



LEED-EB @PPPL



At PPPL, our vision is:

"To create the innovations which will make fusion power a practical reality".

On our path to attaining this vision, we must also strive to have the best environmental record possible. At PPPL, we celebrate Earth Day every day through our recycling, energy conservation and environmental management activities, as well as by the research we do.

R. Hawryluk,
PPPL Deputy Director,
Earth Day 2005

PPPL's website: www.pppl.gov





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USGBC Rating Systems available

- LEED-NC (new construction)
- LEED-CI (commercial interiors)
- LEED-CS (core & shell)
- **LEED-EB**
(existing buildings, operations and maintenance)

Pilots under development

- LEED-H
(homes)
- LEED-ND (neighborhood developments)

Application Guides

- Retail, Schools, College Campus projects

LEED-NC applies to new construction or to major renovations that gut a building back to its shell.

LEED-EB rating system applies to existing building operations and system improvements



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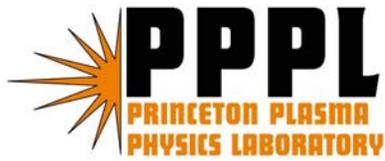
environmental
hang
from
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LEED-CI	
Certified	21-26 points
Silver	27-31 points
Gold	32-41 points
Platinum	42-57 points

LEED-EB	
Certified	32-39 points
Silver	40-47 points
Gold	48-63 points
Platinum	64-85 points

LEED-NC	
Certified	25-32 points
Silver	33-38 points
Gold	39-51 points
Platinum	52-69 points

LEED
GreenSource, Inc.



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- LEED-EB
 - building operations and upgrades
 - facility managers & support companies
 - ongoing/continuous process (life of building)
- LEED-NC
 - building design & construction
 - architects & builders
 - one-time event

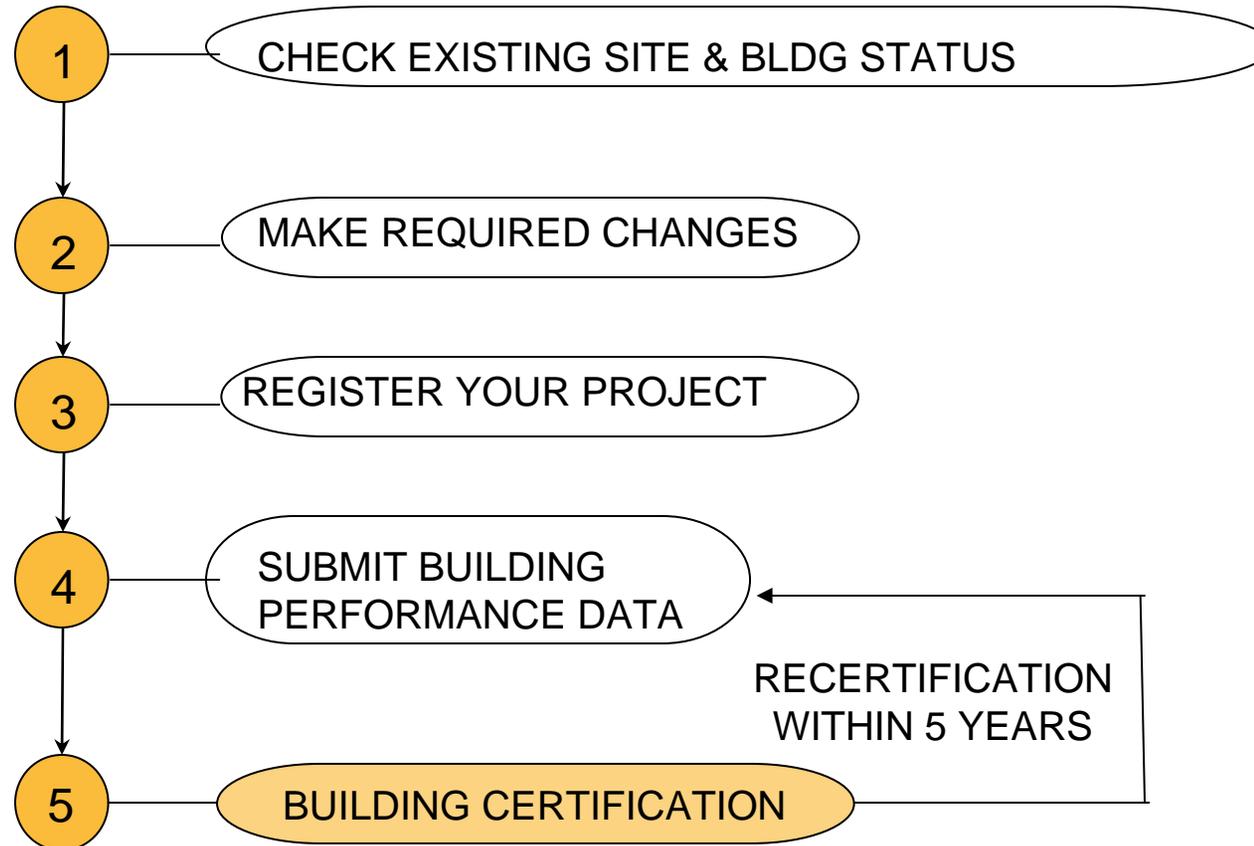
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steps to LEED-EB certification





