Opportunities with Energy Loans

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New Haven School District

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Missouri Department of Economic Development
## Opportunities with Energy Loans

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<th>Part 1:</th>
<th>The New Haven School District project and general concepts about energy loans</th>
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<tr>
<td>Part 2:</td>
<td>The potential for using energy loans to enhance your project</td>
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<tr>
<td>Part 3:</td>
<td>Applying for energy loans, receiving energy loans, completing your project(s)</td>
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</table>
New Haven High School

New wing / Long-range Facility Plan

This project will construct a new HS wing with 4 classrooms. The project also includes installing AC in most of the existing HS.

No bond issue
No tax increase
Current High School Campus
Current HS Campus
Parcel #1 (1964 Site)
Parcel #2
Parcel #3
Long-Range HS Campus Plan
Long Range HS Campus Plan
Long-Range Campus Plan
Long-Range Campus Plan
Current HS Campus with New Wing
Proposed New HS Wing (first phase)
Proposed New HS Wing (first phase)
Effectively Using an Energy Loan

The Concept

Finance “normal” building with lease-purchase dollars

Finance energy-efficient upgrades with energy loan.

Cost of upgrades (energy loan) paid back by energy savings within 10 years

Financed by energy loan

Financed by lease-purchase
### What Happened Next...

**Timeline of events**

- **April 2:** Bids for HS Wing/HVAC due
- **May 1:** HVAC package re-bid
- **May 6:** Missouri Legislature overrode veto of SB 509, approved several additional tax cut bills
- **May 28:** New HVAC bid received and approved. New HS Wing project put on hold.

**Effects of Legislation**

- **SB 509:** Starting in 2017, tax cuts could take effect that may reduce state revenues by $620 million.
- **Additional tax cut bills:** If vetos are overridden, may reduce state revenues by $776 million.
- **Great uncertainty about state funding:** State funding for New Haven Schools may be reduced by $900,000 or more.
Questions?
INTEGRATED PLANNING
Going Beyond Architecture!

Enhancing Learning Spaces

while

Reducing Operating Costs

Our unique Integrated Planning process focuses on the synergy which is possible when space use, maintenance, and utilities costs are studied and planned in tandem. As planned measures are implemented, the learning environment becomes more effective while the operating costs progressively diminish.
Building as a Student Learning Lab
Solar Photovoltaic Roof
Water Harvesting
KRJ Projects: Sun Control

- Roof Insulation
- Wall Insulation
- Sunscreen/Light Shelf
- Double Low E Glass
Proposed building
Internal Gains + solar - on ver 4.2, Building 1
EnergyPlus Output 1 Jan - 31 Dec, Daily
Licensed

Heat Balance (kBtu)

-600 -500 -400 -300 -200 -100 0 100 200 300 400 500 600

Jan 2002 Apr Jul Oct

2002

Tue, 2 Apr 2002 - Start DST; 31 Oct 2002 - End DST

General Lighting  Miscellaneous
Computer + Equip  Occupancy
Solar Gains Exterior Windows  Zone Sensible Heating
Zone Sensible Cooling
<table>
<thead>
<tr>
<th>Activity</th>
<th>Construction</th>
<th>Openings</th>
<th>Lighting</th>
<th>HVAC</th>
<th>Generation</th>
<th>Economics</th>
<th>Outputs</th>
<th>CFD</th>
</tr>
</thead>
</table>

### Construction Template

<table>
<thead>
<tr>
<th>Template</th>
<th>Project construction template</th>
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</thead>
</table>

### External walls
- Below grade walls
- Flat roof
- Pitched roof (occupied)
- Pitched roof (unoccupied)
- Interior partitions

<table>
<thead>
<tr>
<th>Construction</th>
<th>aakrj exterior solid mas 16in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat roof</td>
<td>Project flat roof</td>
</tr>
<tr>
<td>Pitched roof</td>
<td>Project pitched roof</td>
</tr>
<tr>
<td>Unoccupied</td>
<td>Project unoccupied pitched roof</td>
</tr>
<tr>
<td>Partition</td>
<td>Project partition</td>
</tr>
</tbody>
</table>

### Semi-exposed walls
- Semi-exposed walls
- Semi-exposed ceiling

<table>
<thead>
<tr>
<th>Construction</th>
<th>Project semi-exposed wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceiling</td>
<td>aakrj semi exposed Clay or Roof slab only</td>
</tr>
<tr>
<td>Floor</td>
<td>Project semi-exposed floor</td>
</tr>
</tbody>
</table>

