Nez Perce Homeowners Workshop

Energy Conservation Workshop – Preserving the Environment

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Today's Presenter

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Thank you to the following:

- Laurie Ann Cloud - Executive Director, Nez Perce Tribal Housing Authority
- Lisa Stewart – Special Projects/TA Specialist, HUD Seattle Regional Office

Workshop Summary

- **Designed to discuss conservation approaches to reduce costs and improve the life of Nez Perce homeowners**
- **Explain benefits of conserving water and energy**
  - Reduce operating costs;
  - Improve resiliency and safety;
  - Improve air quality and healthier home environments;
  - Increased asset values for Nez Perce homeowners; and,
  - Greater recognition for sustainability and resiliency.
- **Short and long term approaches to conserving energy**
- **Energy savings as revenue to pay project costs, financing**

Agenda

- Introduction
- Overview – Why Conservation Matters?
  - Initiating a project
- Energy Technology – Not Just about Conservation Anymore
- Where Does the Money Come from to Finance Energy Conservation?

Introduction& Orientation

Session 1

Workshop Objectives

- **Better familiar with available technology**
- **Better understand conservation and project financing**
- **Self-help suggestions**
- **How to secure qualified contractors to support your project**

Overview – Why Conservation Matters!

Session 2

Initiating a Project

Why Conservation Matters

- Protect wildlife
- Advance land stewardship
- Safeguard water resources
- Provide environmental education
- Combat climate change

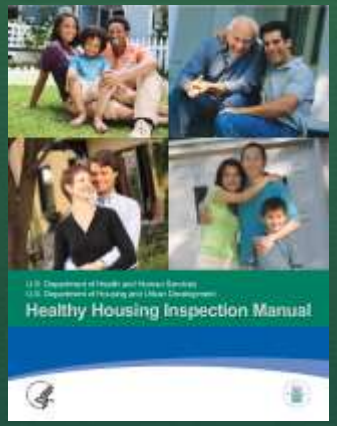
Homeowner Benefits

- *New Equipment* - **Replace obsolete energy/water systems**
  - Reduce costly system repairs and maintenance costs

- *Healthy Living* - **Healthier living environment for family**

Not Just About Conservation Anymore?

"A home has a unique place in our everyday lives. Homes are where we start and end our day, where our children live and play, where friends and family gather to celebrate, and where we seek refuge and safety."



- Identifying the specific elements of a healthy home. The following characteristics can provide a safe and healthy environment for residents:
  - DRY
  - CLEAN
  - PEST FREE
  - SAFE
  - CONTAMINANT FREE
  - WELL VENTILATED
  - WELL MAINTAINED
  - THERMALLY CONTROLLED

Where Do I Begin?

- **Conduct quick analyses of your utility bills:**
  - Have utility rates increased significantly in your area over last 3 years?
  - Has your consumption increased significantly?
- **Inventory heating/cooling systems, appliances, water measures that are older than 10 years**
  - Have less than 30% of their useful life remaining
- **Have your maintenance costs gone up significantly in last 3 years?**
- **Are family members complaining about comfort, environmental issues?**

What Are The Next Steps?

- **Consult local Community Action Partnership (Weatherization) for free energy assessment**
- **Talk to other homeowners about "Best Practice" in addressing utility costs – learn from your peers**
- **Use HUD resources to guide decision making**
  - Prioritize energy and water requirements - Refer to HUD's ECM Checklist
- **Evaluation activities all free to this point**

What Else Should I Consider?

- **Short Term Investment**
  - Focus on economic and efficiency fixes (self-help items)
- **Long Term Investment**
  - Have an energy audit performed, before you invest
  - Focus on fastest payback measures
  - HUD/EPA Checklist

Self-Help Items

- Energy conservation entails two separate but complementary strategies: frugality and efficiency
- Audit – Identify requirements establish priorities
- Seal up a leaky house
- Transition to higher efficiency equipment and renewables
- Energy-efficient lighting: $3 to $15 per bulb
- Power strip: $12 to $35
- Water heater blanket: $25

Self-Help Items

- Foam pipe insulation: $4 to $5 for 6-foot length
- Programmable thermostat: Starts at $25
- Door sweep: $3.50 to $20
- Clothesline: About $10
- Timers for lights: $7 to $13
- Water Measures
  - Showerheads $35
  - Faucets $65
  - Toilets $200
  - Water flapper $10

Homeowner Aggregation

- **Aggregate several homeowner projects for economies of scale**
- **When to Consider**
  - Self assessments of other homeowners reveal potential energy and water savings
  - Too small to obtain optimal financing terms

Energy Technology – Not Just About Conservation (Demand) Anymore

Session 4

Energy Technology Principles

- **A gallon of fuel saved is the best conservation**
- **Home energy audit is critical to a comprehensive assessment of efficiency needs**
  - Energy projects are 40 percent technology and 60 percent financing
  - Establishes cash flow; Can the project pay for itself?
  - What is the return on investment (ROI)?
- Building envelope is a critical component of the home audit
  - Proper insulation and air sealing measures reduce energy load of the home; greatly improve comfort

Energy Technology- Demand Driven

- **Energy Conservation Measures include:**
  - Energy and water-efficiency improvements
  - Mechanical, electrical, and plumbing upgrades (furnaces, HVAC systems, etc.)
  - Thermostatic controls, including programmable thermostats
  - Improvements to building envelope design and condition (air sealing, insulation, roof replacement, windows, storm doors, vent dampers, etc.)
  - Lighting and lighting controls
  - Fuel conversions
  - Rain-water collection; moisture-sensing irrigation systems and controls

Energy Technology – Supply Driven

- **On-site renewable energy and high-efficiency technologies**
  - Solar - domestic hot water, photovoltaic power generation
  - Wind turbines
  - Geothermal systems
  - Cogeneration, etc.

