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SOLAR ENERGY

FOR

AFFORDABLE HOUSING

AND LOW-INCOME

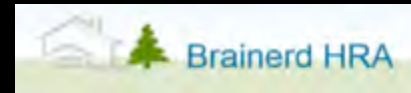
ENERGY PROGRAMS

PANELISTS:

- **DEANNA HEMMESCH –
DIRECTOR, CENTRAL MINNESOTA
HOUSING PARTNERSHIP**



- **JENNIFER BERGMAN – DIRECTOR,
CROW WING COUNTY HRA**



- **KEVIN PELKEY – DIRECTOR,
LAKES AREA HABITAT FOR
HUMANITY**



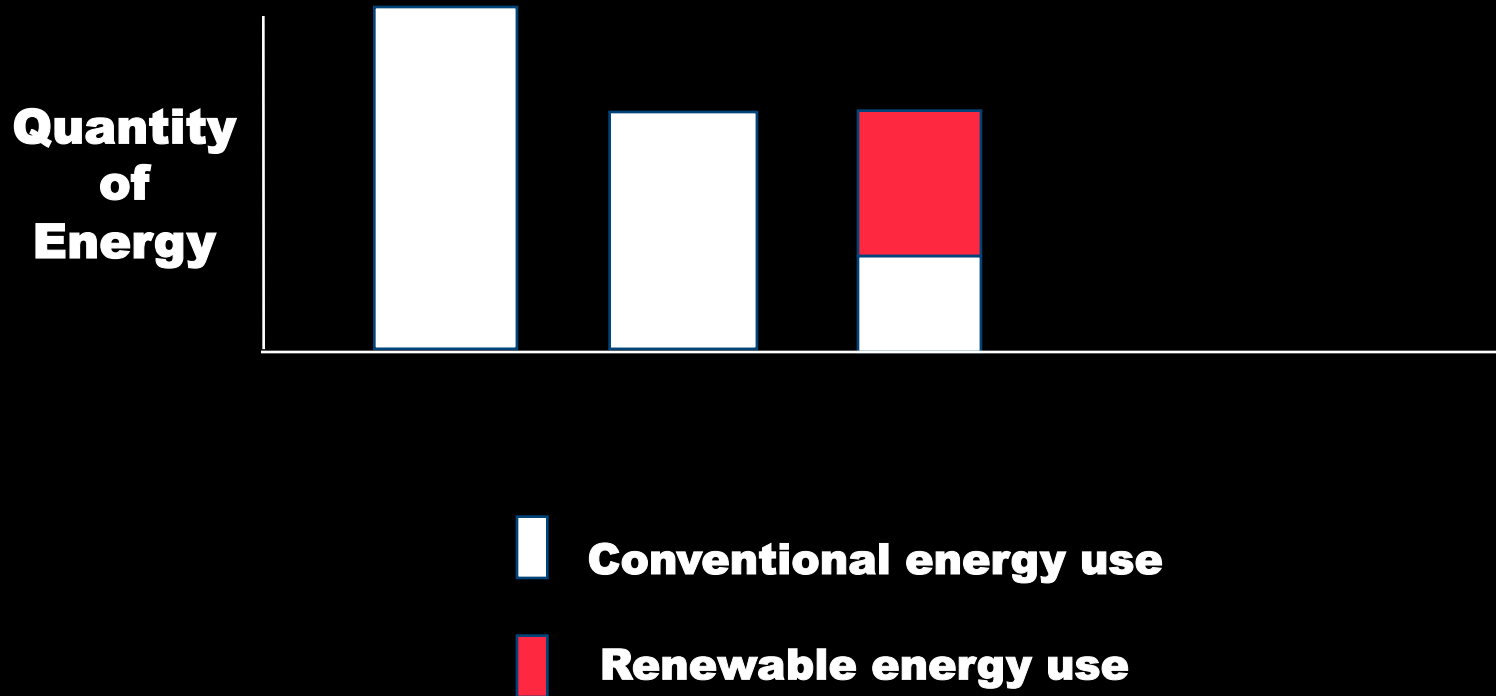
- **JASON EDENS – DIRECTOR,
RREAL**





The Answer is NOT Solar...

