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THE RETURN OF THE LASER PROJECTOR FOR EVENT BACKDROPS

The Benefits of the Panasonic
PT-RQ50K over LED Displays



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FOREWORD INTRODUCTION

High-end laser projectors have maintained their position in the events industry for complex projection mapping and creative stage designs but in recent years LED displays have come to dominate the market being used as video walls and stage backdrops. The image brightness and contrast that LED had to offer was unrivalled for this purpose.

However, the introduction of the Panasonic **PT-RQ50K** in December 2019 has begun to rapidly reverse this trend. The 50,000 lumen, 3 Chip DLP projector delivers Native 4K images in a lamp-free and filter-less design with hermetically sealed optics for 20,000

maintenance free operational hours.

The Rental & Staging industry has quickly realised that the **PT-RQ50K** is a game-changer. It brings new levels of commercial and operational benefits, picture performance and creative flexibility that outgun the LED Display. As a result, its use is becoming widespread in concerts, TV staging and studios and for corporate and conference events.

This paper examines the benefits of the **PT-RQ50K** over LED Displays and draws on the experiences of the largest rental & staging companies in Europe, including The AED Group in Belgium and STS Communication in Italy and others.

*Hartmut Kulesa,
European Marketing Manager
at Panasonic Business.*





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REQUIREMENT EXAMPLE:

