

Life Cycle Costing:

LCC is a process to determine the sum of all the costs associated with an asset or part, thereof including acquisition, installation, operation, maintenance, refurbishment, & disposal costs.

It is a technique we take into account of the total cost or making profit during its life span. In other words, LCC is a systematic consideration of product.

LCC includes product development, introduction cost, production cost, distribution cost, sales cost. LCC includes tracing cost, funding cost & revenue by product basis over several calendar years.

LCC provides overall framing for considering cost of the product whole entire life span. LCC is used to provide a long term picture of profit, life and profitability.

Features of LCC:

- A product has a finite life
- A product passes through different phases of life cycle.
- It begins with identification of customer needs.
- Profit per unit of product varies
- Phase wise functions.

Stages of LCC:

1. Market Research
2. Design specification
3. Proto-type manufacture
4. Development of product
5. Tooling-up for production
6. Manufacturing the product
7. Marketing
8. After sales service.

Problems:-

1. A company is considering to launch a new product having 3 years of life. The full costs are estimated to be incurred @ lifetime phase wise:

- Research & Development 500,000
- Prodⁿ & Design cost 200,000
- Operating cost :-
 - 1st yr 120000
 - II 140,000
 - III 144000
- Product disposal cost (@ the end of 20000 III yr)
- Co's target discounted factor rate is 10%.

Compute: • Total life cycle costing
• Assess viability / suitability of launching a product.

PV factor for one rupee @ 10%

Yr :	1	2	3
Disc fac :	0.91	.83	.75

Proposed revenue for the product:

Yr :	1	2	3
Revenue :	300,000	600,000	800,000

Q2: Calculation of Total Life Cycle Costing:

Particulars.	Amount
- R & D	50,000
- Product Design Cost	200,000
- Operating cost:	
[Cost * Disc fac]	
I 120,000 * .91	109200
II 140,000 * .83	116200
III 140,000 * .75	<u>108000</u>
	<u>333,400</u>
	10,33,400

Product Disposal Cost
 [200000 * .75] 15000
 Total Life Cycle Cost → 10,48,400 //

Calculation of Income / Total Revenue:

Sales * Disc fac	
300,000 * .91	= 273,000
600,000 * .83	= 498,000
800,000 * .75	= <u>600,000</u>
	<u>13,71,000</u>

Calculation of Income:

Total Revenue	→	13,71,000
less: Total Life Cycle Cost	→	<u>10,48,400</u>
Income	→	<u>3,22,600 //</u>

(Company can launch the New Product)

2. A TCS, Computer software Co, develops accounting package namely general ledger. The following budgeted infoⁿ for general ledger over a 6 year product life cycle are given:

Year	1	2	3	4	5	6
- R & D cost:	240,000					
- Design cost:	160,000					
One time Set-Up cost:						
Product cost	₹ 100,000					
market cost	₹ 70,000					
Distribution cost	₹ 50,000					
Customer Service Cost	₹ 80,000					
						Cost / package
						₹ 25/-
						₹ 24/-
						₹ 15/-
						₹ 30/-

Further relevant data are given as follows:

	5000 U	4000 U	2500 U
- Sales quantities (Units)	5000 U	4000 U	2500 U
- Sales price per package	400	450	600

Prepare a statement showing operating incomes for different levels.

Qd^o: Statement Showing L.C.C.:

Particulars.	Alternatives		
	1 [5000 U]	2 [4000 U]	3 [2500 U]
- R & D cost	240000	240000	240000
- Design cost	160000	160000	160000
- Variable cost :			
(i) Prod ⁿ cost + Variable cost			
₹ 100,000 + [5000 U * 25]	225000	-	-
₹ 100,000 + [4000 U * 25]	-	200,000	-
₹ 100,000 + [2500 U * 25]	-	-	162500
(ii) Marketing cost : [marketing cost + Variable cost]			
₹ 70000 + [5000 U * 24]	190000	-	-
₹ 70000 + [4000 U * 24]	-	166000	-
₹ 70000 + [2500 U * 24]	-	-	130000
(iii) Distribution cost :			
₹ 50000 + [5000 U * 15]	125000	-	-
₹ 50000 + [4000 U * 15]	-	110,000	-
₹ 50000 + [2500 U * 15]	-	-	87500

Customer Service Cost:

₹ 80000 + [5000 U × 30]	230000	-	-
₹ 80000 + [4000 U × 30]	-	200000	-
₹ 80000 + [2500 U × 30]	-	-	155000
	<u>11,70,000</u>	<u>10,76,000</u>	<u>9,35,000</u>

LCC →

Calculation of sales:-

Particulars	I	II	III
Sales Value:			
[Units × Sales Price/U]			
- 5000 × 400	20,00,000	-	-
- 4000 × 450	-	18,00,000	-
- 2500 × 600	-	-	15,00,000
	<u>20,00,000</u>	<u>18,00,000</u>	<u>15,00,000</u>

Calc of Operating Income:

Particulars.	I	II	III
Sales Value	20,00,000	18,00,000	15,00,000
Less: - L.C. Costing	<u>11,70,000</u>	<u>10,76,000</u>	<u>9,35,000</u>
Operating Income →	<u>8,30,000</u>	<u>7,24,000</u>	<u>5,65,000</u>

