



INTEGRATING ENERGY SAVINGS INTO ECONOMIC DEVELOPMENT AND INFRASTRUCTURE PLANNING

DOE OFFICE OF INDIAN ENERGY WEBINAR
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Agenda

1. New Development Ideals
2. Infrastructure Considerations for New Developments– Powerlines, Gas lines, Meters & More
3. Choosing Contractors
4. Building Considerations- Beyond Building Codes
 - Housing
 - Commercial
 - Resorts





IDEAL ADVANCE ENERGY PLANNING



Important in
Advance:

Energy Goals

Energy
Planning

Energy
Systems

Stats on Energy In Buildings

- According to US EIA, In 2017, about 39% (or about 38 quadrillion British thermal units) of total U.S. energy consumption was consumed by the residential and commercial sectors.
- According to the Environmental and Energy Study Institute, *Energy* is the number one driver of *housing costs*.
- According to the Rocky Mountain Institute, Utility costs place a significant financial burden on the 35 million very low- to moderate-income single-family households in the United States. On average, low-income households spend three times as much to heat and cool their homes as the average household—from 20 percent to 50 percent of their monthly earnings in some parts of the country.
- According to US EIA, high performance designed buildings typically use 50-70% less energy
- Zero Energy Buildings are possible! See <https://www.energy.gov/eere/buildings/zero-energy-buildings>
- Office buildings in the U.S. spend an annual average of **\$1.34** per square foot on electricity and **18 cents** per square foot on natural gas.
- According to NationalGrid: Energy represents about 19 percent of total expenditures for the typical office building. This clearly makes energy a significant operational cost deserving management attention.

New Development Ideals – Set and Communicate Goals!



Consider the tribe's future dreams and visions when establishing long term goals.

Express your sovereignty by putting your **environmental** and **cost of use** long-term goals into both your communities and individual buildings.

- Many great (free!) resources are available for advanced energy planning.
- Use local or tribally produced materials.
- Walk the Talk!
- Consider the “health” of the local utility system – May you someday want to remove yourself from that system?
 - Microgrids
 - Local generation
 - Using your own energy resources
 - Create your own local “grid”
- Building long-term energy and water efficiency into community and building design is MUCH cheaper than retrofitting.
- Advanced planning can take advantage of efficient and cost saving design options that are lost after the community or building is completed.
- Low cost commercial energy and water systems can make your businesses more profitable and your homes more affordable and comfortable.

Adopt national or state standards through tribal law – Example:

LEED (Leadership in Energy and Environmental Design) Certifications

- Commercial
 - Neighborhood Development
 - Homes
 - Volume Supplement
 - Cities and Communities
-
- Have an informed application of the chosen standards after Cost/Benefit Analysis!



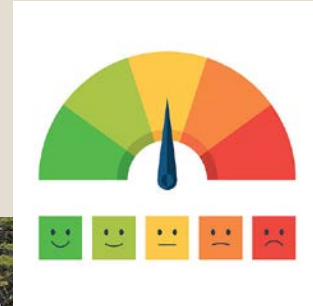
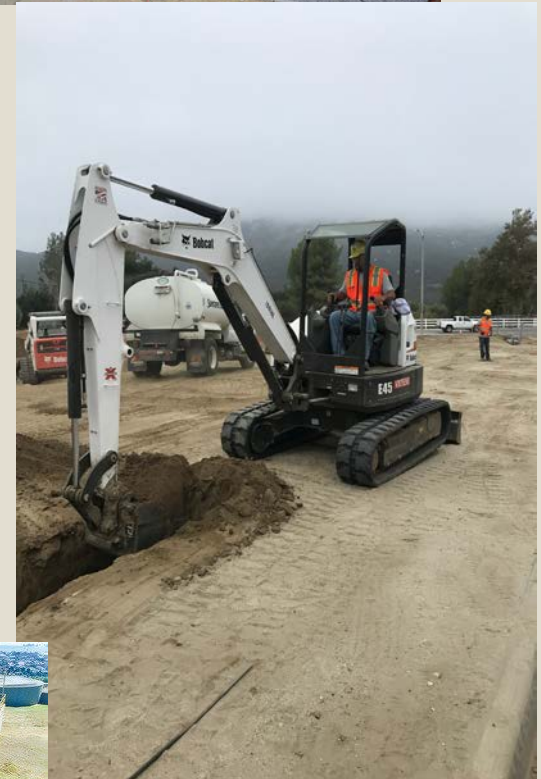
- Establish a holistic approach with defined high standards.
- **Building Codes** – pros and cons
- Established Tribal goals such as **Renewable Energy Portfolio Standards, Carbon reduction goals, Water conservation goals,** and/or **Energy Efficiency goals** AND communicate them!
- Establish **Tribal Codes** that require both the tribe and non-tribal builders or utility companies to meet established standards or consider various energy options.
- Consider **community location and layout** with renewable energy and infrastructure systems in mind.
- **Project finance** can include renewable energy systems, efficiency elements, infrastructure designed to meet goals.
- **RFPs for contractors** (designers, architects, engineers, construction trade) that stress environmentally friendly systems and include experience in these important areas.