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- The 1st step is check the existing conditions & consider how many GLOBAL credits you have toward LEED-EB for the entire complex.
- PPPL's complex has 43 "GLOBAL" points but we do not yet have EnergyStar & existing building commissioning prerequisite credit for each building.
- We need each of these prerequisites for each building we want to obtain LEED-EB certification.



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LEED-EB categories & credits points

- sustainable sites 14
- water efficiency 5
- energy & atmosphere 23
- materials & resources 16
- indoor environmental quality 22
- innovation in operation & upgrades 5

TOTAL POINTS AVAILABLE 85



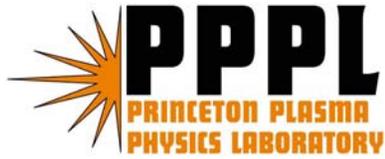
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LEED-EB Version 2.0 Registered Building Checklist

Building Name:	Global PPPL Points for All "House" Buildings on site	
Building Address:	The DOE PPPL	
	Certified 32 to 39 points Silver 40 to 47 points	
	Gold 48 to 63 points Platinum 64 or more points	
	Note Site wide item that apply to all buildings	
	Total Possible points	85
	Building Estimated Possible points	42
	Estimated Certification	SILVER!!!

Summary portion of the LEED-EB Building Checklist



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PPPL's Sustainable Site Facts:

- PPPL is minimizing cut lawn areas & planting meadow grass.
 - REF: Gas powered garden tools emit 5% of the nation's air pollution
- PPPL does NOT water lawn areas.
 - REF: 30% to 60% of urban freshwater is used for watering lawns. A 1,000 ft² lawn requires 10,000 gallons of water/yr to maintain green look.*
- PPPL has an Integrated Pesticide Management Program.
 - REF: 80 million lbs. of synthetic pesticides are used on US. lawns each year. When pesticides are regularly applied, 60-90% of earthworms are killed. Earthworms are invaluable for soil health.**
- PPPL minimizes the application of fertilizers & organic based fertilizers in flower beds.
 - REF: Over 100 million tons of fertilizers are applied to lawns and gardens each year
- PPPL is minimizing soil runoff to our Storm water Detention Basin.





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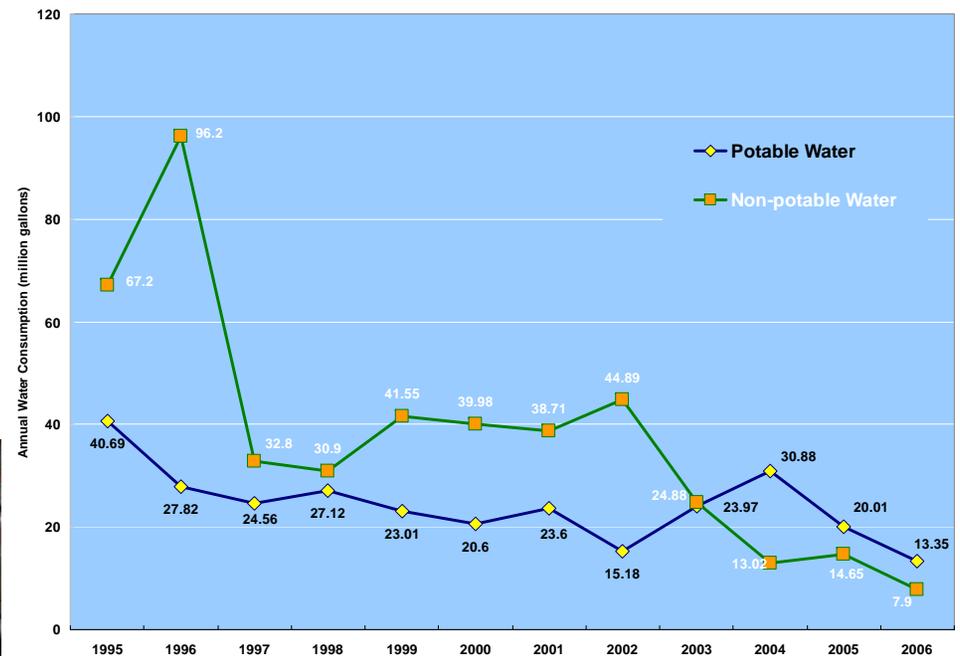