3. X Ltd is about to replace its rapidly ~~deteriorating~~ deteriorating boiler equipment. 3 slips of boiler system are being considered as a suitable replacement:

- a) Coal fire b) Gas fire c) Oil fire

The associated cost are as follows:

Particulars.	CF	GF	OF
Cost of Boiler	<u>55000</u>	<u>74000</u>	<u>67000</u>
Annual fuel cost	27000	23000	25000
Direct Labour cost	8000	-	-
Administrative / maintenance cost	4000	3000	3000
Electricity cost	<u>1000</u>	<u>1000</u>	<u>1000</u>
	40000	27000	29000

The new boiler is expected to last for 10 years. The Co has opportunity cost of finance of 15% p. year, what steps to be taken, for Re. 1, disc factor for 1 to 10 years is 5.019.

1. On the base of initial cost -
 Coal fire step is suitable for replacement & installation, because the cost of investment (initial is less)

2. On the basis of annual operating cost:

Particulars	Coal F	Gas F	Oil F
Cost of Boiler	55000	71000	67000
Add: maintenance cost for 10 years			
Annual cost * 10 yrs			
40000 * 10	400000	-	-
27000 * 10	-	270,000	-
29000 * 10	-	-	290,000
	<u>455000</u>	<u>344,000</u>	<u>357000</u>

In this case Gas fire is chosen for replacement because cost is less.

3. On the basis of Discount factor:

Particulars	Coal F	Gas F	Oil F
Cost of Boiler	55000	71000	67000
Add: maintenance/operating cost			
Ann-cost * Cumulative disc fac			
40000 * 5.019	200760	-	-
27000 * 5.019	-	135513	-
29000 * 5.019	-	-	145551
	<u>255760</u>	<u>209513</u>	<u>212551</u>

In this case, Gas fire is selected for replacement because it is cheaper than other 2 systems.

4. A housewife is looking at the ways of producing domestic hot water & considering possibilities of an electric heater having an installation cost ₹160 & estimated electric charges upto ₹200 & Gas boiler with an installation cost ₹760. with annual fuel bills of ₹80. Assuming yourself as a consultant to this lost housewife, advice the suitability by comparing 2 systems on the basis of

- (i) Total Expenditure
- (ii) Present Value over a 5 years period.

Calculate total cost by taking the

following information:

Disc factor for Re.1 @ 5 years.

<u>Year</u>	<u>Disc fac</u>
0 — 1	1
End of 1 st yr.	0.9174
" " 2 nd yr	0.8417
" " 3 rd "	0.7722
" " 4 th "	0.7089
" " 5 th "	0.6499.

So: (i) Calcⁿ of total Cost for 2 proposals:

$$\text{Total Cost} = \text{Installation charges} + \text{Annual charges}$$

$$* \text{Electric heater} = 160 + 200 * 5 \text{ yrs} = 1160 //$$

$$* \text{Gas boiler} = 760 + 80 * 5 \text{ yrs} = 1160 //$$

On the basis of cost, both are same.
So the Housewife may select any one of them.

(ii) Calculation of Present Value:

Yr.	D.F	Electric Heater		Gas Boiler	
		Cost	PV	Cost	PV
Beginning of 1 st yr.	1	160	160	760	760
End of 1 yr.	.9174	200	183.48	80	73.392
" " II "	.8417	200	168.34	80	67.336
" " III "	.7722	200	154.44	80	61.776
" " IV "	.7089	200	141.78	80	56.712
" " V "	.6499	200	129.98	80	51.992
			<u>938.02</u>		<u>1071.208</u>

Based on PV, electric heater is cheaper. So it is selected by the Housewife.

5. Satellite Co, supports the concept of life cycle costing (Zero Technology) for new investment decisions covering its engineering activities. The Co. is to replace a nos of its machines & the prod² manager is torn out between "m"- machine is more expensive machine with life of 12 years & the "N" machine with a estimated life of 6 years. If "N" machine is choosen, it is likely that would be replaced at the end of 6 years by another "N" machine. The pattern of maintainence & running cost differs between 2 types of machines & revealed data are shown below:

Particulars	M (₹)	N (₹)
Purchase price	19000	13000
Trade Value [Sale]	3000	3000
Annual repairs cost	2000	26000
O/H cost (@ the 8 th yr)	4000	
@ the 4 th yr	2000	
Estimated financing cost		
average over the machine life	10%	- 8 th yr
	10%	- 4 th yr

You are required to recommend with supporting figures which machine to purchase stating any assumptions made:

	Disc	Fac	Cumulative P.V
"M" mach	0	8 th - 12 yr	1 - 12 yrs
"N" mach	0	0.47	0.32
	0	end of 4 th yr - 6 th yr	1 - 6 yrs
	0	0.68	0.56
			4.36

Solⁿ: In case of "M" machine:

[Machine having life of 12 years]

Particulars.	Yr.	DF	Cost	PV
Purchase price	0	1	19000	19000
O/H cost	8	0.47	4000	1880
Repairs	1-12	6.81	2000	<u>13,620</u>
				34,500
<u>less</u> : Trade Value 12 th y		0.32	3000	<u>960</u>
				33,540//

In case of Mach M → 33,540//

In case of "N" Machine [life of 6 years]

Particulars	Yr	DF	Cost	PV
Purchase price	0	1	13000	13000
O/H cost	4	0.68	2000	1360
Repairs	1-6	4.36	2600	<u>11336</u>
				25,696
<u>less</u> : Trade Value 6 th y		0.56	3000	<u>1680</u>

Mach N → 24,016//

In this case, machine 'M' is recommended because the present value for 6 years is less as compared to 6 years machine cost.