450INCH-CLASS (9.6M X 6M) /
4 SCREENS /4K RESOLUTION

PT-RQ50K

LED DISPLAY



PRE-CHECK

1  UNDER
DAY

1     FOUR TIMES
WEEK LONGER



TRANSPORTATION
AND STORAGE

5 FLIGHT
CASES



70 FLIGHT
CASES

3-4 TIMES MORE
TRUCK AND
STORAGE SPACE



SET-UP

8 PEOPLE


3 TECHNICIANS
6-8 Hours

4 PORTERS

1 MEDIA SERVER
OPERATOR

42  HOURS



3-4 TIMES FEWER
MAN HOURS

11 PEOPLE


5 TECHNICIANS
10-12 Hours

6 PORTERS

110  HOURS



BRIGHTNESS
VS POWER
CONSUMPTION



2-3
TIMES MORE POWER
TO DELIVER THE SAME
LEVEL OF IMAGE
BRIGHTNESS

COMMERCIAL AND OPERATIONAL COMPARISON

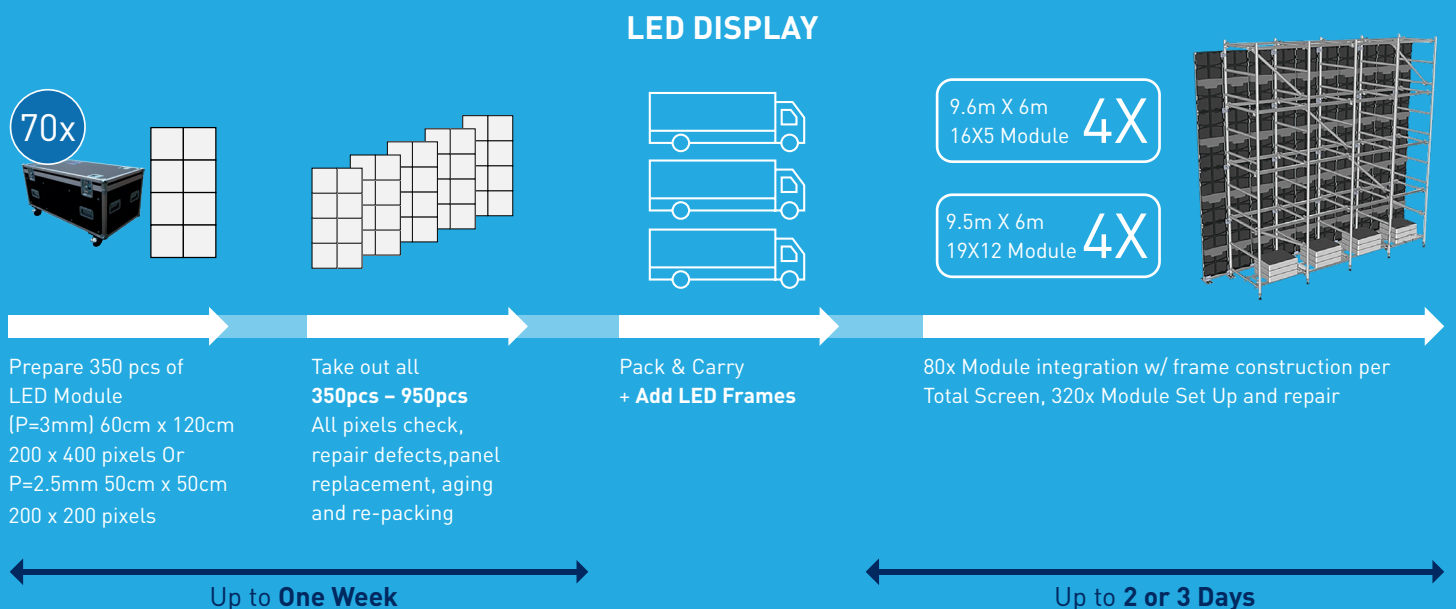
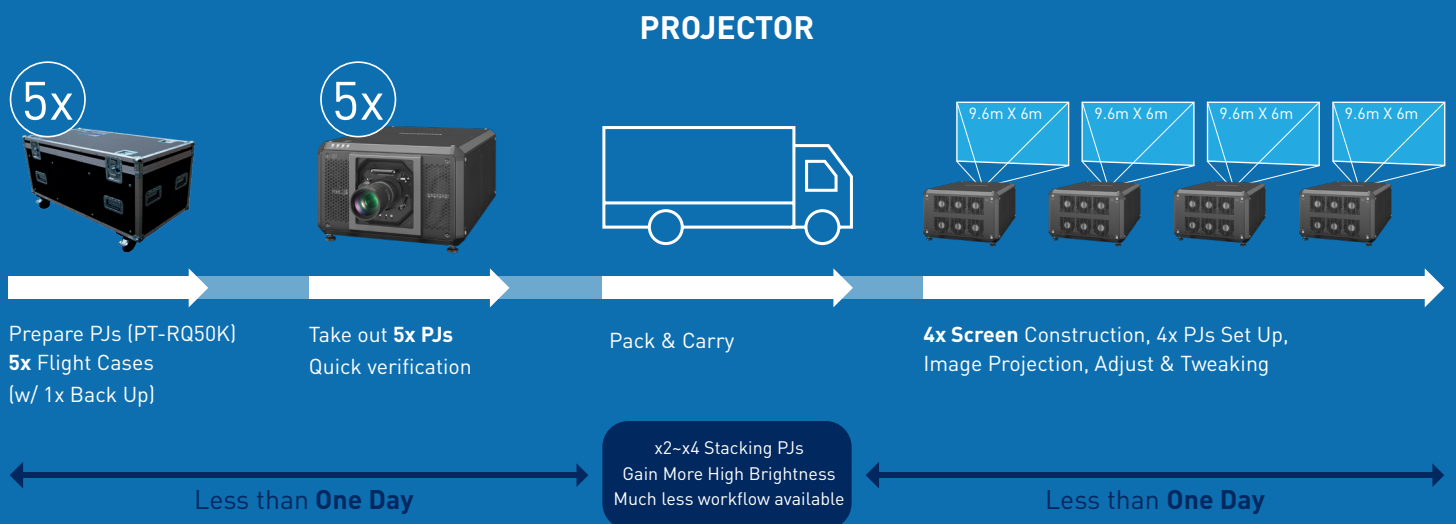
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Firstly, it is important to examine the typical workflow that a Rental and Staging company goes through to set-up a backdrop for a customer event. It quickly identifies a significant number of areas where the use of the PT-RQ50K is simpler, faster and more cost effective than using LED Displays.

