's creator was pre-occupied with getting numeric results like NPV and IRR. They lacked the personal discipline of taking time to check their input data.

Sloppy!
Incompetent!

By contrast a competent professional will continuously check the accuracy of the input data by quickly comparing totals with the source data. Similarly the totals of each row of output data can be sense checked.

		Total	Year1	Year2	Year 3	Year 4	Year 5	Year 6	Year 7	Year8
nd output of saleable products										
	000 tonnes			3,000	3,000	2,500	1,500	1,000	0	
	nnes				800	1,000	1,000	1,000	500	
		0			2.1%	2.1%	2.1%	2.1%	2.1%	
r	s		0	0	17	21	21	21	11	0
er in processing and SX-EW					90%	90%	90%	90%	90%	
athode Copper			0	0	15	19	19	19	9	0
5 Nov 2020 Peter Murphy: Company paired forecasts of copper price and exch										
Copper price - SX-EW cathode	US$/lb real		3.00	3.00	3.00	3.00	3.00	3.00	3.00	
Output and Sales of Cathode Copper	US$ millions real		0	0	100	125	125	125	63	0
Forex A$	A$1.00 = US$...		0.80	0.80	0.80	0.80	0.80	0.80	0.80	
Cashstream 1: Revenue	A$ millions real		**0**	**0**	**125**	**156**	**156**	**156**	**78**	**0**
Years -->	units	Total	2021	2022	2023	2024	2025	2026	2027	2028

Make your model intuitive across each worksheet: -

iv. Columns D and E are prime locations:

Sometimes they will be needed for opening data or historical data.

But preferably the columns to the right of "Total" get straight into action.

They should not be stores of unused history or be largely empty 'in reserve'.

Years -->	units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cashstream 2: Operating Costs												
Sales												
From the 'Sales&Revenue' worksheet												
Direct units Sold	biodigester units	12,943	136	480	990	1,620	1,620	1,620	1,620	1,620	1,620	1,620
Supplier units sold	biodigester units	60,703	170	560	2,680	8,185	8,185	8,185	8,185	8,185	8,185	8,185
Partner units sold	biodigester units	8,473	80	160	589	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Total biodigester units sold	biodigester units	82,118	386	1,200	4,258	10,896	10,896	10,896	10,896	10,896	10,896	10,896
Production												
Working stocks of biodigester units												
3Aug 2023 P Cardin: email of interim estimates												final year
Lead time from production to sale	Days		30	30	30	30	30	30	30	30	30	0
Working stock in distribution channels	Days		60	60	60	60	60	60	60	60	60	0
Total working stocks	Days		90	90	90	90	90	90	90	90	90	0
Biodigester units in working stocks	biodigester units		95	296	1,050	2,687	2,687	2,687	2,687	2,687	2,687	0
increase/(decrease) in working stocks	biodigester units	**0**	95	201	754	1,637	0	0	0	0	0	-2,687
Production of biodigester units												
Production of biodigester units	biodigester units	**82,118**	**481**	**1,400**	**5,012**	**12,533**	**10,896**	**10,896**	**10,896**	**10,896**	**10,896**	**8,210**
CHECK: Sales = Production		OK										
Costs												
Variable Costs - manufacturing												
Production of biodigester units	biodigester units	**82,118**	481	1,400	5,012	12,533	10,896	10,896	10,896	10,896	10,896	8,210
1 Aug 2023: ABC model 'Variable Costs' row 5												
Tank ex-factory	US$ Real/unit		260	260	260	260	260	260	260	260	260	260
Tank manufacturing costs	US$ 000 Real		**125**	**364**	**1,303**	**3,259**	**2,833**	**2,833**	**2,833**	**2,833**	**2,833**	**2,134**
Variable Costs - selling direct units												
1 Aug 2023: ABC model 'Annualised P&L' and 'Variable Costs' many rows												
ore cost - variable	A$ Real/ tonne ore		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ore cost	A$ millions real	182	0.5	1.7	8.0	24.6	24.6	24.6	24.6	24.6	24.6	24.6

Make your model intuitive across each worksheet: -

v. Years must be consistent in every worksheet:

Here for example, Year 1 is in Column D. And so, Year 1 will be in Column D in every other worksheet in this entire workbook.

This is most important to reduce your own errors, to make auditing faster and to make understanding by others so much easier.