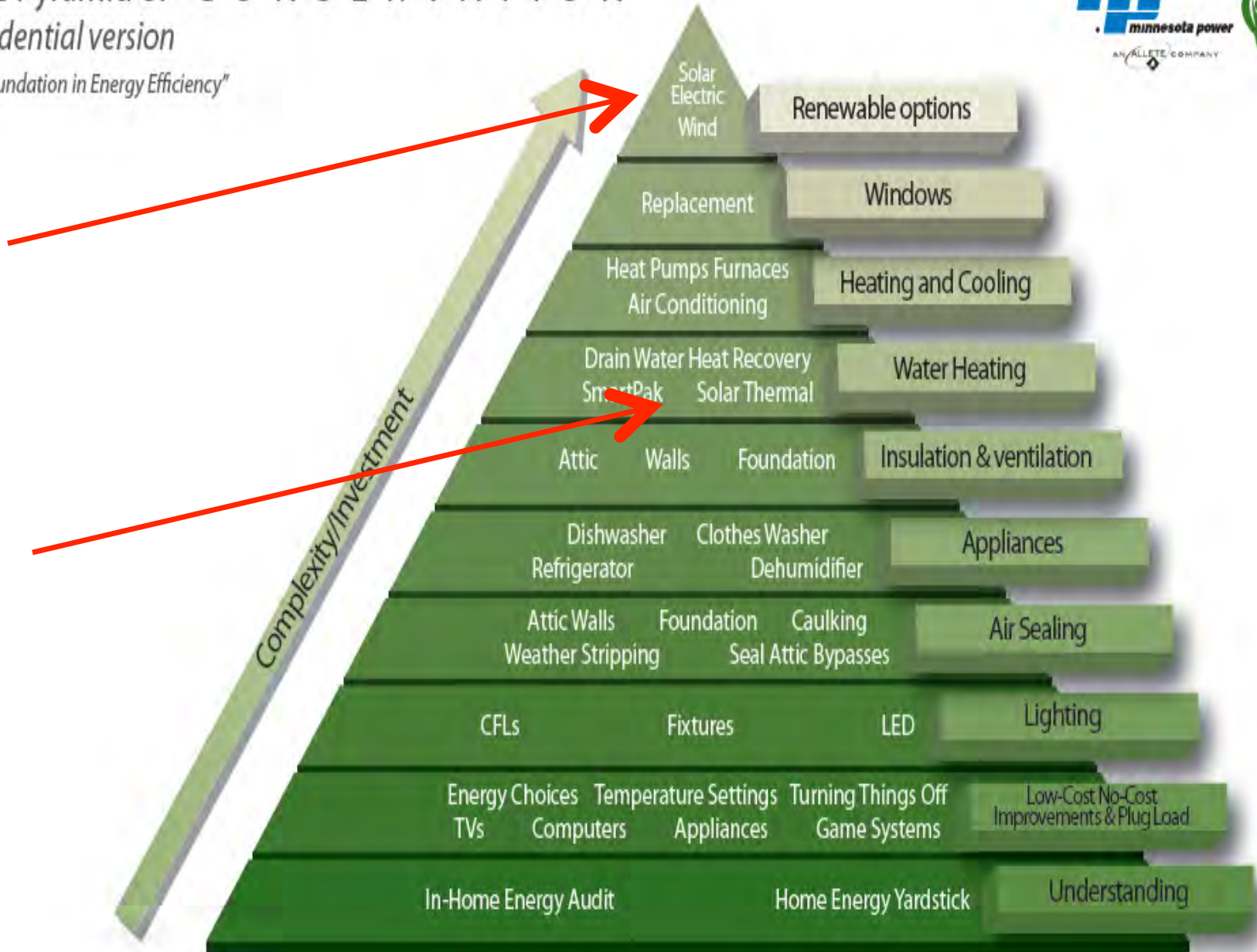
“Efficiency Before Renewables!”



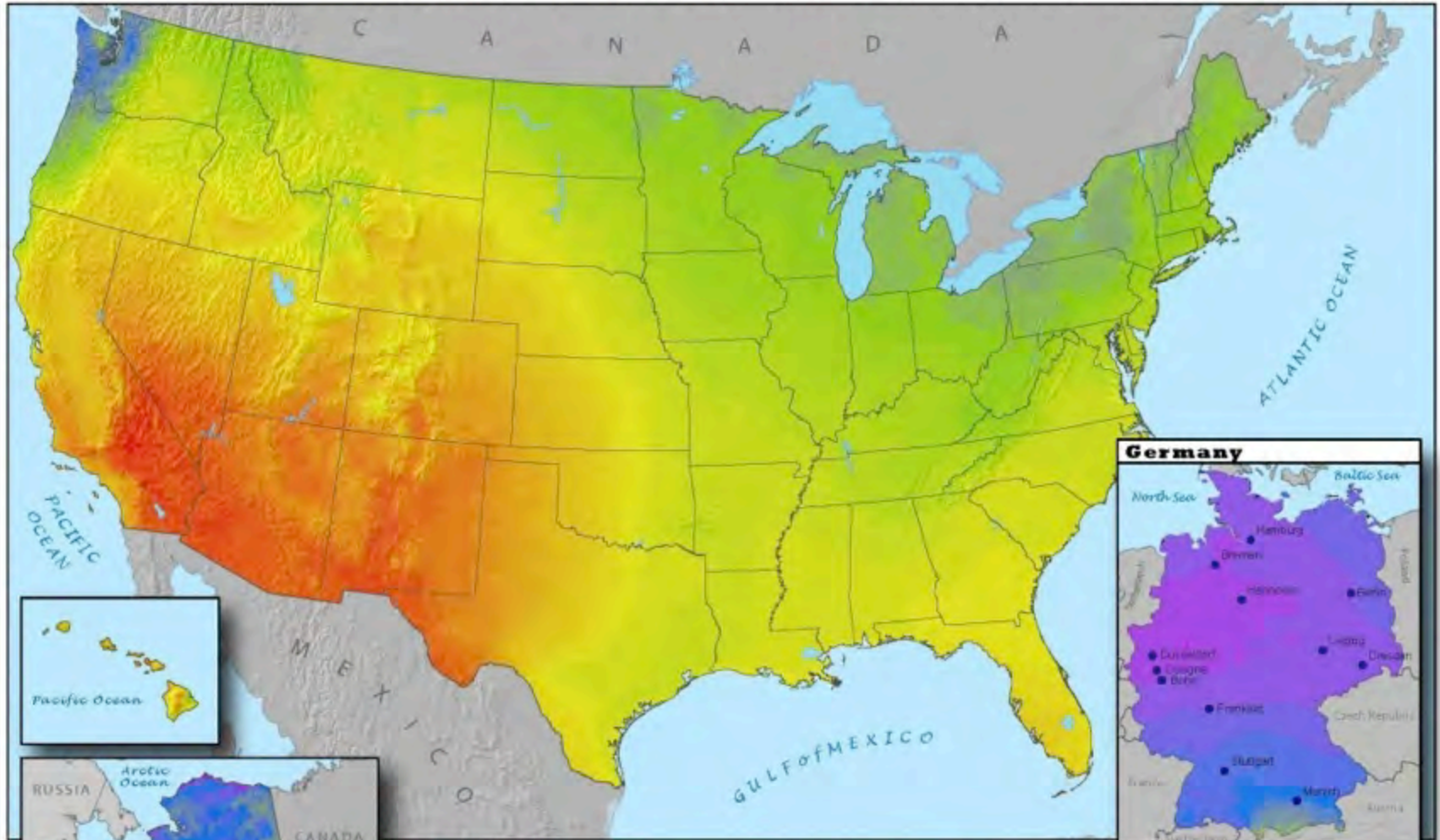
The Pyramid of CONSERVATION

residential version

"A Foundation in Energy Efficiency"



Solar Resource : United States and Germany



Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude. The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005. The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003). The data for Germany were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990.



