Creekside Community High School
Russ Romas, Principal, Creekside Community High School
Kevin Montague, Facilities Manager, Tigard-Tualatin School District
CREEKSFIDE HIGH SCHOOL
Energy Consulting
Energy Consulting

Benchmarking

Standards based Model → EUI – 21.285432

Forecasting Model → EUI Range – 21 to 29

Used to size PV System
Energy Consulting
PV Design

SOUTH ELEVATION
PV Design
Passive Design

- Orientation
- Shading
- Solar study
- Envelope
Energy Conservation

- VRF w/ heat recovery
- Operable windows
- Ceiling fans
- Heat recovery ventilators
Metering Design
Metering Data
Creekside eGauge Site
Energy Dashboard

Glumac Dashboard
PROJECT GOALS

The Durham Center will be a place that:

- Is student-centered
- Engages under-served and marginalized students
- Provides rigorous curriculum and a broad spectrum of experiences
- Prepares students for college and / or careers
- Provides dual college credit and expanded internships
- Provides a more diverse set of spaces
- Reflects modesty and informality
- Achieves net-zero energy use
# FIRST FLOOR PLAN

## NEW CLASSROOM BUILDING

<table>
<thead>
<tr>
<th>Floor</th>
<th>SQFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>10,771</td>
</tr>
<tr>
<td>Second</td>
<td>4,268</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15,039</strong></td>
</tr>
</tbody>
</table>

![Floor Plan Diagram]
# SECOND FLOOR PLAN

## NEW CLASSROOM BUILDING

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![Second Floor Plan Diagram]
ROOF PLAN

NEW CLASSROOM BUILDING

PV Court
Energy Generated
28.7 kBTU/sf/yr

Estimated
Building ELt
19 kBTU/sf/yr

Durham Education Center
Annual Energy Consumption
CONSERVATION – THE ENVELOPE

- 131.6kW PV (South facing)
  - Roof U=0.048 (30%)
- Focus on tight envelope
  - 0.109 cfm/sf @ 75PA
- Window to Wall Ratio - 18% (40%)
  - Window U=0.29, SHGC=0.27 (30%)
  - Wall U=0.039 (40%)
- Operable windows
  - Accountability required
CONSERVATION – THE SYSTEMS

- VRF w/ heat recovery
- Operable windows
- Ceiling fans
- Heat recovery ventilators
simple photovoltaic installation
save 20-25% on installation costs
lose 10% on efficiency
net win

sunlight -> photons
(2) silicon layers
Electron flow to create electric field
CONSTRUCTION
BUILDING TESTING
AIR LEAK AT WINDOW IN MAKERSPACE

63.3 °F

ε = 0.85

FLIR

63 - 73
AIR LEAK (AND POTENTIALLY MOISTURE) AT SILL IN CORRIDOR

60.3 °F

ε = 0.85

FLIR
APPROACH TO ENERGY – PROCESS
APPROACH TO ENERGY – PROCESS
Energy Dashboard

Durham Center Alternative School

Summary for time period shown in graph:
- Energy Used: 230 kWh (approx. $71.13 saved)
- Energy Generated: 425 kWh (approx. $156.55 saved)
- Net: 195 kWh sold (approx. $65.37 earned)

Summary over last 30 days:
- Energy Used: 6,922 kWh (approx. $207.71 saved)
- Energy Generated: 1,325 kWh (approx. $39,004.31 saved)
- Net: 5,597 kWh sold (approx. $18,077.19 earned)

https://egaug42767.egaug.es/SCDC8/
Courtyard
Creekside Community High School
Tigard-Tualatin School District

- Net Zero new construction w/EUI 21
- Passive strategies
  - Natural ventilation
  - Daylighting
  - High-efficiency envelope
- VRF + DOAS mechanical system
- 18 kW solar electric array
- $61,405 in Energy Trust incentives
- $5,250 est. annual utility cost savings
- 70,000 kWh est. annual savings

*Post occupancy incentives pending