In this example, we consider the equivalent PT-RQ50K projector and LED Display requirements to provide an event with 4 screens, each measuring 9.6m x 6m, delivering 4k resolution images. LED Displays with a 3mm pixel pitch have been chosen for this example, as it is the most commonly used pitch

size for events. However, the demand for more narrow pitch solutions is growing. A pixel pitch of 2.5mm and 3mm is used in standard projects, high-end productions are requesting 1.5 - 1.9mm, concert side screens can work with 8 - 10mm, and television shows opt for 3mm or 1.5mm for a set-up with close-up camera shots.

Comparison of Workflow



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1.1 Pre-checks

PT-RQ50K

For an event of this type, 5 projectors would be required, including 1 as a back-up. Pre-checks to ensure all equipment is in operational order would take under one day.



LED Displays

To create the four display screens, 350 separate LED modules would be required, including the additional 10% of modules required for back-up. Pre-check of these modules for panel and pixel quality would take up to one week – up to four times longer.

As a result, the manpower required and the time taken for equipment checks can be radically reduced by the use of projectors – from up to a week to less than a day.

1.2 Back-ups

An important commercial consideration for Rental & Staging companies is backup units; the number required and the investment required to supply them and whether they can be charged for to generate additional profit.

PT-RQ50K

Customers understand that the PT-RQ50K has built-in reliability and redundancy. It has built-in back-up features for inputs, light source, and power - removing the need for additional hot back-up devices. In the case of signal failure, the projector automatically switches over to a back-up input signal within 0.3 seconds. The failover design in the device maintains output even in the case of light source failure.

As a result of this reputation for reliability, customers requesting back-up units are prepared to pay for them, resulting in additional rental revenue and profits for Rental and Staging companies. A projector hot backup is considered “in use” during the event and will be charged for at 100% rental fee. A cold backup will only be charged for when the unit is used and, depending on the commercial agreement, it is often charged at 50% rental fee on these occasions.

LED Displays

With the redundancy of a single LED tile much more difficult to achieve, the rental industry has to include a percentage of tiles as spare back-ups for every deployment in case something goes wrong. On average, the spare tiles represent 3-10% of the total tile deployment. These LED backup tiles are considered an essential standard in the industry. As a result, they are included in the total price for the project and additional revenue opportunities are not available. This is a significant additional cost for the rental company.



1.3 Storage and transportation

PT-RQ50K

The projectors would fit into 5 freight cases (120x60x80cm) for transportation. The single body PT-RQ50K is half the size (under 370l) and weight (under 130kg) of traditional high-end projectors, and does not require any additional chillers or laser racks, reducing the time and cost of transport and installation.

LED Displays

The LED display modules would require 70 freight cases for transportation.

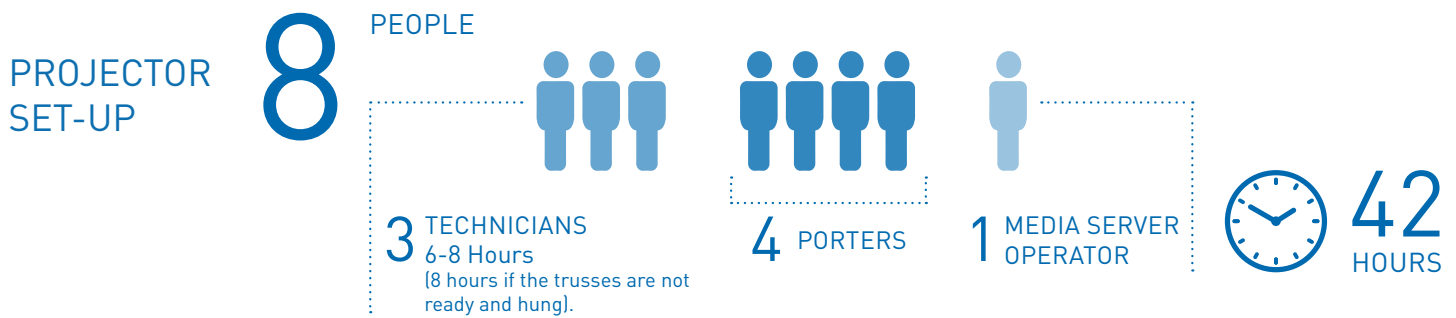
On average, Rental & Staging companies are estimating that a LED Display would require 3-4 times more truck space than PT-RQ50K projectors to create the same screen size.

