

Technical Note 01/2009 – Impairment of Cash Generating Units

For simplicity, this note discusses only a selected issues addressed by HKAS 36. Readers should always refer to the original text of HKAS 36 for a proper understanding of the requirements.

According to paragraph 10 of HKAS 36, an entity shall, irrespective of whether there is any indication of impairment, test annually the impairment of (i) goodwill acquired in a business combination, and (ii) an intangible asset with an indefinite useful life or an intangible asset not yet available for use.

A cash-generating unit to which goodwill has been allocated shall be tested for impairment annually.

A cash-generating unit that includes in its carrying amount an intangible asset with an indefinite useful life or not yet available for use should also be tested for impairment annually.

This technical note discusses how the value in use of such cash generating units (CGUs) may be estimated in accordance with paragraphs 30 to 57 of HKAS 36. A rule of thumb method to arrive at a preliminary estimate of the value in use is suggested below:

As a **Rule of Thumb**, an entity may preliminarily estimate the value in use of a CGU by multiply the **estimated most likely net cash inflow in the next year** by a factor **16**, implicitly assuming a growth rate of 5% p.a., a discount rate of 8% p.a., a risk factor of 90% and no major replacement of non-current operating assets is required to maintain the current conditions of the CGU during its entire expected economic useful life of 25 years.

If the carrying amount of the CGU (for the purpose of impairment testing, this mainly include the carrying amounts of non-current operating assets and inventories) is materially higher than this preliminarily estimate, a more detailed testing is required to justify a decision of not to recognise impairment for the CGU.

Example disclosure complying with paragraph 134(d) of HKAS 36 is as follows:

“The recoverable amount of [CGU XYZ] is determined on the basis of value in use under the general assumptions, which reflect past experience, that the gross profit margins and market shares of the unit would remain stable. Cash flow projections are based on financial budgets approved by management covering a five year period. Cash flows beyond the five year period are extrapolated using a steady growth rate of 5% per annum. The risk-adjusted expected cash flows are discounted at the rate of 8% per annum.”

General Assumptions used in Estimates of Future Cash Flows

Management unavoidably use some assumptions about the future when estimate future cash flows. Some of the key assumptions may include:

1. Market growth and market share
2. Gross profit margin, selling price and raw material price changes
3. exchange rates

In general, management should assess the reasonableness of the assumptions on which its current cash flow projections are based by examining the causes of differences between past cash flow projections and actual cash flows.

The assumptions should be consistent with past actual outcomes. The effects of subsequent events or circumstances that did not exist when those actual cash flows were generated should also be considered.

Cash Flow Budget Prepared by the Management

Based on the CGU's existing conditions and assumptions about the future, management would normally be able to come up with comparatively reliable and detailed cash flow budgets for a short period of 3 to 5 years.

For the purpose of impairment testing under HKAS 36, such cash flow budget shall exclude any estimated future cash inflows or outflows expected to arise from improving or enhancing the performance of the CGU's assets.

However, projections of cash outflows that are necessarily incurred to generate the cash inflows from continuing use of the CGU's assets, including cash outflows to prepare the assets for use, should be included.

For example, an entity may acquire a subsidiary with a detailed plan to replace its existing production lines shortly after the acquisition. It may be argued that the future cash outflows to replace the production lines are necessary to prepare the goodwill arising from the acquisition for use. Therefore, such future cash outflows and the corresponding future cash inflows generated from the new production lines are included in the value in use calculation of the unit. Otherwise, the goodwill would have to be considered as impaired immediately after the acquisition. However, if the entity also plans to add new production lines some years later to expand the unit's production capacity, such capital expenditures would likely be regarded as cash outflows arising from improving or enhancing the performance of the CGU as a whole, and therefore should not be included in the value in use calculation.

Extrapolation of detailed cash flow budgets

Cash flow estimates based on these budgets/forecasts shall cover a maximum period of five years (“explicit budget”), unless a longer period can be justified. For example, even if the management had prepared detailed cash flow budgets from for the next 20 years, those budget years beyond the fifth year should normally be disregarded for the purpose of impairment testing.

In accordance with HKAS 36, cash flow projections beyond the period covered by the explicit budget should be estimated by extrapolating the projections based on the explicit budget.

The extrapolation should be based on a steady or declining growth rate, unless an increasing rate can be justified. In addition, this growth rate shall not exceed the long-term average growth rate for the products, industries, or country or countries in which the entity operates, or for the market in which the asset is used, unless a higher rate can be justified.

Replacement of existing assets

Some of the assets of a CGU may have a shorter useful life than the economic useful life of the CGU as a whole. Any cash outflows necessarily incurred to generate the cash inflows from continuing use of the assets of the unit as a whole should be included.

