

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee

Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

Introduction

Krannert Center for the Performing Arts, a component of the College of Fine and Applied Arts, received an interest free loan of \$450,000 from the University of Illinois Student Sustainability Committee to replace 575 lighting units in the Center's 25,000-square-foot teak lobby floor. The lobby serves as a public square for the extended community and is physically, ideologically and purposefully central to the Center's existence.

The Center continues to take a leadership role in energy conservation and sustainability, and is committed to further strengthening this role in order to become a national model for architecture/facilities retrofitting and sustainable practices in the arts. As a first step, a retro-commissioning of the Krannert Center's HVAC systems resulted in a 32.4% decrease in energy consumption. The Center has also completed a feasibility study as a first step to installing a green roof during the next roof replacement.

Krannert Center would like to extend its deepest gratitude to the Student Sustainability Committee and the Facilities and Services Department at the University of Illinois for all help, guidance, expertise and resources towards the successful completion of this project.



The Krannert Center lobby under incandescent lighting

Before the installation, the lighting consisted of recessed square down-lights, each operated a 150W incandescent lamp, above an architecturally significant ceiling, and used glare-controlling recessed baffles. The old fixtures were original to the lobby which was built in 1969. These 150W lamps had a published life cycle averaging 2,000 hours. It was the experience of the building maintenance staff that lamps had to be replaced almost daily. This was energy-inefficient, labor intensive, and wastefully expensive, particularly as our lobby is open to the public and lit 17 hours per day, 360 days per year.



The Krannert Center lobby under compact fluorescent lighting

In exploring replacement units for 150W incandescent lamps, Krannert Center spent approximately 2 years of research and testing a wide range of replacement units and systems. Compact fluorescent units were ruled out during the testing phase as the quality of light emitted from these units converted the lobby into a pale, cold and unwelcoming space. The look was unsettling and the warm teak floors appeared discolored. The facility's original architect, Max Abramovitz carefully designed the lobby as a warm, welcoming public square and it was critical to maintain these aesthetic properties. There was also no flexibility in controlling these compact fluorescent units for

specific purposes. For example, if we wanted to dim certain units and demarcate certain areas of the lobby for particular events, and create a certain ambience, we would not be able to achieve this with compact

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

fluorescent lighting.

When the possibility for LED lighting was brought to the table, Krannert Center immediately saw its promise. Research showed the potential for LED technology to overtake and replace compact fluorescent fixtures in the future. Further research (Purdue University / Cambridge University) is underway to replace the expensive sapphire substrate with lower costing metal silicone wafers, possibly making this technology more affordable. By selecting and projecting towards the technology of the future, Krannert Center believed that LED fixtures will become more commonplace, and sought to be a proponent of this technology based on its numerous merits. Here are the highlights:

1. Lamp Life of over 50,000 hours
2. Programmable units with a wide color palette allowing for flexibility — ability to control color temperature
3. Ability to isolate parts of the lobby to create different colored “areas”
4. Dimmable
5. Only 32W of energy used — compared to the old 150W incandescent
6. No mercury and/or lead content
7. Manufacturer has recycling options for 99% of the fixture
8. Use 20% - 30% less energy than compact fluorescent units (150W equivalent)
9. Ability to program lights for use with Krannert Center emergency system
10. Quality of light is even — no more splotchy pools of light on the lobby floor
11. At Krannert Center, this would save 78.66% total annual KWH and total annual cost savings of approximately \$65,000/year.

Since LED lighting technology is not commonly used for ambient lighting applications, Krannert Center is now a national leader in showcasing lighting efficiency using LED lighting technology. Massive outdoor lighting retrofits have been undertaken in San Jose, CA and Ann Arbor, MI, but not many people have seen the possibilities of this technology in ambient and solid state lighting conditions. Designers have to be able to recognize the potential of these fixtures to be able to apply them to other ambient lighting situations and Krannert Center’s lobby is now a real-life showroom for this cause.

The manufacturer of LED lighting fixtures has viewed this project as the most interesting project to date — there are immense aesthetic possibilities using LED lighting technology and this project is now an example for others who are actively looking for energy efficient solutions in aesthetically sensitive areas.

Since Krannert Center is also part of the College of Fine and Applied Arts at the University of Illinois — future professionals in theatrical lighting design, visual arts, architectural lighting designers, civil, electrical and environmental engineers and students of the new and innovative courses that center around sustainability, will come through our doors.

Implementation

This project included a *complete replacement* of existing incandescent fixtures. The existing incandescent sockets, reflectors and lamps were removed. The new LED fixtures were complete fixtures including dedicated reflectors, drivers and housing. The only portions of the existing luminaries that were reused are the existing ceiling baffles due to architectural continuity.

Preparation work began on December 7, 2009 and installation work began on December 9, 2009. Installation of all units went very smoothly as all units were installed by January 8, 2010. Testing of all units began on January 9, 2010. In the testing phase, there were a number of control issues that had to be resolved. This involved the control of specific fixtures:

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

1. A few fixtures were not “in-sync” with the rest of the system — for example, if all other units were set to blue, these units would change to a different color (e.g.: pink or green).
2. A few fixtures were unresponsive to controls and would not change colors at all.

Solutions to these issues often involved checking the network wiring, checking program controls on the master computer or replacing the unit entirely. Local manufacturer’s representatives as well as representatives from Renaissance Lighting were present during the testing phase to troubleshoot all possible issues. Software designer, Jason Rogers of Renaissance Lighting also sought specific feedback and was interested in discussing current concerns and future needs with the control software. He was very pleased with the feedback and suggestions that he received.

Due to ceiling accessibility, only 570 fixtures were installed (not 575 as originally planned). These areas of the ceiling would need to have been torn down to accommodate the installation of the new fixture which was not possible to do at this time.

There were also a few hiccups with the units that were received from the manufacturer as 10 fixtures were found to be faulty. To facilitate the installation process, the 10 spare fixtures were used to replace of the faulty fixtures. Krannert Center will have 10 spare fixtures delivered before the end of February 2010.

