

## **9.0 Life Cycle Cost Analysis**

In order to make any final conclusions or system recommendations, it is important to compare life cycle costs of any systems being considered. For this analysis two comparisons will be made. First the VAV and DOAS systems will be compared without and changes being made to the central chilled water plant. Secondly, both chilled water plant options of absorption and electric chillers will be compared with each of the airside systems. For the purpose of this life cycle analysis an interest rate of 6% will be assumed. The annual energy costs of the mechanical analysis along with the initial costs from the construction breadth are combined to compare 20 year life cycle costs. The results of the VAV and DOAS systems are displayed in Table 9.0-1.

Air System	20 Year Life Cycle Cost	Life Cycle Cost Savings	First Cost	Annual Cost	Payback
VAV	\$8,812,317	\$0	\$791,264	\$699,312	N/A
DOAS	\$8,479,052	\$333,265	\$920,305	\$659,006	3.7 years

**Table 9.0-1: VAV and DOAS Life Cycle Cost Analysis**

It can be seen that over a period of 20 years a DOAS system is the less expensive of the two airside options for the Straumann USA building, and can be paid back in a time of 3.7 years. Using the same interest rate, a 20 year life cycle analysis for the central plant is calculated and the results are displayed in Table 9.0-2.

Chiller Type	Air System	20 Year Life Cycle Cost	First Cost	Annual Cost	Payback
Electric	VAV	\$9,324,717	\$1,303,664	\$699,312	N/A
	DOAS	\$8,991,452	\$1,432,705	\$659,006	3.7 years
Absorption	VAV	\$10,431,686	\$1,820,264	\$750,783	No Payback
	DOAS	\$9,905,818	\$1,949,305	\$693,685	No Payback

**Table 9.0-2: Absorption and Electric Chiller Life Cycle Cost Analysis**

The life cycle cost determines that over a period of 20 years an electric chilled water plant with a DOAS airside system is the cheapest system for Straumann USA. It can also be seen that while an absorption/DOAS system is cheaper on an annual basis when compared to an electric/VAV system the additional first cost does not lead to a payback even over a 20 year period.