Examples of Advance Energy (and water) Planning Practices



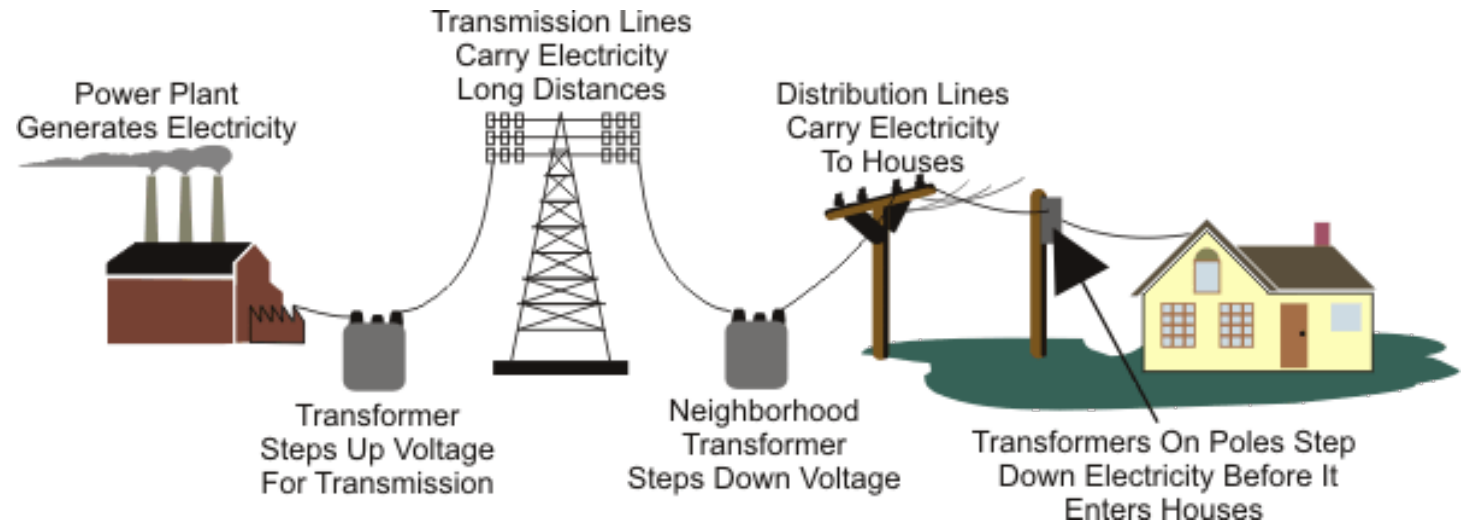
INFRASTRUCTURE CONSIDERATIONS FOR NEW DEVELOPMENTS

Infrastructure planning and development are long-term efforts to incorporate all your current and potential energy resources.



Where on the reservation should you locate your new development?