Column D

Column E

Column F

Column H

Years -->	units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cashstream 2: Operating Costs												
Sales												
From the 'Sales&Revenue' worksheet												
Direct units Sold	biodigester units	12,943	136	480	990	1,620	1,620	1,620	1,620	1,620	1,620	1,620
Supplier units sold	biodigester units	60,703	170	560	2,680	8,185	8,185	8,185	8,185	8,185	8,185	8,185
Partner units sold	biodigester units	8,473	80	160	589	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Total biodigester units sold	biodigester units	82,118	386	1,200	4,258	10,896	10,896	10,896	10,896	10,896	10,896	10,896

Years -->	units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cashstream 1: Sales & Revenue												
Sales of units												
1 Aug 2023: ABC model 'Quarterly Cashflow' Rows 15, 18, 21												
Direct units Sold	biodigester units	12,943	136	480	990	1,620	1,620	1,620	1,620	1,620	1,620	1,620
Supplier units sold	biodigester units	60,703	170	560	2,680	8,185	8,185	8,185	8,185	8,185	8,185	8,185
Partner units sold	biodigester units	8,473	80	160	589	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Total biodigester units sold	biodigester units	**82,118**	**386**	**1,200**	**4,258**	**10,896**	**10,896**	**10,896**	**10,896**	**10,896**	**10,896**	**10,896**
Pricing of units												
1 Aug 2023: ABC model 'Quarterly Cashflow' Rows 16, 19 ,22												
Initial pricing in 2017												
Direct units price set in 2017	US$ Real/ unit		**499**									
Supplier units price set in 2017	US$ Real/ unit		**409**									
Partner units price set in 2017	US$ Real/ unit		**635**									
Rate of price increase in real terms - above/(below) inflation												
Direct units annual price increase	% above inflation	**0**			-1.0%	2.0%		1.0%	2.0%	1.0%		
Supplier units annual price increase	% above inflation	**0**			-1.0%	2.0%		1.0%	2.0%	1.0%		
Partner units annual price increase	% above inflation	**0**			-1.0%	2.0%		1.0%	2.0%	1.0%		
Price of units												
Direct units price	US$ Real/ unit	**5,101**	499	499	494	504	504	509	519	524	524	524
Supplier units price	US$ Real/ unit	**4,181**	409	409	405	413	413	417	425	430	430	430
Partner units price	US$ Real/ unit	**6,491**	635	635	629	641	641	648	661	667	667	667
Revenue												

Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
					final year
30	30	30	30	30	0
60	60	60	60	60	0
90	90	90	90	90	0
2,687	2,687	2,687	2,687	2,687	0
0	0	0	0	0	-2,687
10,896	10,896	10,896	10,896	10,896	8,210
10,896	10,896	10,896	10,896	10,896	8,210
260	260	260	260	260	260
2,833	2,833	2,833	2,833	2,833	2,134
3.0	3.0	3.0	3.0	3.0	3.0
24.6	24.6	24.6	24.6	24.6	24.6

Make your model intuitive across each worksheet: -

vi. There are no hidden rows, no hidden columns and no hidden worksheets

But it is fine to use 'Grouping' where the + and – are visible

Years -->	units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cashstream 2: Operating Costs												
Sales												
From the 'Sales&Revenue' worksheet												
Direct units Sold	biodigester units	12,943	136	480	990	1,620	1,620	1,620	1,620	1,620	1,620	1,620
Supplier units sold	biodigester units	60,703	170	560	2,680	8,185	8,185	8,185	8,185	8,185	8,185	8,185
Partner units sold	biodigester units	8,473	80	160	589	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Total biodigester units sold	biodigester units	82,118	386	1,200	4,258	10,896	10,896	10,896	10,896	10,896	10,896	10,896
Production												
Working stocks of biodigester units												
3Aug 2023 P Cardin: email of interim estimates												final year
Lead time from production to sale	Days		30	30	30	30	30	30	30	30	30	0
Working stock in distribution channels	Days		60	60	60	60	60	60	60	60	60	0
Total working stocks	Days		90	90	90	90	90	90	90	90	90	0
Biodigester units in working stocks	biodigester units		95	296	1,050	2,687	2,687	2,687	2,687	2,687	2,687	0
increase/(decrease) in working stocks	biodigester units	0	95	201	754	1,637	0	0	0	0	0	-2,687
Production of biodigester units												
Production of biodigester units	biodigester units	**82,118**	**481**	**1,400**	**5,012**	**12,533**	**10,896**	**10,896**	**10,896**	**10,896**	**10,896**	**8,210**
CHECK: Sales = Production		OK										
Costs												
Variable Costs - manufacturing												
Production of biodigester units	biodigester units	**82,118**	481	1,400	5,012	12,533	10,896	10,896	10,896	10,896	10,896	8,210
1 Aug 2023: ABC model 'Variable Costs' row 5												
Tank ex-factory	US$ Real/unit		260	260	260	260	260	260	260	260	260	260
Tank manufacturing costs	US$ 000 Real		**125**	**364**	**1,303**	**3,259**	**2,833**	**2,833**	**2,833**	**2,833**	**2,833**	**2,134**
Variable Costs - selling direct units												
1 Aug 2023: ABC model 'Annualised P&L' and 'Variable Costs' many rows												
ore cost - variable	A$ Re		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
ore cost		182	0.5	1.7	8.0	24.6	24.6	24.6	24.6	24.6	24.6	24.6

