Grant Funding Received:

First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands

Karuk Tribe of California

Partnership:

U.S. Department of Energy

Karuk Tribe of California, Department of Natural Resources

Winzler and Kelly Consulting Engineers

WINZLER & KELLY
CONSULTING ENGINEERS

Project Title:

Energy Analysis and Conservation on Karuk Trust Lands

Project Team:

Karuk Department of Natural Resources

- Sandi Tripp
- Ramona Driver
- Bill Tripp
- Tribal Intern (TBA)

Winzler and Kelly Engineers

- Bob Ulibarri – Senior Planner
- David Carter – Energy Engineer
- Rob Holmlund – Environmental Land Use Planner
- Stephen Kullman – Energy Planner

Project Objectives:

1. **Estimate Tribal Energy Demands**

2. **Evaluate Opportunities for Reducing Energy Demands through Energy Conservation and Efficiency Measures**

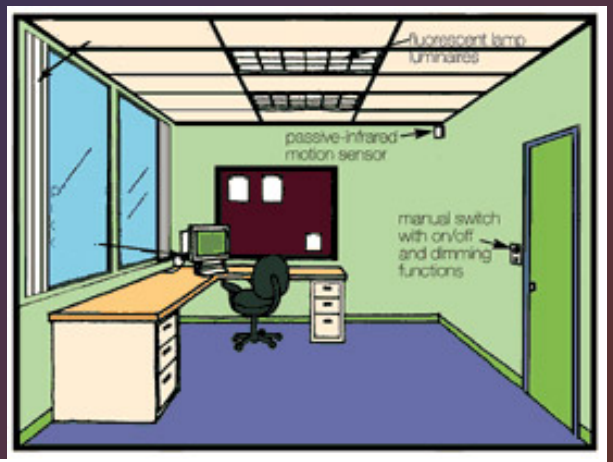
3. **Assess the Potential to Meet Tribal Energy Demands with Renewable Energy Resources**

4. **Assess the Potential for the Tribe to Become a Renewable Energy Exporter**

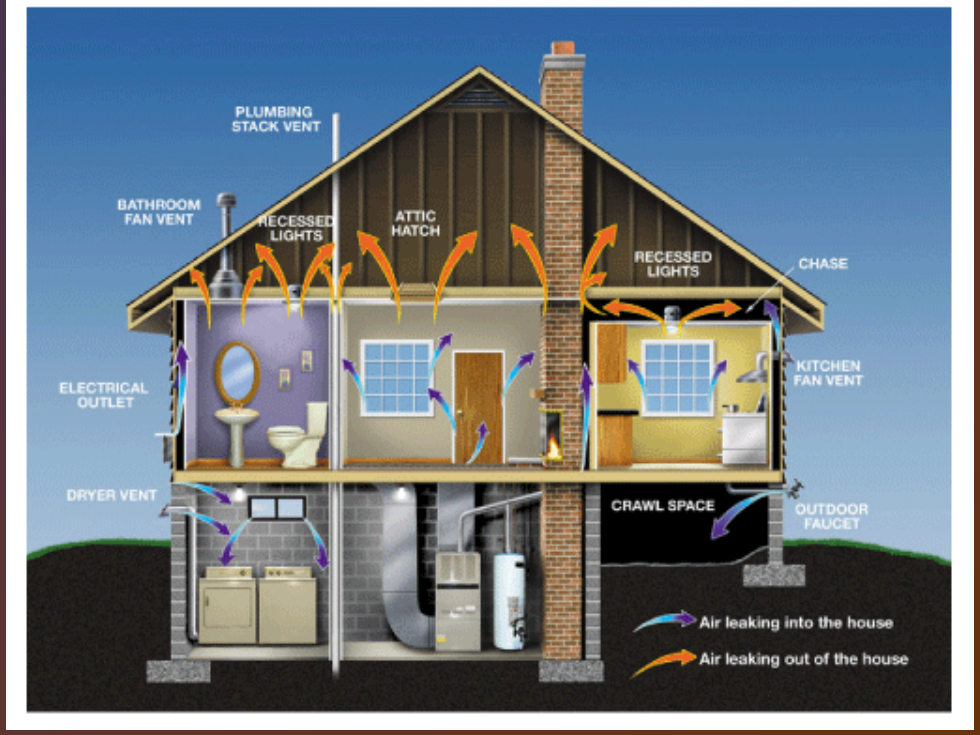
5. **Build Human Capacity within Karuk Tribe and Tribal Communities**

Target Sustainable Energy Use:

1. **Energy Conservation**



2. Energy Efficiency



Target Sustainable Energy Use:

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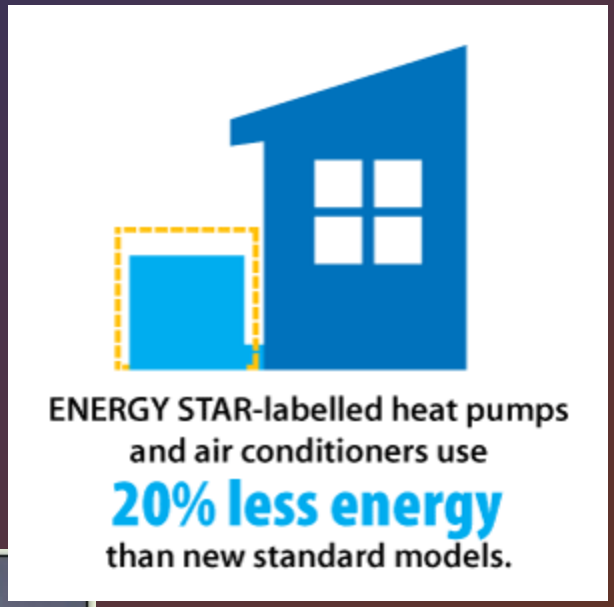
1. Energy Efficiency



Assessing Renewable Energy

1. Solar
2. Micro-hydro
3. Woody Biomass
4. Wind

Renewable Energy :

1. **Solar**

2. Micro-hydro
3. Woody Biomass
4. Wind

Renewable Energy :