PPPL's Water Efficiency Facts:

- PPPL has minimized both potable & process water consumption
- PPPL did this with a new controller in the cooling tower.
- PPPL installed sensor faucets in all restrooms
- Air cooled air compressors vs water cooled



PPPL Water Consumption 1995 to 2006
Potable (NJ American Water Co.) and Non-Potable (Delaware & Raritan Canal)



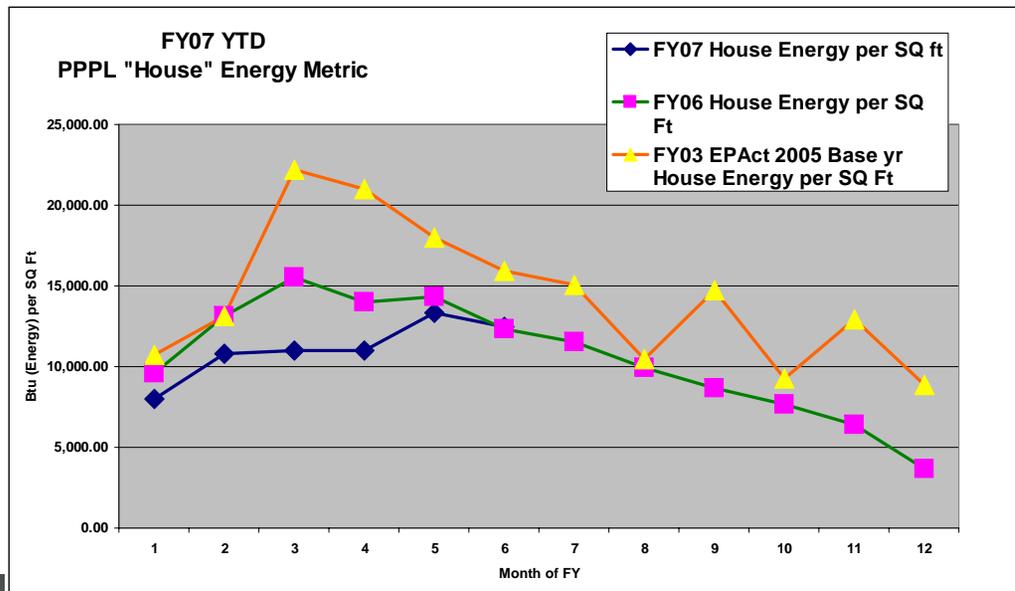


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PPPL's Energy & Atmosphere Facts:

- PPPL has reduced the Energy Utilization Index [EUI] for 2 consecutive years. YTD in FY07 exceeded the EO-13423 goal of 30%!
- PPPL did this with some common sense actions:
 - BAS TOD control of lighting
 - Room Occupancy sensors
 - BAS TOD control of space temperatures
 - Only 10-15% make-up for the boilers for the last 3 years



FY06 "House" Energy Report

"House" Energy is the non-experimental energy we consume at PPPL. This includes lighting, equipment, HVAC, computers, etc.

Our FY06 "House" Energy use was 18.5% lower than in FY05.
 Est. FY06 Savings= \$334,000
 Reduction of CO2 = 1,835 Tons



Our FY07 "House" Energy YTD is 15.5% lower than FY06.
 Also FY07 "House" Energy YTD is 34% lower than FY03!

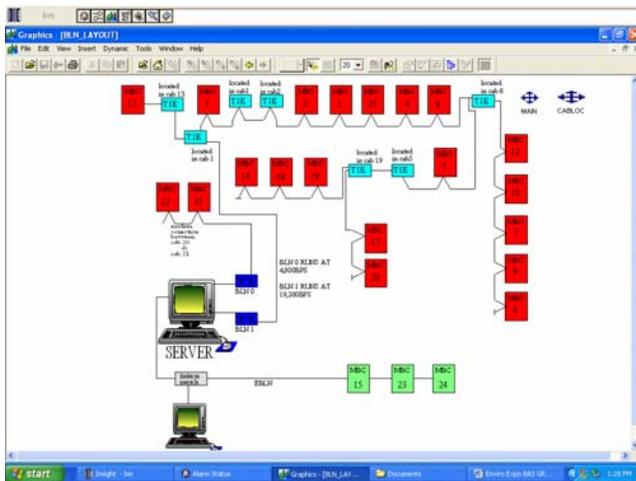
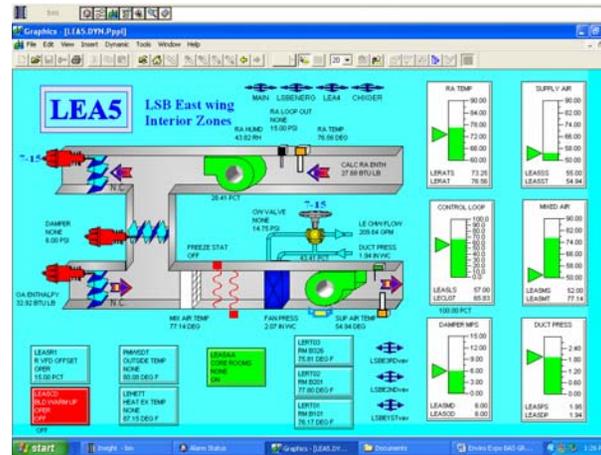