In addition to the additional transportation required, consideration should be given to the additional storage space required at the event for the empty freight cases and the additional storage space required by the Rental & Staging company to hold the LED modules when not in use.



1.4 Set-up & Returns

There are significant man power savings with projector over LED:



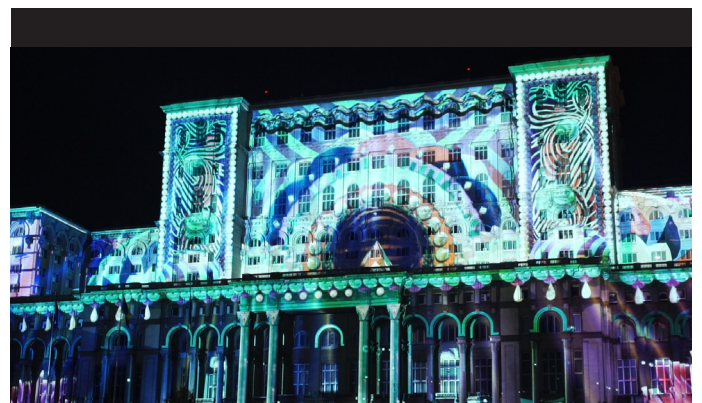
Set-up statistics supplied and ratified by STS Communication - Italy

PT-RQ50K

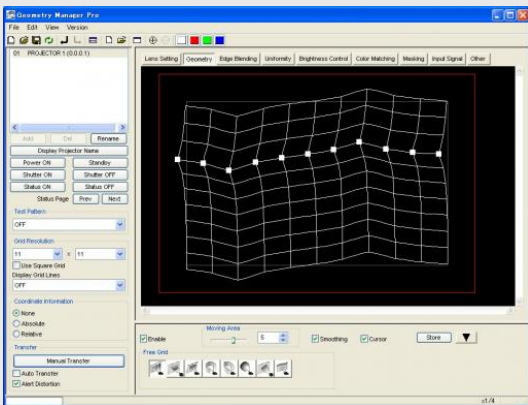
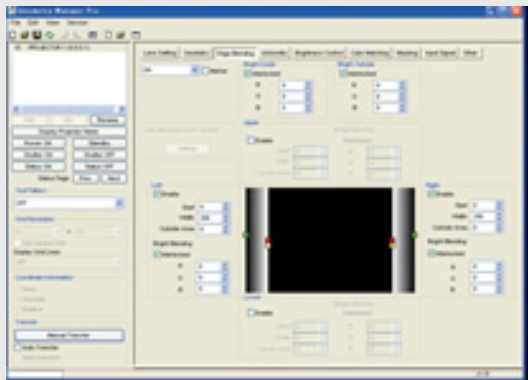
To set-up and test the image projection will take less than 1 day in this scenario. The PT-RQ50K comes with a number of unique Panasonic features to reduce set-up times. For the first time, Panasonic's Geometry Manager Pro software is pre-installed on the device removing the need for additional installation and delivering valuable features such as geometric adjustment, edge blending, colour matching, brightness control and masking.

A small LCD screen has been included in the device, alongside the input ports, to aid simple set-up and to check status information and error messages. A new Remote Preview function allows installers to connect their PC to the device via a LAN cable to preview content remotely while the projector shutter is still in place. The device also works with the upgraded Panasonic Smart PJ Control app, which allows installers to focus faraway screens from their smartphone.

