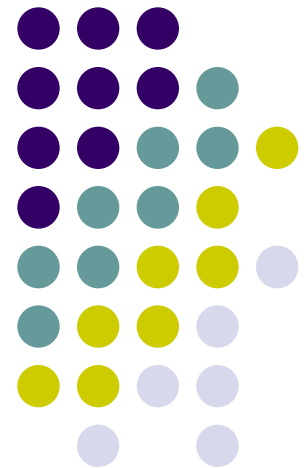




Renewable Energy Wind and Solar

Susan Brown
The Energy Savings Store





About Us

- Renewable Energy Services Company
 - Missouri and Kansas Corporation
 - Design, Provide, Install and Maintain Systems
 - Commercial and Residential
- Locations
 - St. Louis
 - Kansas City
 - Springfield
- Affiliations
 - US Green Building Council
 - Green Building Initiative
 - Heartland Renewable Energy Society
- Licensed General Contractor
- Certifications
 - Uni-Solar
 - Southwest Windpower

SKYSTREAM 3.7™



CONERGY



UNI-SOLAR
United Solar Ovonic



SHARP
..... be sharp



Your Sustainable Energy Source
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636-699-9540 STL 913-221-6253 KC

Our Philosophy

- A Building is a System
- Energy Efficiency First
 - Using energy wisely
 - Lighting
 - Appliances
 - Heating & AC
 - Planning to
 - Insulate Properly
 - HVAC air flow and balance
 - Proper Sizing and Charging
 - Seal Duct Air Leaks and Insulate Ducts

- Energy Efficiency Second
- Energy Efficiency Third
- Energy Conservation
- Renewable Energy



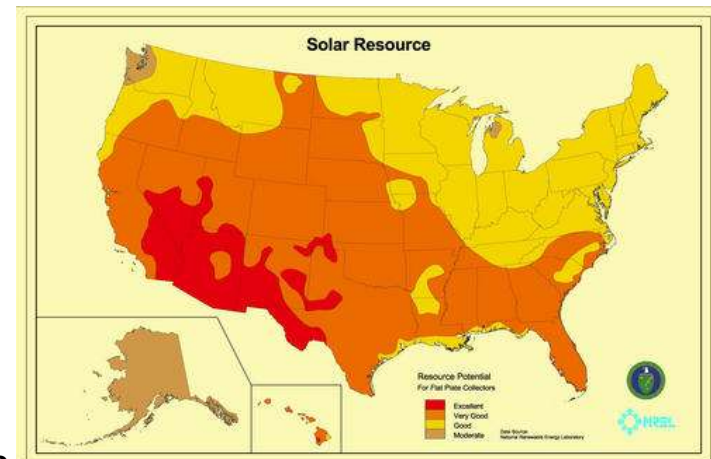
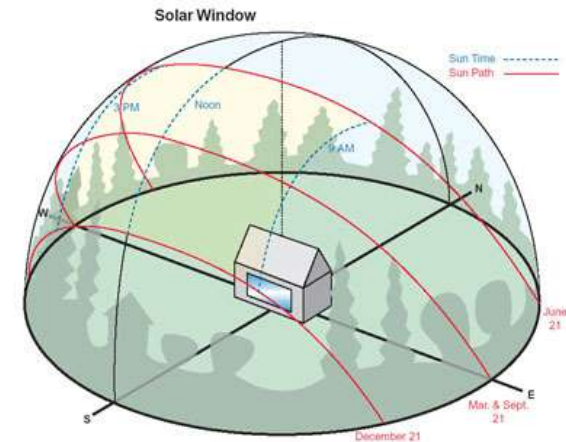
Renewable Options

- Solar
 - Generate Electricity
 - Solar PV
 - Outdoor Lighting
 - Thermal
 - Solar Hot Water
 - Heating
 - Solar Air Heating
- Wind



Solar Basics

- How much heat or electric energy is needed?
- What type of collector will be used?
- How much energy will be lost between the collector and the point of use?
- How much of the sun's energy that could potentially reach your collector surface actually will?
- How does the slope and orientation of the collector affect the amount of solar energy received?