Weather Environment

- Winter...High 39.6 degrees ' Low 27.1 degrees
- Summer...High 89.0 degrees ' Low 59.2 degrees
- Length of Growing Season: 220 days
- Average Rainfall: 12.52 inches
- Annual Clear/Partly Cloudy Days: 168 days

Lewiston, Idaho Utility Information

- **Electricity**
  - Residential 1000 kWh= $91.30 (2008 1000 kWh = $70.42 or 30% increase)
  - Commercial 300kw demand 90,000kwh= $7,255.23
- **Natural Gas**
  - Residential 63 therm= $63.98
  - Commercial 400 therm= $347.27
- **Water**
  - $2.43 per 100 cubic feet
- **Sewer**
  - Residential monthly average= $30.00
  - Small Commercial monthly average=$30.00
  - Large Commercial $3.00 per 100 cubic feet
- **Sanitation**
  - Residential Small Container(32gal)= $12.04
  - Residential Medium Container(65gal)= $18.30

On-Site Renewable Energy - Solar

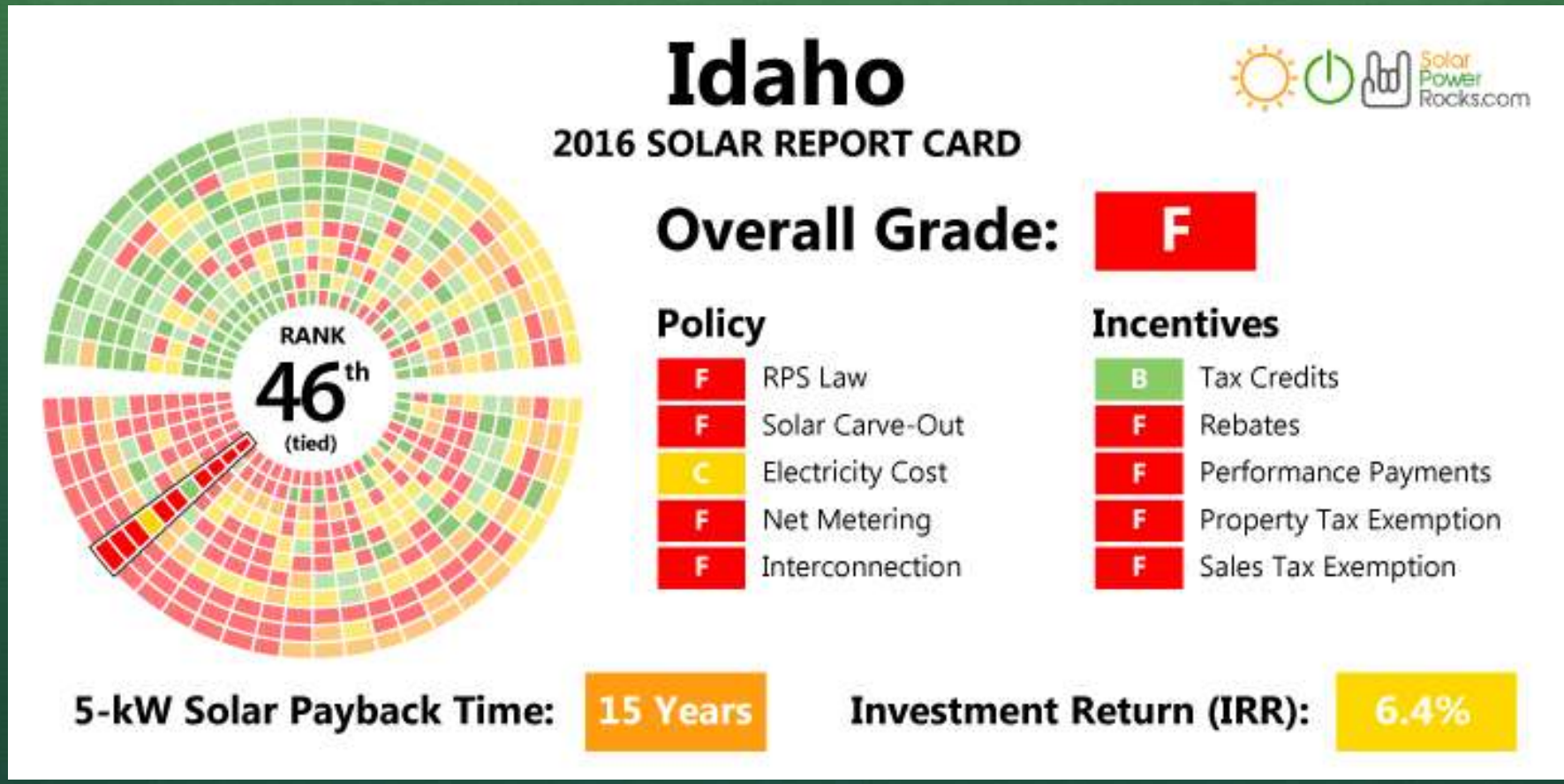
- **Method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect**
  - Most established renewable technology
  - Easier to install, especially on smaller scale, e.g. scattered site

- **Roof top solar system has no moving parts, so it has a long expected lifetime exceeding 25 years**
  - However inverters (which convert the panel DC current into AC) have an expected lifetime of 10 to 15 years

Renewable Energy Sources – Hot Water

- Solar hot water collectors need to receive direct sunshine
- Unshaded location between 9 a.m. and 3 p.m.
- Solar hot water not as sensitive as solar electric (PV) systems to partial shading
- Solar hot water system can save ~ 60 to 70% on your annual water heating bills ($100 and $400 per year)