This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy May 30, 2008

SOLAR ASSISTANCE:
SOLAR HEAT FOR LOW-
INCOME FAMILIES ON
ENERGY ASSISTANCE

JASON EDENS, DIRECTOR
RURAL RENEWABLE ENERGY
ALLIANCE

FUEL POVERTY

A photograph of a weathered log cabin in a winter setting. The cabin is made of dark, aged logs and has several windows, some of which appear boarded up or broken. The ground is covered in snow, and there are bare trees and a few evergreens in the background under a clear blue sky. The overall scene suggests a rural, possibly impoverished, environment during the cold season.

HEAT OR EAT?



FUEL POVERTY



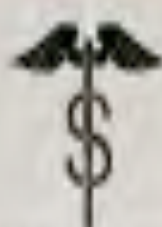
A condition under which someone is unable to meet their home energy needs due to income and rising fuel prices.

More than 15% of utility consumers in the United States are affected by fuel poverty. This is a crisis that affects everyone.

WHO IS AFFECTED



1 IN 8 HOUSEHOLDS IN AMERICA
IS LIVING IN FUEL POVERTY



HEALTHCARE COSTS

Those living in fuel poverty are more likely to suffer heart stroke, heart attack, hypothermia, kidney failure, respiratory disease. These costs are put on the taxpayer as many of those in fuel poverty do not have adequate access to healthcare.



MORE POLLUTION

Many fuel poor homes rely on forms of fossil fuels to heat their homes. Access to renewable energy would alleviate the rise in pollution and the health risks associated with pollution.



ECONOMIC BURDEN

\$1 billion is spent annually to cover bad utility debts. When fuel poor homes cannot pay their debts the cost is shifted to the taxpayer. Weatherized and energy efficient homes and the ability to pay energy bills would save nearly \$6 billion.

ENERGY ASSISTANCE:

\$ 100 MILLION ANNUALLY IN MINNESOTA!

NATIONWIDE...?

\$ 5 BILLION ANNUALLY



IS ENERGY ASSISTANCE A SOLUTION?



Part of the

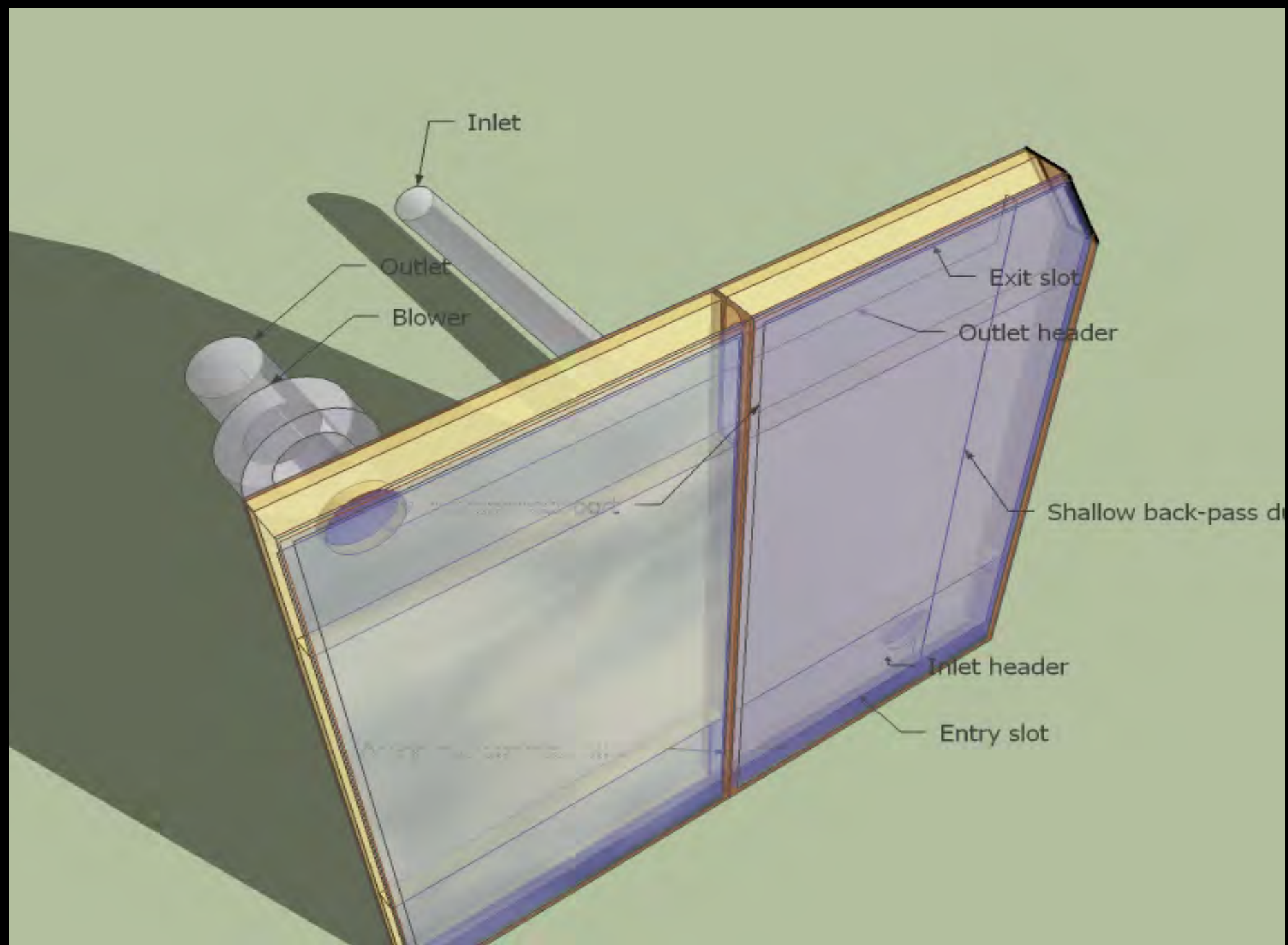


SOLUTION!