1. Solar
2. **Micro-hydro**
3. Woody Biomass
4. Wind

Renewable Energy :

1. Solar
2. Micro-hydro
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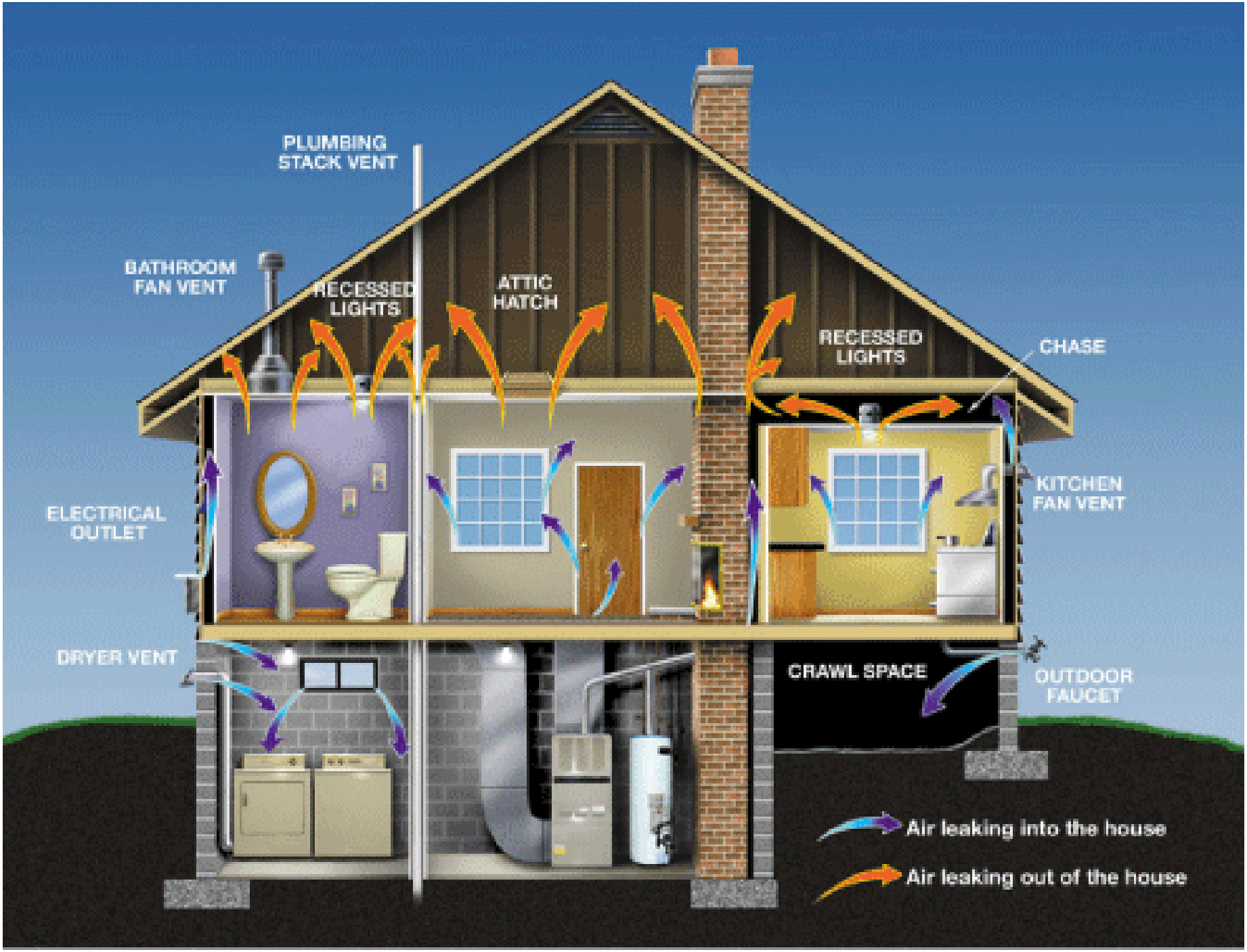
Renewable Energy :

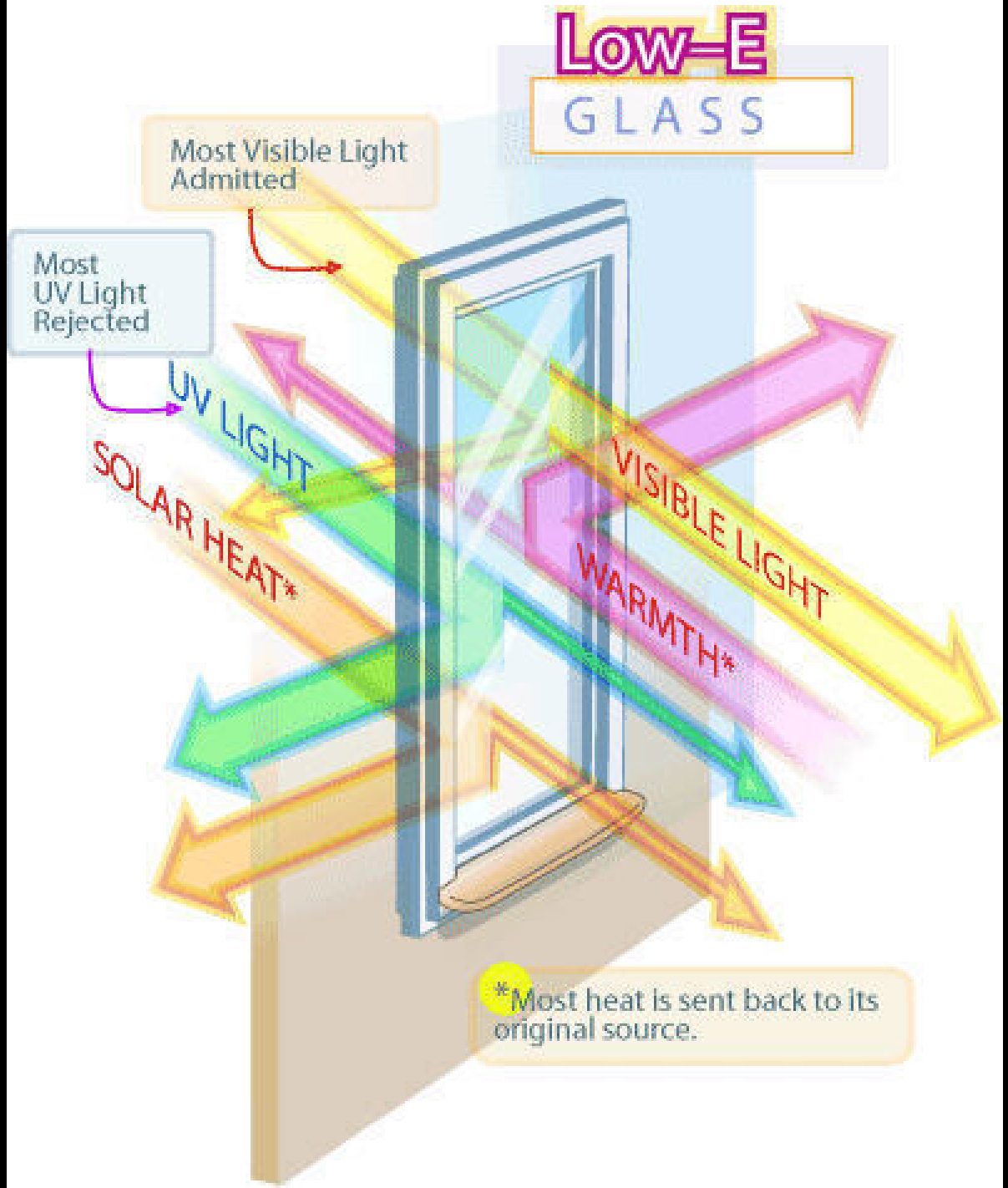
1. Solar
2. Micro-hydro
3. Woody Biomass
4. **Wind**

