True Cost Savings by Upgrading Your Video Wall System

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Today’s control room supervisor is faced with keeping operational costs low while still maintaining high quality displays. As display technology has evolved over the years, this obstacle can be easily overcome if your control room or operation center is equipped with 4th generation video display walls.

The latest technology in 4th generation displays walls give way for significant cost savings and display quality over previous generations of video wall products. Now, the initial investment of upgrading an outdated system makes sense fiscally.

Customer Savings Analysis

With unique features and high reliability, the latest video walls can save customers upwards of 50% in operating and maintenance costs over previous systems. New video walls have increased their mean time between failures (MTBF) and their reliability. Some manufacturers can achieve over 100,000 hour MTBFs for all moving components.

Understanding Where Costs Can Arise

A data wall display is a tool used by multiple users to simultaneously monitor large quantities of information. Like any industrial tool however, there are certain costs associated with performing routine maintenance and repairs. Any multi-projection system display operating 24 hours a day/7 days a week will require interventions for the following:

Ongoing Maintenance

- Lamp Replacement (typical lamps last between 6,000 and 10,000 hours)
- Brightness Adjustment between display units
- Color Adjustment between display units

Service Repairs

- Colorwheel Replacement
- Fan Replacements (Units typically have 8-10 fans each)
- Electronics Module Replacement
- Optical Head Replacement

Ongoing Maintenance

Ongoing maintenance is one of the most overlooked aspects of making a video wall display purchase. This can also be one of the leading frustration points for customers of this technology. By understanding that cost of ownership is more than just purchasing lamps, you will be able to quickly identify how to save money over the next ten years by investing in the correct solution.

Lamp Replacement

132W/150W UHP lamp with a 10,000 hour/6,000 hour expected average lifetime. With this new lamp technology, users are able to have brighter displays at the same or lower cost of ownership. Depending on the vintage and/or manufacturer of displays this can result in significant improvement in display quality while reducing cost of ownership.
The latest cubes feature lamps that provide more brightness and longer lifetimes with the same low cost of ownership. Users that were previously operating in high brightness mode can now actually achieve higher brightness levels while operating in normal mode. For example, users of Mitsubishi’s 50” cubes were able to achieve 1,000 cd/m² in bright mode, while new lamps can achieve 1010 cd/m² in normal mode.

Users of different manufactured cubes can find up to a 4x improvement in display brightness, when upgrading to Mitsubishi’s new 4th generation cubes.

**Brightness Adjustment between display units**

One of the most common complaints about multiple displays combined into a video wall is that the brightness between screens does not match. This gives the appearance of a checkerboard effect. This checkerboard appearance is caused by the lamps not decaying at the same time.

There are two ways to alleviate the discrepancy in brightness levels between screens:

1. Have a technician manually adjust the brightness levels of the displays between screens.
2. Utilize an automated system for measuring actual brightness and automatically adjust so that the adjacent displays match.

*Manual Adjustment Method:*

Manually adjusted video walls require the use of a trained technician to balance the brightness across the entire display wall. The time required to adjust the brightness is based on the size of the display wall. As the display wall becomes bigger the time required to adjust it increases exponentially.

**Estimated Brightness Adjustment cost for a 5x2 display**

2 man hours x $75 per/hour = $150 per visit

**Estimate a visit every 2 months for optimal performance**

6 visits per year x $150 per visit = $900 per year maintenance

*Automatic Adjustment Method:*

New video wall products utilize Dynamic Brightness Balancing to monitor and automatically adjust the brightness level of individual display units. Since the display units are networked
together, the system automatically adjusts the brightness of each screen as required every 2 seconds so that the entire wall is uniform.

- Estimated Brightness Adjust Cost for a 5x2 display
- Automatically done within projection engine every 2 seconds = $0

**Color Adjustment between display units**

Another common issue is that the color balance of the display wall appears to drift over time. This issue typically manifests itself for one of two reasons:

1. In systems without automatic brightness adjustment, brightness intensity changes can tend to cause color intensity differences as well, giving the impression that the color balance has changed.
2. Each lamp has its own color characteristics. When a lamp in a system is exchanged, the established color balance of the entire display wall has changed as well.

Color balancing due to lamp replacement can lead to a vicious cycle, because lamps typically don’t fail at the same time. Instead they fail over weeks or months, requiring color balancing of the entire wall every time a lamp is replaced.

There are two ways to alleviate color discrepancies between screens:

1. Have a technician manually adjust the color levels of the displays between screens manually.
2. Utilize an automated system for color balancing the displays when lamps are replaced within the display.

**Manual Adjustment Method:**
Manually adjusted display wall products require the use of a trained technician to color balance the display wall. The time required to adjust the color is based on the size of the display wall and the imaging technology used. As the display wall becomes bigger the time required to adjust it increases exponentially.

**Estimated Color Adjustment cost for a 5x2 display**
12 man hours x $75 per/hour = $900 per visit

**Estimate a visit every time a lamp is changed for optimal performance**
10 visits per year x $900 per visit = $9,000 total color balance charge for full lamp replacement

**Automatic Adjustment Method:**
Automatic display wall products utilize Smart Lamp technology, which stores color characteristics of individual lamps within a chip in the lamp housing. When a new lamp is inserted into the displays the new value is automatically compared to the old value and an automatic color adjustment is made.