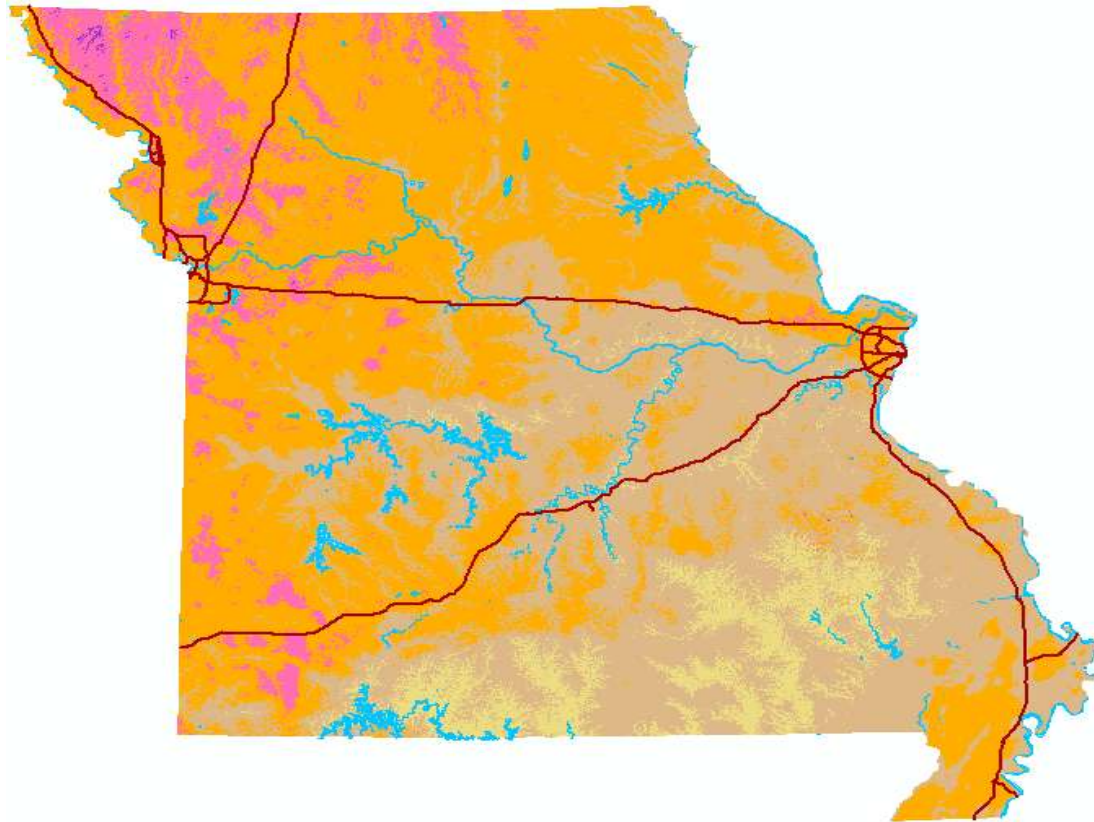
Wind - Factors to Consider



- **Good wind resource**
- **Home or business located on 1 acre or more of land**
- **Zoning restrictions, economic incentives**



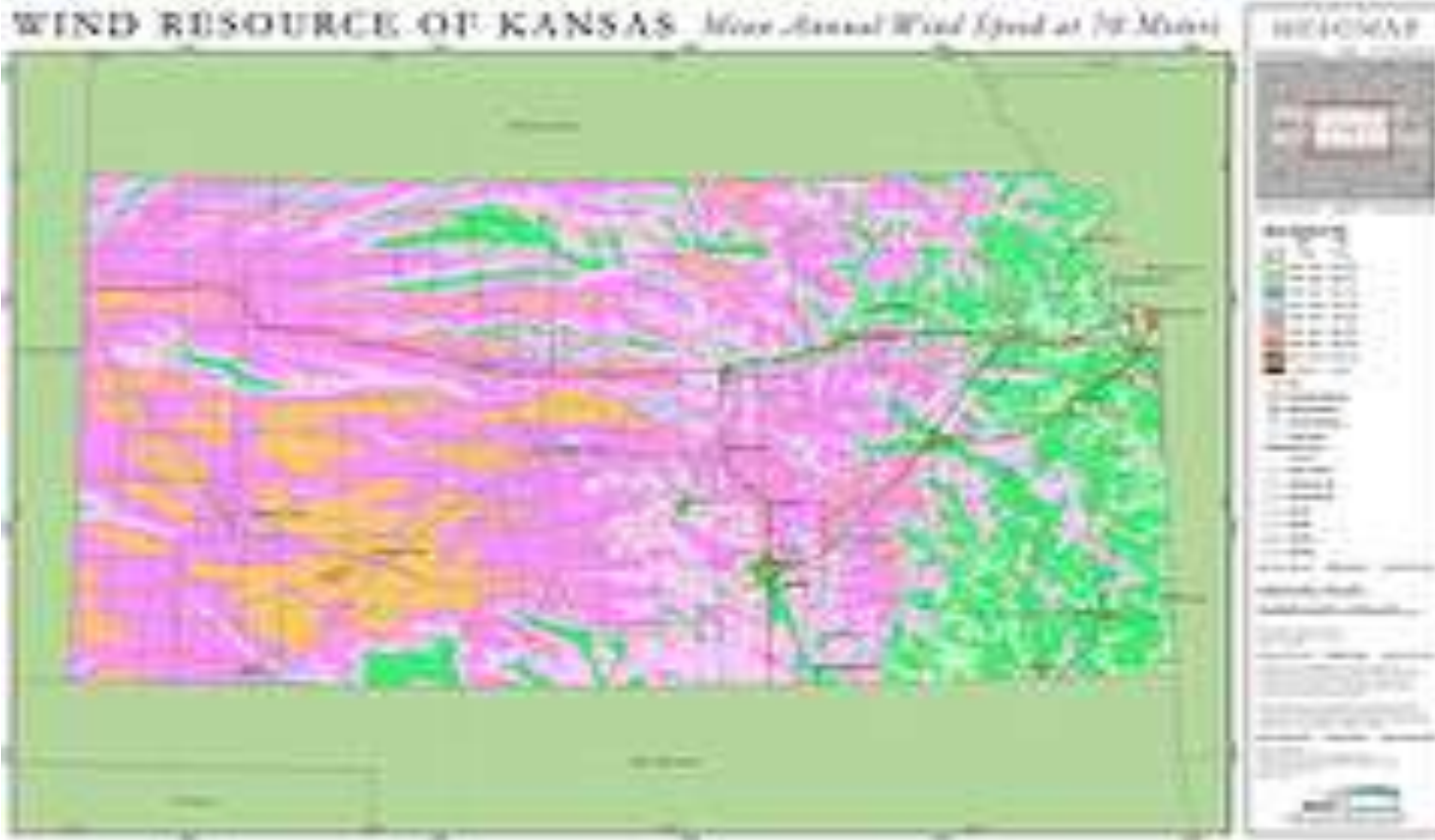
Anticipated wind power at 100 meters above ground level