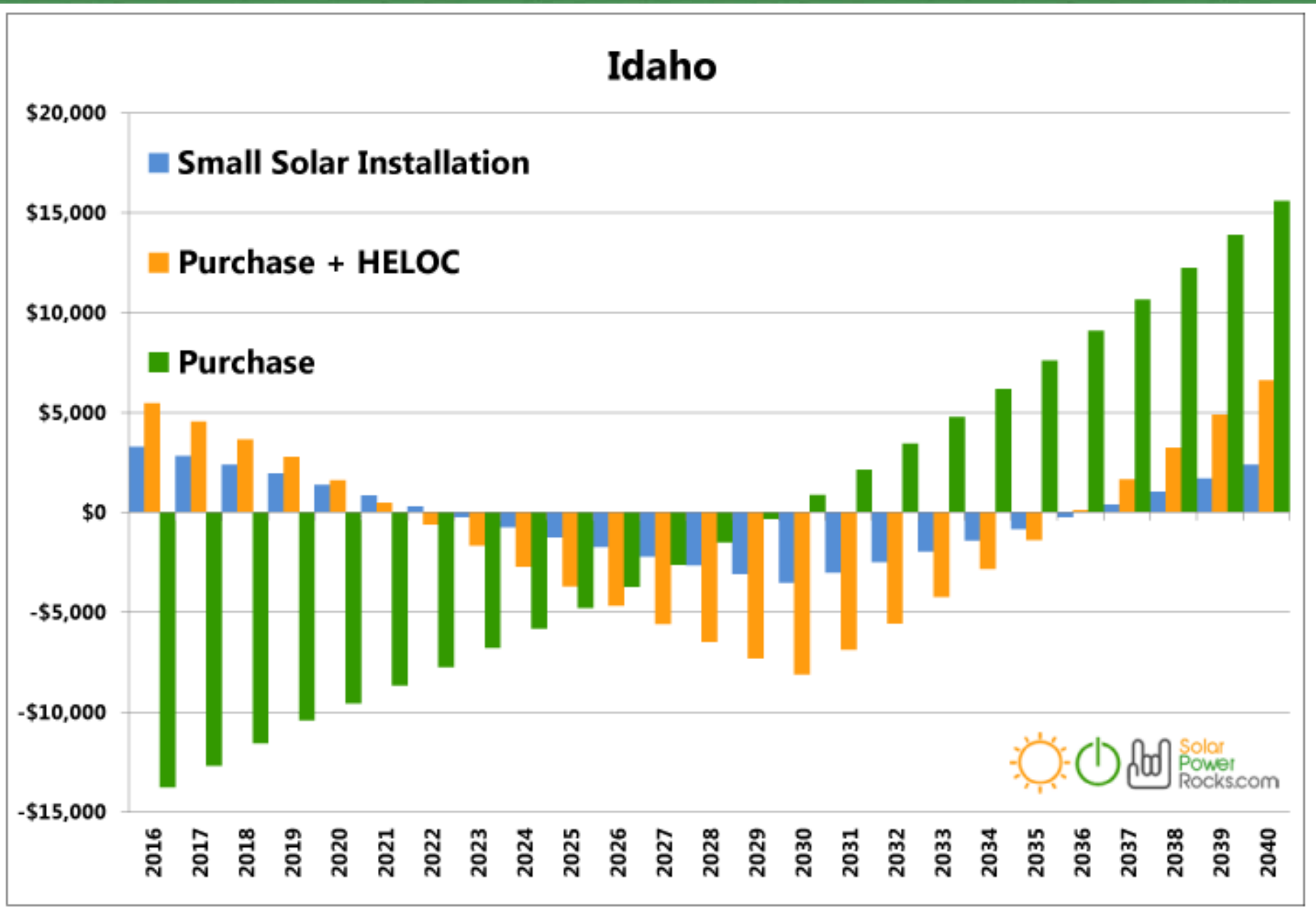
Idaho Solar


Idaho
2016 SOLAR REPORT CARD
Solar Power Rocks.com
Overall Grade: F
RANK 46th (tied)
Policy
F RPS Law
F Solar Carve-Out
C Electricity Cost
F Net Metering
F Interconnection
Incentives
B Tax Credits
F Rebates
F Performance Payments
F Property Tax Exemption
F Sales Tax Exemption
5-kW Solar Payback Time: 15 Years
Investment Return (IRR): 6.4%

Solar Example

- **Assumptions**
  - $2.50/W installed cost for solar
  - Average home usage 1,010 kWh/mo. (ID)
    - Use 1,500 kWh/mo.
  - If Solar is to offset 50% of power, I need 7200 Watt System
  - If Solar is to offset 30% of power, I need 4400 Watt System
    - Installation Cost $18,000/$11,000

- **Total Sys Cost/Value of Electricity Generated/Annual Electricity Usage = Pay Back Time**
  - $18,000/.09 (kWh)/18,000kWh/yr. = 11.11 Years
  - $11,000/.09 (kWh)/18,000kWh/yr. = 6.79 Years
    - Financing costs not included


Idaho
$20,000
$15,000
$10,000
$5,000
$0
-$5,000
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-$15,000
Small Solar Installation
Purchase + HELOC
Purchase
2016
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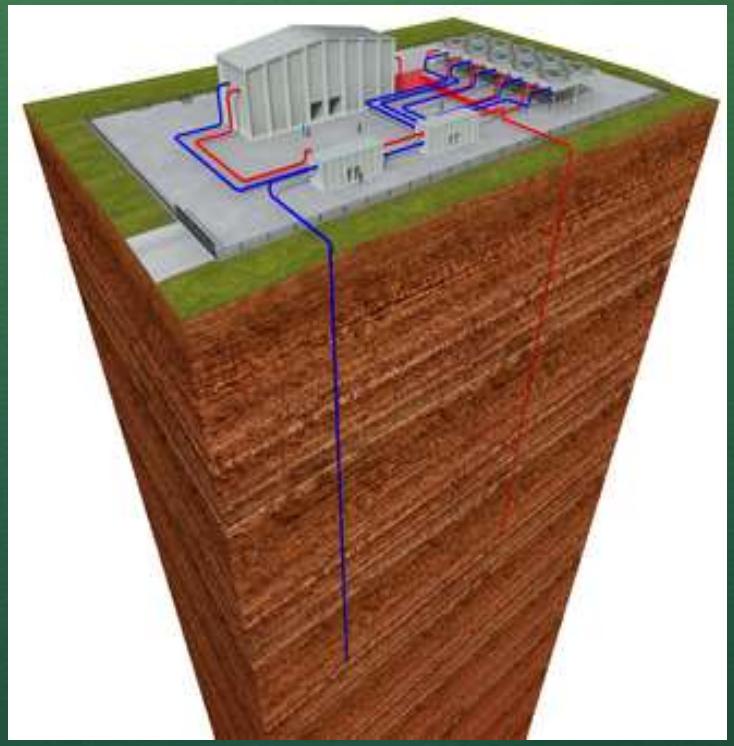
Solar Power Rocks.com