Understanding Sustainable Energy

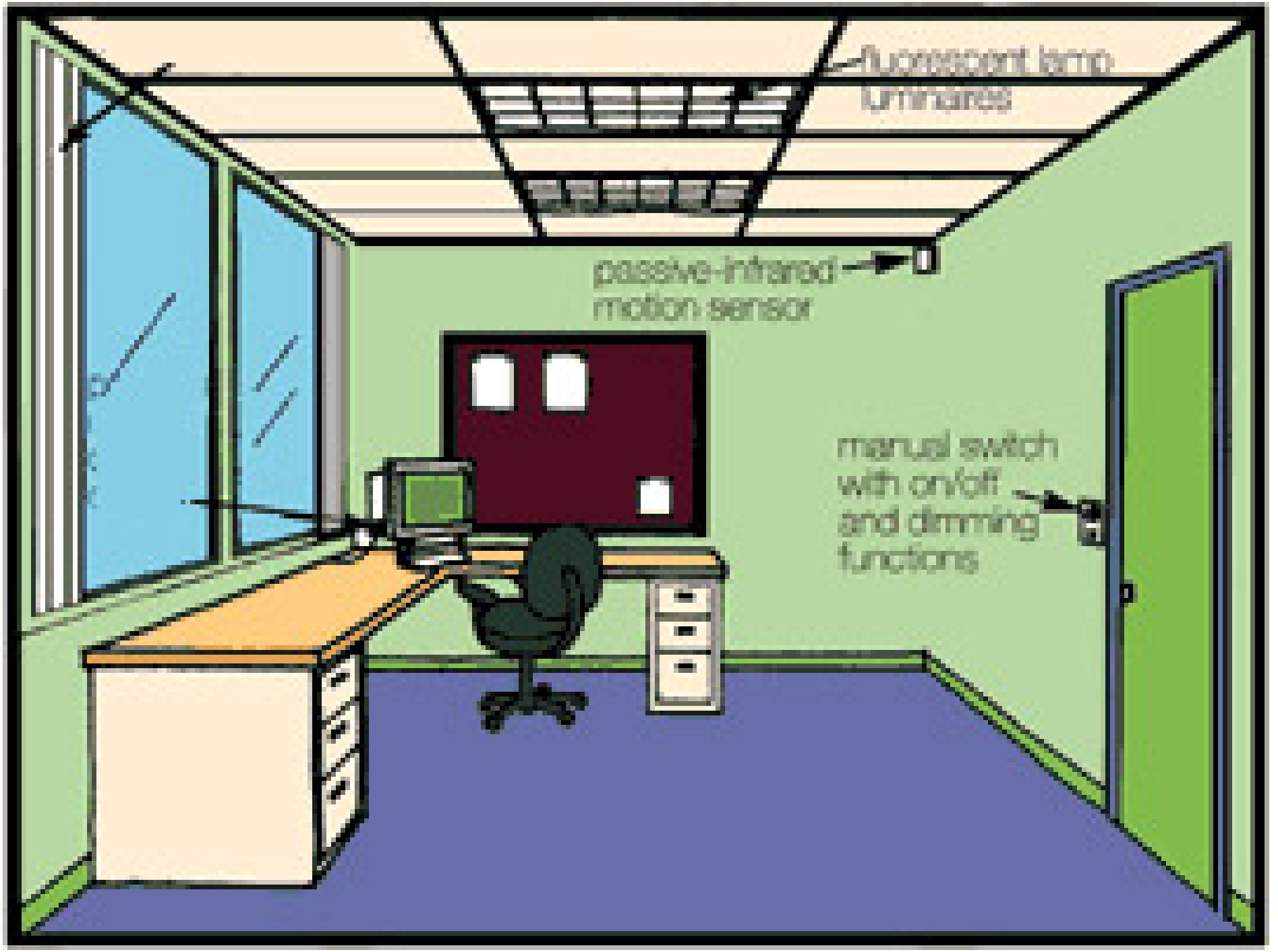
The Energy Pyramid

Energy Conservation

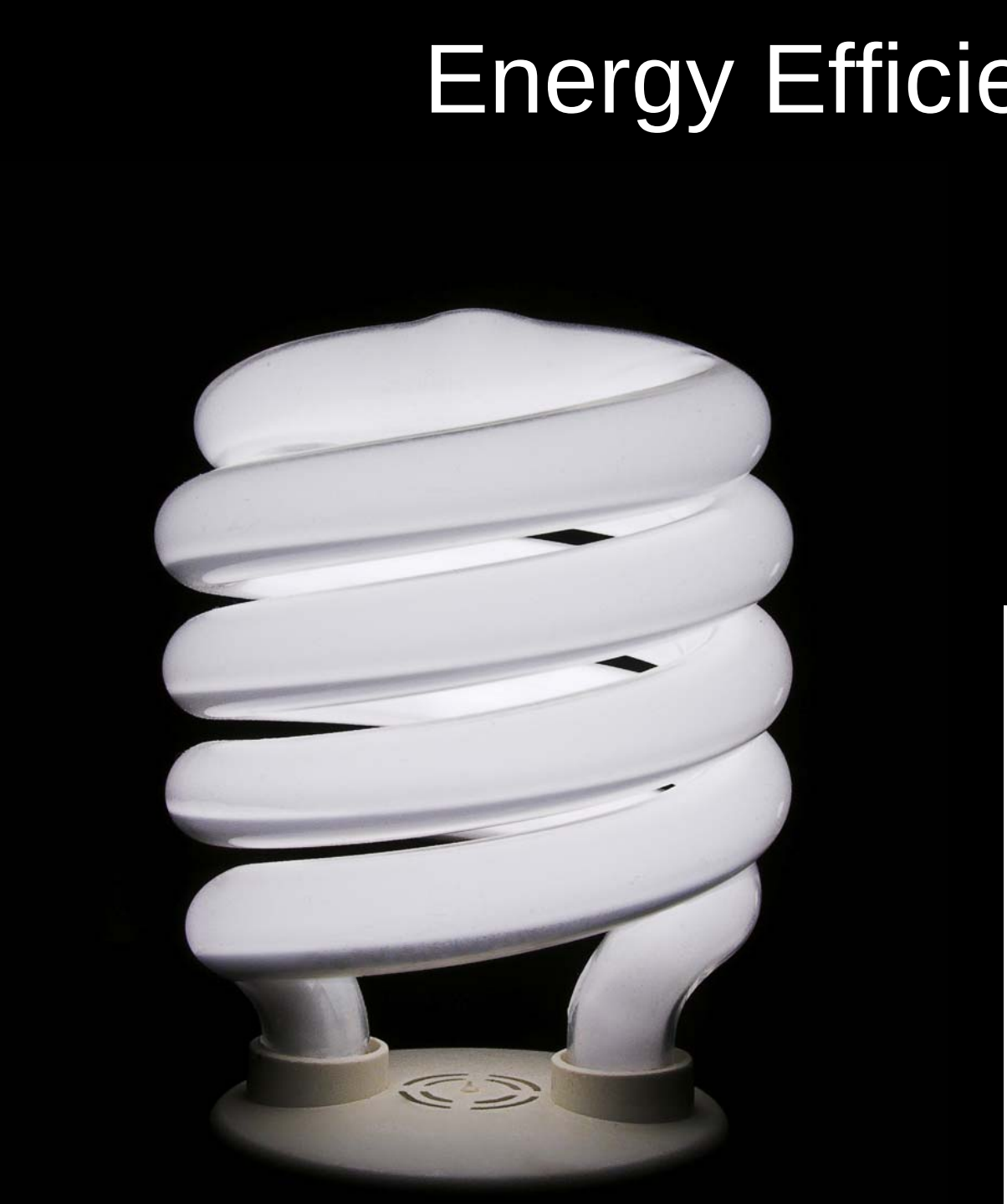

PLUMBING STACK VENT
BATHROOM FAN VENT
RECESSED LIGHTS
ATTIC HATCH
RECESSED LIGHTS
CHASE
KITCHEN FAN VENT
ELECTRICAL OUTLET
DRYER VENT
CRAWL SPACE
OUTDOOR FAUCET
Air leaking into the house
Air leaking out of the house


Low-E
GLASS
Most Visible Light Admitted
Most UV Light Rejected
UV LIGHT
SOLAR HEAT*
VISIBLE LIGHT
WARMTH*
*Most heat is sent back to its original source.


65


fluorescent lamp luminaires
passive-infrared motion sensor
manual switch with on/off and dimming functions

Energy Efficiency



ENERGY STAR-labelled heat pumps and air conditioners use

20% less energy

than new standard models.

Special Advertising Feature

Star Power

Thanks to the government's ENERGY STAR program, businesses and consumers are saving billions of dollars on energy costs while protecting the environment.

Is one of America's coolest crooks robbing you blind?

Save money on energy with a state-of-the-art refrigerator that carries the ENERGY STAR® label.