For returns, the process is straightforward with a simple operational check. The PT-RQ50K has a hermetically sealed DMD block, filter-less design and shielded lasers exceed international dustproofing guidelines for 20,000 hours of maintenance-free projection. Laser modules have Failover Circuitry which bypasses a failed diode's series rather than the entire module for imperceptible brightness loss, reinforcing reliability when image projection must be maintained.



Geometry Manager Pro Software Pre-installed!
No need for additional installation or setup hassles



Simple Setup

- Projector ID
- DHCP
- IP Address
- Default Gateway
- Subnet Mask

Check Status

- Projector Runtime
- Network
- Temperature
- Power Supply Voltage

Error Indication

- Error Code
- Error Type



LED Displays

With 80 modules to integrate into each screen, frame construction and testing for image quality will involve a 2-3 day set-up time. This is 2-3

times longer than with projectors. As a result, the rental company will require more manpower to set-up within limited venue deadlines – resulting in higher crew costs.

RETURNS

PT-RQ50K

The Return procedure for the projector is very quick and easy. The projector is powered on and filter control, pixels and projection spots checked for. For example, as a result of damage from smoke machines.

The return process can be speeded up further by using the NFC chip in the projector. This provides all the information on runtime, IP address and errors without the need to turn on the projector.

A single technician can complete the return checks for four projectors within two hours.

LED Displays

Work time on returned products is a much more complicated process with LED.

After-event checks can take considerably more time than with projectors. Depending on the type of event between 5 and 20% of LED tiles will have some sort of problem when returned to the warehouse. Based on Rental & Staging company experience, around 80 to 85% of LED modules will have impact damage.

15-20% will have failed and need some sort of repair or service following an event, with issues such as broken panels, diode failures or damaged frames.

NFC Function

Tap the
NFC
icon

NFC	
PROJECTOR TYPE	PT-RCQ10
SERIAL NUMBER	DD7550004
PROJECTOR RUNTIME	195H
LIGHT RUNTIME	184H
MAIN / SUB / NT VER.	1.97.01 / 1.00.01 / 0.99.03
PROJECTOR ID	64
ASSET MANAGEMENT	---
PROJECTOR NAME	Name2885
DHCP	OFF
IP ADDRESS	192.168.10.10
SUBNET MASK	255.255.255.0
Creston Connected IP Address	0.0.0.0
Creston Connected IP#	3
SELF TEST	No Error
Last read time : January 31 2019 10:56:11	

Readable/writable settings data enabled by touching your smartphone against NFC touchpoint on the projector

1.5 Man power

A major part of any Rental and Staging company's operational costs is man power. Set-up and return operations are often time restricted as the show moves from location to location. In addition, venues also often have limitations on set-up time. As a result, set-up time is incredibly important and can often be very expensive if man power has to be increased to meet deadlines.

As can be seen from the examples set-out above, a projector set-up and return would require 3-4 times fewer man hours than the equivalent LED display. This is a significant cost saving for the industry.



59 Productions photographed/photo
by Justin Sutcliffe



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1.6 Higher residual value

As well as being more reliable, the PT-RQ50K projector maintains its value better than LED displays. Rental & Staging companies estimate:

PROJECTOR



RESIDUAL VALUE
AFTER 4 YEARS



40-45%

LED DISPLAY



RESIDUAL VALUE
AFTER 4 YEARS



5-10%



1.7 Conclusion

For Rental & Staging Companies, the commercial and operational advantage of the PT-RQ50K projector is the higher rate of return on investment. This rate is based on:



CHEAPER PURCHASE COST PER
INCH SCREEN SIZE



MORE FLEXIBLE AND
THEREFORE INCREASED RENTAL
OPPORTUNITIES



LOWER STORAGE COST



LOWER TRANSPORT COST



LOWER CREW RATE:
Setup
Operation



LOWER IMAGE PRODUCTION COST



HIGHER SECOND-HAND VALUE



Historically, LED Displays gained popularity because of the increased image brightness that they could deliver over projectors in a live event environment. However, this has changed with the introduction of the PT-RQ50K.