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Green 12-15mph, Pink 15-16, Purple 16-18, Yellow 18-19,
Orange 19-20



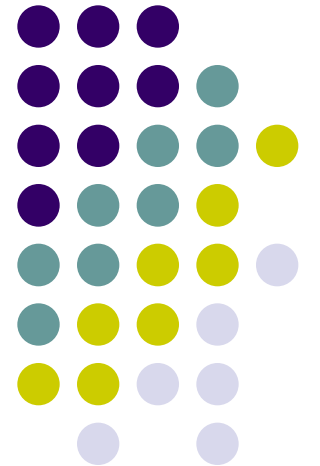


Benefits of Renewable Energy

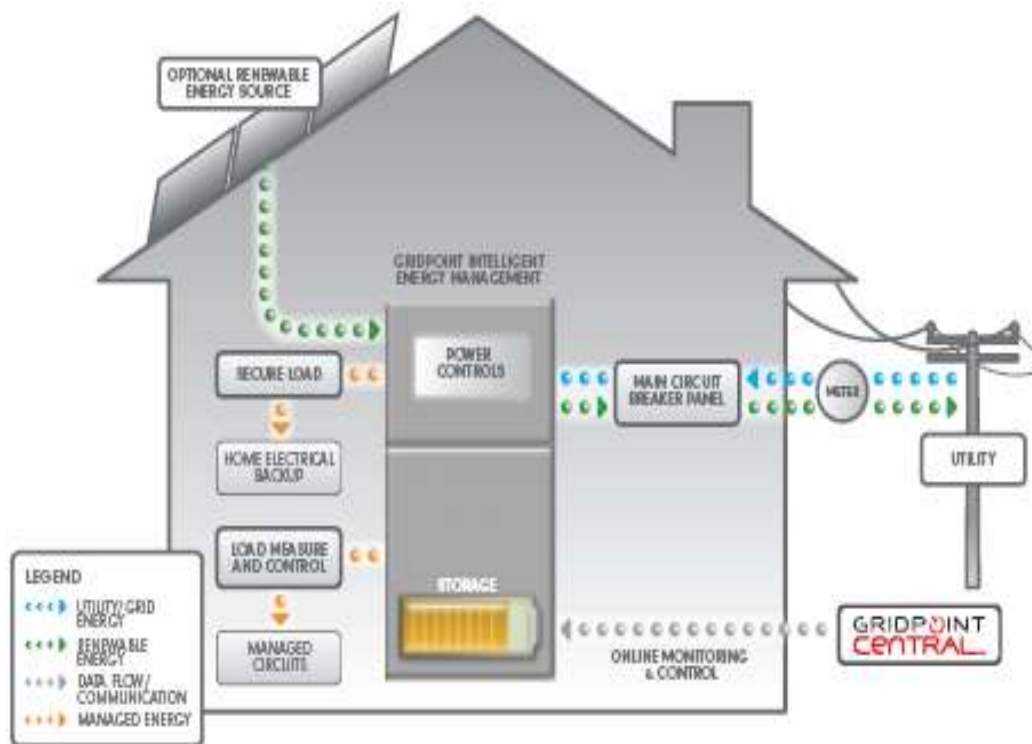
- Health & Environment
- Hedge against rising energy costs
- Energy independence
- Attractive Payback and IRR
- Additional Commercial Benefits
 - Marketing Benefits
 - Leadership position in community
 - Employee morale



Solar Photovoltaic (PV)



How Solar Works



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UniSolar PVL For Metal Roofs



Green Dirt Farm, Weston, MO



Richland, MO



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Village Presbyterian Uni-Solar PV



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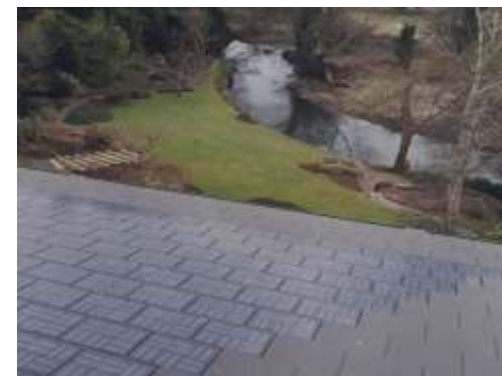
SolarSave Roofing Tiles



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SunSlate Solar Roof Tiles



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Sharp Solar PV Install Collinsville, IL



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CFM Distributors -KCMO

5 KW Solar PV





Financials - Residential

- Price per watt - \$10
- 2 kilowatt system - \$20,000
- Federal tax credit - (\$ 6,000)
- Net Cost - \$14,000
- Energy Produced – 250 kwh/yr
- Return on Investment – 5%+
- Payback – Depends on assumptions



Residential Shade Structures



Shade Structures



Uni-Solar PVL



Industrial Roofing Applications

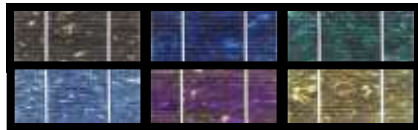


330kW membrane roofing at the Coca Cola plant in Los Angeles, California.





SolarSave™ PV Architectural Glass



- Custom PV glass solutions
- Installed by glazer on-site
 - Available in a variety of shapes and colors
 - Blends seamlessly using a choice of colors that blend onto existing profiles
- California Academy of Science Museum
 - Canopy around perimeter
 - 130 kW AC (60 houses equivalent)



Solarscapes



Solar Tree



The branches of the solar tree were decorated with 10 solar lamps, each one comprising 36 solar cells; they also had rechargeable batteries and electronic systems.