For example, an entity estimates that the goodwill of a CGU would have an economic useful life of at least 25 years. The remaining economic useful life of the tangible assets of the unit is however only 10 years. It expects to incur capital expenditures in year 11 to replace the existing tangible assets so as to maintain the current conditions of the unit as a whole. In such a case, the cash out flows to replace the existing tangible assets in year 11 should be included in the value in use calculation.

Discount rate

In accordance with HKAS 36, the discount rate shall be a pre-tax rate that reflects current market assessments of:

1. the time value of money (represented by the current market risk-free rate of interest, such as a 30-year government bonds); and
2. the risks specific to the asset for which the future cash flow estimates have not been adjusted.

Ideally, the discount rate is estimated from the weighted average cost of capital of a listed entity that has a portfolio of assets similar in terms of service potential and risks to the assets of the CGU under review.

This may however be not practicable in many cases. HKAS 36 does permit an entity to use the entity's incremental borrowing rate or other market borrowing rates as a starting point. These rates should then be adjusted:

- (a) to reflect the way that the market would assess the specific risks associated with the CGU's estimated cash flows; and
- (b) to exclude risks that are not relevant to the CGU's estimated cash flows or for which the estimated cash flows have been adjusted.

The difference between the incremental borrowing rate [or other market borrowing rates] and the risk free interest rate would be a preliminary measure of specific risks associated with the CGU's estimated cash flows referred to in item (a) above. How much adjustment should be made to the incremental borrowing rate [or other market borrowing rates] before it can be used as the discount rate would inevitably involve difficult judgement.

This Technical Note takes a more manageable approach and suggests the entity always use the entity's incremental borrowing rate [or other market borrowing rates], which can normally be reliably estimated and verified in most cases, to discount the cash flows. Any specific risks associated with the CGU's estimated cash flows not adjusted in the discount rate would be adjusted in the expected cash flow (See the interdependence of cash flows and the discount rate below).

However, it is suggested that a discount rate of at least 8% per annum should be used to avoid using a discount rate perceived to be too low by the users or regulators.

Interdependence of estimated cash flow and discounted rate

HKAS 36 recognises that there are two approaches in estimating the discount rate: (i) the traditional approach and (ii) the expected cash flow approach. HKAS 36 also recognises the interdependence of the estimated cash flow and discounted rate.

For example, HKAS 36.A3(a) stated that "a discount rate of 12 per cent might be applied to contractual cash flows of a loan receivable. That rate reflects expectations about future defaults from loans with particular characteristics. That same 12 per cent rate should not be used to discount expected cash flows because those cash flows already reflect assumptions about future defaults."

In another words, the 12 per cent discount rate may be based on (i) a risk-free interest rate of, say, 2% per annum; and (ii) a risk premium of 10% as if the future cash flows were almost certain. However, if an entity has estimated that the chance of future default is 20% and come up with expected cash flows which are only 80% of the cash flow under certainty, a lower discount rate of, say 8%, would be more appropriate.

That is, the expected value of the estimated cash flows have already adjusted for the risks associated with possible variations in the amount or timing of those cash flows, at least partly.

In short, the more the risks are being adjusted in the expected cash flow, the lower the discount rate may be used.

A simplified way to estimate the value in use

As a simple practical way to estimate the value in use of a CGU, an entity may:

- 1) estimate the range of possible outcomes rather than a single estimate of the most likely outcome.

In the simplest case, the entity may estimate as least (i) a most likely outcome, (ii) an optimistic outcome, and (iii) a pessimistic outcome. The entity may estimate the possible outcomes to distribute symmetrically. For example, the optimistic and pessimistic outcomes are 50% above and 50% below the most likely outcome respectively.

- 2) estimate the probability of the possible outcomes.
- 3) based on the estimated possible outcomes and the estimated probabilities of the possible outcomes, calculate the expected values of the cash flows.
- 4) apply the entity's incremental borrowing rate to discount the expected cash flows.

For example, if the entity funds the cash generating unit using a five-year bank loan on a rolling basis at an interest rate of 8% p.a., it may use the borrowing rate of 8% p.a. to discount the expected future cash flow. As a matter of convenience, the entity may use the 8% p.a. discount rate even if the entity's incremental borrowing rate is lower than 8% p.a.

The following example illustrates the above. The cash flow budgets of a CGU for the next five years as follows:

Year	Net cash inflow (HK\$'000)	Percentage change
1	10,000	-
2	10,445	4.45%
3	11,025	5.55%
4	11,525	4.54%
5	12,155	5.47%

The annualised annual growth is 5.0% per annum [$\sqrt[4]{(12,155/10,000)}$]. The entity may use this growth rate to extrapolate the cash flow beyond the fifth year.