When the project deadline was reached, Krannert Center was able to fully control all units. Since then, staff members have experimented (and are still experimenting) with different settings for the lobby. Our Associate Lighting Director was able to program a “chase” sequence meant for large lobby events — something that would never have been possible in the past.

There is one last thing to accomplish before we can officially conclude this phase of the project. Krannert Center needs to have the lighting in the lobby respond directly to the building’s existing emergency system. While Krannert Center does not expect many hurdles towards the completion of this part of the project, the expected completion of this programming aspect of the project is expected to be March 27, 2010 (after spring break).

As a result of the new installation, a couple of small but key lighting concerns in the lobby have surfaced:

1. Krannert Center’s “Donor Wall”, situated on the southwest side of the lobby, facing the Promenade gift shop as well as the Tryon Festival Theater is significantly dimmer and is now less prominent since the nature of LED lighting is more even.
2. The portraits of Herman and Ellnora Krannert on the north side of the lobby, near the north elevator are also not as prominently lit.
3. The Stage5 Bar situated on the west side of the lobby now requires accenting.
4. The menu display at Intermezzo (café) on the north side of the lobby also requires a lighting accent.

Currently, Krannert Center is looking at possible LED track lighting solutions to compensate for these issues when final project financials come in and if there is sufficient money left in the project budget for this cause.

Project Schedule

Please find an outline of the project schedule below. Once the schedule was laid out, there was very little diversion — the project met all deadlines and the schedule (albeit a little tight) proved to be workable and achievable.

Lobby Lighting Retrofitting Project

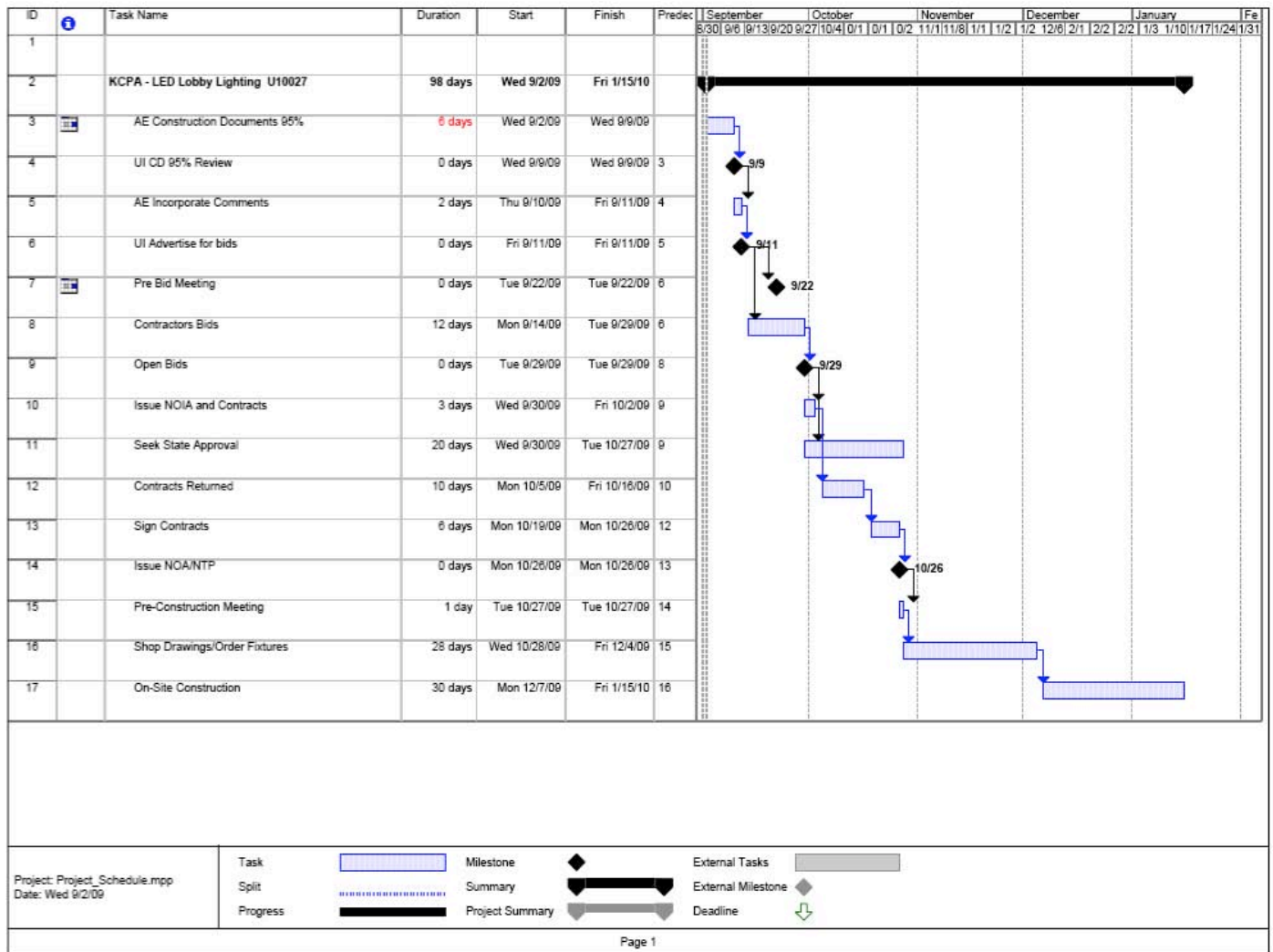
FINAL REPORT for University of Illinois Student Sustainability Committee

Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

All parts and materials were delivered as scheduled. There were no delays due to parts and materials.

Careful coordination and planning was needed to make sure that work was not taking place when the lobby was in use. For example, work could not take place in the evenings prior to a performance and the lighting in the lobby had to be set to a neutral state when patrons entered the building in anticipation of watching performances. To accommodate for the loss of work and labor hours over the Christmas break, contingency hours were planned on Saturdays and Sundays to avoid missing weekly targets.

