



A Deep Dive into Energy-Efficient School Design

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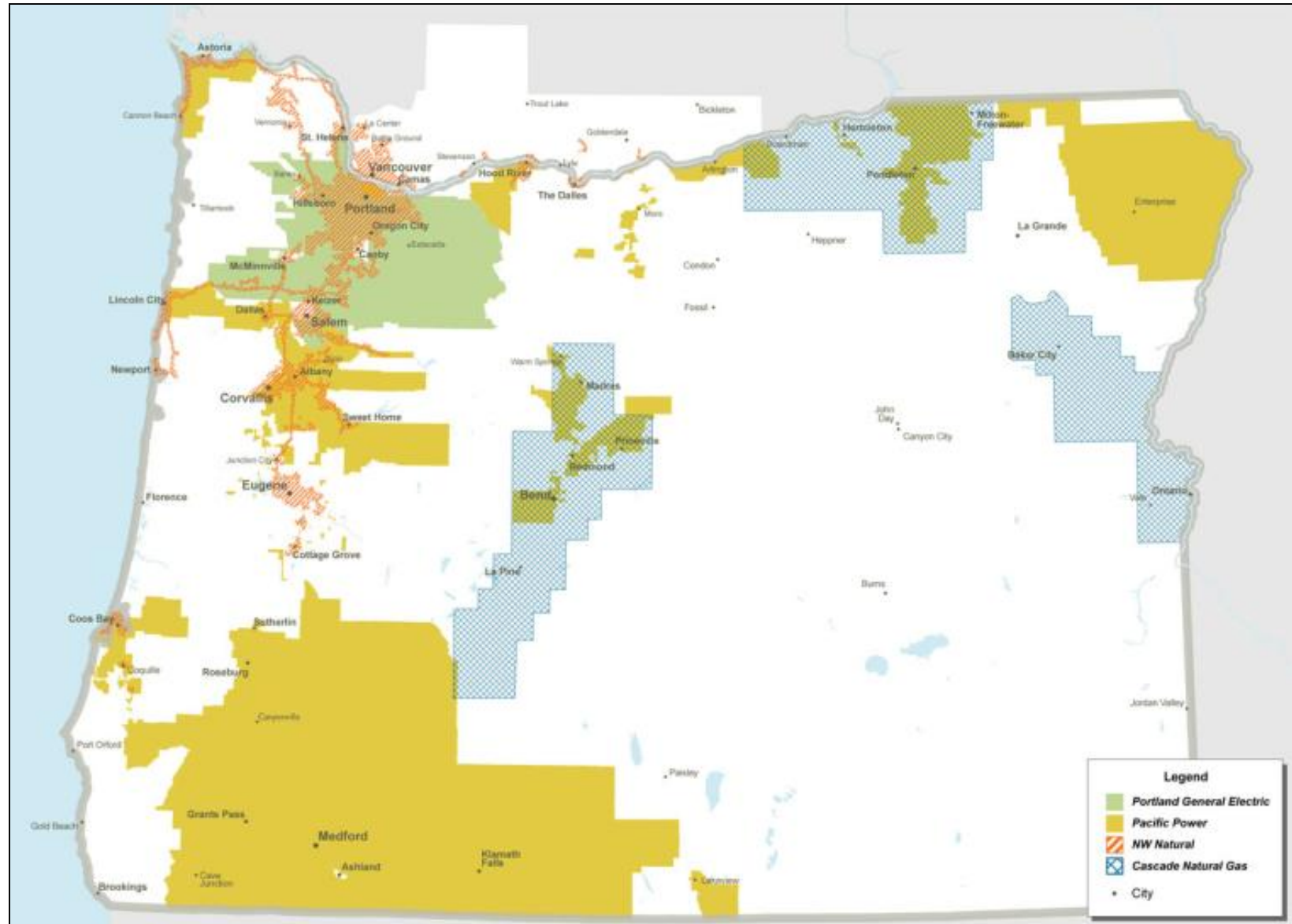
Energy Trust of Oregon: Incentives & Resources for Energy-Efficient Schools



About

- Independent nonprofit
- Serving 1.5 million customers of Portland General Electric, Pacific Power, NW Natural and Cascade Natural Gas
- Providing access to affordable energy
- Generating homegrown, renewable power
- Building a stronger Oregon and SW Washington

Energy Trust service territory



Eligibility

- Oregon customer of Portland General Electric, Pacific Power, NW Natural or Cascade Natural Gas
- Pay or plan to pay the public purposes charge
- Located in Oregon
- Commercial, institutional, industrial or multifamily building

Case Study: Parkrose District Bond Projects

Parkrose bond projects & sustainability: Background and history

- Bond planning process: Community engagement
- Approach: Analysis and verification
- Goals: Longevity and efficiency of systems





Overriding goal:
Focus on energy efficiency

Approach:

- Community Engagement
- Community Support
- Community Oversight

Energy Trust New Buildings Incentives & Resources



Projects served:

- New construction
- Major renovation
- Tenant build-out
- Additions or expansions