The entity estimates from the markets that the risk free interest rate would be 2% per annum. Although its incremental borrowing cost is 6% per annum, the entity uses a discount rate of 8% p.a. to avoid being perceived as using an unreasonably low discount rate.

The entity estimates that in each of the future years, the outcome could optimistically be 150% of the most likely outcome but pessimistically be only 50% of the most likely outcome. The entity also estimates that in each of the future years, the probability for a most likely outcome, an optimistic outcome and a pessimistic outcome are 60%, 10% and 30% respectively. Therefore, the expect value of each year's cash flow is 90% of the most likely outcome [(60% x 100%) + (10% x 150%) + (30% x 50%)].

The entity expects the unit to have an economic life of 25 year. Capital expenditure of HK\$60,000,000 is to be incurred in year 10 to replace the existing tangible assets if the current conditions of the unit are to be maintained.

Value in use of the unit may be estimated as follows:

Year	Net cash inflow	Discount factor	Risk factor	Expected value
1	10,000	1	0.9	9,000
2	10,445	0.92593	0.9	8,704
3	11,025	0.85734	0.9	8,507
4	11,525	0.79383	0.9	8,234
5	12,155	0.73503	0.9	8,041
6	12,763	0.68058	0.9	7,818
7	13,401	0.63017	0.9	7,600
8	14,071	0.58349	0.9	7,389
9	14,775	0.54027	0.9	7,184
10	15,514	0.50025	0.9	6,985
11	16,290	0.46319	0.9	6,791
12	17,105	0.42888	0.9	6,602
13	17,960	0.39711	0.9	6,419
14	18,858	0.36770	0.9	6,241
15	19,801	0.34046	0.9	6,067
16	20,791	0.31524	0.9	5,899
17	21,831	0.29189	0.9	5,735
18	22,923	0.27027	0.9	5,576
19	24,069	0.25025	0.9	5,421
20	25,272	0.23171	0.9	5,270
21	26,536	0.21455	0.9	5,124
22	27,863	0.19866	0.9	4,982
23	29,256	0.18394	0.9	4,843
24	30,719	0.17032	0.9	4,709
25	32,255	0.15770	0.9	4,578
				163,719
Capital expenditure at year 10 (HK\$60,000,000 x 0.50025)				(30,015)
				133,704

[In this case risk factor of 90% is considered appropriate in view of the comparatively large difference between the discount rate of 8% p.a. and risk free interest rate of 2% p.a. If the risk free interest is estimated to be higher, say 5% p.a., a greater risk factor (say 70%) may need to be used. Otherwise, a higher discount rate (say 10% p.a.) should be used instead if the risk factor is maintained at 90%.]

If this is considered as a typical case, a number of useful observations can be obtained from this simplified method of estimating the value in use.

If the entity estimates that the probability distribution is symmetrical, no adjustment to the estimate value is required (i.e. risk factor equal to 1), provided that the possible outcome distribution is also symmetrical.

The table below (Table 1) lists out some of the example cases:

Probability of Most-likely outcome ("Pro-Mos")	50%	60%	70%	80%
Probability of Optimistic outcome ("Pro-Opt")	25%	20%	15%	10%
Probability of Pessimistic outcome ("Pro-Pes")	25%	20%	15%	10%
Most likely Outcome ("Mos-Out")	100%	100%	100%	100%
Optimistic Outcome ("Opt-Out")	150%	150%	150%	150%
Pessimistic Outcome ("Pes-Out")	50%	50%	50%	50%
Risk factor	100%	100%	100%	100%

Even if the probability distribution is skewed towards the pessimistic outcome, the risk factor may not be affected significantly, provided that the possible outcome distribution does not also skew towards pessimistic outcome.

Table 2

Pro-Mos	50%	50%	50%	50%	60%	60%	60%	70%	70%	80%
Pro-Opt	20%	15%	10%	5%	15%	10%	5%	10%	5%	5%
Pro-Pes	30%	35%	40%	45%	25%	30%	35%	20%	25%	15%
Mos-Out	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Opt-Out	150%	150%	150%	150%	150%	150%	150%	150%	150%	150%
Pes-Out	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Risk factor	95%	90%	85%	80%	95%	90%	85%	95%	90%	95%

The risk factor would be affected significantly (say below 80% of the most likely outcome) only if both the probability distribution and the possible outcome distribution are skewed pessimistically.