- Where are the wholesale service substations?
- Where are the wholesale service gas lines?
- What is the capacity at each wholesale service system?
- Do you need a local power source?
- Where are the Solar or Wind resources?
- Where is it best for Geothermal Heat Pumps?
- Water/Sewer



- Metering of Utilities: Where you put your meters, and how many there are will impact how you are charged by the utility. Make this part of the negotiation!
- Know your local utility tariffs.
 - Retail Tariffs
 - Wholesale Tariffs
 - *Do those tariffs apply to you?*

Power Lines/Gas Lines/Meters



Infrastructure Considerations for New Developments - Examples

- Tribal Control of Electric Systems – For Future Options
 - Tribal Utility formation #1 – Resort
Designed with a dedicated substation serving the resort, one master meter and a loop off of which customers can be added.
 - Tribal Utility Formation #2 – No substation, lines which cross through the reservation to serve third parties, no cohesive plan.
- Gas and Utility Meter Placement-
Facility had 4 meters which allowed utility to charge a higher rate for smaller usage and disqualified facility for wholesale tariff.

Financing Projects

Traditional energy systems have always been included in financing of development.

- Heating and cooling
- Distribution lines
- Gas lines
- Insulation

Why not new types of energy systems?

- Improved insulation
- Solar panels and solar structural enhancements
- Batteries
- Microgrids/controls
- Ground source heat pumps
- Smart meters



CHOOSING CONTRACTORS



- Design, Engineering, Architect, Contractor – TEAM APPROACH
- Who you hire is an important choice in meeting energy goals
- Do they have “green” experience? Are they committed to recycling? Do they have experience with green codes?
- Put provisions for efficient building plans in the construction contract.
- How will you enforce this?