Geothermal Energy

- Estimated, in U.S., 30 gigawatts of undiscovered hydrothermal resource capacity and more than 100 gigawatts of Enhanced Geothermal Systems potential lie deep in the subsurface—10% of today's energy needs
  - Idaho has underused geothermal resources, estimated 800 megawatts MW of near-term geothermal-powered generation potential.
  - Boise has oldest geothermal district heating system in U.S.; Idaho State Capital Building is the only state capital building heated with geothermal energy.



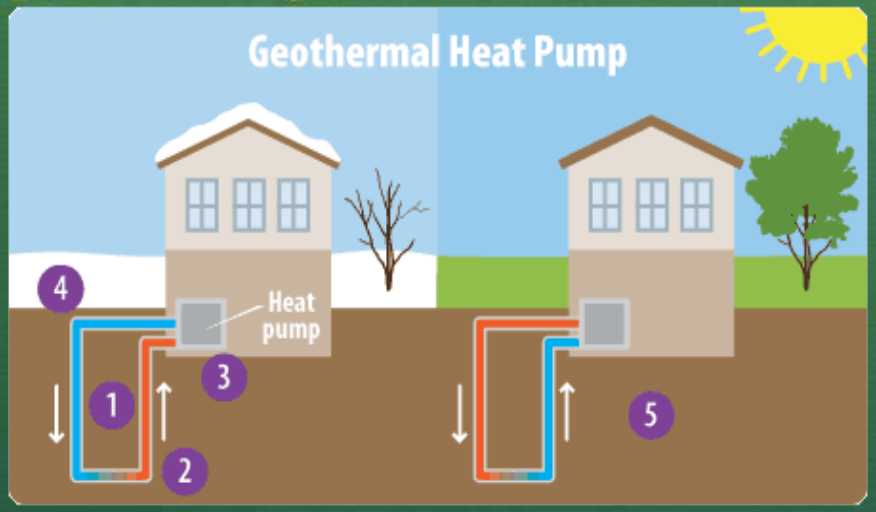
Geothermal Systems

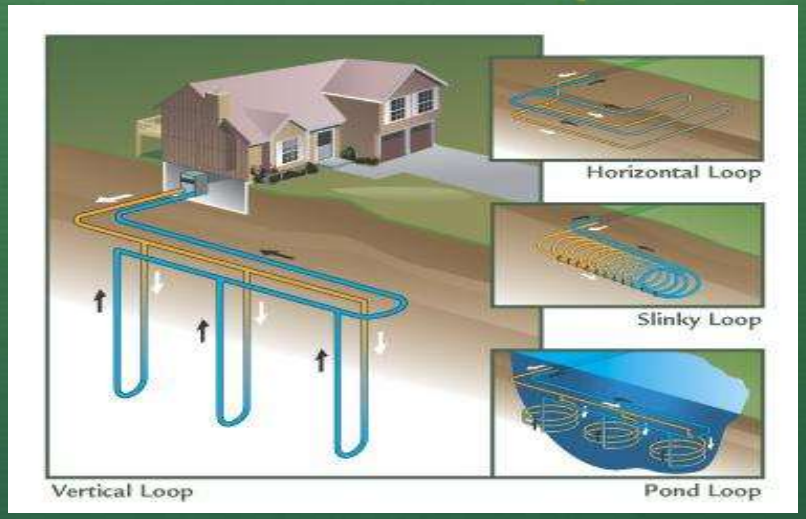
- **Geothermal energy is efficient, clean because it can be generated without burning fossil fuels.**
  - Release a fraction of the carbon dioxide produced by fossil fuel plants, and they create very little nitrous oxide or sulfur gases
  - Reykjavik, Iceland, which heats 95 percent of its buildings using geothermal energy, is considered one of the cleanest cities in the world
- **Higher upfront costs, incentives help; 2500 square feet home, heating/cooling load of 60,000 BTU costs $20,000 - $25,000 installed.**
  - Double the cost of a conventional heating, cooling, and hot water system,
  - Geothermal heating/cooling systems can reduce utility bills by **40% to 60**%.
  - Protection from rising energy costs - price of electricity, will continue an upward trend for foreseeable future
- **Payback for a system can range from 2-10 years; lifetime of a system can be 18-23 years, almost double a conventional system**
  - Renewable energy systems add value to home equity
  - 30% federal tax credit; and, many state and utility companies offer incentives

Geothermal Systems

- **GHPs improve humidity control by maintaining about 50% relative indoor humidity, making GHPs very effective in humid areas**
- **Geothermal heat pump systems installed in both new and retrofit situations**
  - Hardware requires less space than HVAC system
  - Equipment rooms can be greatly scaled down, freeing space for productive uses
  - GHP provide excellent "zone" space conditioning, allowing different parts of your home to be heated or cooled to different temperatures
  - Systems few moving parts and those parts are sheltered inside a building, so the systems are durable and highly reliable; underground piping often carries warranties of 25 to 50 years, and the heat pumps often last 20 years or more
  - Systems have no outdoor compressors, so GHPs are not susceptible to vandalism
    - Components in living space are easily accessible, increasing convenience factor and helps ensure that the upkeep is done on a timely basis
    - GHPs have no outside condensing units like air conditioners, so noise outside the home; users usually do not know it is operating.