Solar Assistance



***Solar Heat for Low-income Families
on Public Energy Assistance***



Inlet

Outlet

Blower

Exit slot

Outlet header

Shallow back-pass duct

Inlet header

Entry slot

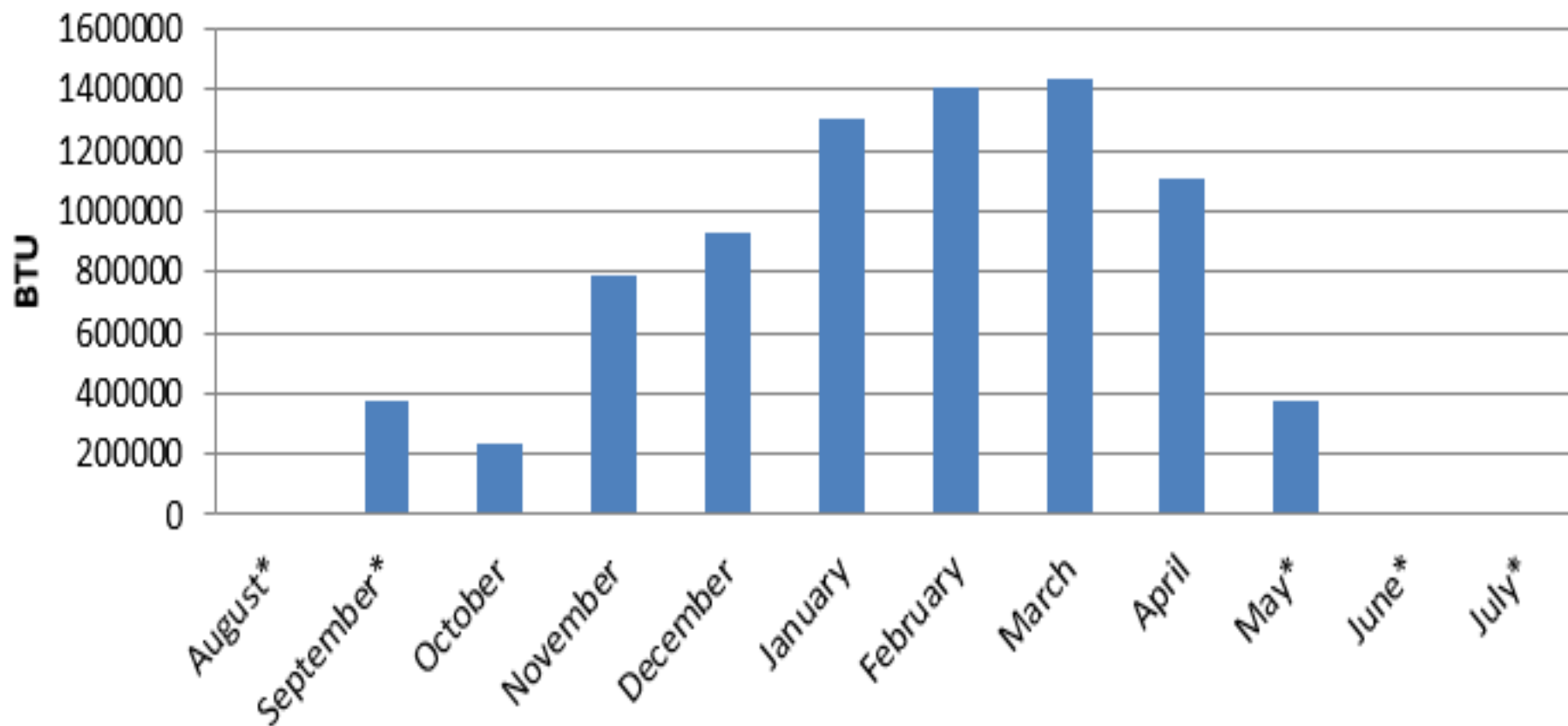
A lasting, clean and
domestic solution to
fuel poverty!



System Performance

BTU Production

Monthly BTUs Delivered



*Partial Month or No Data Available For This Month

Month	BTUs Delivered	Total BTUs Available	Percentage of BTUs Delivered	Maximum Collector Temperature (°F)	Maximum House Temperature (°F)
August*	-	-	-	-	-
September*	377477	777434	48.6%	200.9	82.9
October	236277	2372073	10.0%	283.2	84.3
November	787783	1180578	66.7%	280.1	83.2
December	930925	942028	98.8%	133.3	81.0
January	1308590	1323721	98.9%	139.2	79.7
February	1405078	1430139	98.2%	136.4	82.1
March	1436570	1468928	97.8%	140.7	85.3
April	1110805	1139383	97.5%	139.2	83.7
May*	377477	777434	48.6%	200.9	82.9
June*	-	-	-	-	-
July*	-	-	-	-	-
Total or Maximum	7970984	11411718	69.8%	283.2	85.3