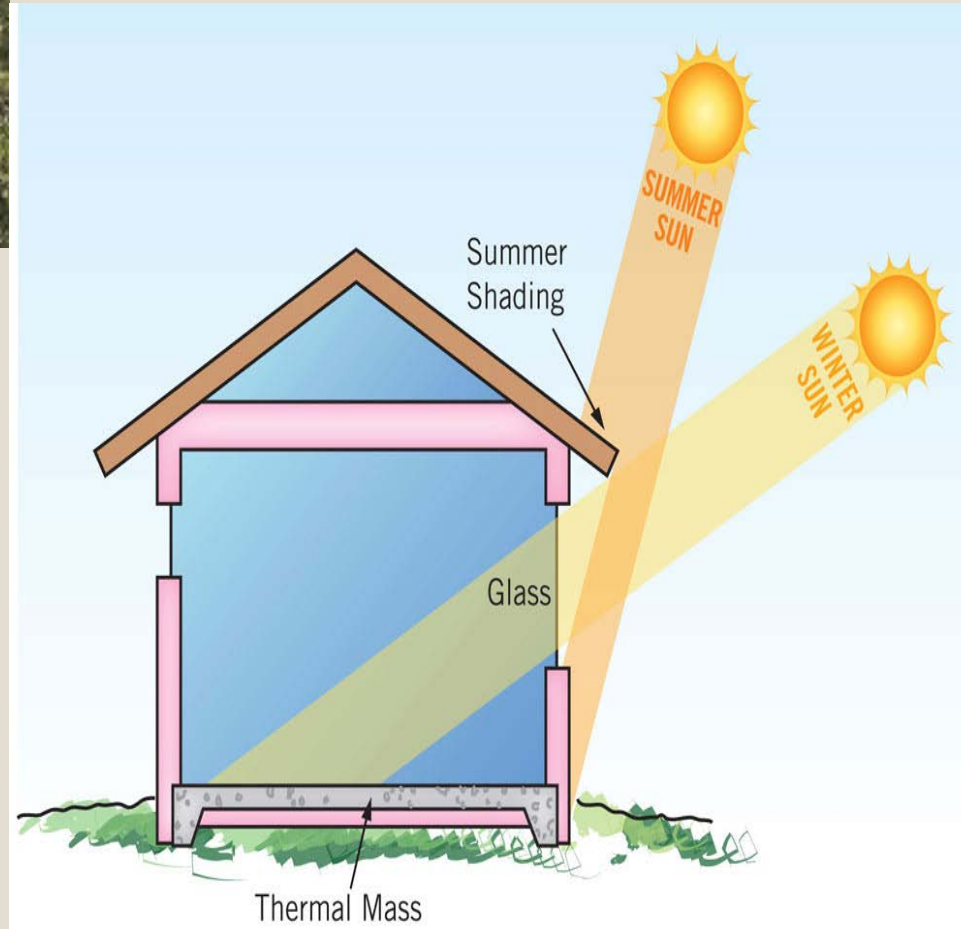


**BUILDING CONSIDERATIONS:
BEYOND BUILDING CODES AND LEED**



Culturally
Appropriate
Building
Stock

Use Local
Materials
and
Traditional
Knowledge



Design for Efficiency & Renewables

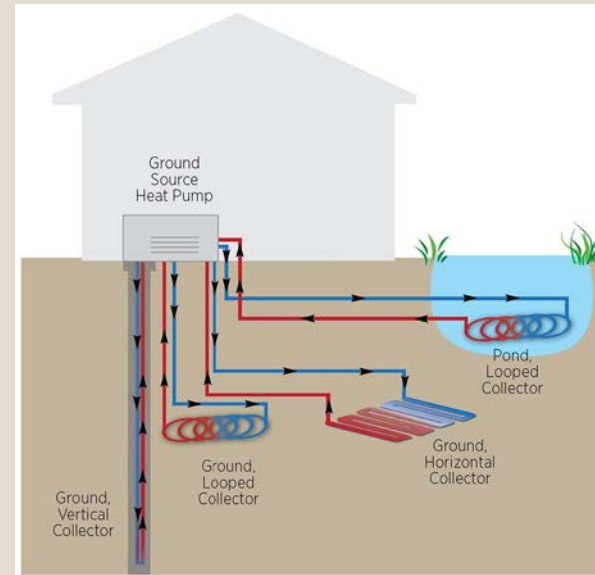
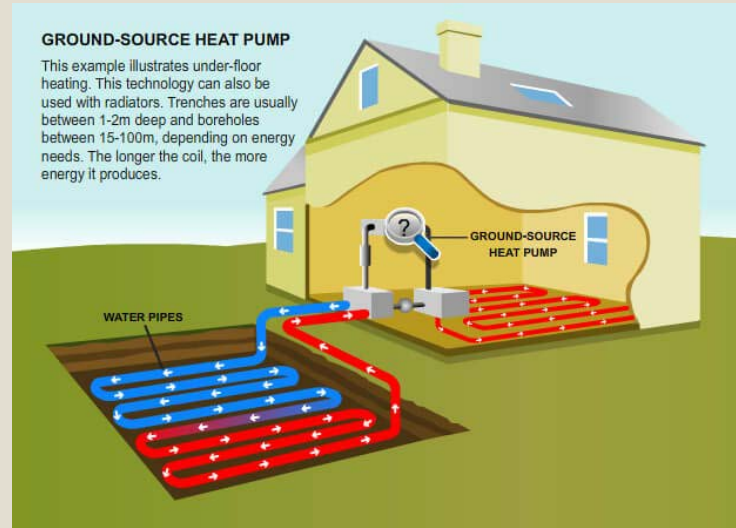
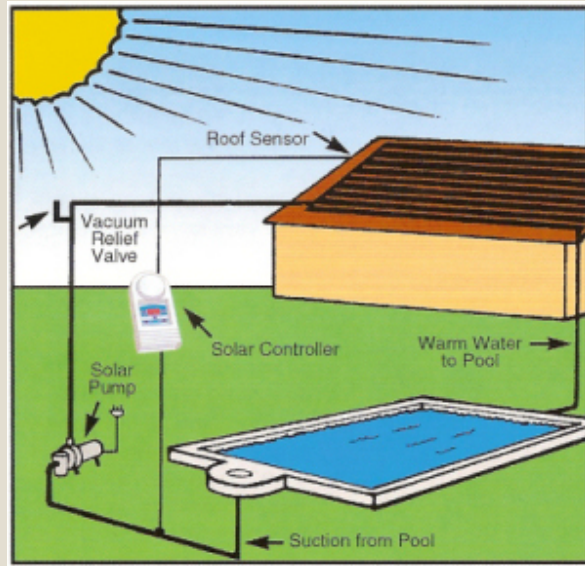
Passive Solar

Tree planting for shade

Geothermal Floor and Building Heat

Rooftop Solar

High Efficiency Wood Heating



Geothermal Heating



Large Scale!

