Greening & Reuse of Queen of Peace High School Facilities

IPRO 314
Decline of enrollment in the past 5 years
  • Competing schools turning co-educational
  • Major schools overlapping Peace’s drawing radius

Proposal
  • Increase Revenue
  • Decrease Costs
  • Accelerate the school’s reputation as a technologically-advanced, eco-friendly facility

Reuse, Reduce, Recycle, Reputation
IPRO 314 – Queen of Peace High School
Methodology

	- Greening (Physical)
	  - Window Replacement
	    - Nic Sahm
	  - Roof Re-Design
	    - Sana Ihmoud, Erin Pedersen, Kaumil Shah
	  - Lighting Retrofit
	    - Meghan Murdock

	- Re-Use (Social)
	  - Multi-Purpose Center
	    - Kyle Dralle, Ryan Dudek, James Rossi, Mimi Wide
	  - Communication Center
	    - Rawan Abbasi, Sarah Pfeifer
Current Window units original to school (Built 1963)

Goals
- Decrease facility heating expenditures (approx. $7,000)
- Increase personal comfort during summer months
- Beautification of Queen of Peace High School
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Windows

- **Window SqFt.**
  - North Wing: 1012 SqFt (Units 38)
    - Gymnasium / Cafeteria
    - Cafeteria 16 non replace units
  - Middle Wing: 9024 SqFt (Units 147)
    - Library / Classrooms
  - South Wing: 4494 SqFt (Units 143)

- **Suggested Cost ($30 SqFt Units) / Suggested Savings (yearly)**
  - North Wing: $30,360 / $6,950
  - Middle Wing: $270,720 / $6,950
  - South: $134,820 / $4,700

- Future window analysis will be approached as an independent project to incorporate new technologies that could lead to specific grant funding.

- **Estimated Project Cost:** $435,900
- **Estimated Savings:** $18,600
- **SIMPLE PAYBACK:** *23.4 Years*
  - Secondary Funding Needed
Determine current lighting inventory (convent & gym) and subsequent costs before the retrofit

Calculate the lighting costs (purchase, installation, energy consumption) after retrofit

Calculate the simple payback the school can expect to start realizing savings

- Commonwealth Edison incentive

Calculate the reduction in the production and emission of pollutants
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Lighting

- Kilowatt Hour Usage Per Year
  - Before Retrofit: 139,398 kWh
  - After Retrofit: 49,793 kWh
  - Savings: 89,605 kWh

- Lighting Cost Per Year
  - Before Retrofit: $17,731
  - After Retrofit: $6,333
  - Savings: $11,397

- Pollutant reduction
  - Carbon Dioxide: 201, 612 lbs/yr
  - Sulfur Dioxide: 1,568 lbs/yr
  - Nitrogen Oxide: 735 lbs/yr

- Estimated Project Cost: $49,616
  - Com Ed Incentive: $9,147
  - Net Project Cost: ~$40,500

- SIMPLE PAYBACK: 3.55 Years
Utilize the roof space to install **energy saving** and **energy generating** green technology

- Reflective roofing
- Enhancing insulation
- Solar panels
- Water harvesting

**Reflective roofing**

- Reflects the sun's rays to minimize heat transfer
  - Keeps the building cooler in the summer
  - Will allow the school to operate during the summer
- Can save a minimum of **25%** in energy usage.
  - The Lawrence Berkley Laboratory in California
- Can extend the roof's life by up to **15 years** by blocking UV rays
Roof Re-Design

Roofing Insulation
- Prevents heat loss during the winter months
  - Reduces energy consumption due to heat retention
- More testing needed on current school conditions to generate an accurate savings figure

Solar Panel
- Addition to current science curriculum (e.g. robotics)
- Increase reputation as a technology school
- Cost of one solar panel (5’ x 2’) ~$650-$800

Water Harvesting research
- Additional teaching aid
- Increases soil moisture levels for urban greenery
- Mitigates urban flooding
- Improves the quality of groundwater
New construction cost is comparable to restoration

Goals

- Increase appeal in Queen of Peace
- Attract people from various age-groups and neighborhoods
- Display presence of Queen of Peace
IPRO 314 – Queen of Peace High School Multi-Purpose Center
Problem:
- Current Library under-utilized

Objectives:
- Opportunity for online classes
- Enhance technology
- Develop reputation through world-wide networking (e.g. military families)
- Adding conference rooms and exhibition spaces

Research:
- Loyola’s Information Commons
- Videoconferencing Equipment, TV’s, Furniture, Wall Partitions
IPRO 314 – Queen of Peace High School
Communication Center
IPRO 314 – Queen of Peace High School
Communication Center

- **Costs**
  - Cheapest videoconferencing package: $7,000
  - Most expensive videoconferencing package: $14,642
  - All new furniture: $36,423
  - New furniture & re-using furniture: $17,550
  - Wall partitions: ~ $5,000
  - Grand Total: $26,500-$54,882
Major impacts, risks and challenges associated with the project:

- **Risks:**
  - Funding for proposals
  - Changing demographic over timeline of the proposals

- **Challenges:**
  - Defining the scope/goals of the project
  - Retaining an all-girls school put limitations on proposals ideas
  - Coordinating schedules (students, QoP, consultants) for on-site visits
  - Coordinating outside equipment for testing
Next steps for future IPROs:

- Further research and analysis needed on proposal ideas
  - Continued market research on surrounding community
  - Further testing on windows and green-roof
- Further schematic design
- Further development of cost versus benefit analysis
- Getting approval from school on proposal ideas
- Funding of proposals
Q & A