Sustainable Operations Collective
Forest Service Job Corps

Connecting Consumption with Education

Lexie Carroll, P.E., LEED LP
USFS, R2 Center for Design and Interpretation
What is Job Corps?

Job Corps was founded by President Lyndon Johnson on August 20, 1964. (50 year Anniversary this summer)

Job Corps (JC) is Nation’s largest career technical training and education program for interested low income young people between the ages 16 through 24.

125 Job Corps Centers (JCCs) across the US, including the District of Columbia, Puerto Rico, Alaska, and Hawaii.

No cost to students.
What does Job Corps offer?

Hands-on training in more than 100 career areas. Samples include: Masonry, Electrical, Plumbing, Culinary Arts, Welding, Nursing, High School Diploma.

Students studying the Manufacturing, Automotive, or Construction career technical training areas also receive training in variety of green subject areas.

Training programs are aligned with industry credentials and are designed to meet the requirements of today’s careers.

“Work-Based Learning” and community service programs allow students to gain experience with local employers prior to graduation.

Courses in independent living, employability and social skills are also offered.
Job Corps Statistics

<table>
<thead>
<tr>
<th>Sex</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>51%</td>
<td></td>
<td>49%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>51% African-American</td>
<td></td>
</tr>
<tr>
<td>28% white</td>
<td></td>
</tr>
<tr>
<td>16% Hispanic</td>
<td></td>
</tr>
</tbody>
</table>

82% of graduates join the workforce, enlist in the military, or enroll in higher education.

2.7m Students have graduated from Job Corps since its inception.

60,000 students are served by Job Corps each year.
Job Corps and the Forest Service

Each Job Corps Center is funded by the Department of Labor but managed by either another agency, or private enterprise.

The National Office for Forest Service Job Corps is located in Golden, Colorado. R2 CDI provides Engineering support services.

Job Corps Centers employ a variety of disciplines including teachers, nurses, admin staff, and maintenance staff.

The Forest Service manages 28 of the 125 Job Corps Centers.
Job Corps and the Forest Service

Forest Service Job Corps Civilian Conservation Centers Map
Each JC has numerous facilities, most of which were constructed in the 1960’s, so are therefore inefficient and in need of maintenance or replacement. (bldg life cycle is over)

Some JCC’s are being proactive and are seeking out ways to reduce their energy consumption, save money, and meeting Executive Order requirements.
Trapper Creek Job Corps Center (TCJCC)

- Located near Darby, Montana
- Current student population = 248 (68 females and 180 males)
- Facility Portfolio:
  - 23 primary buildings with 160,113 GSF total
  - 18 ancillary buildings with 11,960 GSF total
  - Total of 41 structures with 172,073 GSF
- Site is all electric.
- Partnership has been developed between the Job Corps, the utility provider (Ravalli Electric), and Bonneville Power Administration.
Trapper Creek Job Corps Center

Energy Efficiency Projects Update

Monday, July 28, 2014

Bonneville Power Administration (BPA) Energy Efficiency

Erik Boyer-Mechanical Engineer
## Overview

- Bonneville Power Administration (BPA) Background
- BPA Energy Efficiency (EE) Background
- Why EE for Federal Facilities?
- TCJC EE Overview
  - Past work
  - Recent work
  - Future
- Questions/Discussion
BPA Background

Established in 1937 by FDR

Self-funded Federal Agency (subset of DOE)

Markets wholesale power to public utilities from 31 Dams from Columbia river system, 1 nonfederal Nuclear and other nonfederal power plants.

Transmission Lines = over 15,000 miles (BPA sells capacity on these)

Substations = 261

Employees = 3,175

Customers = 142 (includes Co-ops, Munis, PUDs, Federal, IOU, Direct Service, Tribal)
BPA EE Background

Early 1980s

• Northwest Power Act requires BPA to provide the most cost effective resource.
• BPA EE was created.
• BPA is federally mandated to obtain the lowest cost resource = EE

1981 to 2012

• +1,400aMW (over full output of equal to output of Bonneville Dam)
BPA EE programs = Residential, Commercial, Agricultural, Industrial, and R&D.
Why EE for Federal Facilities?

EO 13423—What’s that?