A sensor was used to measure the amount of light in the atmosphere and trigger the solar lamps to go on automatically at sunset and off at sunrise.

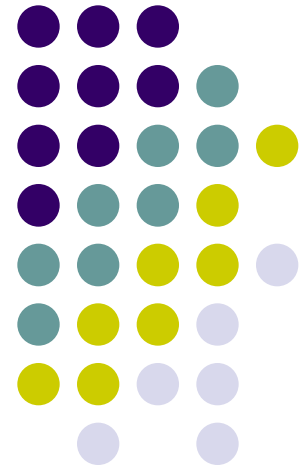


Solar Flairs





Solar Outdoor Lighting



Why Solar Lighting

- No Trenching or Re-Paving
- No electric bill
- Reduced copper wire theft
- Offset CO2 Emissions
- Immune to Power Outages
- Will have lighting during Flood Events



CFL Fixture Options



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Solar Outdoor Lighting Retrofit – Brookside, Kansas City



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Solar Sign Lighting



Mission, KS



Platte Purchase Park Shelter House Lighting



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CFM Distributors Green Parking Lot Lighting



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Mead Lofts – St. Joseph Solar Parking Lot

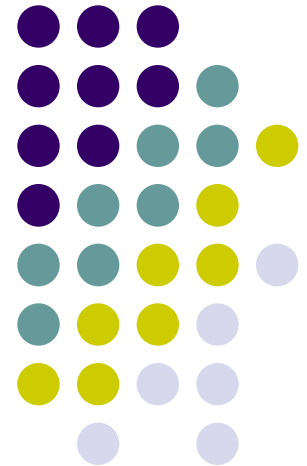


Johnson County Parks Solar Sign Lighting

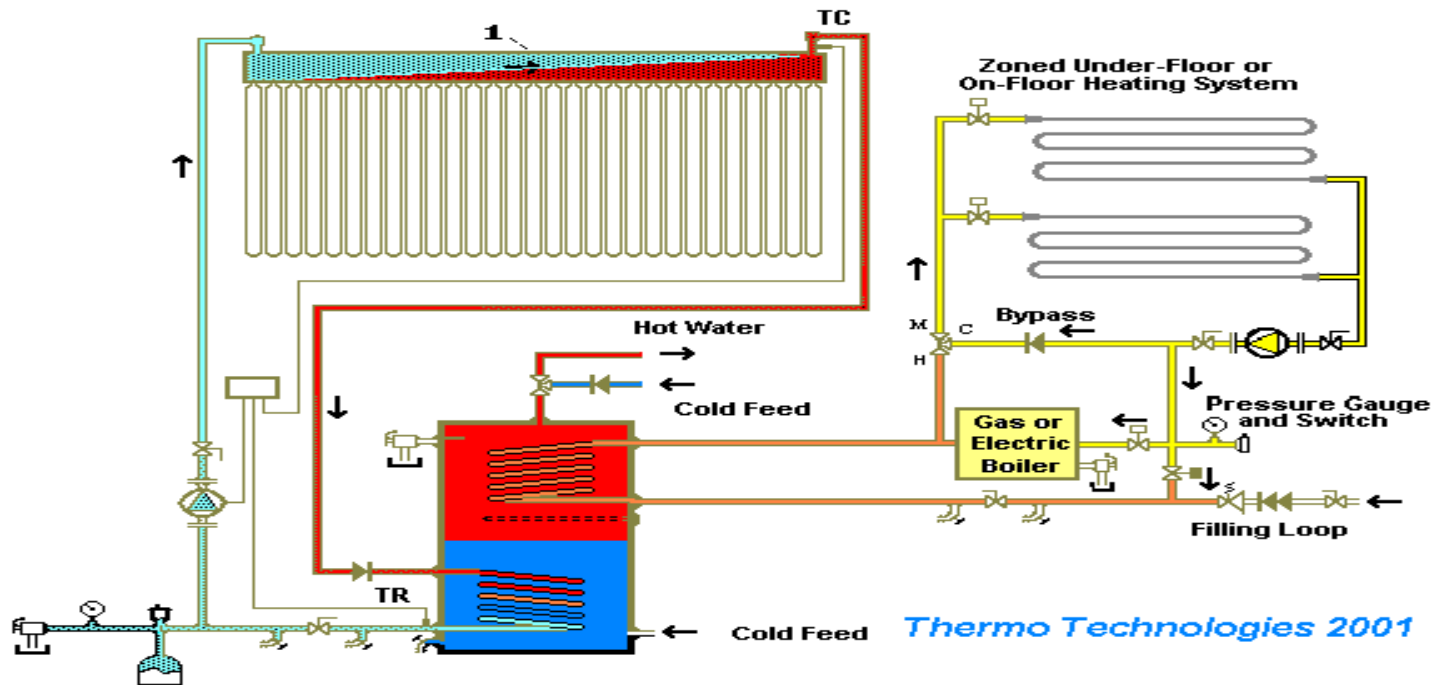




Solar Thermal



How Solar Thermal Works



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Mead Lofts – St. Joseph Glazed Panels