It is frustrating when working your way through a workbook to discover the reason you could not follow the logic quickly was because a few **rows are hidden**, or because a few **columns are hidden** or because a few **worksheets are hidden**.
(The '**Grouping'** function should be used because the symbols make it obvious)

Modelling tip: Splitting the screen : -

vii. Try modelling with the window split so you always see what is happening in your final columns:

The total is obvious on the left hand side, you can see the first years and you can always see the last years

This will increase your confidence because you can instantly check what is happening in the final years/months

This will increase your speed by using the 'Shift' key to copy and paste formulas from Year 1 right across to the final year.

View/ Split

Months -->	units	Total	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 46	Month 47	Month 48
Social Enterprise - Activity															
2018 09 05 Y Khani: "Business Plan for Organic Fertiliser Business in Villages" page 3															
Activity -->			Receive approvals and funding	Start construction of workshops	Construct waste receival	Start constructing processing plant		Complete construction & raise working	First sales	Ramp-up sales	Ramp-up sales	Ramp-up sales			
Cashstream 1: Sales & Revenue															
1a . Sales															
2018 09 05 J Hui: "Marketing report on the Sales of Organic Fertilisers in Villages" page 6															
sales of organic fertiliser	kilograms	2,640,537		18,000	20,000	22,000	24,000	27,000	30,000	33,000	36,300	39,930	64,308	64,308	64,308
price of organic fertiliser - including 10% VAT	$/kg Real	0.21							0.22	0.22	0.22	0.22	0.22	0.22	0.22
Revenue - organic fertilisers	$ Real	556,498	0	0	0	0	0	0	6,600	7,260	7,986	8,785	14,148	14,148	14,148
1b. Debtors															
2018 09 05 P Carr email: Farmwers will be required to pay cash on purchase so there will not be debtors															
Cashstream 1: Revenue	$ Real	556,498	0	0	0	0	0	0	6,600	7,260	7,986	8,785	14,148	14,148	14,148
Cashstream 2: Capital Costs															
Capex - Start up and sustaining															
2018 09 05 J Lee: "Construction of Organic Fertiliser Plant" page 3															
Green waste receival	$ Real	4,000			4,000										
Mulching and mixing plant	$ Real	7,000				7,000									
Processing plant	$ Real	18,000				6,000	6,000	6,000							
Despatch facilities	$ Real	3,000						3,000							
workshop and office	$ Real	10,000		5,000	5,000										
sustaining - replacement of whole units of equipr	$ Real	39,000								1,000	1,000	1,000	1,000		
Cashstream 2: Capital Costs	$ Real	81,000	0	5,000	9,000	13,000	6,000	9,000	0	1,000	1,000	1,000	1,000	0	0
Months -->	**units**	**Total**	**Month 1**	**Month 2**	**Month 3**	**Month 4**	**Month 5**	**Month 6**	**Month 7**	**Month 8**	**Month 9**	**Month 10**	**Month 46**	**Month 47**	**Month 48**