Table 3

Pro-Mos	50%	50%	50%	50%	60%	60%	60%	70%	70%	80%
Pro-Opt	20%	15%	10%	5%	15%	10%	5%	10%	5%	5%
Pro-Pes	30%	35%	40%	45%	25%	30%	35%	20%	25%	15%
Mos-Out	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Opt-Out	150%	150%	150%	150%	150%	150%	150%	150%	150%	150%
Pes-Out	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Risk factor	95%	73%	65%	58%	95%	73%	65%	95%	73%	95%

Prepared by Paul Yeung, Technical Director, March 2009.

As a rule of thumb, it is reasonable in many cases to estimate the expected value of the outcome to be 90% of the most likely outcome. This represents a typical case where (1) the optimistic outcome is taken as 150% of the most likely outcome and pessimistic outcome 50% of the most likely outcome. The probabilities for the most likely outcome, the optimistic outcome and the pessimistic outcome are taken as 60%, 10% and 30% respectively.

If the entity is pessimistic about the future outcome, it may estimate the expected value of the outcome to be as low as 70% of the most likely outcome. Any estimate of the expected value of the outcome to be below 70% of the most likely outcome would seem to be over pessimistic.

Given the net cash flow of Year 1 (the Base Year), a specific growth rate and a discount rate, the value in use can be readily estimate by referring to the follow table of multiples for a CGU with an economic life of 20, 25 and 30 years respectively provided that no replacement of the existing tangible assets are necessary during the economic life:

Table 4a: 20 year multiples

		Growth rate						
		8%	7%	6%	5%	4%	3%	2%
Discount rate	10%	16.9	15.6	14.4	13.3	12.4	11.5	10.7
	9%	18.3	16.9	15.5	14.3	13.3	12.3	11.4
	8%	20.0	18.3	16.8	15.5	14.3	13.2	12.3
	7%	21.9	20.0	18.3	16.8	15.5	14.3	13.2
	6%	24.0	21.9	20.0	18.3	16.8	15.4	14.2

Table 4b: 25 year multiples

		Growth rate						
		8%	7%	6%	5%	4%	3%	2%
Discount rate	10%	20.2	18.3	16.6	15.1	13.8	12.7	11.7
	9%	22.4	20.2	18.2	16.5	15.1	13.8	12.6
	8%	25.0	22.4	20.2	18.2	16.5	15.0	13.7
	7%	28.0	25.0	22.4	20.1	18.1	16.4	14.9
	6%	31.6	28.0	25.0	22.4	20.1	18.1	16.4

Table 4c: 30 year multiples

		Growth rate						
		8%	7%	6%	5%	4%	3%	2%
Discount rate	10%	23.3	20.7	18.4	16.6	14.9	13.5	12.3
	9%	26.3	23.2	20.6	18.4	16.5	14.8	13.4
	8%	30.0	26.3	23.2	20.5	18.3	16.4	14.8
	7%	34.3	30.0	26.3	23.1	20.5	18.2	16.3
	6%	39.9	34.5	30.0	26.2	23.1	20.4	18.1

[For simplicity, these tables assume all cash flows happen at the beginning of the year. The worksheet to calculate the figures in Table 4 is attached in the last page.]

For example, if an entity estimates that the CGU has a 25 year life, the growth rate at 5% p.a. and discount rate at 8% p.a., the multiple factor from Table 4b would be 18.2. If the entity estimates that the expect value of each year's cash flow is 90% of the most likely outcome, and if the entity estimates the net case inflow in Year 1 at HK\$10,000,000, the value in use of the CGU can be readily estimated to be HK\$164,000,000 [HK\$10,000,000 x 90% x 18.2], if no replacement of the existing tangible assets are necessary during the economic life of the CGU.

Table 4 can also be used in the other ways.

1. Supposed that an entity has a CGU with carrying amount of HK\$150,000,000 for impairment testing purpose and it estimates the most likely net cash flow for the next year to be HK\$8,000,000. If the expected cash flow is estimated to be only 80% of the most likely net cash flow because the entity is comparatively pessimistic, the multiple fact for a 25 year operation would be 23.4 [(150/8)/0.8]. If the entity currently borrows at 8% p.a. [or below] to finance the unit, and if the entity does not consider impairment is necessary, it implicitly expects a growth rate between 7% p.a. to 8% p.a. [23.4 is between 25 multiples of 22.4 and 25.0 in Table 4b]. In such a case, the entity should re-consider whether such a growth rate is reasonable in the circumstance and comply with the requirements of HKAS 36, under the assumption that no replacement of the existing tangible assets are necessary during the economic life of the CGU.