Geothermal Energy





1. Water or a refrigerant moves through a loop of pipes
2. In cold weather, water or refrigerant heats up as it travels through loop that's buried underground
3. Once it gets back above ground, warmed water or refrigerant transfers heat into building.
4. The water or refrigerant cools down after its heat is transferred. It is pumped back underground where it heats up once more, starting the process again.
5. On a hot day, the system can run in reverse. Water or refrigerant cools the building and then is pumped underground where extra heat is transferred to the ground around pipes.

Air to Air Heat Pump Facts

- **Heat pumps are ideally suited for Northwest climate, delivering efficiencies 2-4 times that of electric resistance space heating**
  - Low price of electricity, heat pumps heat for less in the Northwest.
- **ENERGY STAR® ductless, mini-split-system heat pumps (mini splits) make good retrofit add-ons to houses with "non-ducted" heating systems**
  - Good choice for room additions where extending or installing distribution ductwork is not feasible
  - Very efficient new homes that require only a small space conditioning system
  - Standard air-source heat pumps, have two main components -- an outdoor compressor/condenser and an indoor air-handling unit.
    - Conduit houses power cable, refrigerant tubing, suction tubing, and a condensate drain, linking outdoor and indoor units

Air to Air Heat Pumps

- In heating mode, liquid refrigerant in the outside coils extracts heat from air and evaporates into a gas. Indoor coils release heat from the refrigerant as it condenses back into a liquid.
- In cooling mode, reversing valve, near the compressor, changes direction of refrigerant flow for cooling as well as for defrosting the outdoor coils in winter.

Air Versus Ground Pumps

Air to Air

- **Air-source heat pumps are not generally used in areas that experienced extended periods of subfreezing temperatures**
  - Problems with low airflow, leaky ducts, and incorrect refrigerant charge
  - Installed cost of single-zone ductless heat pumps ranges from $3,000 to $5,000
  - Rebates, incentives available

Ground Heat Pumps

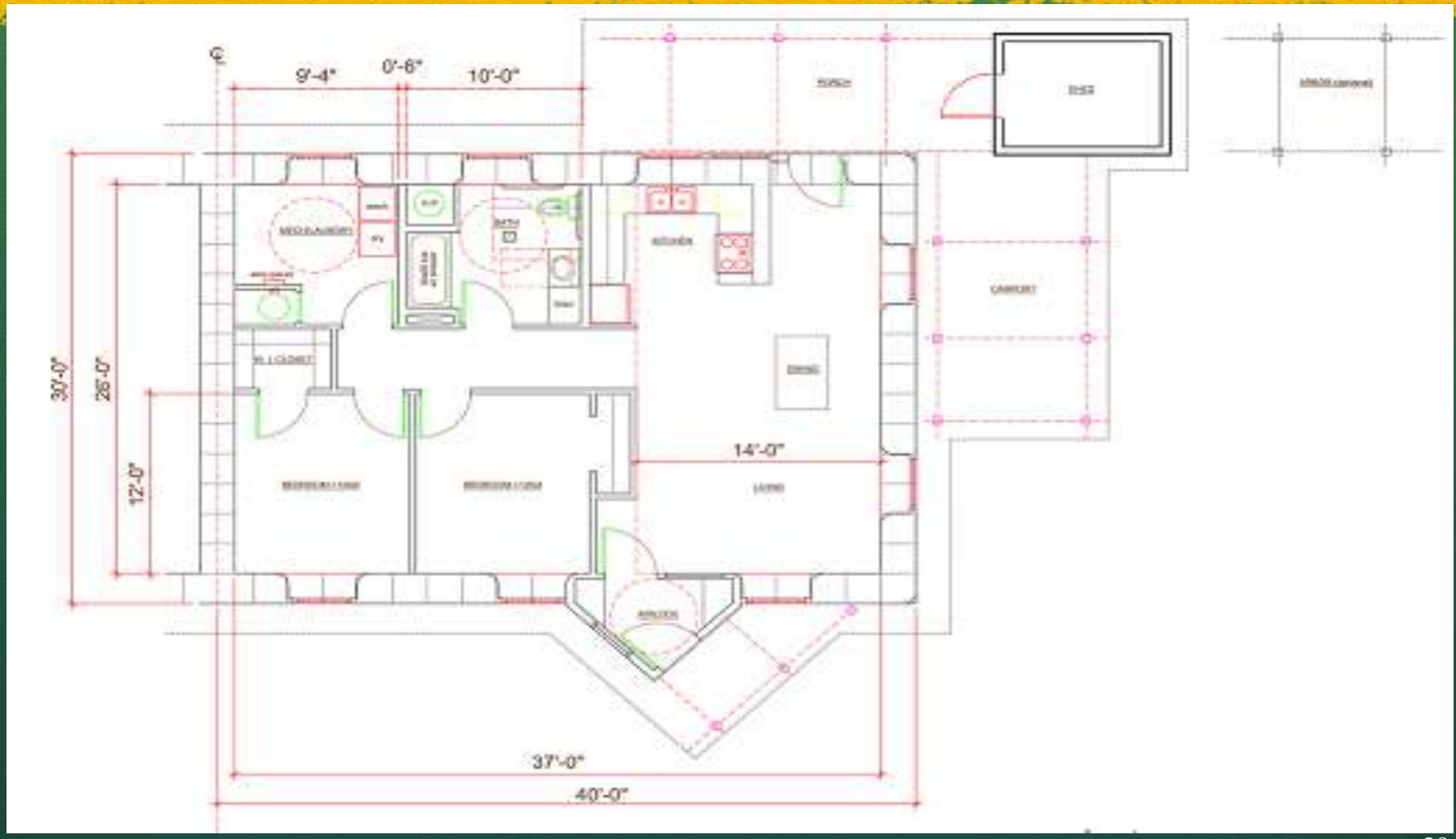
- GHPs use earth's constant temperature as exchange medium, fairly high efficiencies (300% to 600%) on the coldest winter nights, compared to 175% to 250% for air-source heat pumps on cool days
- GHP can be several times cost air-source system of same heating and cooling capacity, additional costs are returned to you in energy savings in 5 to 10 years
- GHP estimated at 25 years (inside components); 50+ years for ground loop
- 50,000 geothermal heat pumps installed in the United States each year
- Rebates, incentives available