At the time of this final report, Krannert Center is unable to obtain energy consumption figures from F&S. The Center anticipates that these figures would be available in 2-3 months and would be able to obtain energy consumption figures for the entire facility with the plan to compare the results of energy consumption at the facility between October-November 2009 and January-February 2010. These months would be months of almost similar building activity and therefore similar and comparable energy use.



The project schedule as laid out by Facilities and Services

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

Project Financials

This project is highly anticipated to remain within budget although not all project financials have been finalized. Below is the most current project budget spreadsheet to date. Coleman Electric won the bid for the contract at a construction/electrical work cost of \$369,500. Since the original budgeted amount for construction and electrical work was \$352,000 with a contingency of \$18,600 (total \$369,600), the project was given the go-ahead.

As mentioned earlier, if there are excess funds from the project, Krannert Center would like to invest these funds into the acquiring of energy efficient track lighting for areas of the lobby which are now less prominently lit because of the even nature and quality of the new LED Lighting. If there are remaining funds after the installation of track lighting, Krannert Center would like to conduct an independent energy audit.

Project Financials: KCPA - LED LOBBY LIGHTING (U10027)

Budget				Current Budget Less
Budget Code	Description	Current Budget	Total Anticipated	Total Anticipated
10000	CONSTRUCTION	\$0.00	\$0.00	\$0.00
12600	ELECTRICAL WORK	\$369,500.00	\$375,687.96	(\$6,187.96)
19030	CONSTRUCTION CONTINGENCY	\$18,092.00	\$0.00	\$18,092.00
Category Total:		\$387,592.00	\$375,687.96	\$11,904.04
Code	Description	Curr Bud	Tot Antp	Bud Less Antp
20000	FURNITURE, FIXTURES, & EQUIPMENT	\$0.00	\$0.00	\$0.00
Category Total:		\$0.00	\$0.00	\$0.00
Code	Description	Curr Bud	Tot Antp	Bud Less Antp
30000	OWNER'S COST	\$0.00	\$0.00	\$0.00
30400	FM ASSISTS/SYSTEMS INTEGRITY	\$1,848.00	\$1,500.00	\$348.00
30700	PROJECT MANAGEMENT FEE	\$15,217.00	\$15,217.00	\$0.00
30720	COMMISSIONING AND INSPECTION	\$5,543.00	\$5,543.00	\$0.00
Category Total:		\$22,608.00	\$22,260.00	\$348.00
Code	Description	Curr Bud	Tot Antp	Bud Less Antp
40000	PROFESSIONAL SERVICES	\$0.00	\$0.00	\$0.00
41400	A/E CONSTRUCTION DOCUMENTS	\$25,000.00	\$24,750.00	\$250.00
41500	A/E BIDDING	\$8,000.00	\$1,320.00	\$6,680.00
41650	A/E CONSTRUCTION ON-SITE OBSERV.	\$3,800.00	\$10,730.00	(\$6,930.00)
41700	A/E POST CONSTRUCTION / WARRANTY	\$1,000.00	\$1,000.00	\$0.00
41900	A/E REIMBURSABLES	\$2,000.00	\$2,000.00	\$0.00
Category Total:		\$39,800.00	\$39,800.00	\$0.00
Grand Total:		\$450,000.00	\$437,747.96	\$12,252.04
Total Funding:				
Unallocated Funds:				

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee

Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

Additional Funding Sources

Krannert Center also received a \$225,000 grant from the Illinois Clean Energy Community Foundation. This amount is exactly 50% of the cost of the project, which enabled the Krannert Center to repay 50% of the \$450,000 loan to the Student Sustainability Committee immediately. This would allow the Student Sustainability Committee to fund other projects on campus at a greater rate.

Tom Abram, Sustainability Coordinator at Facilities and Services has also been in touch with the Illinois Department of Commerce and Economic Opportunity's Public Sector Electrical Efficiency Program for a possible incentive of \$32,476. Once gained, this would be applied directly to the loan that Krannert Center received from the Student Sustainability Committee. If this incentive becomes reality, the portion of the loan that Krannert Center will be responsible for is \$192,524.

Education and Marketing

Krannert Center has published articles on its website as well as conducted interviews with a number of local newspapers and media outlets. Examples may be found at the end of this report. The Center is also in the midst of planning a green-themed after school program with the Don Moyer Boys and Girls Club to use these and other examples as teaching tools to the generation of the future.

There are also plans in progress to add Krannert Center's sustainability efforts into the daily tours of the building that Krannert Center conducts.

Krannert Center is a partner and a host of "Innovator's Improv". Innovator's Improv connects forward-looking thinkers at the intersection of the arts, sciences, business, and engineering to create unique and transformative ideas. On February 18, 2010, the event will once again celebrate the creative, innovative, and entrepreneurial spark in the Champaign-Urbana community. It will be an evening of exciting conversation when participants take to the stage for a lightning round of enterprising ideas focused on sustainability. Krannert Center has invited all partners in the project to attend and it will be the first public "sneak preview" of the new LED Lobby Lighting at the Center.

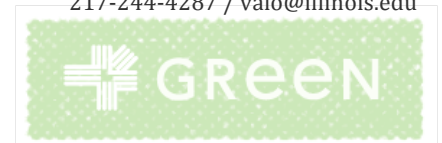
Conclusion

Since it seems to be too soon to actually gauge the full success of this project, Krannert Center would like to request a submission of an addendum report in 6 months. In this time, Krannert Center will work with University of Illinois Facilities & Services Department and possibly a third party to report further findings and results from this installation.

Krannert Center would like to thank the University of Illinois Student Sustainability Committee, the University of Illinois Facilities and Services Department, the Illinois Clean Energy Community Foundation, the Illinois Department of Commerce and Economic Opportunity's Public Sector Electrical Efficiency Program and the staff at Krannert Center for making this project a huge and collaborative success. Without their support, resources, expertise, collaborative spirit, skills and time, this project's success would not have been possible.

