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Life Cycle Cost Comparison Between Typical AC and Thermo-drain

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Abstract: The AC and Thermo-drain are the typical equipment used in the buildings to maintain the climate in the building. The Air conditioner (AC) typically cools the air inside with the help of thermostat containing a radiator and cools the temperature inside a room. The thermo-drain on the other hand uses water for cooling with the help of a radiator containing thermostat and passes the cool water thoroughly through pipes which indeed reduces the temperature of the room. In India, we've hot summers and buildings are un-insulated. They absorb the solar heat and emit it inside. The interior surfaces get heated and radiate heat. Sufficient evidence has been gathered till date to show that un-insulated buildings in India absorb radiation during the day and release it within the night.

***Index Terms*:** Thermo-drain, Air Conditioner, HVAC, Life cycle cost.

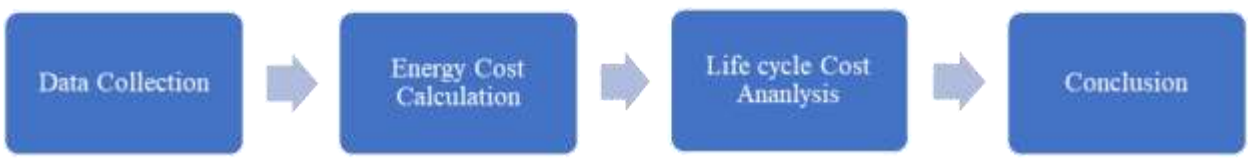
I. INTRODUCTION

The importance of analyzing life cycle cost comparison in building design is to provide clear view of the increasing awareness of its role in building life cycle costs and environmental impacts. However, energy analysis is done using NPV method. By utilizing life cycle cost as a data source for energy analysis, the data input will be more efficient and the existing data more reusable. Rapid rate of urbanization has led to increase in demand (growth in cooling systems). People prefer using regular split air conditioner rather than Thermo-drain which leads to more energy consumption which indeed increases more bills. The current level of energy consumption is more elevating and expensive. Planned and proper cooling systems is the current need of hour. Proving the cooling systems prove to be an efficient and effective for the current heat transfer of in a particular room area. The decision on the thermo-drain can affect urban life perspectives such as low energy consumption, cooling with lesser energy, and performance. Accordingly, energy consumption management is one of the most important tools for city managers to improve city residents with a good quality of life.

II. EXISTING SITUATION OF COOLING SYSTEMS

The residential and commercial spaces use the typical air conditioners as a cooling system for their space. With the expanding interest in energy-efficient building design, whole building energy simulation programs are increasingly employed in the design process to help architects and engineers determine strategies for saving energy and to find components that are cost-effective. People still demand a regular AC for cooling than more energy efficient cooling systems because of the initial cost. This leads to increase in the energy consumption which indeed leads to more financial expense in the regular use of cooling systems.

III. METHODOLOGY



Details:

A typical 1000 sq.ft of area for commercial space is considered for the comparison.
The Cooling systems suggested for the space are regular Air conditioners and a Thermo-drain.
The initial cost and working cost are easy to acquire from existing structures with the components. In case of regular AC the information collected is from Ajith publicity Mahatma nagar Nashik and Thermo-drain information is acquired from Panasia Pune.
A typical 25 year cost is selected and the comparison is done by the net present value method.

Life Cycle Cost Analysis

Typical life cycle cost for a regular ac

Year	Application Cost	Average Energy Bill (Annual)	Maintenace Cost	Total Cost	Cummulative Cost
2019	349900			349900	
2020		38794	8000	46794	396694
2021		41141	8484	41141	437835
2022		42367	8737	42367	480201
2023		43629	8997	43629	523830
2024		44929	9265	44929	568759
2025		46268	9541	46268	615028
2026		47647	9826	47647	662674
2027		49067	10118	49067	711741
2028		50529	10420	50529	762270
2029		52035	10730	52035	814305
2030		53585	11050	53585	867890
2031		55182	11380	55182	923073
2032		56827	11719	56827	979899
2033		58520	12068	58520	1038419
2034		60264	12427	60264	1098683
2035		62060	12798	62060	1160743
2036		63909	13179	63909	1224652
2037		65814	13572	65814	1290466
2038		67775	13976	67775	1358241
2039		69795	14393	69795	1428036
2040		71875	14822	71875	1499910
2041		74016	15263	74016	1573927
2042		76222	15718	76222	1650149

2043		78494	16187	78494	1728642
2044		80833	16669	80833	1809475

Typical Life cycle Cost for Thermo-drain

Year	Application Cost	Average Energy Bill (Annual)	Maintenace Cost	Total Cost	Cummulative Cost
2019	120000			120000	
2020		13692	3000	16692	136692
2021		14520	3181	14520	151212
2022		14953	3276	14953	166165
2023		15399	3374	15399	181564
2024		15857	3474	15857	197421
2025		16330	3578	16330	213751
2026		16817	3685	16817	230567
2027		17318	3794	17318	247885
2028		17834	3907	17834	265719
2029		18365	4024	18365	284084
2030		18912	4144	18912	302997
2031		19476	4267	19476	322473
2032		20056	4394	20056	342529
2033		20654	4525	20654	363183
2034		21270	4660	21270	384453
2035		21903	4799	21903	406356
2036		22556	4942	22556	428913
2037		23228	5089	23228	452141
2038		23921	5241	23921	476062
2039		24633	5397	24633	500695
2040		25367	5558	25367	526062
2041		26123	5724	26123	552186
2042		26902	5894	26902	579088
2043		27704	6070	27704	606791
2044		28529	6251	28529	635321

CONCLUSION

In terms of capital cost, the structural cooling system is 50 per cent less costly than a conventional Thermo-drain system and the recurring energy cost is a mere 8.7 per cent of a conventional system. Given the outline of the comparative analysis (in Table) of regular AC and thermo-drain marts as info of comparative mechanisms in organisations, there are variations that can be attributed to size, sophistication, and level of usage.

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