2010

6. Electronic Ltd is examining the profitability & pricing policy of its recent 3 software packages namely EE-46 packages for electrical engineers, ME-83 packages for mechanical engineers, IE-17 packages to Industrial engineers. The cost details relating to the said packages over entire life cycle are as follows...

Package	Selling Price (₹)	Nos of units of sales	
		Year I	Year II
EE-46	2500	2000	8000
ME-83	3000	2000	3000
IE-17	2000	5000	3000

Assume that no inventory remains on hand @ the end of second year. In the past 2 years Companies concerned with R&D in research & development cost. An analysis pointed out that for one of its most recent namely (IE-17), major effects has been made to reduce research & development.

Ms. Praveen, the software manager collected the full life cycle revenue & cost info^e for EE-46, ME-83 & IE-17.

Particulars	EE-46		ME-83		IE-17	
	Yr 1	Yr 2	1	2	1	2
Sales: Revenue :	(2500 × 2000) 50,00,000	(2500 × 8000) 200,00,000	60,00,000	90,00,000	1,00,00,000	60,00,000
<u>Less:</u> Cost :						
R & D →	70,00,000	-	45,00,000	-	24,00,000	-
Design cost of product →	18,50,000	150,000	11,00,000	100,000	800,000	160,000
Manufa ^e cost →	750,000	22,50,000	10,50,000	10,50,000	14,30,000	650,000
Dist ^e cost →	150,000	600,000	10,50,000	10,50,000	600,000	360,000
Customer Service →	50,00,000	32,50,000	4,50,000	10,50,000	22,00,000	38,80,000
	<u>1,47,750,000</u>	<u>62,50,000</u>	<u>73,40,000</u>	<u>25,60,000</u>	<u>74,30,000</u>	<u>50,50,000</u>
			(81,50,000)	(32,50,000)		

Required :-

- Prepare a product life cycle volume income statement for each software
- which is the most profitable
- Ignore time value of money.

How does these 3 software packages differ in their cost structure.

Q.2: Statement Showing L.Cy. Income

Particulars	EE-46		ME-83		IE-17	
	I	II	I	II	I	II
Sales Revenue:	50,00,000	2,00,00,000	60,00,000	90,00,000	1,00,00,000	60,00,000
less: Total cost →	14,75,000 1,40,50,000	62,50,000	13,40,000 2,50,000	22,50,000 25,60,000	41,30,000	50,50,000
Profit/loss →	+35,25,000	+1,37,50,000	+46,60,000	+64,40,000	+58,70,000	+9,50,000

On the basis of first year cost EE-46, ME-83 are incurring losses because initially establishment cost is more but IE-17 is profitable. On the basis of second year cost ME-83 is more profitable.

4. The foll info relating to life cycle:

Period	Estimated Prod ⁿ (U)	Fixed cost p.a	Variable cost/U (₹)	Total cost (FC+VC)	Cost/U
1	10000	50000	20000	70000	7.00
2	20000	50000	40000	90000	4.5
3	100,000	50000	200,000	250,000	2.5
4	30000	50000	60000	110,000	3.66
5	<u>5000</u>	50000	10000	60000	12.00
	165,000				

Calculate L.C.C. Give your comment.

Q.2: Calculations of Life Cycle Cost:

Fixed Cost (50000 p.a × ₹5)	25,00,000 250,000
Variable Cost [22 × V. Cost / 22] (165,000 × ₹2)	<u>330,000</u>
	Life Cycle Cost → <u>580,000</u>

$$\begin{aligned} \text{L.C.C per Unit} &= \frac{\text{L.C.C}}{\text{Nos of Units}} \\ &= \frac{580,000}{165,000} \\ &= ₹ 3.51 / \text{Unit} \end{aligned}$$

As per the given info cost/unit has differed from year to year, where as the LCC per unit is ₹ 3.51/-.

8. 2016 Q.4] X Ltd supports the concept of LCC for new investment decision to replace a machine. Two models are available in the market which will serve the purpose of the company. The details are as follows:

Particulars	Model AB	Model CD
Life	10 yrs	5 yrs
Cost	19000/-	13000/-
Scrap Value	3000/-	3000/-

Annual Repairing cost	2000/-	2600/-
One-time O/H cost	4000/-	2000/-
cost of funds	10%	10%.

Note:- One time O/H cost is expected to be incurred at the end of 8th year for Model AB & at the end of 4th year for Model CD.

Required :- Recommend the machine to be purchased.