Straw Bale Construction

- Construction technique as a low cost alternative for building highly insulating walls
  - Straw bale walls can be accomplished with unskilled labor, and low costs of bales economically attractive
  - Cost will differ depending on time of year they are harvested and how far they need to be transported
    - Cheaper at harvest time rather than after stored from the previous season and, of course, cheaper over shorter distances
    - Bales must also be protected from getting wet
- Costs rise based type of stucco and its application
  - Earthen plaster taken from site soil, applied by the owner/builder, and maintained by owner is quite inexpensive, but may take a long time to apply
  - Cement stucco applied by a contractor is accomplished quickly; lasts a very long time without any maintenance, but also costs money
  - More labor input by owner and less by contractor, the less costly it will be

Straw Bale Construction

Straw Bale Design Proposal



Straw Bale Construction

Construction Considerations

- Straw bale construction uses baled straw from wheat, oats, barley, rye, rice and others
  - Homes insulated with straw bale can have insulation values of R-30 to R-35 or more depending on thickness
- Building code acceptance will be key to obtaining conventional financing and insurance
- Due to thickness of straw bale walls, every window can have a window seat or shelf
  - Wall thickness helps to reflect sunlight throughout the room
- Straw bale insulation is most effective in climates where heating and/or cooling of the home is essential for comfort
- Straw bale walls can be carved with a knife or chainsaw; openings around windows or doors can be bull-nosed to a nice radius

Straw Bale Construction

Environmental Consideration:

- **Straw bales are 100% biodegradable**
  - Straw Bale homes can last over 100 years if properly maintained
  - At some point, all structures will eventually be replaced. When the replacement is required, straw bales can be plowed back into the earth
  - Fiberglass, on the other hand, becomes a disposal problem
- **Straw bales have a low-embodied energy**
  - Very little energy was used to manufacture the product as sunlight was main energy source for growing plant
  - Only energy needed to make a straw bale is bailing process and transportation to worksite
  - Other insulation materials, such as fiberglass, require a substantial amount of energy to produce

Straw Bale Construction

Disadvantages:

- **Contractor or do-it-yourselfer will need to learn new construction technique**
- **If straw bale building codes are not part of your local codes, it may be a bit more work to get your plans approved**
- **Straw bale walls need to be kept dry as moisture is detrimental to not only straw, but to many building materials**
  - Moisture entering the bales from the roof above is to be avoided at all cost
- **Areas of extreme humidity and rain my not be appropriate for straw bale construction**
- **Wall thickness (usually around 18-20 inches), more of your overall square footage will be unusable due to it being within the wall space**
- **If straw bales are not locally available (100 miles) to construction site, cost of shipping, transportation pollution must be taken into account**

Straw Bale Construction Cost

- **Does straw bale home construction cost more than conventional?**
  - 1500 SF bale house costs (approx) 10% more than conventional house
  - Bale house offers high energy savings and carbon sequestration; long term savings (life cycle savings) associated with energy savings
- **Cost drivers in straw bale construction**
  - Larger homes have higher construction and operational costs. Stay with comfortable and affordable.
  - Finishes - higher quality, less maintenance cost more
  - Labor – highest cost driver – stacking, shaping, prepping, plastering
  - Design – high quality drawings will save construction mistakes
  - Contractors – Hire right General Contractor and subs

Advancing, Affordable Technologies

- **Toilet technology continues to improve:**
  - 3.5 GPF; 1.28 GPF; 1 GPF gives way to .8 GPF over 12 year development period
  - Ultra high-efficiency toilet
  - Patented process uses energy created by water filling and falling in the tank during a flush cycle in addition to the actual flush volume to help evacuate waste

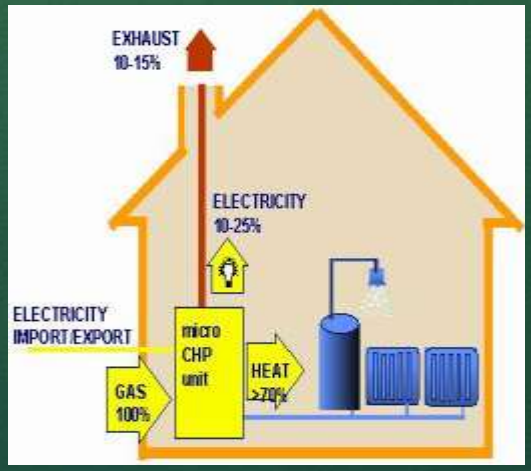
Niagara's 0.8 GPF StealthTM

Advancing, Affordable Technologies

- **Pueblo Housing Authority**
  - Uses tankless hot water heater with hydronic furnace
  - Elderly enjoyed quick hot water
  - Hydronic heating retains moisture over typical gas furnace
  - 70% drop in gas costs
  - Fits in tight closet spaces