Linwood, KS Evacuated Tube System





Solar PV and Thermal System



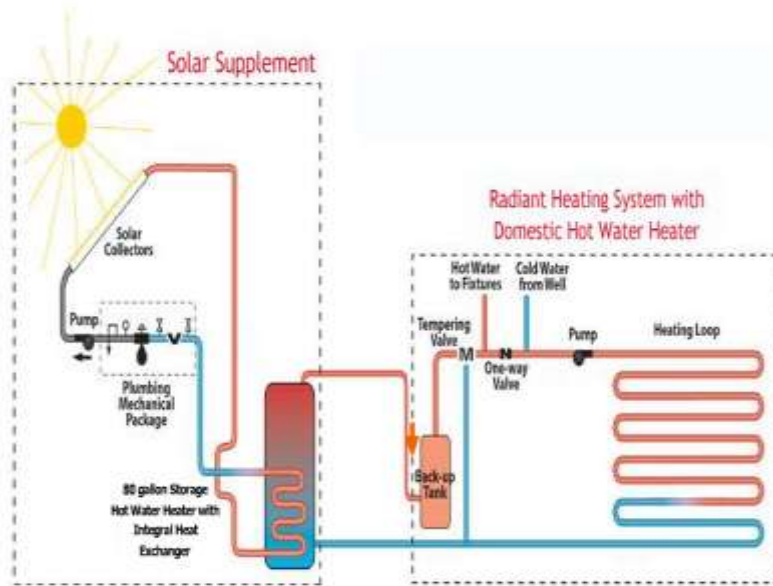
"Combined Heat and Power"



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Radiant Floor Heating

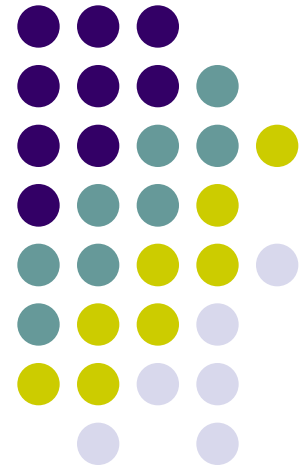


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Solar Pool Heating



Mead Lofts – St. Joseph Solar Pool Heating



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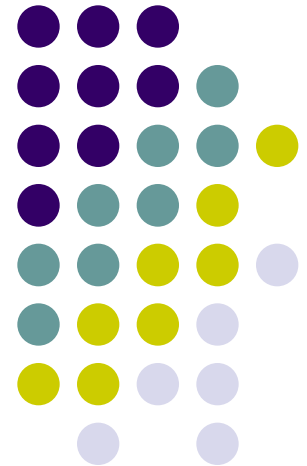


Solar Pool Heating/Turbine Independence, MO





Solar Air Heating



Solar Air Heating

Reduce Heating Cost 20 – 30%



SOLAR AIR HEATING

**Ideal for cottages,
HOMES &
industrial buildings**



YOUR SOLAR HOME



SOLARHEAT

- Affordable, renewable heating
- Fresh air ventilation improves overall health
- Saves money on heating costs resulting in lower bills
- Lowest CO₂ emissions to help the environment
- Easy installation – no electrical hookup necessary
- Installs quickly and smoothly with power pending crossing strip

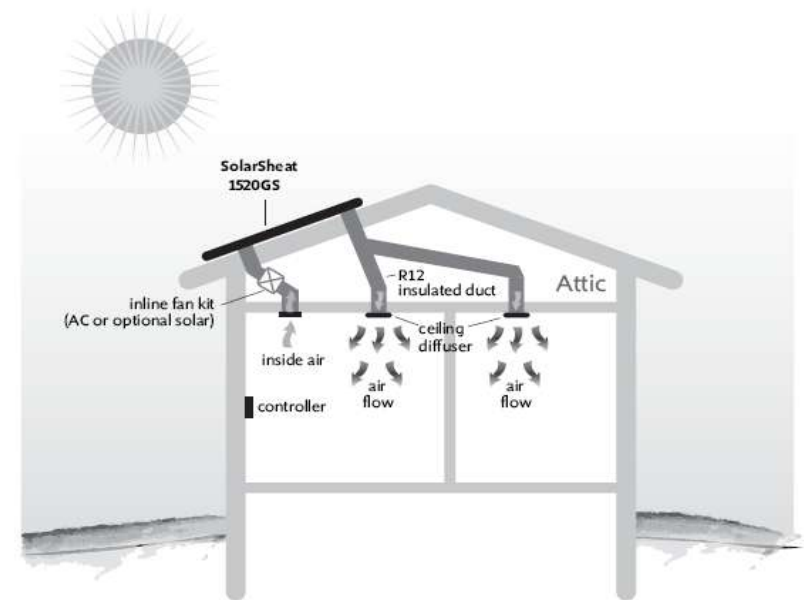
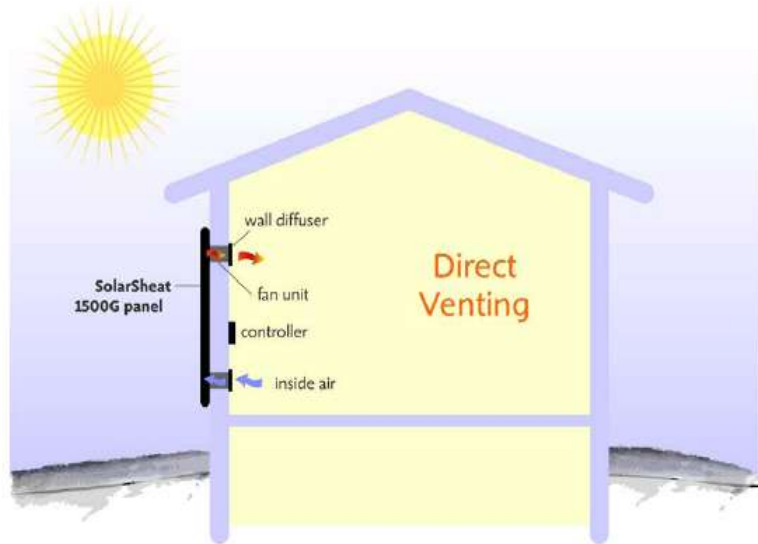
www.yoursolarhome.com