- The reduction of energy by 3% each year to hit 30% by 2015 from 2003 levels.

---

Executive Order 13423 of January 24, 2007

Strengthening Federal Environmental, Energy, and Transportation Management

By the authority vested in me as President by the Constitution and the laws of the United States of America, and to strengthen the environmental, energy, and transportation management of Federal agencies, it is hereby ordered as follows:

Section 1. Policy. It is the policy of the United States that Federal agencies conduct their environmental, transportation, and energy-related activities under the law in support of their respective missions in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner.

Sec. 2. Goals for Agencies. In implementing the policy set forth in section 1 of this order, the head of each agency shall:

(a) improve energy efficiency and reduce greenhouse gas emissions of the agency, through reduction of energy intensity by (i) 3 percent annually through the end of fiscal year 2015, or (ii) 30 percent by the end of fiscal year 2015, relative to the baseline of the agency’s energy use in fiscal year 2003;
BPA REBATE PROGRAM

- Available to any Federal Agency served by a BPA utility customer.
- A “Holding Account” is established at BPA for the Unit. (requires an MOU between Unit and BPA.)
- Amount of rebate depends on the type of project.
- BPA provides the rebate based on actual savings. Verification is required after project completion.
- Rebate amount is placed in the holding account.
- Trapper Creek JCC currently has approximately $45K in their account.
- Can put this money towards a future project.
TCJC EE History

Late 2011
BPA Scoping Audit
• 1997 Energy Study (done by another party)
• 2010-2011 Facility Survey (included 16 largest facilities)

Challenges
• All facilities at main campus are served by one electrical meter

Trapper Creek Job Corps Civilian Conservation Center
ENERGY SCOPING AUDIT

ANALYSIS PERFORMED BY:
Erik Boyer & Andrew Hollic
Bonneville Power Administration
707 W. Main Ave, Suite 500
Spokane, WA 99201
November 7, 2011
## TCJC EE Baseline

<table>
<thead>
<tr>
<th>Category</th>
<th>Energy Usage</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5yr Average Annual Energy Usage</strong></td>
<td>3,200,000kWH</td>
<td>$172,000/yr</td>
</tr>
<tr>
<td><strong>Summer Peak</strong></td>
<td>125,000kWH/mo</td>
<td>$6700/mo</td>
</tr>
<tr>
<td><strong>Winter Peak</strong></td>
<td>422,000 kWh/mo</td>
<td>$22,600/mo</td>
</tr>
<tr>
<td><strong>Non-weather dependent</strong></td>
<td>135,000kWH/mo</td>
<td>$7200/mo</td>
</tr>
</tbody>
</table>

Normalized Annual Energy Usage = 3,102,385kWh or 10,585 MMBTUs, which equates to 66,111 BTUs/GSF.
TCJC EE Overview-Recent

Late 2011 – BPA Scoping Audit
Late 2011 to present
Installed individual building metering at 14 locations
- Food Service
- Dorms (4)
- Academic
- Recreation
- Carpentry
- Welding
- Gym
- Admin (currently)
- Medical (currently)
- Well (water system)
- Waste Water System
TCJC EE Overview-Recent

Late 2011/Present– Metering/Loggers

[Images of metering and logging equipment]
TCJC EE Overview-Recent

Metering Results

- Dorm #3 HVAC = 117,364kWh/yr (3.8%*)
- Carpentry Heating = 63,003kWh/yr (2% *)
- Food Service Radiant Boiler = 106,287kWh/yr (3.4%*)
- Medical Center = 49,822kWh/yr (1.6%*)

*percentages are compared to overall use at main campus
TCJC EE Projects

Campus Wide:
- 26 Projects identified for a total projected savings of 335,000 kWh+ ($18,000+)
- Main Campus: 17 Projects implemented for a total actual savings = 315,000 kWh+ (10.2% - year 2). EO 13432 requires 30% reduction in energy intensity (BTU’s/GSF) by 2015.

