Less Energy Consumption a Feature and Real Benefit

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As I write this article, gasoline prices have dropped to below $3.00 per gallon. However, as most of us know, this is only temporary. Our politicians seem to finally be ready to address the issue of energy in terms of availability, consumption, conservation, and the development (hopefully) of renewable resources that our kids and grandkids can rely on. Add to this newfound political “hot potato” the issues of the environment and global warming and you have a series of real discussions going on that are long overdue.

In the audio visual industry we are faced with energy issues of our own in both AV systems and individual products that are components in the systems. In teaching display technology courses at InfoComm and conducting our own ISF Commercial display calibration and certification courses, we note that the issue of energy is a key element to consider Yet we find that most of us are not aware of the implication that this holds. We teach that with proper system design and display calibration there can be as much as a 20% savings in energy consumption on a display and that this will actually extend the life of the display in the process. While this may not be a significant issue for the home owner or a business that is using a couple of flat panel displays or portable projectors, the issue of energy consumption is one of significance when we speak of displays used in multiples and for 24/7/365 applications as well as rental and staging severe duty usage.

While energy consumption should be of concern for every niche of the audio visual industry, nowhere is it more relevant than in displays. We are seeing some progress in energy consumption from the flat panel display manufacturers, but I had not heard a great deal from the projector side of the house. Being armed with natural curiosity I began to delve into the issue with several projector manufacturers. Frankly, I was surprised at what I discovered, especially at the high brightness end of the market.

When we look at projectors, we have a natural tendency to look at the ANSI lumen specification first followed by the resolution of the core chip technology, then the specified contrast ratio. At this point most potential buyers then look at “features” such as input capability, lens availability, and networkability. All of these “abilities” overshadow two of the most important ownership factors, being power consumption and total cost of ownership AKA TCO.

To better illustrate the impact of energy consumption in real world data (read that dollars), I found a most interesting website called the Energy Information Association or EIA. It breaks down actual energy costs into numerous segments including “Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, Year-to Date through July 2008 and 2007 (Cents per kilowatt hour).” For the complete chart and all the sub sections go to (www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html). The bottom line is that we often ignore those energy costs and the implications to our TCO, not to mention the environment.

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The obvious place to start with energy consumption in a projector is with the lamp module. You have “X” amount of lamp light output and through the optical system and you produce “X” number of lumens. A byproduct of high powered lamp luminosity is heat and we must consider another component, the cooling fans, thus introducing another variable and that is noise. The concept of true efficiency in lamps, optical designs, and noise reduction has not been on most manufacturers’ radar screens. They have concentrated on chips, processors, connectivity, and price reductions. Note that I did not say cost because there is a huge difference between price and cost. You may pay a lower price up front on a given product but the cost in terms of TCO can make the more “expensive” price less expensive in the final analysis. This is where energy savings comes into play.

Armed with a healthy curiosity about power consumption costs, heat dissipation, and noise coupled with a significant concern for the environment, I started my research into finding out who was doing what in terms of the energy consumption issue. As most of us know, Google is our friend so I began my search there inquiring about energy efficiency in projectors. One name dominated my search and that was Digital Projection Inc., better known as DPI. After reading about DPI and their published efforts on energy savings, my interest level and curiosity accelerated. Was this just a way to differentiate them in the market or was this actually substance over form? After all, we live in an audio visual environment where nearly everyone is good (in some cases very good) and it is increasingly difficult to distinguish a company in these times of technology parity so “marketing speak” can prevail.

Rather than beat around the bush, I went directly to Mike Levi, president of DPI, who parenthetically was a major competitor during the 1990’s when your author was at Hughes –JVC. Mike was more than gracious and happy to answer my questions and address my concerns. We spoke at length about the evolution of projectors since we both started back in the 1980s and have seen a lot of developments from a CRT projector outputting a “blazing” 120 lumens to the brightest products today producing over 40,000 lumens. During the interview it became obvious that Mike understood that the typically marketed differentiation in projectors still resides in the DLP versus 3LCD arguments and that things like scaling engines and networkability not to mention image quality are important but he had another perspective to share. He is serious when it comes to the details of projector design and feels that a concern for energy savings will net DPI benefits in other areas of projector manufacturing and ultimately the quality and reduced TCO that their end users will receive. Who am I to argue, as DPI was the first manufacturer to introduce a DLP based projector and thus has extensive experience with digital display technology and the nuances of design.