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Lobby Lighting Retrofitting Project

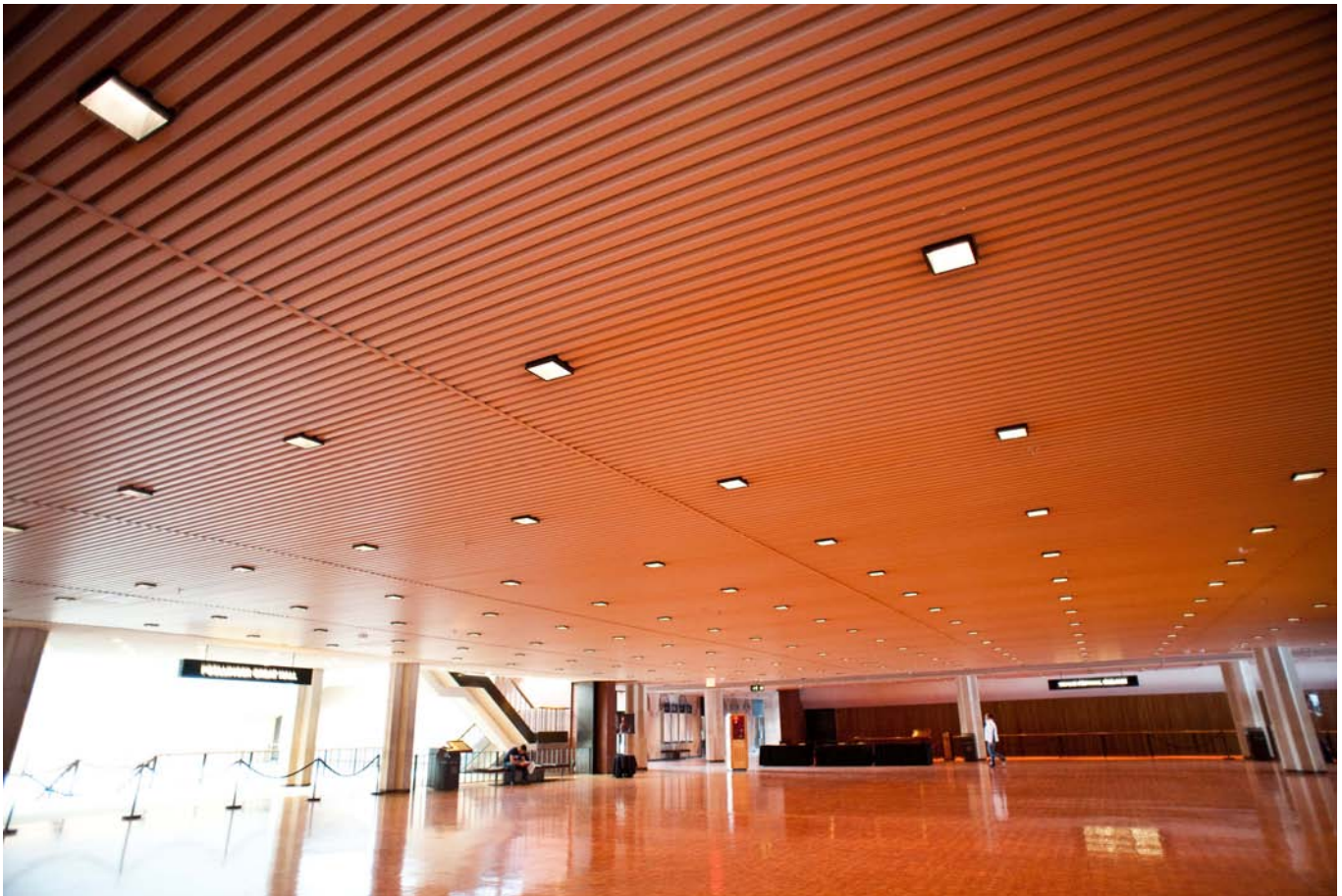
FINAL REPORT for University of Illinois Student Sustainability Committee

Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

Completed Project Images:

Krannert Center Lobby Today

If you walked into Krannert Center today, you would witness the Krannert Center Lobby under the new LED lighting. At first you wouldn't think that there was anything different about it because it does look the same: the technology has allowed the Center enough flexibility to choose the exact color temperature of all units to find a temperature that is similar to the color temperature of the old incandescent lamps. There are 16 million possible color combinations in the RGB range allowing for extreme sensitivity with architectural lighting choices. What is different is the more even quality of the light that does not make "splotchy" hotspots all over the historic (and gleaming) teak flooring.



The photo above shows the Krannert Center Lobby on a typical day at around 3pm in the late afternoon

Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee
Krannert Center for the Performing Arts, University of Illinois at Urbana-Champaign

Color Options for Special Occasions and Events

Because of the huge color palate this technology offers, Krannert Center staff can also program different looks for the lobby for different events. The entire lobby could be one (different) color – this allows the lighting in the lobby to respond to the events that Krannert Center organizes. Krannert Center staff can also program specific lighting for different “areas”. For example, in the area around the lobby stage (Stage5), different colors or intensity of lighting is now programmed if there was a performance at Stage 5.



The photo above shows the Krannert Center Lobby in pink lighting.