### Floors
- Ground floor
- Basement ground floor
- External floor
- Interior floor

<table>
<thead>
<tr>
<th>Construction</th>
<th>Project ground floor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basement</td>
<td>Project basement ground floor</td>
</tr>
<tr>
<td>Exterior</td>
<td>Project exterior floor</td>
</tr>
<tr>
<td>Interior</td>
<td>Project interior floor</td>
</tr>
</tbody>
</table>

### Sub-Surfaces
- Walls
- Internal
- Roof
- External door
- Interior door

<table>
<thead>
<tr>
<th>Construction</th>
<th>aakrj metal panel 5in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>Project internal wall sub-surface construction</td>
</tr>
<tr>
<td>Roof</td>
<td>Project roof sub-surface construction</td>
</tr>
<tr>
<td>Door</td>
<td>Project external door</td>
</tr>
<tr>
<td>Door</td>
<td>Project interior door</td>
</tr>
</tbody>
</table>

### Internal Thermal Mass
- Component Block
- Geometry Areas and Volumes
- Surface Convection
- Linear Thermal Bridging at Junctions

### Lighting
- **Modular Illumination**
  - Constant rate (ac/h)
    - 1,500

### Schedule
- On

### Cost
### Glazing Template

**Type:** Single Pane 3mm

**Preferred height:** 1.5m, 30% glazed

**Dimensions:**
- **Window to wall %:** 0.00
- **Window height (ft):** 4.32
- **Window spacing (ft):** 16.40
- **Still height (ft):** 2.82

**Reveal:**
- **Outside reveal depth (in):** 0.000
- **Inside reveal depth (in):** 0.000
- **Inside sill depth (in):** 0.000

**Frame and Dimers:**
- **Has a frame/dividers?:** Yes
- **Construction:** Painted Wooden window frame

#### Dividers
- **Type:** 1-Divided lite
- **Width (in):** 0.787
- **Horizontal dividers:** 1
- **Vertical dividers:** 1
- **Outside projection (in):** 0.000
- **Inside projection (in):** 0.000
- **Glass edge-centre conduction ratio:** 1.000

#### Frame
- **Frame width (in):** 1.575
- **Frame inside projection (in):** 0.000
- **Frame outside projection (in):** 0.000
- **Glass edge-centre conduction ratio:** 1.000

#### Shading
- **Window shading:** Blind with high reflectivity slots
- **Position:** 1-inside
- **Control type:** 3-Schedule
- **Operation schedule:** ASHRAE 90.1 Occupancy - School

**Local shading:**
### HVAC Template

#### Template
- **Type**: Fan-coil unit hr
- **Mechanical Ventilation**
  - **Outside air definition method**: 2 Min fresh air (Per person)
  - **Operation**
    - **Schedule**: ASHRAE 90.1 Occupancy - School

#### Heating
- **Heated**: Gas-fired condensing boiler
- **Local Heating Units**
- **Operation**
- **Schedule**: ASHRAE 90.1 Occupancy - School

#### Cooling
- **Cooled**: Default
  - **Chiller**: DOE 2 Centrifugal/550 COP
  - **Chilled water setpoint temperature (°F)**: 45.0
  - **Condenser water setpoint temperature (°F)**: 84.9
  - **Cooling tower type**: 1-Single speed
  - **Supply Air Condition**
  - **Cooling Coil**
  - **Cochlor**
  - **Schedule**: ASHRAE 90.1 Occupancy - School

#### DHW (Domestic Hot Water)
- **DHW Template**: Project DHW
- **Type**: Similarly as HVAC
- **Water Temperatures**
  - **Delivery temperature (°F)**: 143.00
  - **Mains supply temperature (°F)**: 50.00
- **Operation**
- **Schedule**: Off

#### Earth Ventilation
- **On**: Off
- **Earth Tube**: Off
- **Air Temperature Distribution**: Off
KRJ

Lighting $2,300
Mechanical $17,300
Mechanical $17,300
Lighting $2,300
Vestibule $9,124
Roof $6,118
Wall/Foundation $5,181
Window $704
Vestibule $9,124
Space Use Planning
New addition saves money by acting as a blanket over these walls:
Reduce costs step by step

1. Planning spaces for learning
2. Improved skylights & roof insulation
3. Energy recovery & improved ventilation
4. Improved windows & wall insulation
5. Light sensors, exterior sun shades, & skylight reflectors
6. Solar pv panels & alternative energy use
Questions?