Incentives & resources

Design Solutions

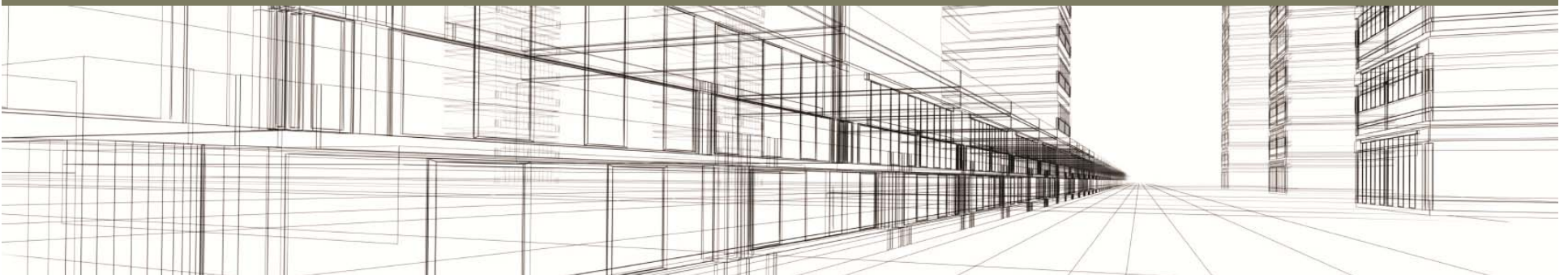
- Early design assistance
- Energy modeling
- Commissioning

Installation Incentives

- System-by-system options:
 - Standard equipment
 - Lighting & HVAC calculators
 - Special measures
- Whole-building approaches:
 - Modeled savings
 - LEED®
 - Market solutions

Design solutions

- Early design assistance: up to \$2,500 for projects in schematic design or earlier
- Energy modeling: up to \$25,000 to offset the costs of whole-building energy modeling
- Commissioning: offsets costs commissioning energy-efficient systems



System-by-system options

Standard equipment

- Incentives for installing equipment that meets specific energy-efficiency criteria.

Lighting & HVAC

- Excel-based tools for calculating savings and incentives.
- Lighting calculated based on reduction of lighting power density in an interior space.
- HVAC calculated based on percent efficiency above current code requirements.

Special Measures

- Incentives for energy-efficient equipment or systems that exceed code requirements, but do not fit within the current incentive structure.

Whole-building approaches

Modeled Savings

- Incentives based on savings beyond code as determined by a whole-building energy model

LEED

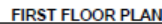
- Incentives for projects that achieve any level of LEED certification from the U.S. Green Building Council

Market Solutions

- Incentive packages tailored to specific building types
- Six options for small commercial buildings under 70,000 square feet
- A special incentive package for data centers

Case Study: Parkrose Middle School

DULL OLSON WEEKES - IBI GROUP
architects inc.



Setting sustainability goals

The Parkrose approach for a LEED® Gold school:

- Process:
Community engagement
- Goal:
Community support
- Results:
Community oversight



What resonated in Parkrose

- Good for the children—a healthy school:
 - Indoor air quality
 - Low-emission materials
 - Daylight
- Good for the school district—a common sense approach to the bottom line:
 - Energy efficiency
 - Renewable energy
 - Commissioning and verification



What resonated, cont.

Good for the future—a building that is good for the planet:

- Storm water quality
- Regional materials
- Recycled content
- Heat island effect

Parkrose Middle School design process

- Community goal-setting for sustainability
- Integrated design workshop
 - Energy Trust representative
 - Architect
 - Mechanical engineer
 - District staff
- LEED
 - Goal-setting
 - Cost-benefit analysis
 - Prioritization
- Energy modeling
- Incentive analysis

Beyond Parkrose middle school

Sustainability across the Parkrose school district:

- Integrated design approach on infrastructure projects
- Four elementary school upgrade projects ranging from \$1 million to \$4 million
- Energy Trust incentives on all projects
- A net-zero multipurpose room

Parkrose School District Incentives

School	Electric savings (kWh)	Gas savings (therms)	Total incentives
Prescott ES Major reno/addition	19,024	0	\$12,750
Russell Academy Major reno	3,366	151	\$3,850
Russell Academy Net zero MPR addition	9,436	0	\$1,470
Sacramento ES Major reno/addition	5,933	13,740	\$28,460
Shaver ES Major reno	5,300	6,570	\$15,825
Shaver ES Net zero MPR addition	9,301	0	\$1,438
Parkrose MS New construction	88,166 (est)	14,480 (est)	\$41,070 (est)
TOTAL	140,526	34,941	\$104,863

Hey school, congratulations.
You're all set to deliver a higher
efficiency education.