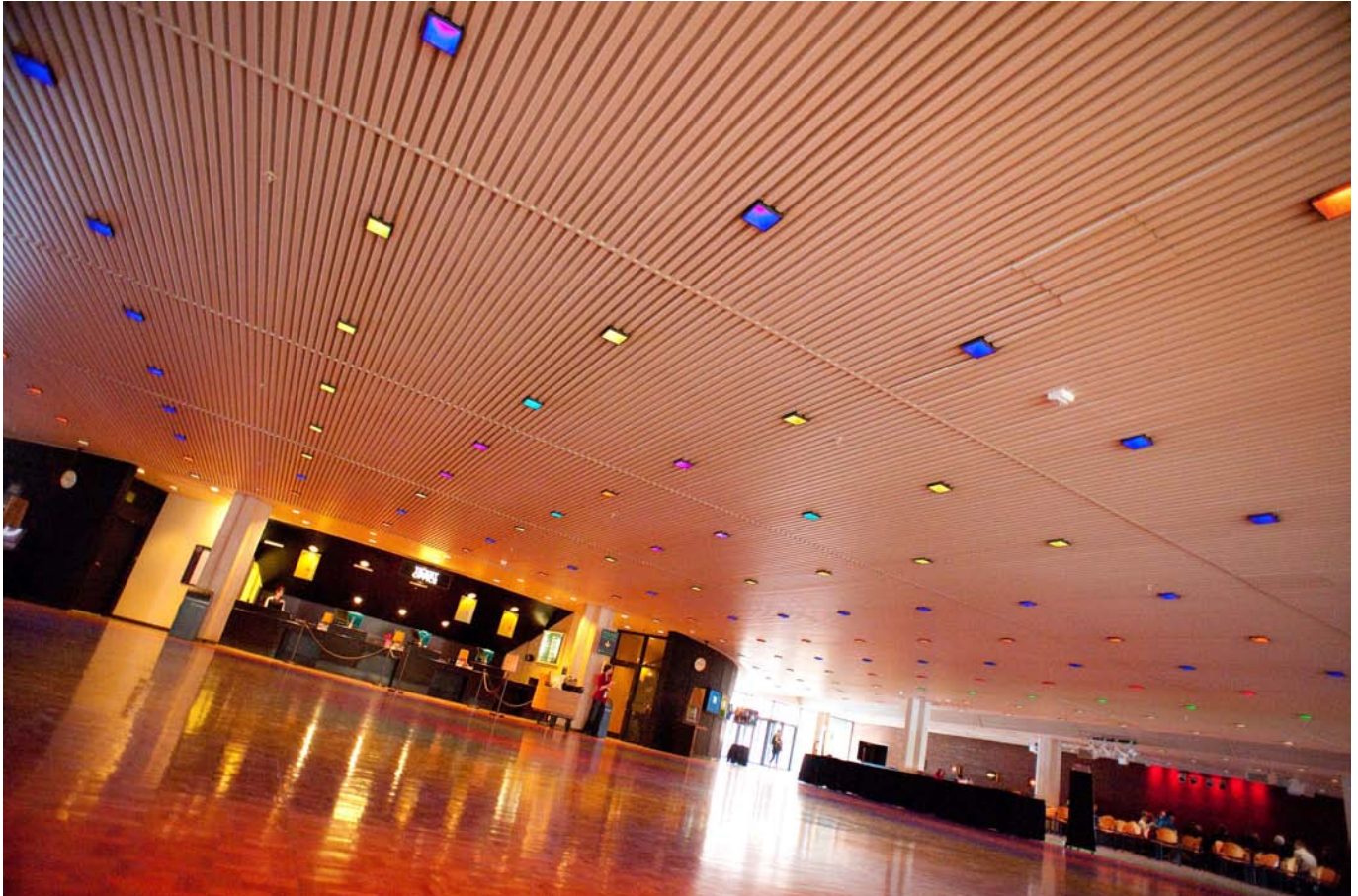
Lobby Lighting Retrofitting Project

FINAL REPORT for University of Illinois Student Sustainability Committee

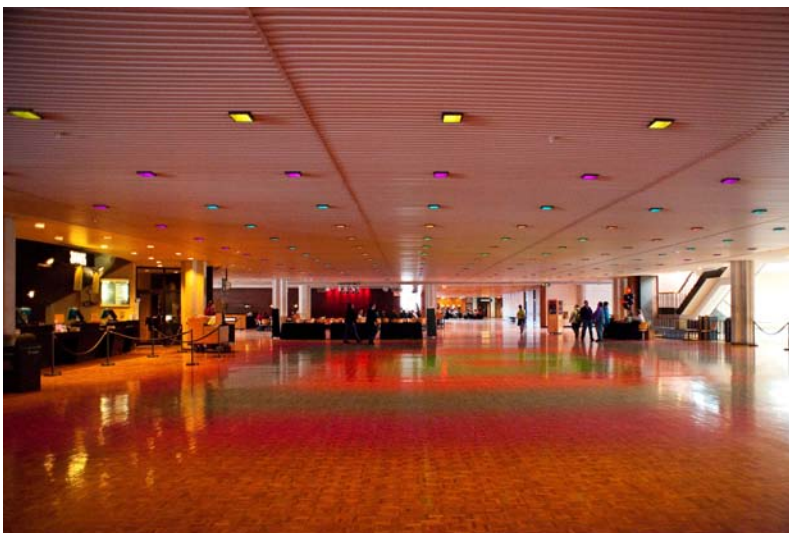
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Programming Options for Events and Special Occasions

The current software also allows Krannert Center staff the flexibility of control each and every fixture in the lobby. This means that they can identify each fixture and program that fixture to be a specific color.



The photo above and below shows several rows of fixtures being programmed to illuminate at different colors.



There's more: these fixtures can also be programmed to "chase". The color of the lights can change at given and specified rhythm (for example, every 2 seconds). While it does take some programming time, this is possible with the new LED system. Light can "move" across the lobby or in specific patterns based on what was programmed by the lighting designer.



PRESS AND WEBSITE CLIPPINGS FOR THE KCPA LED LOBBY LIGHTING RETROFITTING PROJECT AS OF 18 FEBRUARY 2010.

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Renaissance Lighting and University of Illinois Announce LED Lighting Project

Renaissance Lighting, an innovator in the development and manufacture of energy-efficient, solid-state LED luminaires, has announced, in collaboration with the **University of Illinois at Urbana-Champaign**-- the birthplace of the Light Emitting Diode (LED)--that it has completed its largest sustainable energy/energy-saving lighting project to date at the University's **Krannert Center for the Performing Arts**.