- Estimated Color Adjustment cost for a 5x2 display
- 1 man hours x $75 per/hour = $75 per visit
- Estimate a visit every time a lamp is changed for optimal performance
- 10 visits per year x $75 per visit = $750 total color balance charge for full lamp replacement

**Onsite Diagnosis**
Self diagnosis of video wall cubes can prevent multiple trips by qualified technicians. Self diagnosis can be fairly rudimentary or quite advanced depending on the manufacturer. At the most basic level, the
projection engine should have a display indicating trouble codes. However, more advanced systems should have written explanations of problems on a LCD screen on the engine. Some manufacturers take the display of diagnosis a step further, by utilizing on screen LED signals. An LED light will either stay emitted or flash a code indicating failure. This enables untrained personnel to read off the error code from their workstation.

_Savings to Customer:_
1 diagnosis visit at 4 hours x $75 per/hour = $300 savings

**Service Repairs**
New technology in manufacturing has gone through great efforts to ensure high reliability of the new video wall products and a warranty burden of less than 1% attests to this. However, service issues are inevitable under such intense operating conditions, so the latest display wall cubes have incorporated many repair cost saving features into the displays themselves to help reduce service liability to the customer.

**Fan Replacement**
Fans in previous generations of display had an average lifespan of 25,000-50,000 hours. Each display cube can use up to 10 fans per cube for maximum cooling during operation. This meant that users had to typically replace fans every 3-5 years, and not each fan failed at the same time. With each failure a technician had to come and service the cubes which increased the total cost of ownership with each failure. New cubes make use of high-tech ceramic bearing fans that last over 100,000 hours. With over 10+ years of continuous operation, a technician will rarely have to come and replace them.

_Previous Generation’s Method:_
4 man hours x $75 per/hour x 2 visits every 10 years = $600 per visit

_4th Generation Method:_
2 man hours x $75 per/hour x 1 visit every 10 years = $150 per visit

_Savings to Customer: $450_

**Color Wheel Replacement**
Previous generations of display walls used a color wheel that had an average lifespan of 25,000-50,000 hours. This meant that users had to typically replace this component every 3-5 years. With new ceramic bearing technology, the latest generation of cubes feature a color wheel that lasts over 100,000 hours. That is over 10+ years of continuous operation until the color wheel needs to be replaced. The new colorwheels utilize Smart colorwheel technology that store its color characteristics within a chip in its housing. Therefore when a color wheel is changed the Smart unit automatically calibrates itself.

_Manual Color Adjustment Method:_
13 man hours x $75 per/hour = $975 per visit (includes replacement and color balance of wall)

_Automatic Color Adjustment Method:_
2 man hours x $75 per/hour = $150 per visit (includes replacement and color balance of wall)

_Savings to Customer: $825_

**Estimated Savings Worksheet**
The below Estimated Savings Worksheet is based on the 5x2 display wall example provided above. The numbers reflect costs over 10 years and don’t include integrator travel costs, customer costs and customer convenience.
<table>
<thead>
<tr>
<th></th>
<th>4th Generation Cubes</th>
<th>Previous Generation Cubes</th>
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</thead>
<tbody>
<tr>
<td><strong>Lamp Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Cost per lamp</td>
<td>$569</td>
<td>$650</td>
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<tr>
<td>Lamp Life (hrs)</td>
<td>10,000</td>
<td>6,000</td>
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<tr>
<td>Hours per Year</td>
<td>8,766</td>
<td>8,766</td>
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<tr>
<td>Number of full lamp replacements in 10 years</td>
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<td>14</td>
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<tr>
<td><strong>Total 10 Year Lamp Costs</strong></td>
<td><strong>$45,520</strong></td>
<td><strong>$91,000</strong></td>
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<tr>
<td><strong>Color Balancing Costs</strong></td>
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<tr>
<td>Cost Per adjustment</td>
<td>$150</td>
<td>$900</td>
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<tr>
<td>Number of adjustments per 10 years</td>
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<td>14</td>
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<tr>
<td><strong>Total 10 Year Color Balancing Costs</strong></td>
<td><strong>$ 1,200</strong></td>
<td><strong>$12,600</strong></td>
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<tr>
<td><strong>Continuous Brightness Matching Adjustment</strong></td>
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<tr>
<td>Cost per adjustment</td>
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<td>Number of adjustments per 10 years</td>
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<tr>
<td><strong>Total 10 Year Brightness Matching Costs</strong></td>
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<td><strong>$6,000</strong></td>
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<td><strong>Diagnostics Costs</strong></td>
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<td>Cost Per Visit</td>
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<td>Number of visits per 10 years</td>
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<tr>
<td><strong>Total 10 Year Diagnostics Costs</strong></td>
<td><strong>$150</strong></td>
<td><strong>$600</strong></td>
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<tr>
<td><strong>Fan Replacement Costs</strong></td>
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<tr>
<td>Cost Per visit</td>
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<td>$600</td>
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<tr>
<td>Number of replacements every 10 years</td>
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<tr>
<td><strong>Total 10 Year Fan Replacement Costs</strong></td>
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<td><strong>Colorwheel Replacement Costs</strong></td>
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<tr>
<td>Cost Per visit</td>
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<td>$975</td>
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<tr>
<td>Number of replacements every 10 years</td>
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<td><strong>Total 10 Year Colorwheel Replacement Costs</strong></td>
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<tr>
<td><strong>Estimated Total Cost of Ownership</strong></td>
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<td><strong>$113,950</strong></td>
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<tr>
<td><strong>TOTAL SAVINGS</strong></td>
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<td>59%</td>
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</tbody>
</table>

*Estimated labor costs: $75 per hour*

*Costs are estimates. Actual results may vary. Actual System Integrator billable hour may differ.*