Employee Housing Campus:
- 9 Projects = 20,000 kWh+
TCJC EE Projects

Dorm #1 Project

- $3,000 initial investment
- < 2yr Simple Payback (SP) / 50%ROI (Return on Investment (after rebate))
  - Web Enabled Programmable Thermostat (WEPT)
  - Duct Sealing/Repair
  - Attic Insulation
  - Air Sealing

<table>
<thead>
<tr>
<th>Energy [kWh]</th>
<th>% of Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Baseline Energy</td>
<td>116,929</td>
</tr>
<tr>
<td>Projected Post Energy</td>
<td>60,608</td>
</tr>
<tr>
<td>Energy Savings</td>
<td>56,321</td>
</tr>
</tbody>
</table>
TCJC EE Projects

Dorm #4 Project:
(phase 1) +$2,600 & < 6mo SP / 200%ROI (after rebate)

Duct Sealing/Repair

<table>
<thead>
<tr>
<th>System</th>
<th>Pre-Flow</th>
<th>Pre-Pa</th>
<th>Post-Flow</th>
<th>Post-Pa</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB #1</td>
<td>241</td>
<td>232</td>
<td>104</td>
<td>270</td>
</tr>
<tr>
<td>AB #2</td>
<td>299</td>
<td>356</td>
<td>142</td>
<td>494</td>
</tr>
<tr>
<td>CD #1</td>
<td>481</td>
<td>136</td>
<td>231</td>
<td>214</td>
</tr>
<tr>
<td>CD #2</td>
<td>1633</td>
<td>218</td>
<td>174</td>
<td>122</td>
</tr>
<tr>
<td>Common</td>
<td>788</td>
<td>362</td>
<td>299</td>
<td>366</td>
</tr>
</tbody>
</table>

Energy [kWh] % of Baseline

<table>
<thead>
<tr>
<th></th>
<th>Normalized Baseline</th>
<th>Normalized Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normalized Energy Savings</td>
<td>48,656</td>
<td>47.3%</td>
</tr>
</tbody>
</table>

Dorm #4 HVAC Energy
TCJC EE Projects

Technology Assessment:
Well stand-by Gen-Set EGBH Project:
+$200 & < \textbf{free} \text{ simple payback (after rebate) }

<table>
<thead>
<tr>
<th></th>
<th>Projected Baseline Energy</th>
<th>Projected Post Energy</th>
<th>Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>kW</td>
<td>7,538</td>
<td>3,764</td>
<td>3,774</td>
</tr>
<tr>
<td>Energy Savings % of Baseline</td>
<td>50.1%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

![Graph](image1)

![Graph](image2)
TCJC EE Projects

Residential Ductless Heat Pump + Attic Insulation Project:
(House 28)
• +$670

<table>
<thead>
<tr>
<th>Projected Baseline Energy</th>
<th>24,966 kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Post Energy</td>
<td>12,444 kWh</td>
</tr>
<tr>
<td>Energy Savings</td>
<td>12,523 kWh</td>
</tr>
</tbody>
</table>

House 28 Energy Usage

Sustainable Operations
TCJC EE Projects

Results from the Main Meter
TCJC EE Projects

Summary

- **Residential Area**
  - Measured Savings = 20,982kWh (on a meter separate from main meter)

- **Main Campus**
  - Measured Savings for Year 2 (2013) = 315,688kWh (10.2%)
  - Savings to Date for Year 3 (2014 (7 mo – through June 2014) = 229,897kWh (7.4%)
  - $18,101 with combined Simple Payback of 2 years and Return on Investment (ROI) of 50%
TCJC EE Overview-Future

- **In Progress Projects**
  - Food Service South Kitchen Heat Pump (in progress)
  - WEPTs + Active Web-based Energy Management-facility upgrades (in progress)
  - LED Exit Signs (in progress)

- **Future Projects**
  - LED Fluorescents
  - Insulation-facility upgrades
  - Water Source Geothermal in Gymnasium
  - Possible Campus wide Geothermal
  - Lighting Controls
  - Ductless Mini-Split Heat Pumps (Academic + Rec)
  - Duct Sealing-facility upgrades
  - Dorm Ventilation
    - HRV, DCV, Heat Pumps??
Acknowledgements

- Erik Boyer – Mechanical Engineer, Bonneville Power Administration
- Dan Gager, Work Program Administrator, Trapper Creek JCC
- Aurora Cutler- Communications, FS SusOps Collective
Questions and Discussion