School incentives & requirements

	REQUIREMENT	INCENTIVE
BEST	“Good” requirements + six additional electives	\$0.50/sq ft
BETTER	“Good” requirements + four to five electives	\$0.40/sq ft
GOOD	15% reduction in lighting power density above current code requirements + 10% reduction in fan static pressure + two electives	\$0.30/sq ft



School electives include:

- Exterior lighting
- Bi-level lighting in corridors
- Plug loads
- ENERGY STAR cooking equipment
- Variable frequency drives
- Domestic hot water
- Premium electives*
- Special measures**

**Visit our website for a full list of premium incentives*

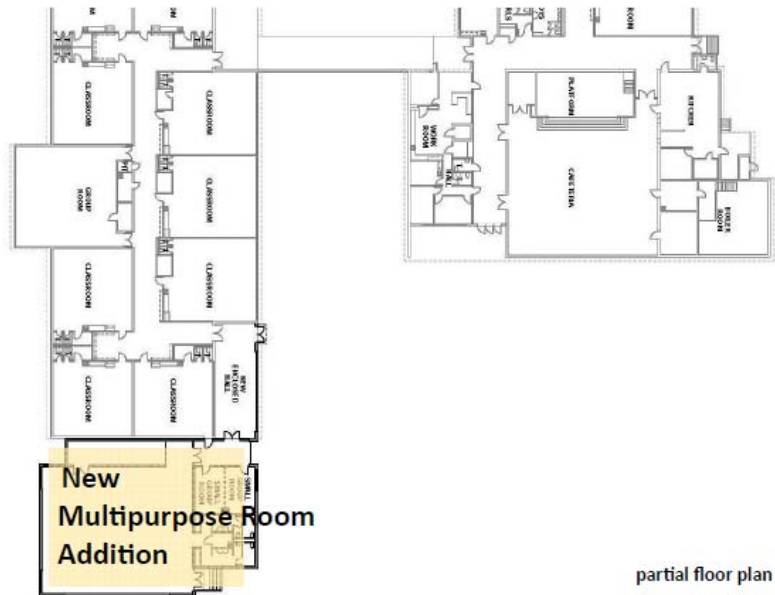
***Special measures refer to design features that are not specified here but may qualify for incentives.*

Path to net zero

- Enhanced design and technical assistance
- Solar ready
- Installation incentives
- Commissioning



Net-zero multipurpose room—Shaver Elementary School



Shaver multipurpose room: key features

- R20 rigid insulation with R19 batts at walls
- R30 at roof
- R10 under slab
- Heat recovery ventilation
- Heating and cooling from radiant slab
- Air-to-water heat pump
- Skylights to maximize natural light
- 12-kilowatt, kW, solar electric array

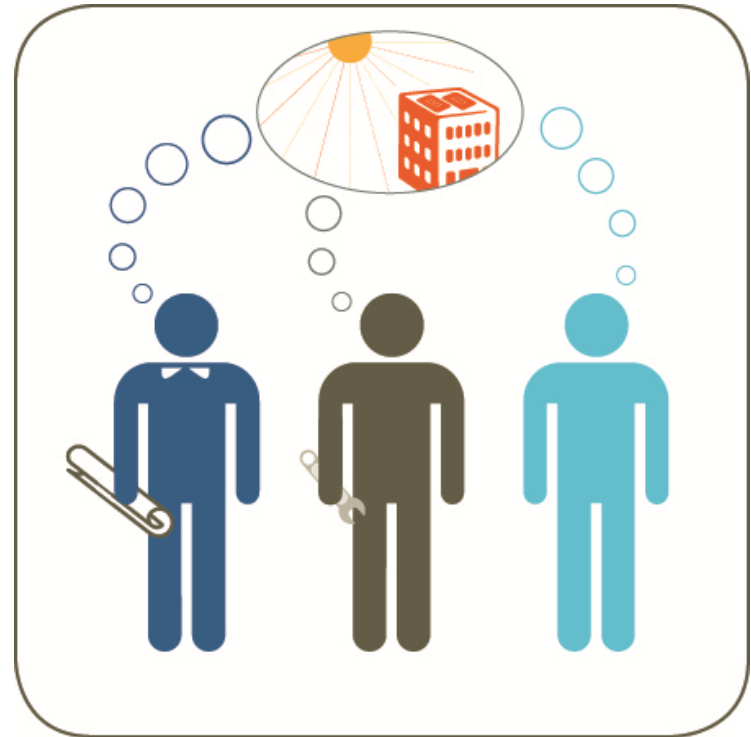
Commercial Solar Incentives & Resources

Solar ready incentives

Incentives and technical guidance to reduce costs:

- Solar assessment
- Solar ready design
- Solar ready construction

Templates and tools to simplify the design process



Solar electric incentives

UTILITY	INCENTIVE	PROJECT MAXIMUM
PGE	0-25 kW: \$1.30/watt 26-250 KW: \$1.30-\$0.72/watt	\$180,000
Pacific Power	0-35 kW: \$0.90/watt 36-200 kW: \$0.90-\$0.40/watt	\$80,000



Design challenges: When reality and dreams collide

- Integrating the energy model early in the design process
- Maintaining sustainable goals during value engineering
- Making sustainability visible—not just a plaque on the wall
- Training staff to lose old habits





Construction process

- Developing an integrated process between architect and contractor
- Importance of ongoing record keeping
- Managing subcontractors
- Expecting the unexpected/preparing for construction challenges



Thank You

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