

Calculating and Conveying the *True* Cost of Ownership of Projection Displays

Courtesy of Digital Projection, Inc. – www.digitalprojection.com -- 770-420-1350

Link to the Cost of Ownership Calculator:

http://www.digitalprojection.com/news/zips/DPI_CostofOwnership_Calculator.zip

As the world's economies work their way toward recovery, the challenges of the past year have left us with valuable lessons. Now more than ever, it is vital that the True Cost of Ownership, of any capital expenditure, be clearly defined and understood. Savvy end-users and purchasing agents are becoming increasingly aware that purchase decisions need to be based not just on the initial purchase price of the product, but also on the long-term cost of ownership, as the combination of the two actually defines the actual cost of owning and operating any product. This article will describe how you can calculate true cost of ownership information for your clients, in order to help them recognize all of the costs associated with projector ownership.

The formula for calculating full cost of ownership is straightforward, but first, let's define some terms:

- PPP = Projector Purchase Price – that being, the initial price the customer paid for each projection system.
- OHRy = Operational Hours per Year – that being, the number of hours the customer expects to operate each projector on an annual basis.
- AYS = Anticipated Years of Service – that being, the number of years the customer expects to operate each projection system.
- LLHr = Lamp Life in Hours - being the number of hours the manufacturer specifies each lamp to operate before reaching 50% of its original brightness.
- LRC = Lamp Replacement Cost – that being, the customer's cost for each replacement lamp.
- LPU = Lamps Per Unit – being the number of lamps installed in each projector. This is typically one, two or four lamps, depending on the manufacturer and the model.
- AMI = Additional Maintenance Items – that being, the annual cost of any additional maintenance items that need to be replaced from time to time, such as filters, fans or color wheels.
- PQ = Projector Quantity – being the total number of projectors in the customer's application.
- PwrC = Power Consumption – being the projector power consumption in Kilowatts.
- ACPwr = Average Cost of Power – being the average cost of a Kilowatt Hour.

Now that the terms are defined, here is the formula to calculate the true cost of ownership for any number of projectors:

True Cost of Ownership =

$((PPP + (((((OHRy \times AYS) / LLHr) - 1) \times (LRC \times LPU)) + (AMI \times AYS))) + (OHRy \times AYS \times PwrC \times ACPwr)) \times PQ$

[You can download the calculator as an Excel spreadsheet by clicking here.](#) Included in the .zip file are Excel versions of the calculator for both Office 2003 and Office 2007.

You can also copy and paste this formula, formatted for Excel, into a spreadsheet:

$$+((PPP+((((OHRy*AYS)/LLHr)-1)*(LRC*LPU))+(AMI*AYS))+OHRy*AYS*PwrC*CPwr))*PQ$$

You may note that within the formula, one set of lamps is deducted from the total lamps consumed by each projector during its operational life. This accounts for the fact that the purchase price of each new projector already includes one set of lamps, which are already installed in the unit. Those are the first lamps used.

Here is an example of how to put the formula to work in a real world application:

We will assume a high-use application - 24 hour-per-day, 7 days-per-week, that employs (4) TITAN 1080p-700 displays, which are dual lamp projectors. Being 3-chip displays, beyond lamps and filters, no additional maintenance items are required.

First, let's organize the data:

- PPP = Projector Purchase cost = \$67,000 (list price of a TITAN 1080p 500 and a typical lens)
- OHRy = Operational Hours per Year = 8760 (24 hours per day x 365 days per year)
- AYS = Anticipated Years of Service = 7
- LLHr = Lamp Life in Hours = 2000
- LRC = Lamp Replacement Cost = \$995
- LPU = Lamps Per Unit = 2
- AMI = Additional Maintenance items = \$0
- PQ = Projector Quantity = 4
- PwrC = Power Consumption = .950 Kw == per the published specifications for the TITAN 1080p 700.
- ACPwr = Average Cost of a Kilowatt Hour of Power = \$.10175. This figure is per http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html, which identifies that in 2007, the average cost of residential and commercial electricity in the US was \$0.10175 per KwHr.

Now, let's plug the data into the formula:

Total Cost of Ownership =

$$((PPP + (((((OHRy \times AYS) / LLHr) - 1) \times (LRC \times LPU)) + (AMI \times AYS))) + (OHRy \times AYS \times PwrC \times ACPwr)) \times PQ$$

$$((\$67,000 + (((((8760 \times 7) / 2000) - 1) \times (\$995 \times 2)) + (\$0 \times 7))) + (8760 \times 7 \times .950 \times \$0.10175)) \times 4$$

$$((\$67,000 + (((61320 / 2000) - 1) \times \$1,990) + \$0)) + \$5,927) \times 4$$

$$((\$67,000 + ((30.66 - 1) \times \$1,990) + \$0)) + \$5,927) \times 4$$

$$((\$67,000 + (29.66 \times \$1,990)) + \$5,927) \times 4$$

$$(\$67,000 + \$59,023 + \$5,927) \times 4$$

$$\$131,950 \times 4$$

Total Cost of ownership = \$527,800 for all four units, for 7 years of 24 / 7 operation.

Total Cost of Ownership = \$131,950 per unit, for 7 years of 24 / 7 operation.

The resulting true cost of ownership values include all costs - Initial purchase price, lamp replacements, scheduled maintenance, miscellaneous consumables and cost of power.

It is important to mention, power consumption, lamp life and cost of replacement lamps have a huge impact on the true cost of ownership calculation. In our example, we can see that each of the efficient TITAN 700's, which require only 950 watts to operate at full brightness, consume a total of \$5927 of power during the seven year, 24 / 7 operational life. For comparison sake, an unwary customer of our average competitor's projector that consumes 2638 watts would spend **over \$ 16,459, per projector**, on electricity for same usage over the same time period! Across the 4 projectors in our example, that would increase the total cost of operation (and power) by **more than \$42,000!** Beyond costing far more to operate, projectors that consume more power also place a greater power burden on facility HVAC, and they leave a much larger carbon footprint in their wake.

The same analysis can be made for lamp life and cost of replacement lamps. As a simple modification to our example, if a projector was selected with the same lamp cost as the TITAN, but with a lamp life of only 1500 hours, the total cost of operation (and lamps) would **increase by nearly \$20,000 per unit - \$80,000 across all 4 units!** In short, selecting projectors that utilize lamps with shorter operational life, or higher lamp replacement costs (or both), can have an astoundingly costly impact on the true cost of ownership.

We all know that times have changed. Government and corporate customers are under tremendous pressure to make responsible purchase decisions that achieve their objectives in the most efficient way possible. Our job is to provide them with the information they need to make the right decision.

The next time you have the opportunity to specify displays for an important project, take the time to calculate the overall cost of ownership between, for instance, the customer's old projector and the proposed DP projector, or the proposed DP projector and any competitive model the customer may be considering as a reasonable alternative. More than likely your analysis will demonstrate that your DP offering delivers a more efficient solution over the long term - one that saves your customer money, helps preserve our natural resources and allows your point of contact to stand out as a savvy decision-maker to their employer.