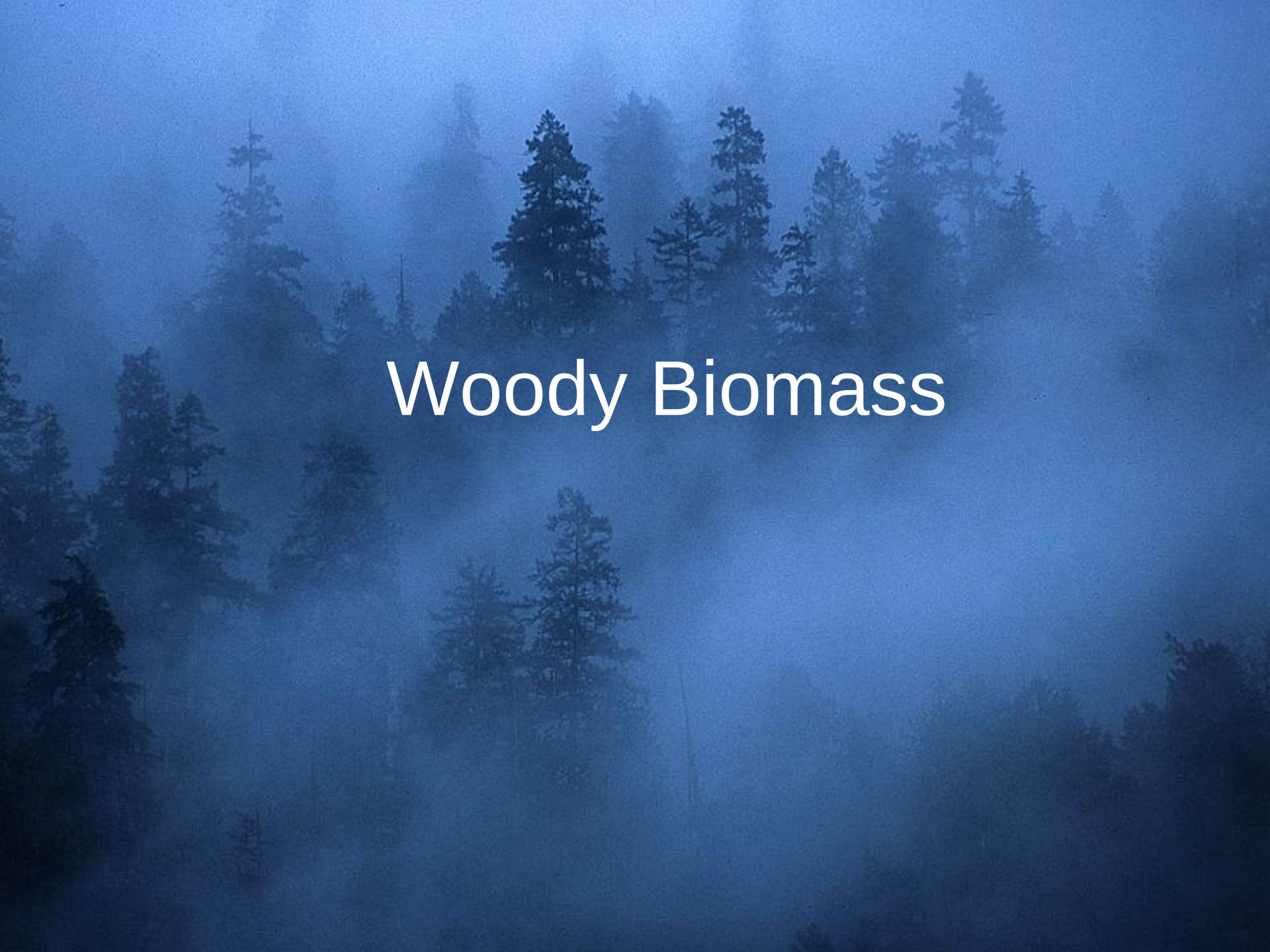
It's a sad fact that your refrigerator could be causing you to pay more in energy costs than you have to. Now, energy-efficient ENERGY STAR designated refrigerators can save $200 or more in energy costs over the life of your fridge. So if you're thinking about a new refrigerator, especially a model with the latest features, consider one that carries the ENERGY STAR label. Not only is it cool. It's money you'll save a whole lot.

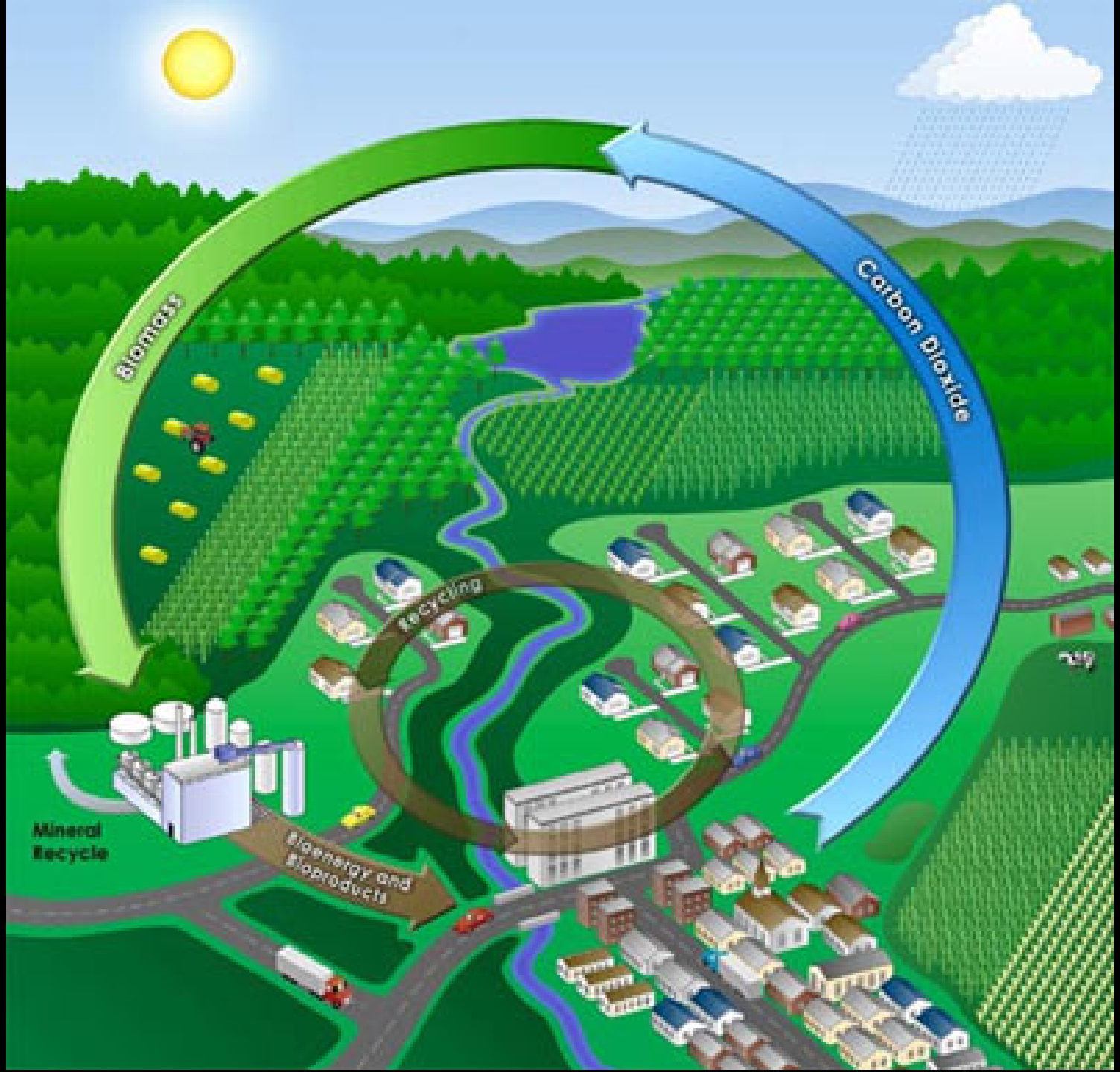
ENERGY STAR
The Symbol for Energy Efficiency