*Partial Month or No Data Available



2014 Results

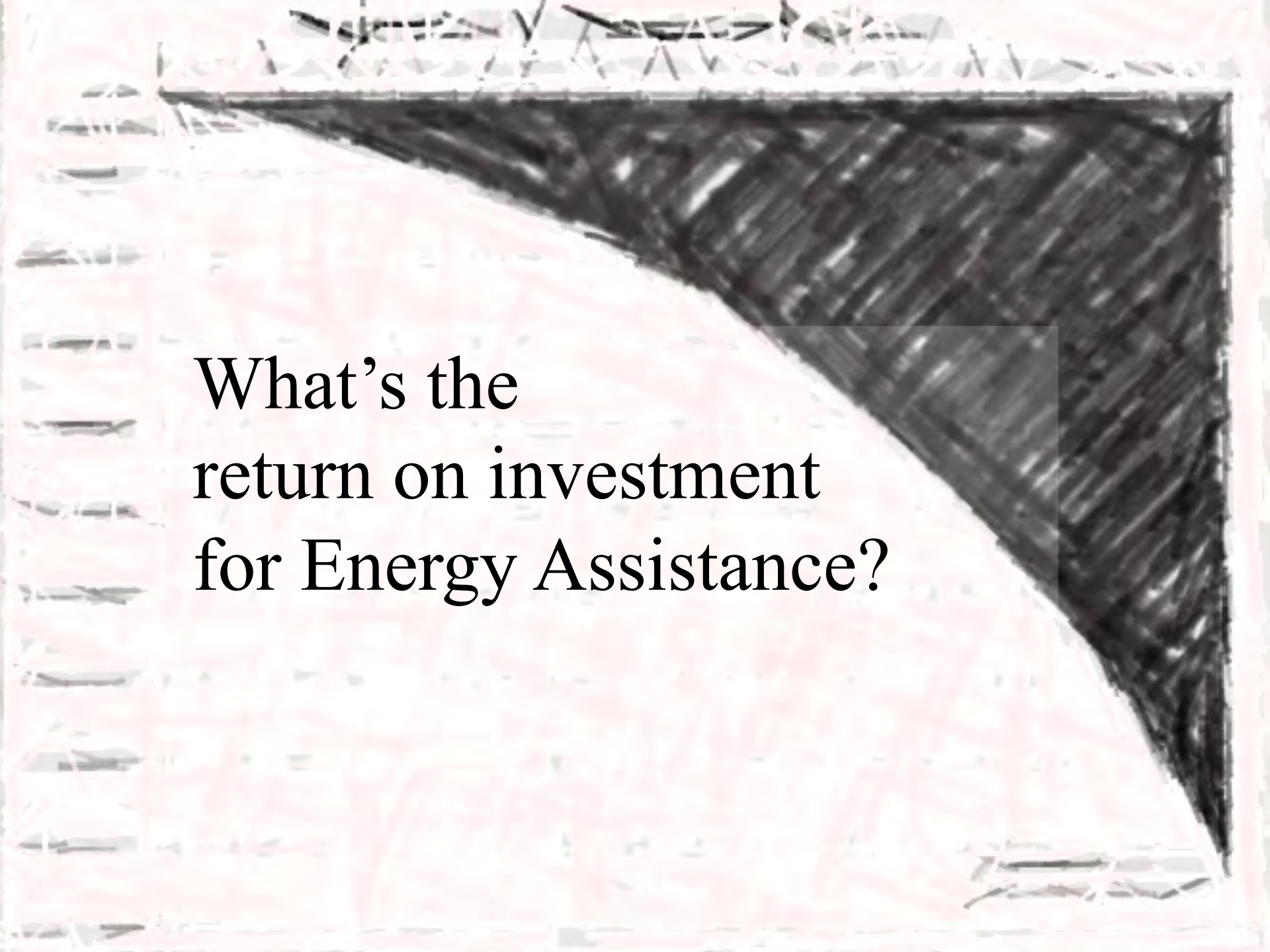
**60 Low-income Families
Empowered with Solar
Energy!**