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PPPL's Energy & Atmosphere Facts:

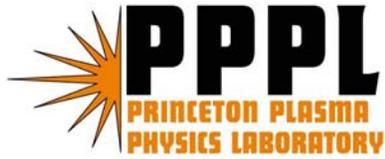
- PPPL utilizes the more advanced aspects of the BAS:
 - Enthalpy Economizers for free outside air cooling
 - Start Stop Optimization of "HOUSE" air handling units



Additional E&A items:

- Variable Frequency Drives on varying loads
- High Efficiency Motors





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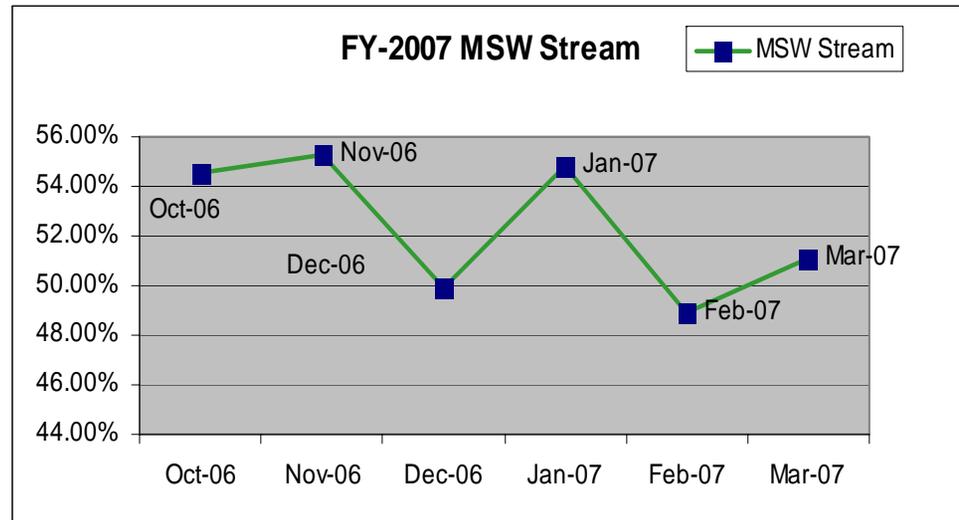
PPPL's Materials & Resources

Facts:

- PPPL occupant recycling rate is above 50%, we have a goal of 55% in FY07
- C&D recycling is mandatory at PPPL
- PPPL did this improved signage & internal public relations
- PPPL is an active member in the WasteWise program & the National Recycling Coalition
- PPPL uses biobased cleaning products

FY06 Recycling Report:

Total Recycled- 1185.49 tons
Total to Landfill - 211.53 tons
Total Recycling Rate—86%
(FY05 Recycling Rate = 63%)
Est. FY06 Savings = \$82,110
Reduction of CO2 = 232.6 Tons





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PPPL's Indoor Environmental Quality Facts:

- PPPL uses low & ultra low VOC paints & carpet glue
- PPPL's GREEN office furniture meets the "Cradle 2 Cradle" criteria.



- We have setup next to PPPL's lobby our GREEN model
- Cradle to Cradle office layout. Ref websites: <http://www.steelcase.com/na/> and http://www.steelcase.com/na/environmental_answer_products.aspx?f=12242&c=2055



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PPPL's Innovations in Upgrades, Operations & Maintenance Facts:

- PPPL has upgraded eighty five 25 year old pneumatic controls in our major office to BAS DDC operation
- PPPL has committed to all renovations will be as "GREEN" as possible





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PPPL's Major steps forward to LEED-EB 2.0 Certification:

- **PPPL will upgrade building energy meters where possible & install new meters on all buildings going for EnergyStar**
 - **Then apply for EnergyStar for each building & LEED-EB Certification for each building after energy data is collected**
- **PPPL will investigate the cost of retro-commissioning**
 - **First for our largest office building & then other buildings**
- **PPPL will document for each building all the Credits that are in the "GLOBAL" Checklist**
- **PPPL will continually make all renovations as "GREEN" as possible**
- **Also any new office/lab construction will meet LEED-NC Silver !**