Pacific Gas and Electric Company.

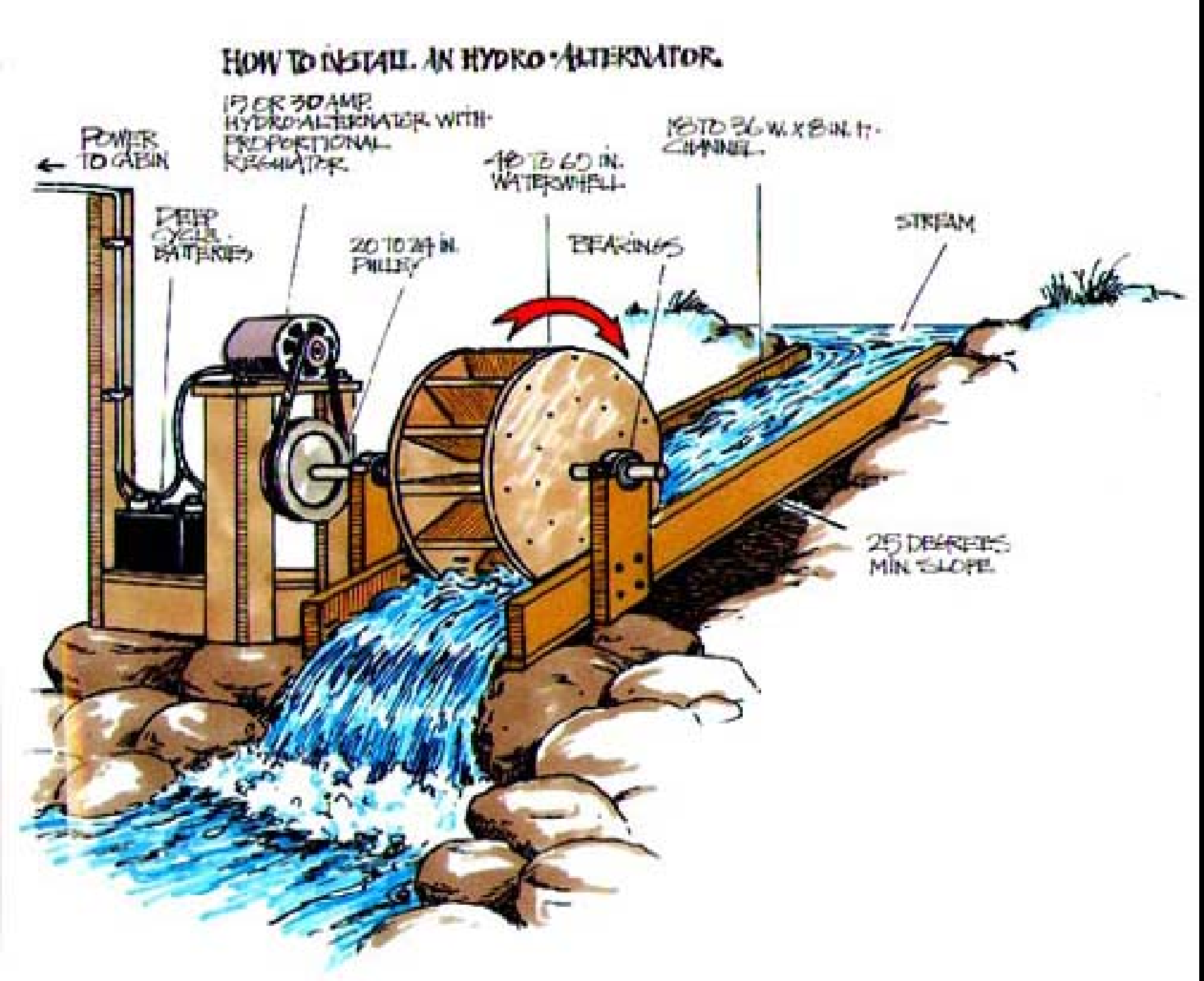

1 eco-bulb = 12 incandescents

Money Isn't All You're Saving


Woody Biomass


Biomass
Carbon Dioxide
Recycling
Mineral
Recycle
Bioenergy and
Bioproducts


Micro-Hydro


HOW TO INSTALL AN HYDRO-ALTERNATOR.
15 OR 30 AMP. HYDRO-ALTERNATOR WITH PROPORTIONAL REGULATOR.
POWER TO CABIN
DEEP CYCLE BATTERIES
40 TO 60 IN. WATERWHEEL
20 TO 24" DIA. PULLEY
BEARINGS
15 TO 24" W. X 8 IN. H. CHANNEL.
STREAM
25 DEGREES MIN. SLOPE