The centerpiece of the almost 600 fixture solid-state lighting initiative is Krannert Center's lobby, a mammoth 25,000 square foot space shared by four separate theatre and concert venues. For 40 years this lobby has been illuminated by 625 energy-gulping incandescent light fixtures, consuming nearly 573.8 million watts annually.

"The university is a huge proponent of the green movement and we view Krannert Center as the crown jewel in that effort," said **Michael Williams**, Krannert Center's lighting director. "We're focused on saving energy and sustainable energy initiatives, and if you look at how this project is being funded, all of the dots are green and they connect perfectly. The Renaissance Lighting luminaires provide us with energy efficiency and great cost savings in many areas and contain capabilities providing us incredible creativity and flexibility." he said.

Half of the project funding is grant money from the **Illinois Clean Energy Community Foundation**, according to Williams. The balance of the funding is a seven-year, zero-interest loan from the university's Student Sustainability Committee whose income stems from a \$2 clean energy fee that students pay every semester. Williams noted that the Krannert Center lighting project is the first major green effort to be backed financially by the student group.

By retrofitting the Krannert Center lobby ceiling with Renaissance Lighting luminaires, energy consumption will decrease dramatically - by about 460 million watts annually," said Renaissance Lighting CEO, **Barry Weinbaum**. "By spending less on electricity and along with the impressive longevity of our luminaires, we expect Krannert Center will realize annual savings greater than \$70,000 annually. The quality of the light produced by our fixtures surpasses any incandescent or fluorescent fixture on the market as each luminaire provides a glare-free, superior light throw and eliminates "hot spots". Also, our color changing products provide for both efficiency and creativity unique to the lighting industry," Weinbaum said.

Krannert Center can anticipate additional savings due to the fact that solid-state LED luminaires produce virtually no heat below the suspended ceiling where they are installed. By contrast, 90 percent of the energy consumed by incandescent bulbs is in the form of heat rather than light, which in turn increases air conditioning load and related costs. LED Luminaires far outlast their incandescent counterparts; 50,000-70,000 hours versus 2,000 hours for incandescent bulbs, thereby eliminating frequent and costly light replacement.

A key feature of the Renaissance Lighting color changing luminaires is



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the ability to produce more than 16.5 million different colors including white. Each fixture incorporates a circular array of RGB (red, green and blue) LEDs that illuminate in a color mixing dome before the blended light exits the fixture - a patented design called Constructive Occlusion. Each fixture can be individually addressed with the entire illuminated space optionally controlled by Renaissance Lighting's Rhapsody Color Management System, which consists of controller hardware and proprietary software for creating dynamic effects such as color intensity, cross-fading and rainbow washes.

The simplicity of Renaissance Lighting's Rhapsody Color Management technology relieves Krannert Center personnel from countless hours of tediously inserting multi-colored theatrical gels into and out of individual light fixtures in preparation for many of the 350 performing arts functions and the 100-plus special lobby functions held each year, which include weddings, corporate gatherings, receptions and private parties.

 www.renaissancelighting.com

(20 January 2010)

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LEDs shed new light on lobby of Krannert

[Nishat Khan](#) News staff writer

Posted: December 9th, 2009 - 11:53 PM

Updated: December 10th, 2009 - 2:10 PM

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With the planned installation of 650 new light-emitting diode lights (LEDs), the Krannert Center lobby is in the midst of implementing a colorful, energy-efficient lighting scheme.

Krannert Center worked with the Student Sustainability Committee to embark on a project that will replace all the old incandescent lightbulbs with LED lights.

The Krannert Center has had six LED prototype lights in its lobby for six months now. Installation of the new lights started Tuesday and is slated to finish Jan. 15.

LED lights are very expensive to produce and are not very popular, said Suhail Barot, member of the Student Sustainability Committee.

Tom Abram, sustainability coordinator for Facilities and Services at the University, said the LED lights were a smart decision for Krannert, despite the initial costs.

"LED lighting has not yet reached widespread adoption due to their costs and somewhat comparable efficiencies to fluorescent technology. However, this is a perfect application for LED lamps," he said in an e-mail.

Krannert has been researching a plan for the lobby lights for two years now, and it wanted the final choice to be aesthetically seamless in regard to the architecture, said Valerie Oliveira, assistant to the associate director at the center.

The new LED lights have a much longer life span than incandescent light bulbs; they burn at 32 watts and last on average for 50,000 hours. The incandescent lights are much less efficient, lasting on average 2,000 hours and burning at 150 watts, Oliveira said.

The LED lights can be controlled wirelessly by a personal digital assistant that uses Bluetooth, or by a laptop. The lights have an expansive color spectrum and are more versatile than the incandescent bulbs. The new system allows every single light to be a different color, said Michael Williams, lighting director at Krannert.

The lighting project was proposed in the summer by the Student Sustainability Committee, which has been looking to fund projects that see a return in energy savings, Barot said.

"We expect the project to save \$70,000 in electricity maintenance per year," he said.

Half of the project is funded by a \$225,000 grant from the Illinois Clean Energy Community Foundation, and the other half is funded by a loan from the Student Sustainability Committee. The Krannert Center can pay this loan back over a seven-year period with the energy savings it will realize from the new lights, Oliveira said.

She said fluorescent lightbulbs were considered, but they are not as versatile, they are known to have large amounts of mercury and lead, and they cannot change color.

"Aesthetically, you can't control anything," Oliveira added.

When the project is completed, the center wants to program the pattern of the lights in the event of a fire. The lights of the ceiling can be programmed to change red and show the pathway to the exit. Williams said this is an idea in the works, and it will have to work with the emergency system already in place.

"This will be the first usage of LEDs for ambient lighting on campus and will be one of the most impressive installations in the country," Abrams said.

Reader's Comments



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11.06.09 | We're Putting Our Green Initiatives Up in Lights

What do a retrocommissioned HVAC system that has saved 32 percent in energy costs, OUTSIDE at the Research Park, and LED lights have in common? We know you don't need a hint, but we suspect you'll be intrigued by the newest addition to our green initiatives.