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How It Works



How It Works



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Solar Wall Systems



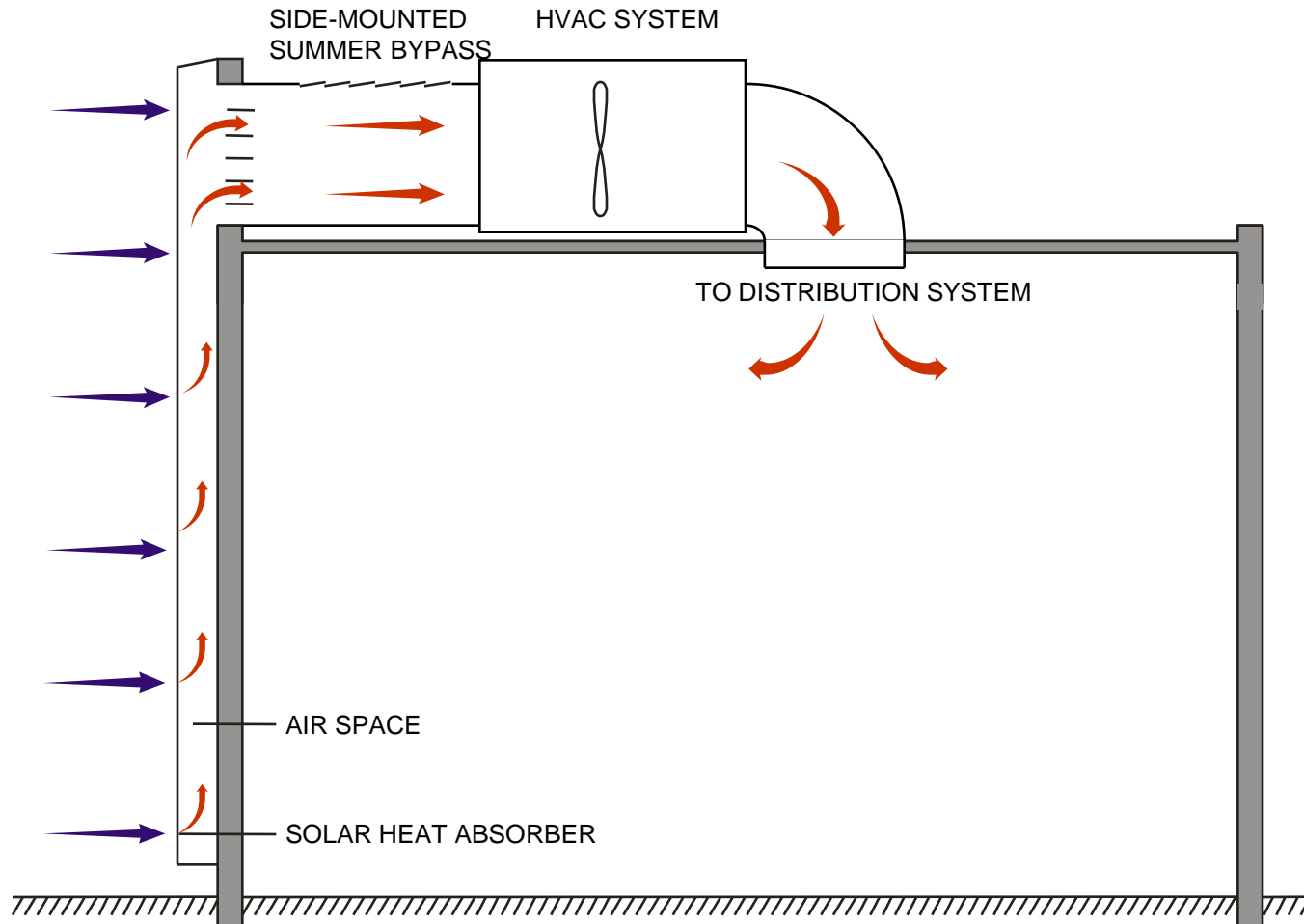
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Inspire Solar Wall Installation



Heating Season



Heated air is then evenly distributed in the building via conventional distribution system