In a comparison with the leading LED displays on the market, with a 600nits image up to a 600inch screen, the 50k lumen PT-RQ50K projector delivers increased or comparable brightness at a significantly reduced power consumption.

Life examples of PT-RQ50 usage



Production: LANG AG
Customer: LANG AG
Screen: AV Stumpfl FullWhite
Gain: 1.2



Production: AED Display
Customer: Panasonic
Screen: CarbonBlack™ Professional
Gain is 1:1



Production: Panasonic
Customer: Tokyo Race Course
Screen: DNP Supernova
Gain: 0.8



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2.1 Trend for higher resolution

In addition, as resolution quality continues to improve, with 8K format becoming common in live events, the audience is being brought closer to the viewing screen.

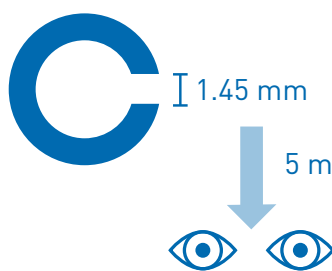
In an LED display environment, this causes issues with the pixel pitch (the gap between LED modules) becoming visible to the naked eye – diminishing picture quality.

Smooth Picture - a question of distance

VISUAL ACUITY CHARTS		
4.0		0.10
4.1		0.12
4.2		0.15
4.3		0.20
4.4		0.25
4.5		0.30
4.6		0.40
4.7		0.50
4.8		0.60
4.9		0.80
5.0		1.00
5.1		1.20
5.2		1.50
5.3		2.00

EYESIGHT

Landolt Ring



Vision Test

1.0 = 20/20

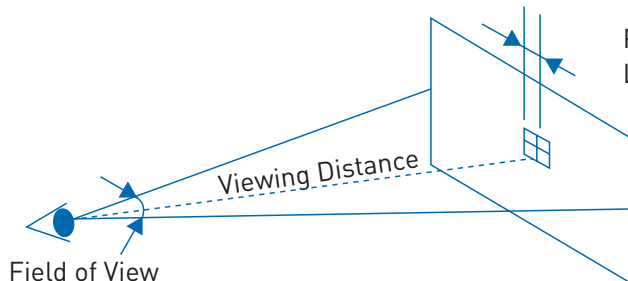
$$\text{TAN}^{-1} (1,45/5,000) = 0,0166 \cong 1/60 \text{ (deg.)}$$

- A visual acuity test of “1.0” means that a small gap of “1.45mm” can be distinguished from a viewing distance of “5m”.

- The human eye is capable of spatial resolution at an angle of about “One Minute (=1/60 deg.)”.

< Case of 4K >

$$\text{TAN}^{-1} (H \div 2,160/1.5 \times H) = 0.0177 \cong 1/60 \text{ (deg.)}$$



Pixel Pitch =
Less than ‘One Minute’

Pixel Pitch needs to be: smaller than **1/60** of the field of view

DEFINITION OF 2K / 4K / 8K

Format	Resolution	Recommended Viewing Distance	Display Area Field of View
2K	H : 1,920 V : 1,080	3 x V	Approx. 30deg.
4K	H : 3,840 V : 2,160	1.5 x V	Approx. 60deg.
8K	H : 7,680 V : 4,320	0.75 x V	Approx. 100deg.
	pixels	V : Height of Image Area	(Horizontal Direction)

450” EXAMPLE:

- Minimum distance of 9m is required
- LED requires larger viewing distance

As well as diminishing viewing quality to the naked eye, this will also cause Moiré Effect issues for cameras trying to broadcast images of the event backdrop to viewing video walls placed around the venue for audiences. In addition, the quality of audience video and

photography for their personal use will also be affected.