Cogeneration

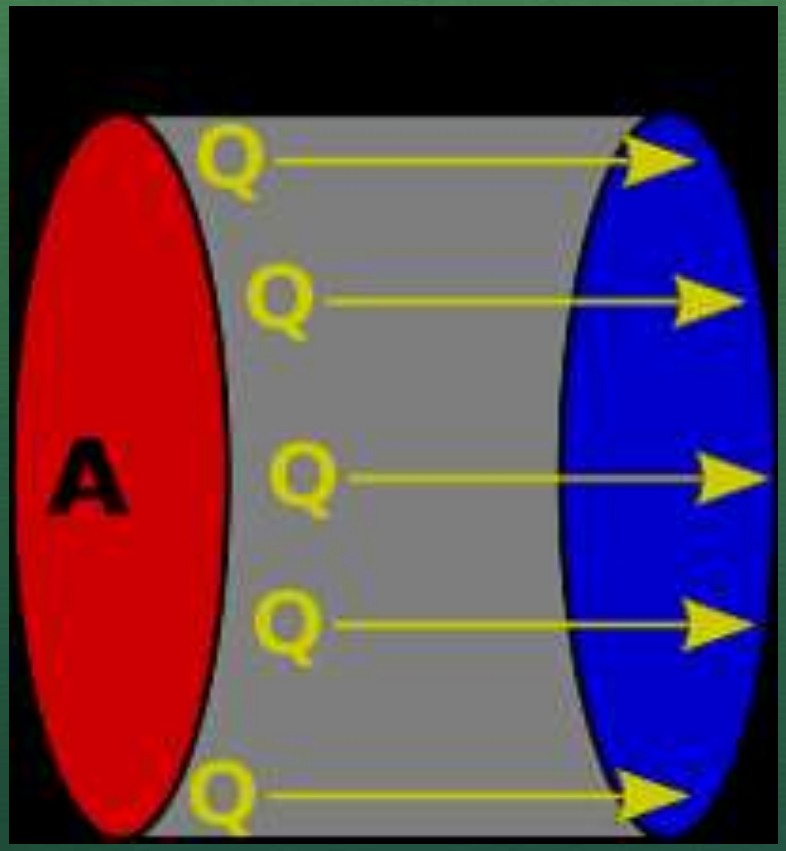
- **Production of electricity and heat from a single fuel source**
- **Highly efficient, captures heat lost during production of electricity**
  - Converts heat into useful thermal energy, usually in the form of steam or hot water
  - 60-80 percent efficient
  - Benefits - cost savings, reduced air pollution/greenhouse gas emissions, increased power reliability and quality, reduced grid congestion and avoided distribution losses



Phase Change Materials

- In U.S. up to 40% of all energy used is consumed by commercial and residential structures.
  - Nearly 40% of that energy is spent on heating or cooling the building
- Use of properly formulated and placed PCMs within the structure can reduce the heating and cooling load by between 40% to 60%
- Use of PCMs in U.S. buildings has potential of saving Quadrillions of BTUs of energy every year, reduce our dependency on foreign energy sources, and significantly reduce our carbon footprint. (Oak Ridge National labs, the U.S. DOE)

Phase Change Materials



- Heat energy only flows from a warmer to a cooler place
- Heat flow depends on two things
  - Temperature difference between the two places
  - Conductivity of the heat flow path.
  - Traditionally we limit heat flow by placing more resistance (“R” Value) between the two temperature differences.
  - PCM controls the temperature differential across the “R” Value.
  - Fiberglass, cellulose straw, works to slow the rate of heat energy flows from a warm to a cooler area.

Phase Change Materials

- Acts as a thermal energy sponge that intercepts and absorbs heat energy
- Releases heat as the heat source is removed, temperature drops (at night)
- Releases its heat only at one specific temperature, enabling a slow release of thermal energy over a longer period of time thereby modulating room temperatures and reducing thermal loads.
- Building stays at a prescribed temperature throughout the day, consuming less energy and keeping room temperatures more constant

Phase Change Materials

Prioritizing ECMs

- **Energy Improvements Checklist**
- Designed to meet needs of small housing authorities and homeowners
  - Developed in partnership with EPA; prioritizes ECMs with recommended specs
- **Tier 1 ECMS – "low hanging fruit"**
  - Lighting, Fixtures and Controls; Appliances Programmable Thermostat; Water Efficiency; Ductwork Improvements; Envelope Improvements; HVAC Maintenance; Ventilation Upgrades; Install Energy Management Controls (e.g., benchmarking)

Prioritizing ECMS – Tier 2

- **TIER 2 ECMs – valued ECM, slower payback**
  - Replace Cooling Equipment; Replace Heating Equipment; Replace Water Heating; Replace Windows, Doors and Skylights; Replace Motor/Pumps; Install Building Management System
  - http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/ph/phecc
    - Energy Improvements Checklist

Selecting the Right Contractor

- **Define your needs – what are your conservation/resiliency requirements based on an energy audit?**
  - What size project are you anticipating; what are your priorities?
- **Experience counts. What is size and types of projects has your contractor completed successfully?**
- **Are past Clients satisfied? Ask for – and check – references from past clients**
  - Will you clean up at end of each day?
  - Will you remove my old equipment and all debris from the premises?
- **Verify that contractor is licensed (where required) and adequately insured**
  - Are your contractors licensed to do this type of work?
  - Will all work meet or exceed existing codes and will you be pulling a permit?