Industrial



Photos courtesy of Conserval Engineering



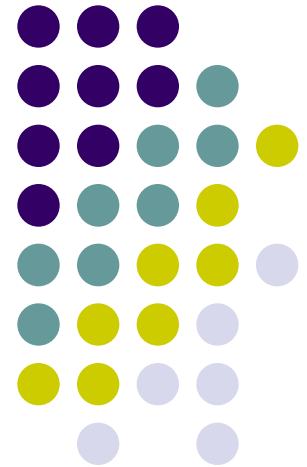
Schools & Other Institutions



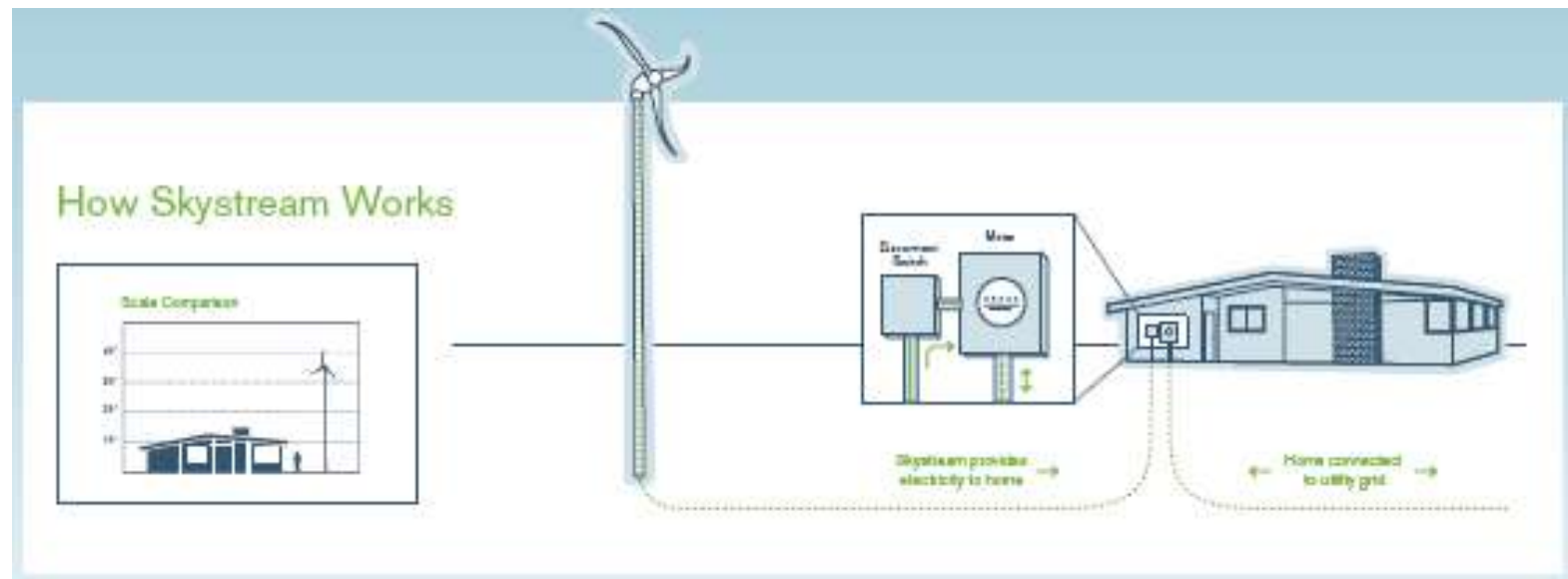
Photos courtesy of Conserval Engineering



Wind Turbines Systems



How it Works

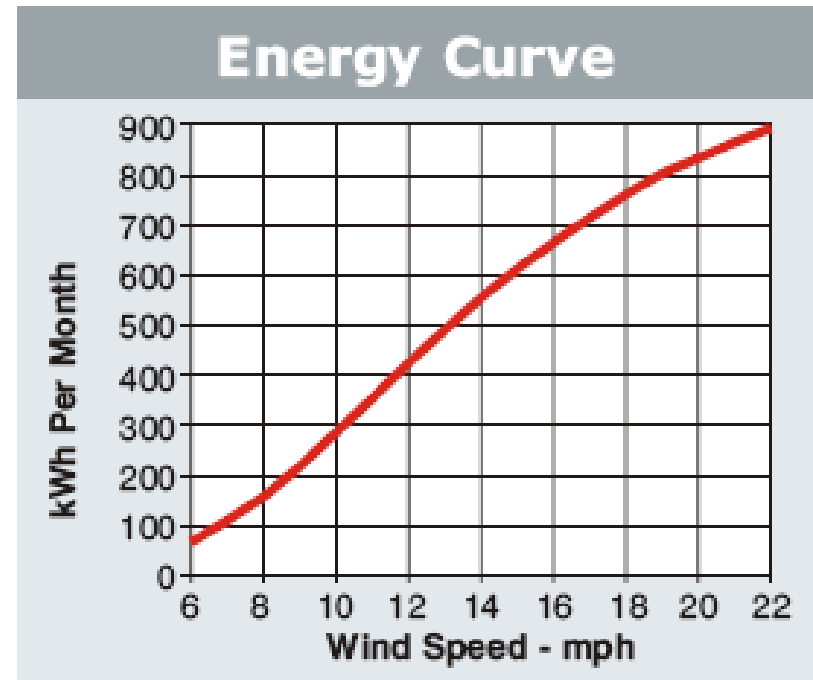


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Skystream 3.7

Cuba, MO



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Skystream Install Hannibal, MO



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Skystream Green Dirt Farm Weston, MO



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Skystream Install St. Joseph, MO



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Whisper 500 Weston, MO



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Southwest Wind Power Whisper Series



Whisper 100



Whisper 200



Whisper 500



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Iskra 5 KW



AMWS m/s	Annual MWh	Daily kWh
4	5.0	13.0
5	8.7	23.9
6	13.1	35.9
7	17.1	46.8
8	20.2	55.3
9	22.2	60.8