With the PT-RQ50K projectors, none of these viewing challenges are an issue. Even at the highest resolutions, pictures can be seamlessly projected as one image to the naked eye.

2.2 Increased contrast capabilities

In the past, the lack of brightness from traditional projectors meant that LED Displays delivered a better contrast. No more. With the brightness of the PT-RQ50K projector,

images can be projected onto dark or black backgrounds, creating contrast above and beyond the capabilities of LED Displays.

2.3 Standardised workflow

There are many different versions of LED tiles and even more manufacturers. This makes the LED market very diversified. There are many exotic resolutions, sizes, etc.

This results in set-ups where a lot of scaling and stretching of pictures is needed and requires a more robust playback system - increasing the cost of installation.

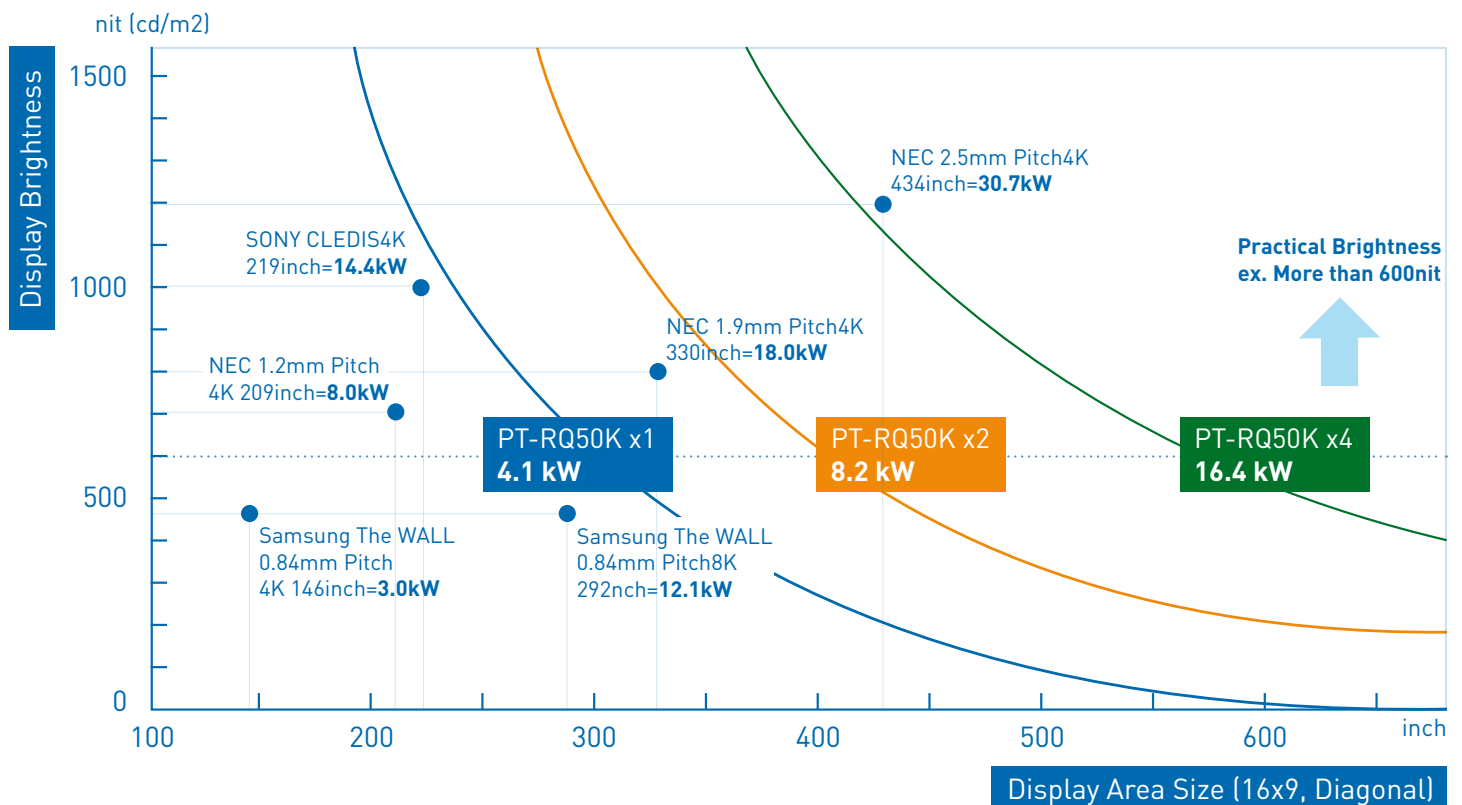
The projector market is very standardised and lacking exotic resolutions, which enables a simple playback system to be used – standardising workflows and minimising installation costs.