Solar Paneled
Garage

Include in
Design!



Small Scale!

High Efficiency
Wood Heat
(and wood
delivery program)

Energy Efficient Housing Planning Resources

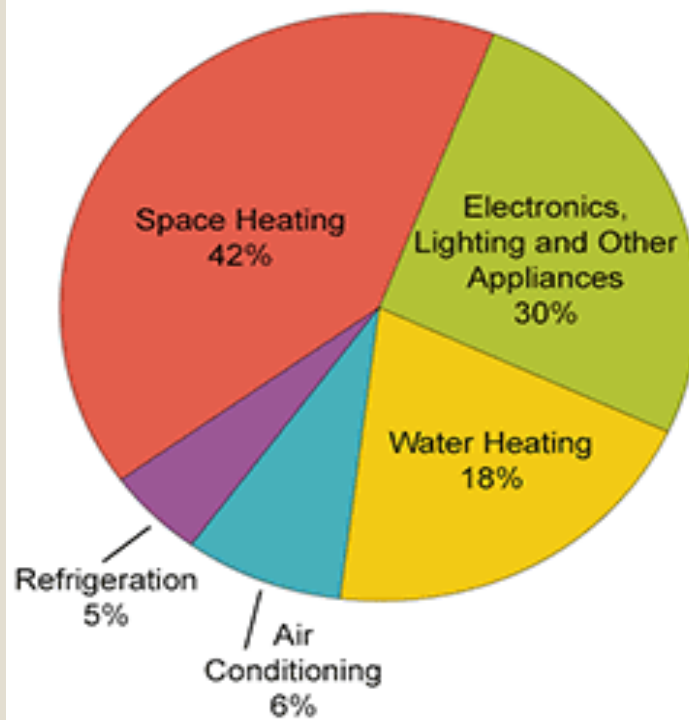
- HUD Energy Performance Contracting:
https://www.hud.gov/program_offices/public_indian_housing/programs/ph/phecc/ep_performance
- HUD's Multifamily Energy and Water Efficiency Library
<https://www.hudexchange.info/news/check-out-huds-new-multifamily-energy-and-water-efficiency-resource-library/>
- DOE – Energy Efficient Home Design:
<https://www.energy.gov/energysaver/design/energy-efficient-home-design>
- See DOE Article and Webinar: <https://www.energy.gov/indianenergy/articles/tribal-housing-authorities-advancing-energy-projects-through-informed>

Energy considerations for new housing developments



© Design Coalition, Inc., Architects ••• Madison, Wisconsin 2007

How Energy Is Used in Homes (2009)*



* 2009 is the most recent year for which data are available.