Solar

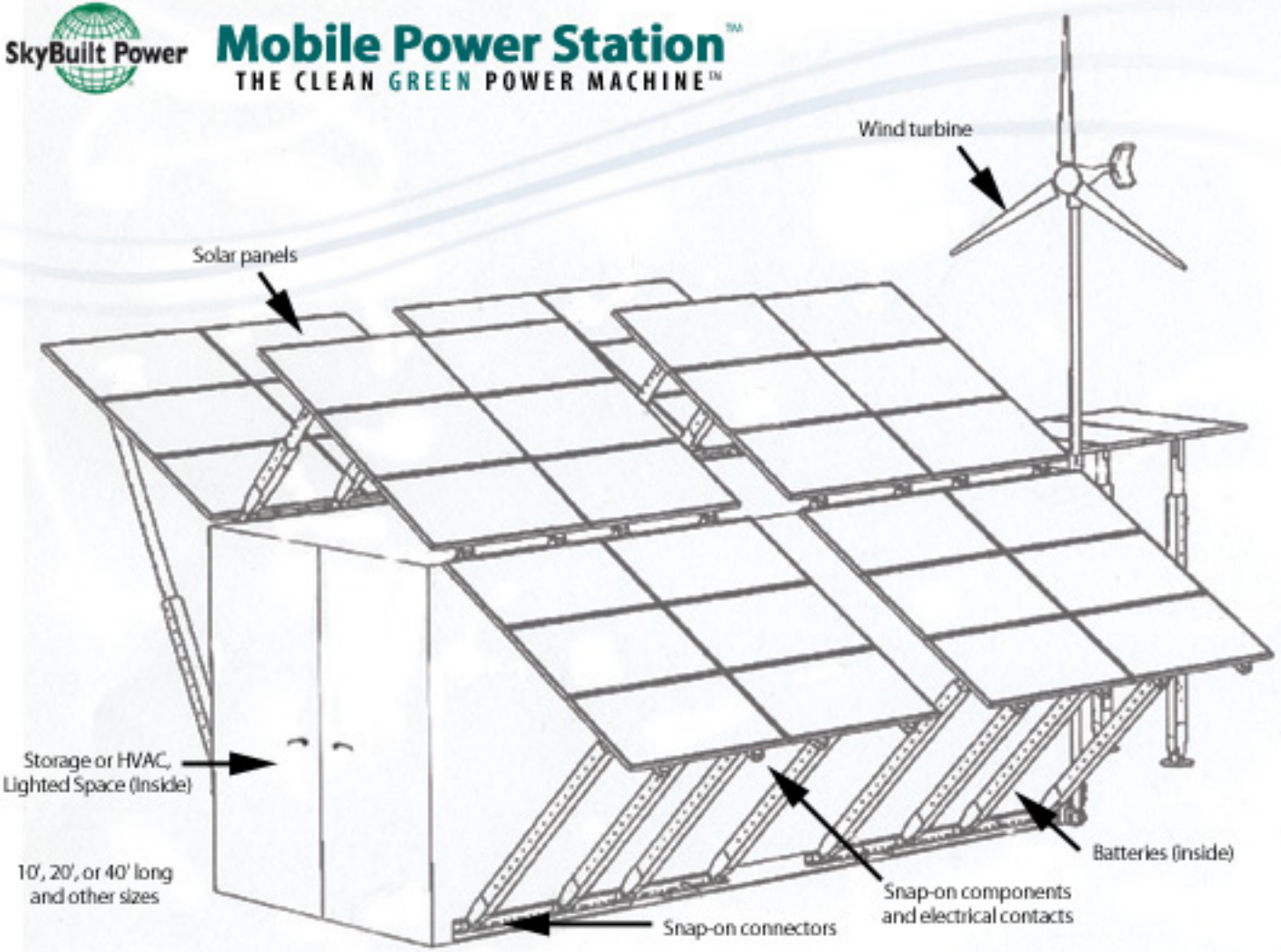
Wind Power


D400

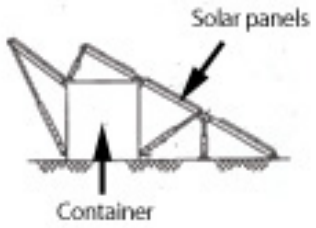
SkyBuilt Power

Mobile Power Station™

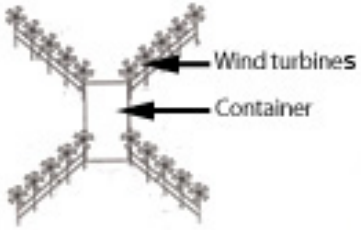
THE CLEAN GREEN POWER MACHINE™



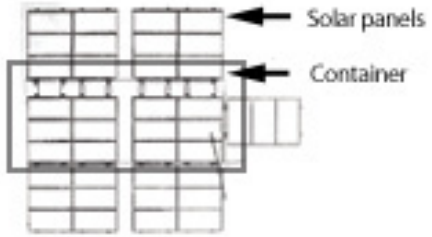
SIDE VIEW



WIND FARM



SOLAR FARM



Phases of Work:

1. Tribal Council Participation
2. Energy Demand Analysis
3. Energy Conservation & Efficiency
4. Assessment of Renewable Energy Availability
5. Energy Source Analysis
6. Energy Export Assessment
7. Human Capacity Building

Task 1: Tribal Council Participation

1. Discuss Tribe's Energy Vision
2. Discuss *Energy* as a component of Tribal Strategic Plans (e.g. IRMP, Eco-Cultural Plan)
3. Discuss Human Capacity Building
4. Develop screening criteria to evaluate renewable energy options

Deliverable: Report of Screening Criteria and Goals for Renewable Energy Options

Task 2: Energy Demand Analysis

1. Analyze current energy consumption patterns of Tribe – residential and non-residential structures.
2. Up to 50 Residential; 10 non-residential
3. Project Future Energy Demands

Deliverable: Report on current and projected energy demands.

Task 3: Energy Conservation/Efficiency

1. Identify energy conservation opportunities
2. Recommend measures to reduce energy use
3. Up to 20 Residential structures; 5 non-residential

Deliverable: Report on potential energy conservation improvement opportunities, including cost estimates for new instituting measures.

Task 4: Renewable Energy Availability

1. Conduct assessment of availability for selected renewable energy options
   A. Solar
   B. Micro-Hydro
   C. Wind
   D. Biomass

Deliverable: Report on results of assessment of generation potential for selected renewable energy options.