Selecting the Right Contractor

- **Is there a design fit? Does this contractor have expertise in the equipment and residential marketplace?**
- **Warranty and service. Is any maintenance included?**
  - Are they authorized to provide the equipment manufacturers recommended maintenance?
  - Are service contracts available to cover repairs and service?
- **Do you have an office staff to handle potential customer care situations?**

Where Does the Money Come From to Finance Energy Efficiency

Session 6

Energy Efficiency Rebate and Incentive Programs

DSIRE® NC CLEAN ENERGY TECHNOLOGY CENTER

- http://programs.dsireusa.org/system/program?zipcode=83501
- At federal and state level, technical assistance grants, loans and tax credits are available
- Don't overlook opportunities to use Utility Company incentives
  - Avista – Furnaces, thermostats, duct sealing, insulation, water heaters, etc.
  - Clearwater Power – heat pumps, fuel switching, duct sealing, etc.
- Research local community groups, national non-profits
- ESP should bring expertise on incentive programs and assist NPTHA and homeowners to apply

Consider the Economics

- **Life Cycle Costing (LCC) - economic analysis tool used to identify least cost alternatives**
  - Life cycle costs are the total costs estimated to be incurred in the design, development, production, operation, maintenance, support, and final disposition of a major system over its anticipated useful life span
  - LCC provides best results when both art and science are merged with good judgment
- **LCC is not an exact science, everyone gets different answers and the answers are neither wrong nor right—only reasonable or unreasonable**
- **LCC outputs are only estimates and can never be more accurate that the inputs and the intervals used for the estimates—this is particularly true for cost-risk analysis**

Basic Formula for Calculating Life-Cycle Cost

- LCC = I + Replacement – Residual Value + E + W + OM&R + O
  - Lowest present value (PV) dollars of a given alternative
    - I: Initial cost
    - Replacement Cost: PV capital replacement cost
    - Residual Value : PV residual value (resale value, salvage value) less disposal costs
    - L: Desired useful life in years of the building or system
    - E: Total energy cost (PV)
    - W: Total water costs (PV)
    - OM&R: Total operating, maintenance, and repair costs (PV)
    - O: Total other costs, if any—contract administration costs, financing costs, employee salaries and benefits, and so forth (PV)

HVAC vs. GHP LCC Comparison

Assumptions:	
Current Elect (all) annually ($250/mo.)	$3,000
L: Desired useful life in years of the building or system	HVAC - 15 yrs/GHP 25 yrs
Energy Savings	HVAC 30%/GHP 60%
Utility Rate of Inflation (annually)	2.00%
Discount rate	10%
HVAC Saving 30%	$30
GHP Savings 60%	$60

	HE HVAC	GHP
Initial Cost	$12,000	$25,000
Replacement Cost: PV	$16,150	$719
Residual Value : PV	$0	$0
E: Total energy cost (PV)	$21,963	$12,551
W: Total water costs (PV)	$0	$0
OM&R: Total operating, maintenance, and repair costs (PV)	$1,519	$759
O: Total other costs, if any—contract administration costs, financing costs, employee salaries and benefits, and so forth (PV)	$677	$1,439
Total	$56,028	$44,160

Savings to Investment Ratio

- Savings-to-investment (SIR) ratio determines whether the potential savings of a project justifies the initial investment
- SIR = $\frac{\text{Useful Life X Savings/Year}}{\text{Total Cost}}$

	HE HVAC	GHP
Initial Cost	$12,000	$25,000
Replacement Cost: $15,600	$15,600	$2,000
Total annual energy savings	$1,141	$2,282
SIR = $\frac{\text{Useful Life X Savings/Year}}{\text{Total Cost}}$	0.99	2.03

Simple Payback Period

- **Payback period is the time in which initial cash outflow of an investment is expected to be recovered from cash inflows generated by the investment**
  - One of the simplest investment appraisal techniques
  - Simple Payback Period = $\frac{\text{Initial Investment}}{\text{Cash Inflow/Period}}$

(HVAC) Simple Payback Period = $\frac{\$27{,}600}{\$900}$ = 30.67 Years

(GHP) Simple Payback Period = $\frac{\$25{,}000}{\$1800}$ = 13.84 Years

Internal Rate of Return

- **IRR is used to evaluate attractiveness of a project**
  - If the IRR of a new project exceeds a company's required rate of return, that project is desirable. If IRR falls below the required rate of return, the project should be rejected

System	IRR
HE-HVAC	-0.06%
GHP	7%

Economic Scorecard

System	LCC	SIR	SPP	IRR
High Efficiency HVAC	$56,028	0.99	30.67	-0.06%
Geothermal Heat Pump	$44,160	2.03	13.89	7%

Overview – Energy and Water Funding Sources

- **Indian Housing Block Grant (IHBG) Eligible Activities**
  - Development. The acquisition, new construction, reconstruction, or moderate or substantial rehabilitation of affordable housing, which may include real property development and rehabilitation of utilities, necessary infrastructure and utility services, improvement to achieve greater energy efficiency, etc.
- **Section 184 loans can be used, for new construction, rehabilitation, purchase of an existing home, or refinance**
- **Indian Community Development Block Grant (ICDBG)**
  - Awarded under an annual competition, provide single purpose grants for housing rehabilitation, infrastructure construction, etc.
- **Title VI Loan Guarantee Program**
  - Assists Indian Housing Block Grant recipients (borrower) who want to finance eligible affordable housing activities, but are unable to secure financing without the assistance of a federal guarantee

Barriers to Financing Energy

- **Some banks unwilling to commit capital w/o collateral**
  - Energy data credibility quantity/quality is suspect
  - Collateral such as revenue, income, real property
- **Proration – potential for default**
- **EE is not generally valued in real estate appraisal**
- **Lack of education on the part of lenders**
- **Investors perceive a lack of investment opportunities at scale with attractive returns, strong risk management**

Key Take Aways

- **Conservation reduces operating costs, increases comfort and quality of life**
- **Good project planning is essential to success**
  - **Home energy audit is critical**
- **A successful energy project reflects favorable on Tribal Management's leadership to control costs, improve property value**

Next Steps

- **No decision is a decision; no urgency or desire to undertake a project at this time**
  - Energy project requires commitment to achieve success
- **If the decision is to begin pre-planning stage, start by:**
  - Beginning to analyze your current and projected utility rates;
  - Developing an inventory of the energy and water; systems, improvement opportunities;
  - Identifying potential sources of funding; and,
  - Conducting a home energy audit.
- **Fix the items that are easily repairable**


Thank You
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