ND, IA, WI and MN

400 Families

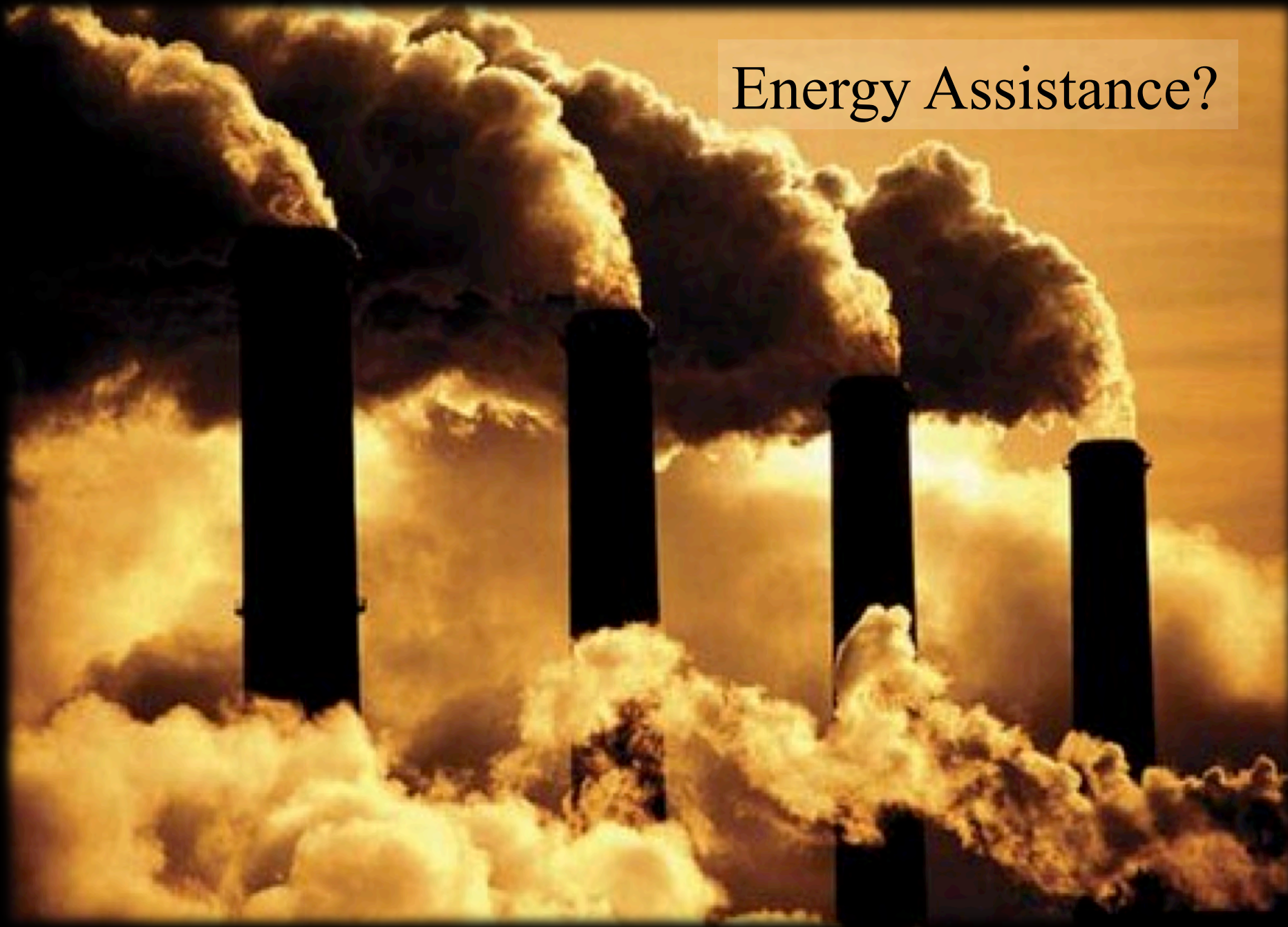


Empowered!




What's the
return on investment
for Energy Assistance?

Energy Assistance?





Or Solar
Assistance?



We saved over
\$2000 last
heating season
between
weatherization
and the solar
heating system.
- Illinois
recipient

A photograph of a white, single-story house with horizontal siding and a gabled roof. The house is set against a clear blue sky with some green trees in the background. A large, semi-transparent blue map of Minnesota is overlaid on the left side of the image, partially covering the house. The text is written in white on the blue map.

Solar Assistance:
*A Made-in-
Minnesota*
Model



REEGP:
Renewable
Energy
Equipment
Grant
Program

[http://mn.gov/commerce/
energy/topics/financial/
Weatherization-Assistance-
Program/For-Weatherization-
Providers/](http://mn.gov/commerce/energy/topics/financial/Weatherization-Assistance-Program/For-Weatherization-Providers/)