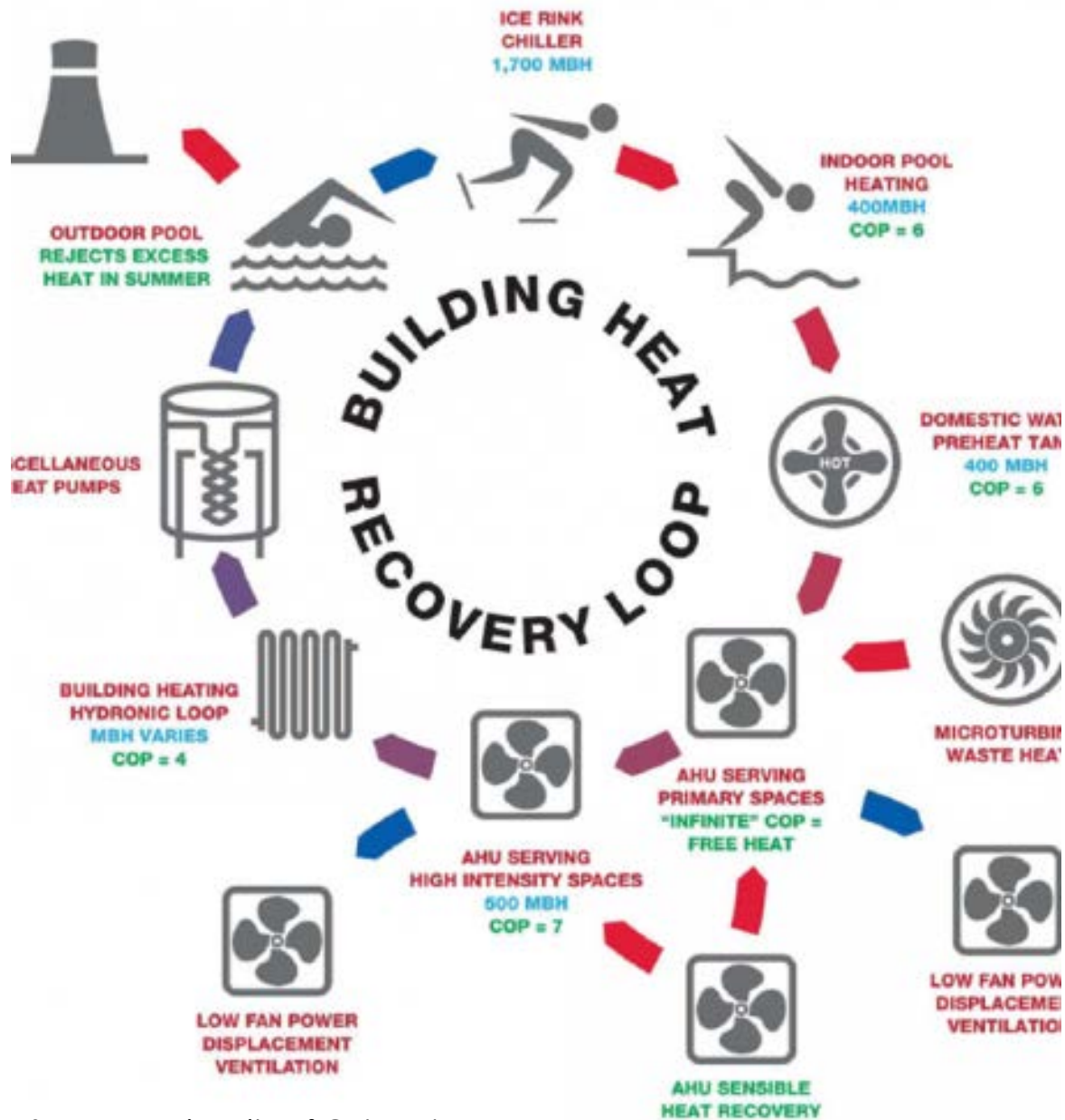
Source: U.S. Energy Information Administration, *Residential Energy Consumption Survey (RECS) 2009*.



- Energy Trust of Oregon – New Construction and Major Renovations Program: <https://www.energytrust.org/programs/new-construction-major-renovations/>
- US EPA Green Building for Tribes Program: <https://www.epa.gov/green-building-tools-tribes/forms/contact-us-about-green-building-tools-tribes>
- Sparks Northwest’s Energy Planning a Guide for Northwest Tribes: https://sparknorthwest.org/wp-content/uploads/2013/05/NWSEED_Tribal-GB_Final.pdf
- Office of Indian Energy: <https://www.energy.gov/sites/prod/files/2015/08/f25/5-Step%20Project%20Development%20Overview.pdf>
- Your utilities! They have programs, requirements, standards, and advice.
- Development professionals! Engage them early!

Commercial
Developments:

Energy
Efficiency
and
Planning
Resources



Source: University of Colorado

Energy Ideas for Large Projects (Casinos, Hotels, Resorts, etc)

- Building heat recovery loops
- Sandia National Labs Report: IDENTIFYING SUSTAINABLE DESIGN OPPORTUNITIES IN TRIBAL HOTELS AND CASINOS: MESCALERO INN OF THE MOUNTAIN GODS HOTEL AND CASINO
- Google "Green Casino" !!



QUESTIONS?

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