Mike best states his case.

> "Environmentally friendly products have risen to the forefront of the consumer and business conscience over the last year. Fortunately for DP, efficient design has been a cornerstone of our development philosophy for more than a decade. As a result, Digital Projection's precision displays possess technologies that promote efficiency and extend useful life, while limiting cost of ownership, energy consumption, heat generation and operating noise.
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> Over the course of a projector's operational life (5-10 years), the positive financial and ecological savings derived from using a display that is thousands of watts more efficient would be very meaningful and tangible in terms of electricity consumed, carbon produced and dollars saved. Taking this data into consideration, it becomes clear that in a large venue application, using a product that produces maximum lumens from the lowest wattage lamps can make a huge difference in terms of long-term cost of ownership (cost of electricity per year) and CO2 footprint. For multi-unit applications, the environmental and cost of ownership benefits of using a DP product, as well as the negative impacts of using competitive products, are multiplied."

Mike further pointed out that "Many of the most important efficiency benefits of these products stem from DP's innovative CoolTek™ engineering. The CoolTek™ process is founded on the concept of minimum wattage in and maximum lumens out. As a result of DP's innovative illumination and optical designs, every DP projector is a demonstration of purposely designed lumen-per-watt efficiency. If we look at lumen for lumen, these products employ lower wattage lamps and consume less power than comparable products. In some products, the difference can be dramatic: As an example, the LIGHTNING 45HD-3D projector employs a 3.6 Kilowatt (kW) xenon lamp to produce 30,000 lumens. Competitive products employ 6 or 7 kW lamps to deliver similar brightness."

According to Mike, the DPI design philosophy is to integrate into most of their high light output products thermal management systems to maximize component life while minimizing heat generation, resulting in a lower cost of ownership and reduced projector noise levels. Digital Projection has engineered a unique system of airflow management they call DirectFlow™ that efficiently cools projector components such as the DMD engine itself in a manner that allows them to produce some of the most energy conservative and quiet projectors on the market .

In addition to energy savings and proper thermal management, DPI states that they engineer their products to be "small, light and as quiet as possible, reducing the projectors' impact on the immediate environment. By designing products that comply with our CoolTek™ principles, it becomes much easier to build small and quiet products." Their focus and common sense approach is really fundamental to what they do. With lower lamp wattages it reduces the need for high volume airflow. Also, we know that lower wattage lamps and their matched reflectors are smaller and lighter than higher wattage lamps / reflectors and as such, lower wattage lamps can also be cooled with smaller fans. Lower lamp wattage and fewer / smaller fans requires smaller power supplies. This further reduces power consumption, heat generation and chassis size not to mention reduced noise levels inherent with smaller fans. The good news is that I get it and hopefully others will as well.

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As a display guy I was pretty impressed and found the DPI approach to be refreshing and encouraging noting that marketing hype had not yet taken over the industry. Good impressions aside, I decided to go back to Google and search for others who were as dedicated to the energy “cause.” A little bit to my surprise, there was not a great deal of data on the topic. At this point I decided to go to the proverbial “horses mouths” and see what most of the large projector manufacturers were stating about power consumption using their current 10K lumen light output products as a point of reference.

My first stop was at BARCO who has a long and storied history in the display market. I looked at the site and selected the BARCO CLM-R10 to quote their power consumption. According to their specifications, this projector will consume a maximum of 1600 watts of power. I then cruised over to the Christie Digital site and forced myself to stop looking at their digital cinema projectors long enough to look at their relatively new Roadster HD-10K-M. Their specification showed 1320 watts of consumption. Being a fan of Panasonic over the years and having recently reviewed their 10K projector, I can report that the PT-D10000 consumes 1450 watts of power and their new 12K unit consumes 1500/1600 watts. My final stop on the “tour” was back at the good folks at DPI where I began the journey. Their Titan 1080p-700 consumes a miserly 850 watts of power. This is a variance from high to low of over 40% in a category! Add to applications with multiple projectors, extended lamp life, lower noise, and lower TCO and it is not to be ignored.

The purpose here is not to be overly critical of any company but to point out the importance of designing audio visual products and systems with energy efficiency in mind. Our research showed not only energy savings, but extended component life, less noise pollution and, by the way, did we mention it is good for the environment? DPI must be commended on their efforts and we know that this will soon spread throughout the AV industry. We will all be better off for the effort.

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