Sprucewood Townhomes

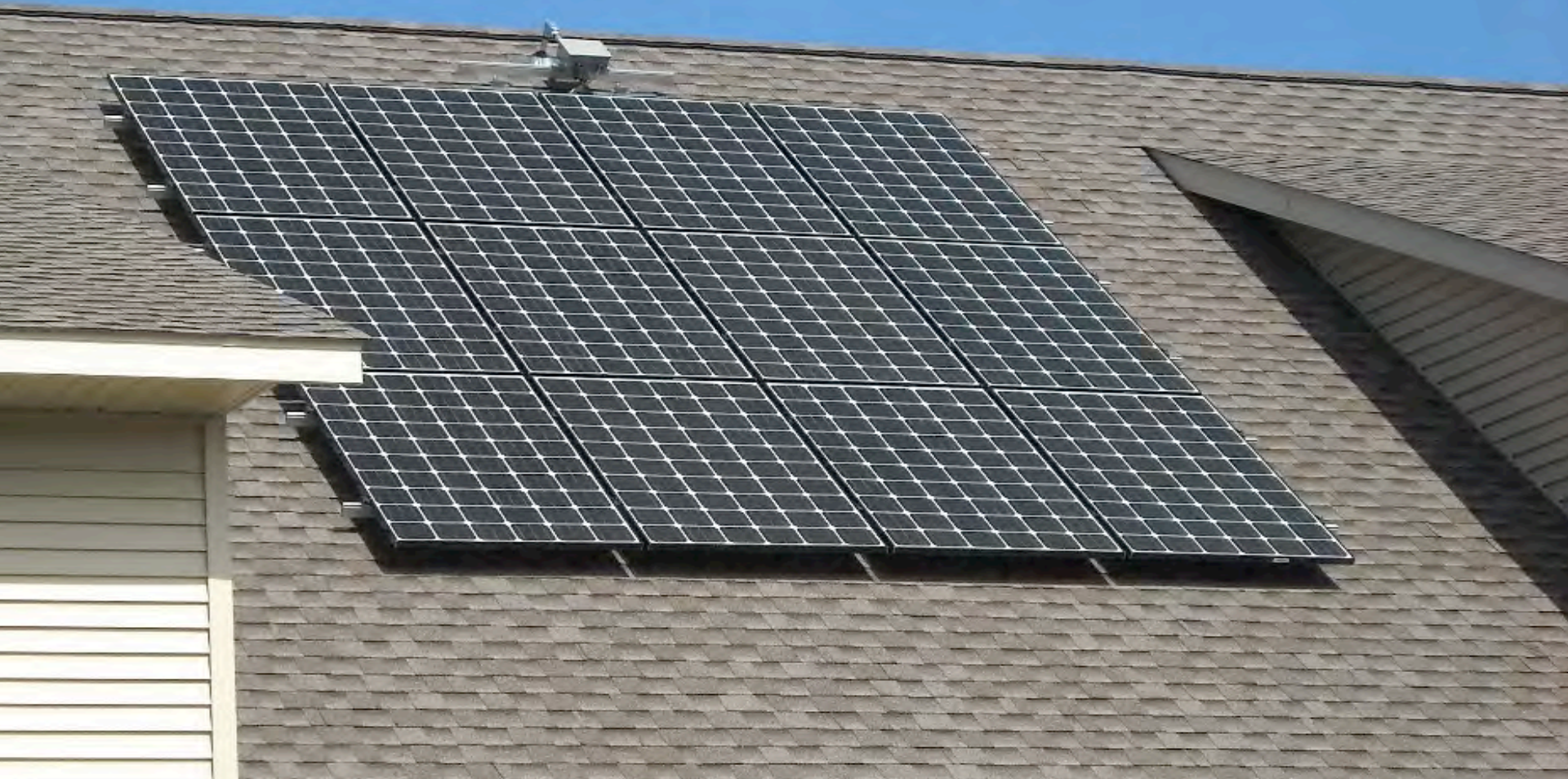


Lower income workforce housing - Baxter, MN
A Central Minnesota Housing Partnership Project
Deanna Hemmesch



Sprucewood Townhomes

40 kW PV System



How we came to incorporate Solar Energy?

- Part of the Resilient Region work in Region 5.
- Resilient Region is an EPA-HUD funded regional sustainable planning project in Crow Wing, Cass, Todd, Wadena and Morrison Counties
- It assisted in fulfilling the Resilient Region goals by incorporating renewable energy.

A Sprucewood snapshot:

- Consists of 36 townhome back-to-back units.
- Designated affordable to low and moderate income households (60% of the area median income or less).
- 4 units were designated for homeless households.
- The land purchased was a piece of foreclosed property.
- Included renewable energy.
- City supported the project with Tax Increment Financing.

Sprucewood Financing:

- The project received the following income to make this idea a reality.
- Received an allocation of tax credits from MN Housing.
 - Low Income Housing Tax Credit Equity: \$5,187,886
 - Energy Credit Equity: \$46,093
 - 1st Mortgage through Minnwest Bank: \$815,405
 - Deferred Developer Fee from owner: \$143,662
 - Total Development Cost: \$6,193,006

How Does the Solar Energy Work at Sprucewood?

- All of the solar panels are tied to the house meter on each of the 3 separate buildings.
- The energy produced is purchased by Crow Wing Power and is netted against what is consumed by the house meter.
- This has been producing a credit to the property.

Sprucewood Savings So Far:

- From when the first building came on line in July 2014 through January 2015, the buildings have produced a credit of: \$948.81.
 - Building 1 (12 unit complex) came on in July 2014 has a credit of: \$449.19
 - Building 2 (8 unit complex) came on in August 2014 has a credit of: \$134.41
 - Building 3 (14 unit complex) came on in October 2014 has a credit of: \$365.21
- These credits were not initially figured into the operating cost of the project.

Long Term Benefits:

- Due to the unanticipated credit, we will be able to keep rents lower.
- Use of renewable energy is good for the environment.
- Getting a history of what solar energy can do to a low income project and incorporate that into other projects.

Lessons Learned:

- Snow on the solar panels that are on the roof can reduce production.
- We have not had a very sunny winter and so the solar energy is not netting as much in the winter months.
- The project has not been in service long enough to see all of the pros and cons of what the solar energy can do for the project.
- The online data monitoring feature is useful.
- The monitoring feature also shows carbon offset for the month.

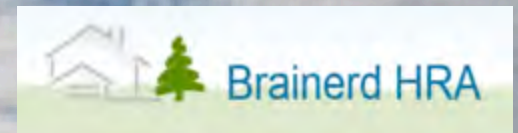
**USING SOLAR
ELECTRICITY (PV) TO
STABILIZE ENERGY
COSTS FOR LOW-INCOME
RENTALS:**

**JENNIFER BERGMAN
CROW WING COUNTY AND
BRAINERD HRA**

RESIDENTIAL GRID-TIED PV SYSTEMS FOR LOW- INCOME RENTAL UNITS

A COLLABORATIVE PROJECT INCLUDING

- BRAINERD HRA
- RREAL
- BRAINERD PUBLIC UTILITIES
- REGION FIVE DEVELOPMENT COMMISSION
- RESILIENT REGION
- CONSERVATION CORPS OF MINNESOTA





**Proposed solution –
August, 2014**





Installed solution – January, 2015

**Installed solution –
January, 2015**



Cumulative Cash Flow

- 2 kW Grid-tied System
- Low-income HRA rental unit
- Stabilizes electrical costs which are born by renter
- Positive environmental impacts
- Numerous organizational and societal benefits
- \$11,000 in savings over service life to low-income household!
- Installed cost of approx. \$9000

\$8,000.00
\$6,000.00
\$4,000.00
\$2,000.00
\$0.00
(\$2,000.00)
(\$4,000.00)
(\$6,000.00)

21 22 23 24 25 26 27 28





**USING SOLAR
ELECTRICITY AND SOLAR
HEATING TO ENSURE
AFFORDABLE HOUSING:**

KEVIN PELKEY

LAKES AREA HABITAT FOR HUMANITY

Stabilizing heating costs
makes home ownership
more likely!





Volunteers from the solar community have worked with LAHFH and RREAL to install solar heating systems for new homeowners.