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Entegrity 50KW

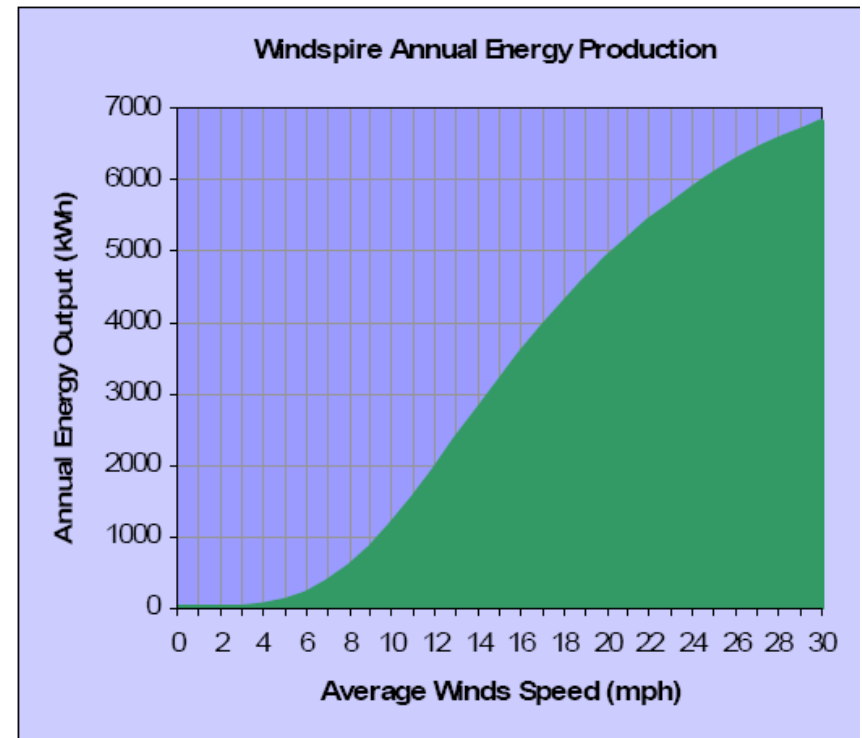


NorthWind 100 KW



Windspire 1.0 KW

The College School, Webster Groves, MO



VAWT for Roof Applications



BRAC Gray Water Recycling

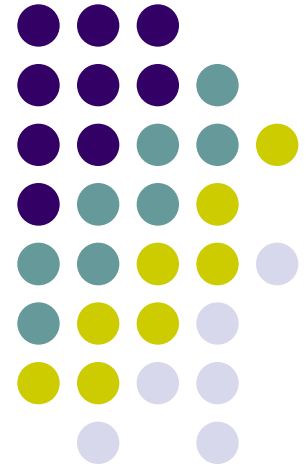


- About 1/3 of our water goes down toilet
- Can save 35-40% on annual water bill
- Filters used water from shower, bath and laundry then reuses it for toilet





More Installations



Wind, Solar, Green Roof

William A. Kerr
Foundation – St. Louis,
MO

3.6 KW Solar PV

1.8 KW Wind System



Hybrid Wind and Solar PV

KCMO Recycling Center

Off Grid - Battery Back-up



McCowan Gordon Green Trailer



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KCP&L Power & Light District Clock Tower



Vertical Axis Wind
Turbine

Grid-tied

Turbine supplies
electricity to light tower



Wind

Frieze Harley Davidson
O'Fallon, IL

LEED Registered

1.8 KW Grid-tied Wind
Turbine



Johnson County Sunset Drive Building



1.8 KW Wind Turbine



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LEED Points

- EA Credit 2: On –Site Renewable Energy
 - Use on-site renewable energy systems to offset building energy cost
 - 1 point – 2.5%
 - 2 points – 7.5%
 - 3 points – 12.5%
- ID Credit 1-1.4 : Innovation in Design
 - 1-4 points





Federal Incentives

- **Solar Federal Tax Credit**
 - 30% for Commercial and Residential
 - MARCS Depreciation
- **Wind Federal Tax Credit**
 - \$500/kilowatt up to \$4,000
- **Historic Tax Credits**
- **USDA Grants**
 - 25% of project cost for farms or rural small businesses
- **Adds Value to Property**

www.dsireusa.org



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Kansas Incentives

- **Property Tax Exemption**
- **State Loan Program**
 - Kansas Energy Efficiency Program
- **Energy Standards for Public Buildings**
 - Greensburg – Green Building Requirement for New Municipal Buildings
- **Solar Access Law/Guideline**





Missouri Incentives

- **State Loan Program**
 - MDNR Energy Revolving Fund
- **Utility Loan Program**
 - Columbia Water and Light – Super Saver Loans
- **Utility Rebate Programs**
 - Columbia Water and Light – Solar and Efficiency Rebate
- **Net Metering**
- **Interconnection Standards**
- **Renewables Portfolio Standard**
 - Columbia Renewables Portfolio Standard
 - State Renewable Energy and Energy Efficiency Objective
- **Solar Access Law/Guideline**





Other Grant/Loan Sources

- Kansas Green Schools Program
 - www.kansasgreenschools.org
 - Grants up to \$4,500 for public and private K-12 schools
- Kansas Wind Applications Center
 - <http://www.eece.ksuedu/psg/wac/>
 - Rural Schools – K-12 – Five Skystreams/yr
- StEEP Foundation
 - www.steppfoundation.org
 - Gov't, Non-profits, Academic
- Kresge Foundation
 - www.kresge.org
 - Planning grants for sustainable design
- Bonneville Environmental Foundation
 - www.b-e-f.org/grants
 - Solar 4R Schools
- MO Dept. of Elementary and Secondary Education
 - www.dese.mo.gov

Vocational-Technical Educational Enhancement Grant



Commercial Paybacks and IRR



- Solar Air Heating <4 yrs 26% IRR
- Solar Hot Water <6 yrs 19% IRR
- Solar PV <10 yrs 10.5% IRR
- Solar Lighting Very competitive in remote areas
- Wind Varies depending on resource



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QUESTIONS?



THANK YOU!

SUSAN BROWN

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