2 On the other hand, if the entity estimates that the growth rate is unlikely to be higher than 3% p.a., the multiple factor from Table 4b for an 8% discount is 15.0. To support the argument that impairment is not necessary, the entity must demonstrate that it could reliable achieve a net cash inflow of at least HK\$10,000,000 [HK\$150,000,000/15.0] in the next year.

If the entity expects a pessimistically skewed distribution, the minimum net cash inflow should be gross up to say HK\$11,100,000 [HK\$10,000,000/90%]

3 An expectation for the CGU to last for 25 years should be consider reasonable in most of the cases. Where appropriate, an economic life of 20 years, 30 years or other specific economic life may be used. However, it should be note that the effect of increase the useful life would be diminishing due to the discounting effect.

Worksheet to calculate the figures in Table 4 is attached:

Year	Growth factor	Discount factor	Multiple factor	Growth factor	Discount factor	Multiple factor	Growth factor	Discount factor	Multiple factor
1	1	1	1	1	1	1	1	1	1
2	1.08	0.90909	0.98182	1.07	0.90909	0.97273	1.06	0.90909	0.96364
3	1.1664	0.82645	0.96397	1.1449	0.82645	0.9462	1.1236	0.82645	0.9286
4	1.25971	0.75131	0.94644	1.22504	0.75131	0.92039	1.19102	0.75131	0.89483
5	1.36049	0.68301	0.92923	1.3108	0.68301	0.89529	1.26248	0.68301	0.86229
6	1.46933	0.62092	0.91234	1.40255	0.62092	0.87087	1.33823	0.62092	0.83093
7	1.58687	0.56447	0.89575	1.50073	0.56447	0.84712	1.41852	0.56447	0.80072
8	1.71382	0.51316	0.87946	1.60578	0.51316	0.82402	1.50363	0.51316	0.7716
9	1.85093	0.46651	0.86347	1.71819	0.46651	0.80155	1.59385	0.46651	0.74354
10	1.999	0.4241	0.84777	1.83846	0.4241	0.77969	1.68948	0.4241	0.7165
11	2.15892	0.38554	0.83236	1.96715	0.38554	0.75842	1.79085	0.38554	0.69045
12	2.33164	0.35049	0.81723	2.10485	0.35049	0.73774	1.8983	0.35049	0.66534
13	2.51817	0.31863	0.80237	2.25219	0.31863	0.71762	2.0122	0.31863	0.64115
14	2.71962	0.28966	0.78778	2.40985	0.28966	0.69805	2.13293	0.28966	0.61783
15	2.93719	0.26333	0.77345	2.57853	0.26333	0.67901	2.2609	0.26333	0.59537
16	3.17217	0.23939	0.75939	2.75903	0.23939	0.66049	2.39656	0.23939	0.57372
17	3.42594	0.21763	0.74558	2.95216	0.21763	0.64248	2.54035	0.21763	0.55285
18	3.70002	0.19784	0.73203	3.15882	0.19784	0.62495	2.69277	0.19784	0.53275
19	3.99602	0.17986	0.71872	3.37993	0.17986	0.60791	2.85434	0.17986	0.51338
20	4.3157	0.16351	0.70565	3.61653	0.16351	0.59133	3.0256	0.16351	0.49471
21	4.66096	0.14864	0.69282	3.86968	0.14864	0.5752	3.20714	0.14864	0.47672
22	5.03383	0.13513	0.68022	4.14056	0.13513	0.55952	3.39956	0.13513	0.45938
23	5.43654	0.12285	0.66786	4.4304	0.12285	0.54426	3.60354	0.12285	0.44268
24	5.87146	0.11168	0.65571	4.74053	0.11168	0.52941	3.81975	0.11168	0.42658
25	6.34118	0.10153	0.64379	5.07237	0.10153	0.51498	4.04893	0.10153	0.41107
26	6.84848	0.0923	0.63209	5.42743	0.0923	0.50093	4.29187	0.0923	0.39612
27	7.39635	0.08391	0.62059	5.80735	0.08391	0.48727	4.54938	0.08391	0.38172
28	7.98806	0.07628	0.60931	6.21387	0.07628	0.47398	4.82235	0.07628	0.36784
29	8.62711	0.06934	0.59823	6.64884	0.06934	0.46105	5.11169	0.06934	0.35446
30	9.31727	0.06304	0.58736	7.11426	0.06304	0.44848	5.41839	0.06304	0.34157
Growth rate:		8.00%			7.00%			6.00%	
Discount rate:		10%			10%			10%	
10 year multiple			9.2		8.9		8.5		
15 year multiple			12.5		11.8		11.1		
20 year multiple			16.9		15.6		14.4		
25 year multiple			20.2		18.3		16.6		
30 year multiple			23.3		20.7		18.4		
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