In early 2010, we plan to unveil a solid-state, glare-free LED lighting system for our Lobby that will save energy, reduce labor costs, increase our flexibility in setting the mood for events through color, allow for dimmer and brighter areas that will better fit Lobby activities, integrate into our emergency system, and let us put up in lights our commitment to sustainability, green practices, the environment, and this community.

[Renaissance Lighting](#) has designed a revolutionary system that is nearly 100 percent recyclable. These lights have no mercury or lead, consume only one-fifth the energy of incandescent bulbs, and fit seamlessly into our ceiling. This aesthetically and architecturally sensitive retrofitting was two years in the making and would not have been possible without the efforts of the Student Sustainability Committee at the U of I. Charged with evaluating and funding campus clean energy and sustainability projects with student fees, this group worked with us to gather information on our options, assessed input from engineers at the Division of Facilities and Services, and generously offered to underwrite a zero-interest loan to cover some of the costs. Thanks to this assistance, our collaborative and innovative project earned a grant from the [Illinois Clean Energy Community Foundation](#).

The choice of an LED system turned out to be an obvious one. Did you know:

- that the Lobby contains 675 incandescent ceiling lights?
- that those lights shine approximately 17 hours each day?
- that those lights burn 360 days each year?

That's a total of 6,120 hours of brightness-creating output a year. Since a single bulb typically lasts no more than 2,000 hours—or about 118 days around here—our building operations workers climb up and down ladders entirely too many times to replace an awful lot of burned-out husks.

You probably do know that incandescent bulbs—like the ones that some of us still use in our table lamps, overhead lights, and outdoor fixtures at home—are inefficient. They get hot, so that means we end up spending more on cooling costs (but less on heating costs) to keep the Lobby temperature steady. They take a lot of energy to run, so that means high power bills (especially with 675 bulbs). And about 90 percent of the energy it takes to keep them running turns into heat rather than light (remember cooking cakes in the Easy-Bake Oven?).

You may also know that they are hazardous to our environment. The wires in the bulbs' filaments contain lead, so when these lights get sent to landfills, that toxic mineral can seep into groundwater and can affect the quality of the soil. The bulbs are almost impossible to recycle, so often there's no choice but to send them to those landfills (we pay a fee to recycle all of the incandescent and fluorescent bulbs we have around the building).

Compact fluorescent bulbs—which many homes and businesses now use exclusively—offer cost and energy savings over incandescent ones but can't match the far superior savings with the LED system. And because they contain mercury and are not easily recyclable, compact fluorescents require special disposal processes that add to their costs.

Our Lobby was conceived to be warm, inviting, spacious, and welcoming. The teak parquet floors, creamy Italian marble, rich brick, and recessed lighting create the perfect ambience for coming together, meeting others, and reveling in the arts. With this LED system, our grandly open Lobby will only feel more glorious, more enveloping, more wondrous. We can't wait to let it shine.



FOR IMMEDIATE RELEASE

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RENAISSANCE LIGHTING AND UNIVERSITY OF ILLINOIS ANNOUNCE MASSIVE SOLID-STATE LED LIGHTING PROJECT

Annual savings of \$70,000+ expected as U of I takes on biggest green project ever

HERNDON, VA.– January 19, 2010 – [Renaissance Lighting](#), a leading innovator in the development and manufacture of energy-efficient, solid-state LED luminaires, is proud to support the University of Illinois at Urbana-Champaign, birthplace of the Light Emitting Diode (LED) in completing its largest sustainable energy/energy-saving lighting project to date at the University's Krannert Center for the Performing Arts.

The centerpiece of the almost 600 fixture solid-state lighting initiative is Krannert Center's lobby, a mammoth 25,000 square foot space shared by four separate theater and concert venues. For 40 years this lobby has been illuminated by 625 energy-gulping incandescent light fixtures, consuming nearly 573.8 million watts annually.

"The university is a huge proponent of the green movement and we view Krannert Center as the crown jewel in that effort," said Michael Williams, Krannert Center's lighting director. "We're focused on saving energy and sustainable energy initiatives, and if you look at how this project is being funded, all of the dots are green and they connect perfectly. The Renaissance Lighting luminaires provide us with energy efficiency and great cost savings in many areas and contain capabilities providing us incredible creativity and flexibility." he said.

Half of the project funding is grant money from the Illinois Clean Energy Community Foundation, according to Williams. The balance of the funding is a seven-year, zero-interest loan from the university's Student Sustainability Committee whose income stems from a \$2 clean energy fee that students pay every semester. Williams noted that the Krannert Center lighting project is the first major green effort to be backed financially by the student group.

By retrofitting the Krannert Center lobby ceiling with Renaissance Lighting luminaires, energy consumption will decrease dramatically – by about 460 million watts annually," said [Renaissance Lighting CEO, Barry Weinbaum](#). "By spending less on electricity and along with the impressive longevity of our luminaires, we expect Krannert Center will realize annual savings greater than \$70,000 annually. The quality of the light produced by our fixtures surpasses any incandescent or fluorescent fixture on the market as each luminaire provides a glare-free, superior light throw and eliminates "hot spots". Also, our color changing products provide for both efficiency and creativity unique to the lighting industry," Weinbaum said.

Krannert Center can anticipate additional savings due to the fact that solid-state LED luminaires produce virtually no heat below the suspended ceiling where they are installed. By contrast, 90 percent of the energy consumed by incandescent bulbs is in the form of heat rather than light, which in turn increases air conditioning load and related costs. LED Luminaires far outlast their incandescent counterparts; 50,000-70,000 hours versus 2,000 hours for incandescent bulbs, thereby eliminating frequent and costly light replacement.