Task 5: Preferred Energy Option

1. Using screening criteria developed by Tribal Council, identify the most promising energy option for typical structures
2. Analyze fixed costs and variable costs
3. Evaluate energy sales revenues and energy-cost off-sets.

Deliverable: "Cost of Energy Analysis" for the selected forms of renewable energy. Cost estimate for materials, installations, and maintenance.

Task 6: Energy Export Assessment

1. Estimate potential excess generation capacity from sources analyzed in Task 5.
2. Estimate potential revenue of energy export
3. Conceptual feasibility and marketability of energy sales “back to grid”
4. Conduct analysis of transmission capacity

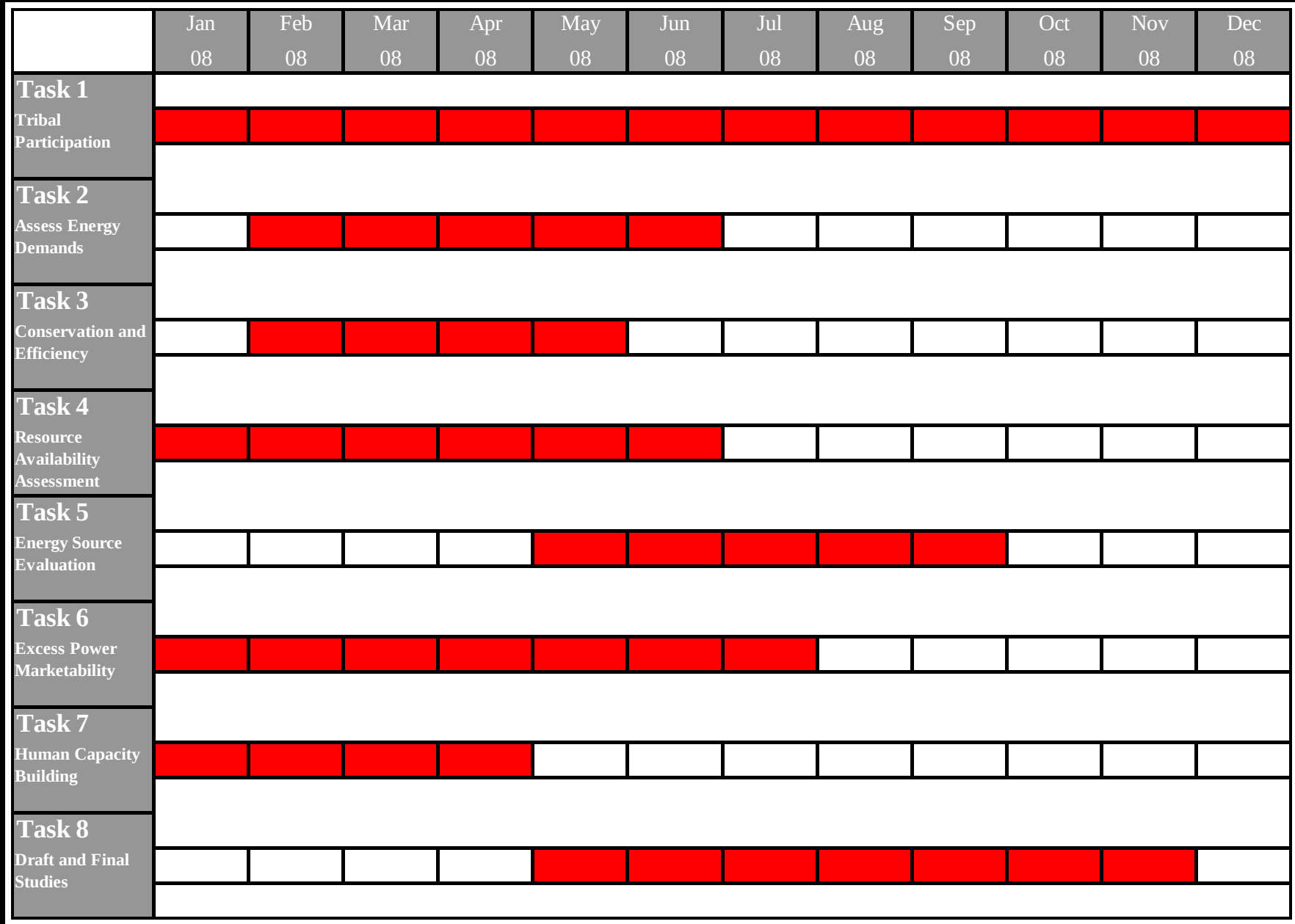
Deliverable: Report on feasibility and marketability of energy sales from Tribal lands to “grid”.

Task 7: Human Capacity Building

1. Hire and train intern specific to this project
2. Three community meetings by DNR – presentation and discussion of energy conservation and renewable energy concepts (Yreka, Happy Camp, and Orleans)
3. Involve home owners/renters in assessment of energy demands and conservation opportunities
4. Research additional training programs

Deliverable: Summary of training opportunities

Timeline


Jan 08
Feb 08
Mar 08
Apr 08
May 08
Jun 08
Jul 08
Aug 08
Sep 08
Oct 08
Nov 08
Dec 08
Task 1
Tribal Participation
Task 2
Assess Energy Demands
Task 3
Conservation and Efficiency
Task 4
Resource Availability Assessment
Task 5
Energy Source Evaluation
Task 6
Excess Power Marketability
Task 7
Human Capacity Building
Task 8
Draft and Final Studies

What Will This Project Lead To?

1. Greater independence and sovereignty for the Karuk Tribe.
2. Tangible strategies for lowering Tribal utility costs, particularly for selected structures.
3. Useful baseline data regarding energy:
   A. An approximate understanding of the Tribe's energy demands
   B. Energy conservation opportunities (ways to save $)
   C. Energy efficiency opportunities (ways to save $)
   D. A preliminary understanding of the Tribe's renewable energy options
4. DOE Grant #2 - "Feasibility of Renewable Energy Projects on Tribal Lands"
5. Forest Service – "Woody Biomass Utilization Grant"
6. BIA Grant – "Energy and Mineral Development Program"
7. **Installation of Tribally-owned renewable energy projects!!!**

Thank You!