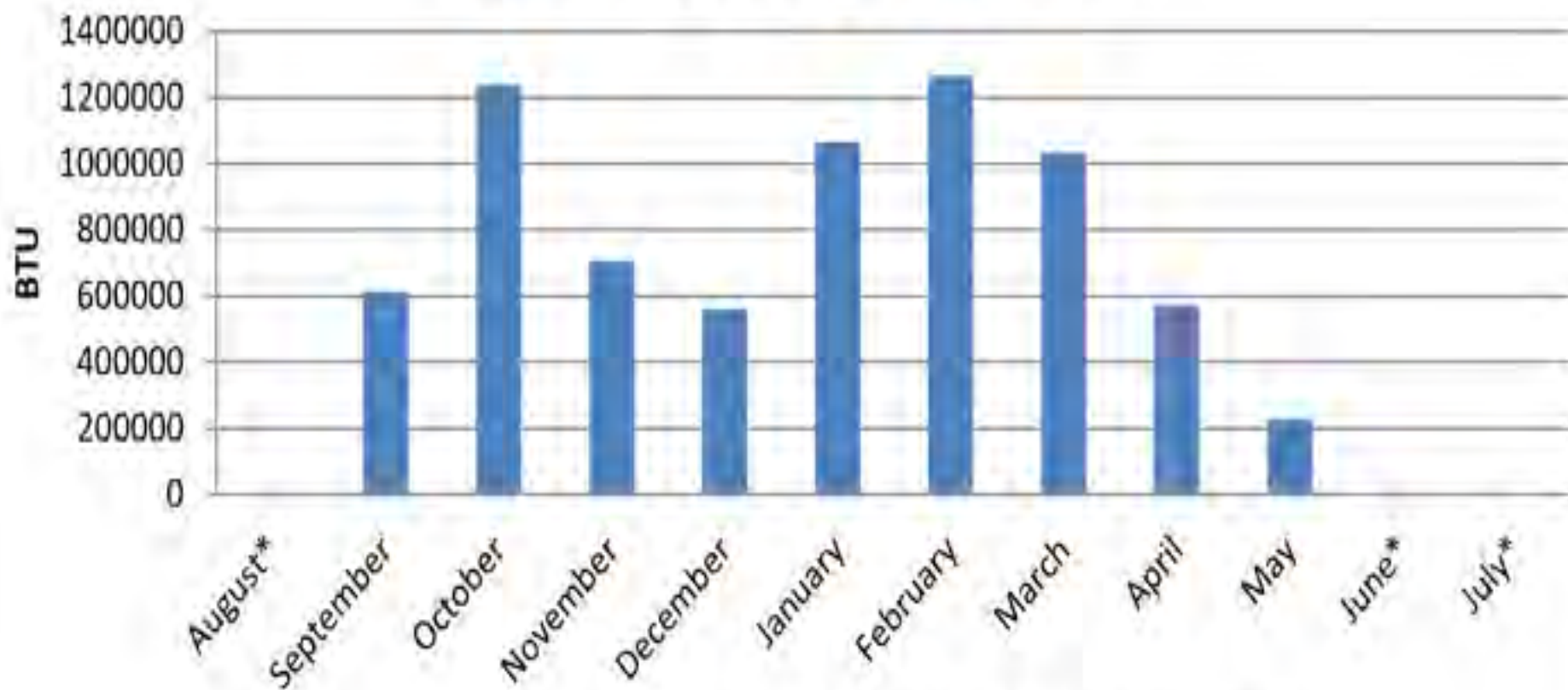
**Residential,
supplemental solar
space heating keep
energy costs stable.**



System Performance

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October	1238426	1245701	99.4%	162.4	74.7
November	703753	708219	99.4%	171.6	75.4
December	561219	564196	99.5%	171.1	75.6
January	1065927	1072586	99.4%	171.1	79.3
February	1265475	1271635	99.5%	172.6	78.2
March	1031786	1041946	99.0%	163.2	75.1
April	572346	586674	97.6%	130.0	74.4
May	230168	451371	51.0%	153.4	80.0
June*	-	-	-	-	-
July*	-	-	-	-	-

A man and a woman are standing in front of a house. The man is wearing a blue t-shirt with a graphic of an eagle. The woman is wearing a blue t-shirt with a graphic of fireworks and the text "USA". A speech bubble is positioned to the right of the woman, containing text. The house behind them has white siding and a brown roof. A utility box with two blue doors is visible on the side of the house. The ground is covered in dry grass and dirt.

**I'm excited to
have a credit on
my energy
assistance going
into the heating
season. It's a
first for me!**

5 kW grid-tied PV system to
reduce operating costs for
Lakes Area Habitat for Humanity
Re-store – Brainerd, MN



With funding and support from:
Lakes Area Habitat for Humanity
Toledo Community Foundation
Brainerd Public Utilities
First Solar
RREAL



**COMMUNITY SOLAR FOR
COMMUNITY ACTION:**

***A NEW MODEL FOR LOW-
INCOME ENERGY
ASSISTANCE!***

**JASON EDENS, DIRECTOR
RURAL RENEWABLE ENERGY
ALLIANCE**

Community Solar Garden



Solar PV panels are installed in sunny locations to produce renewable electricity



1



2

Individual entities can subscribe to enough solar to cover up to 120% of their annual electricity usage



3

Each subscriber's utility bill is credited with the electricity created by their share of the solar garden



Energy Assistance Today!

Dept of Health and Human Services provides energy assistance funding to each state.

Each state gives funding to regional service providers to manage and provide energy assistance at local level.

Service providers give funds to utilities on behalf of energy low-income households and individuals.

Energy Assistance tomorrow!





*Community Solar
for Community
Action: A new
model of
energy
assistance...*



When each Community Action Agency is empowered with community solar gardens, we will have greater resiliency for our low-income communities and the families they serve!



*We are going to build the first Community
Solar Garden for Low-income Energy
Assistance in the Nation!*



The Power to make a difference



RRREAL

Rural Renewable Energy Alliance

*Making Solar Energy Accessible to
Communities of All Income Levels*

Thank you for your support!