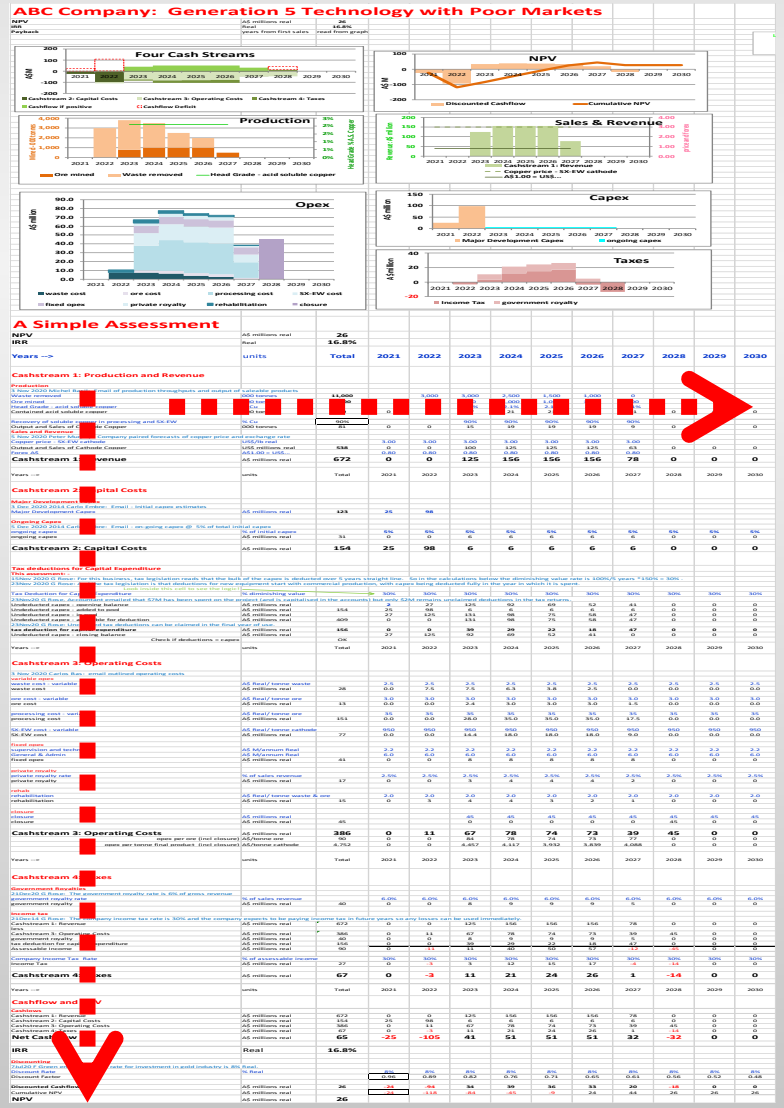
Most important: the Workings must be intuitive:-