2.4 Brightness vs power consumption

Another important consideration is the power consumption required to generate the required levels of brightness at the event. As can be seen from the illustration below, LED display

walls will consume 2-3 times more power than the equivalent PT-RQ50 projectors to deliver the same levels of image brightness across a standard display area.

Brightness vs. Display Area Size



- Under the less bright environment, more the 600nits images are practical enough to show the visible images.
- x1, x2 and x4 units of PT-RQ50K projector operation available to realize more than-600nits images up to 600inch screen.

Same size LED wall produces 2-3x the power consumption of PT-RQ50

Note: Power consumption examples are theoretical and in reality brightness depends on the content displayed and the brightness level setting of the complete LED setup (60% of maximum brightness is a common industry standard). However, rental companies will need to calculate their additional power equipment requirements based on these maximum theoretical levels.

With the trend towards larger, higher resolution and more immersive backdrops, there are a number of creative advantages to using the PT-RQ50K projector.

3.1 Floating Screens

PT-RQ50K

Floating screens are relatively easy to create using a single backdrop suspended from a steel wire. This minimises cost and set-up time.

LED Displays

LED displays always require a base construction. This can cause issues for Rental & Staging companies. Many venues have a limit on the rigging weight that can be suspended. A LED wall size of 240m² weighs approximately 1 tonne. In addition, the labour required to build and dismantle a floating LED Display is much more than for a floating screen using a projector.

If a floating screen is not possible in the venue, then the LED display needs to be set-up in a frame. This additional infrastructure requires more equipment and man power resulting in increased costs.



3.2 Free Shapes

PT-RQ50K

Projector images can be set-up to project any shape on to any surface, for example for 3D mapping, providing maximum freedom and creativity for the event producers.

LED Displays

As typical LED modules are based on a square or rectangular construction, they can be restrictive on the creative process. It is possible to build curves into LED Display walls but this requires much smaller and more expensive LED tiles and is prohibitively expensive compared to projection.

3.3 Camera Close-Ups

PT-RQ50K

The resolution and brightness of the projector image can be scaled quickly and seamlessly with the addition of each projector.

LED Displays

The large pixel size typically used in LED Display backdrops results in a loss of picture quality when close-up camera images including the displays are used for picture distribution to audience viewing screens or for broadcast. This can only be avoided by using narrow pixel pitch LED Displays, which significantly increases the cost compared to using projection.





CONCLUSION

Despite its recent launch, the introduction of the PT-RQ50K projector is already changing the dynamics of the live events market in the creation of backdrops. Rental & Staging companies have already recognised a number of commercial and operational benefits in using the PT-RQ50K projector over LED Displays.

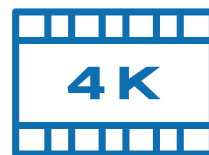
These benefits can be summarized as:



MORE FLEXIBLE
AND INCREASED
REVENUE
OPPORTUNITIES



LOWER OPERATIONAL
COSTS - STORAGE,
TRANSPORTATION,
MAINTENANCE AND
RESIDUAL VALUES



INCREASED IMAGE
QUALITY



MORE CREATIVE
FLEXIBILITY



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