A key feature of the Renaissance Lighting color changing luminaires is the ability to produce more than 16.5 million different colors including white. Each fixture incorporates a circular array of RGB (red, green and blue) LEDs that illuminate in a color mixing dome before the blended light exits the fixture – a patented design called Constructive Occlusion™. Each fixture can be individually addressed with the entire illuminated space optionally controlled by Renaissance Lighting's [Rhapsody™ Color Management System](#), which consists of controller hardware and proprietary software for creating dynamic effects such as color intensity, cross-fading and rainbow washes.

The simplicity of Renaissance Lighting's Rhapsody Color Management technology relieves Krannert Center personnel from countless hours of tediously inserting multi-colored theatrical gels into and out of individual light fixtures in preparation for many of the 350 performing arts functions and the 100-plus special lobby functions held each year, which include weddings, corporate gatherings, receptions and private parties.

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About Renaissance Lighting:

[Renaissance Lighting](#) is a global leader in the development of next-generation solid-state architectural downlights and controls, the result of on-going breakthroughs in the application of LED technology and [Constructive Occlusion®](#), a patented technology for the unique mixing and blending of multiple LED light sources. The company's innovation and unrelenting commitment to green technology are key forces driving the development of highly creative lighting products that deliver the solid-state industry's purest light source with exceptional appearance, superior efficiency and glare-free illumination for all architectural applications. Headquartered in Herndon, Virginia, USA, Renaissance Lighting deploys a revolutionary approach to product engineering and design that is supported by 32 patents including its optical and feedback control technologies.

About the Krannert Center for the Performing Arts:

Krannert Center for the Performing Arts is dedicated to the advancement of education, research, and public engagement through the pursuit of excellence and innovation in the performing arts. Embracing the art of the past as well as the art of our time, the Center supports the belief that creativity is a core human characteristic and that the arts hold uniquely transformative potential. Through its multiple and integrated roles as classroom, laboratory, and public square, Krannert Center serves as a touchstone for the exploration and expansion of human experience. Construction of the \$21 million center, which opened in 1969, was made possible by a gift from Herman Charles Krannert, a 1912 U of I engineering graduate, and his wife, Ellnora. It was Mrs. Krannert, in fact, whose idea it was to have a common lobby shared by all patrons of the performing arts, whether it be theater, opera, classical music, dance or jazz, so that all could come together to share their respective experiences while at the center.

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Krannert going ahead with change to lobby lighting

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Photo by: Darrell Hoemann



Michael Williams, lighting director for Krannert Center for the Performing Arts, holds one of the LED light units that are being installed in the lobby to save energy.

Mon, 01/04/2010 - 7:04am | [Julie Wurth \(/author/julie-wurth\)](/author/julie-wurth)

URBANA – You think you've got high power bills.

The annual cost just to light the lobby at the Krannert Center for the Performing Arts is \$59,000, or almost \$5,000 a month.

That's a lot of energy – 619.6 million watts, to be precise.

But Krannert is going green. The center has embarked on a \$450,000 project to replace the incandescent lights in the lobby with energy-saving LED fixtures.

Though the new fixtures are more expensive up front, the annual savings in energy use and money should be significant, said Michael Williams, lighting director at Krannert.

The new lights are projected to use 132.2 million watts per year, at a cost of \$12,500 – about a fifth of the old system. They also last much longer – 50,000 hours, compared with 2,000 for the incandescent bulbs – cutting the \$27,000 annual cost of replacing the lights to about \$3,800, Williams said.

And since they'll put off less heat, they should reduce cooling bills in hot weather, he said.

"It adds up to tremendous energy savings for us, which affects the environment and our budget," said Maureen Reagan, assistant director for marketing and patron services.

The project is funded in part by a zero-interest loan from the Student Sustainability Committee, using income from a \$2-a-semester clean energy fee paid by UI students. The student support helped Krannert win a \$225,000 grant from the Illinois Clean Energy Foundation to fund half the cost.

Williams and Associate Lighting Director Lisa Kidd tested many fixtures to find lights that would preserve the warmth of the lobby, with its teak parquet floors and cream-colored marble walls.

When Krannert opened in 1969, donors Herman and Ellnora Krannert envisioned the lobby as a sort of community gathering space, large enough to hold patrons from all four theaters at once. They believed in bringing people together from all backgrounds in one creative space, Reagan said.

"There's a way people feel when they walk in our lobby, and we want it to be warm and inviting and spacious," Reagan said. "Lights have a big effect on that."

Another stipulation was the contractors not alter the aesthetics of the lobby's distinctive ceiling, with its ridges and black baffles designed for the old lights, Williams said.

The new lights aren't like the compact fluorescents used in homes – the ones that cast that sickly, office-style glow.

The default setting for the LED lights is a bluish white, but the Krannert lights can be mixed – using red, blue and green LEDs inside – to get just the right shade, a "warmer white light" that you usually see in an incandescent light, Williams said. The computerized mixing feature will also allow Krannert staff to change lighting colors for different productions, he said.

The lobby is used for myriad events – receptions, noontime concerts, wine tastings, corporate nights, the annual guitar festival, and the Afterglow, Interlude and 5 o'clock Traffic Jam concerts.

In the past, the staff would tape colored gels onto the ceiling lights to cast a festive red or blue glow, Williams said.

"Now we can do that with a laptop," he said. "If we wanted to get really crazy, we could literally change every single light to a different color."





They're also tying the lights into the fire alarm system, so if an alarm is triggered, the lights will default to all-white for easier evacuation, he said. There's also talk of illuminating a path to the exits in green, a color more readily seen through smoke, though it may not work, he said.

The contractor, Coleman Electric, began work in early December and is scheduled to wrap up by the middle of this month.

"It's a cool project," said electrical engineering graduate student Suhail Barot, chairman of the Student Sustainability Committee. "This is just breaking new ground for us, the university, probably the state."

Barot said the committee had been looking for a high-profile project to fund as part of its effort to promote energy efficiency on campus. The group also provided a \$75,000 zero-interest loan to the Division of Campus Recreation to add fluorescent lighting and new wiring to the Activities and Recreation Center (formerly known as IMPE).

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