You can contact David at Kromm Rikimaru and Johansen
davidk@krjarch.com
314.432.7020
Financing your Energy Efficiency Projects with the Division of Energy’s *Energy Loan Program*

Presented by:
Ron Wyse
Purpose

• **Help fund energy efficiency improvements for:**
  ▫ Schools (K-12, universities, public & private)
  ▫ Hospitals (public & private)
  ▫ Local governments—including water & wastewater facilities

• **Help finance upgrades on new construction encouraging energy efficiency design**

• **Help finance renewable energy projects**

• **Help finance emergency projects for energy efficiency improvements**
Project Examples

- Lighting
- HVAC
- Boiler upgrades
- Chiller upgrades
- Renewable energy projects
- Pumping Systems & Components
- Process Equipment
- Insulation upgrades
- Compressed Natural Gas Fleet
- Combined Heat and Power
Benefits

• Free up your tax dollars for other essential services
• Does not count against debt limits
• Does not require a public vote or bond issuance
• Low-Interest Loans compare favorably to other financial services
Benefits - (Continued)

- Close the “GAP” on the loss of opportunity
- After the loan is paid off, energy savings may be used for other essential services.
- Expedite capital improvements
- Create jobs in the community
<table>
<thead>
<tr>
<th>Bond or Levy</th>
<th>Energy Loan Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increases debt services cost</td>
<td>Does not increase debt services cost (Loan repayment will be paid by savings)</td>
</tr>
<tr>
<td>Requires public vote</td>
<td>Does not require public vote</td>
</tr>
<tr>
<td>Requires debt reporting</td>
<td>Does not require DESE debt reporting for school districts</td>
</tr>
</tbody>
</table>

**Bond**
- Interest rate is based on: Credit worthiness – Debt ratio, Credit Rating, Acid Test, EBIDA, Cash Flow Solvency Ratio

**Energy Loan Program**
- Interest rate is based on: Fixed rate at the time of the announcement
Program History

• Approximately 539 loans since 1989
• Awarded more than $89 million
• Saving more than $167 million cumulatively
FY2015 Announcement

- $7.5 Million is available for the FY2015 loan cycle
- Maximum $1,500,000 per applicant
- Application deadline October 31, 2014
- Projects more than $1,500,000 will be considered if available funds remain after applications have been reviewed and prioritized
- 2.5% interest rate, 10-year-loan repayment
Application

- Application process is user friendly
  - Excel Spreadsheet Application
- Processed in a timely manner
- Simple projects such as lighting upgrades can be documented with worksheets
- Energy audit calculations and reports are acceptable
- Complex projects such as chiller upgrades or new constructions may require a Technical Energy Study (TES) which may be requested
How the Loans Work

- Simplified application process
- Applications are accepted during announced loan cycles
- Typically 90 day turn around on approval
- Projects may begin prior to final loan approval
- Reimbursements to loan recipients require project cost documentation and take about 30 days
Loan Repayment

- Once the project is complete, loan recipients repay the Division of Energy in semi-annual payments
- Loans are repaid from the savings that are generated by the improvements
Project: Lee’s Summit School District

- FY2012: Loan amount: $2,499,700
- Project: Building Automation Systems
- Estimated annual savings $288,318
- Simple payback – 8.7 years
- Loan repayment – 10 years
Project: Dora School District

- The Division of Energy approved an $80,000 loan toward the incremental cost of installing a ground-source heat pump in the new main building
- Project saves the district an estimated $10,000 per year
Project: New Haven School District

- FY2014: Loan amount: $49,260
- Project: Building Addition Above Code
  - The Division of Energy approved $49,260 loan toward the incremental cost of installing energy efficient materials/equipment in the new building addition.
- Estimated annual savings $5,641
- Loan repayment – 10 years
TESTIMONIALS

• Ozark Medical Center
  http://www.youtube.com/watch?v=D24ZxxQ9E6o

• Laclede County
  http://www.youtube.com/watch?v=s1UPb1nbEF8
For More Information

- Visit our Web page
  http://energy.mo.gov/energy/communities/assistance-programs/energy-loan-program

- Contact:
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