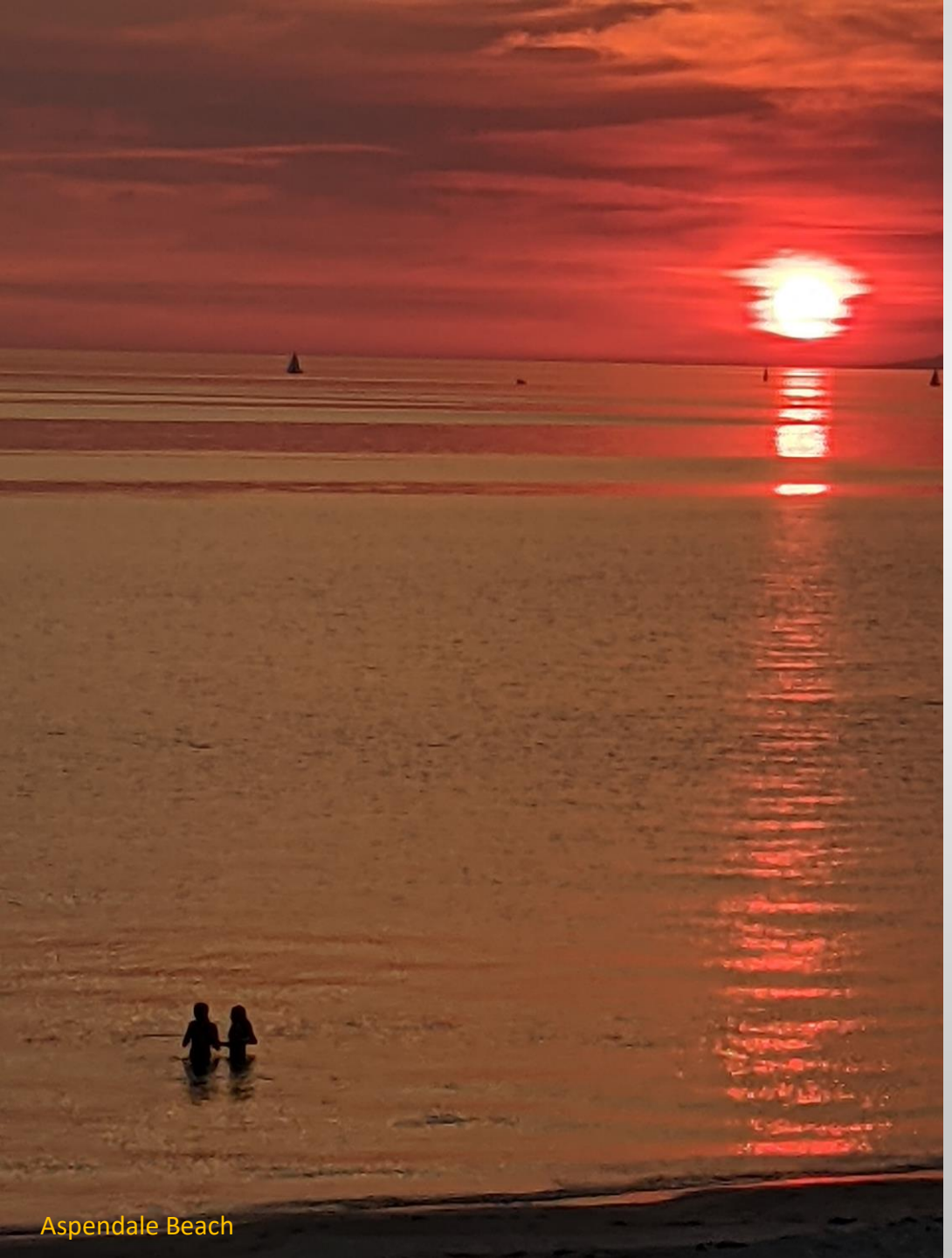
Down the worksheet

i. Discrete work blocks
ii. Bold headings
iii. Obvious totals
iv. Colour coding
v. Row notes above input data
vi. Small steps

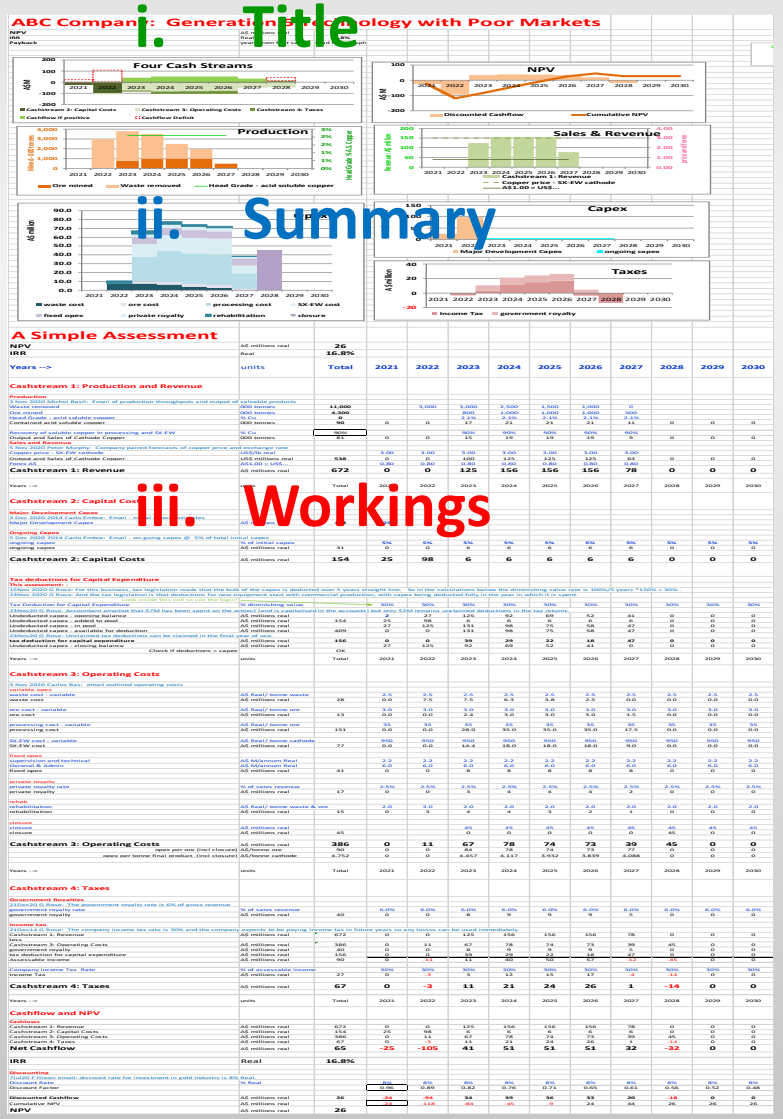
Across the worksheet

i. No set-backs of columns
ii. Every descriptor & unit is given full meaning
iii. Totals always are visible on the left hand side
iv. Columns D and E are prime locations
v. Years are consistent in every worksheet
vi. No hidden rows, columns nor worksheets
vii. Try modelling with the window split





Typical worksheet architecture…



END