

Solar America Cities

U.S. Department of Energy
Solar Energy Technologies Program



Solar America Cities
Accelerating Solar on a Local Level

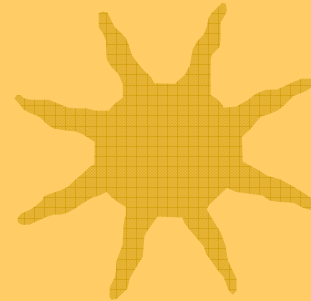
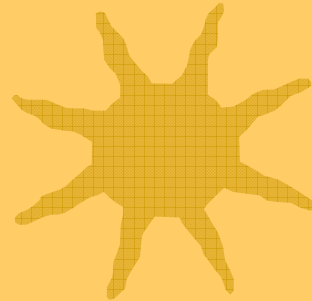
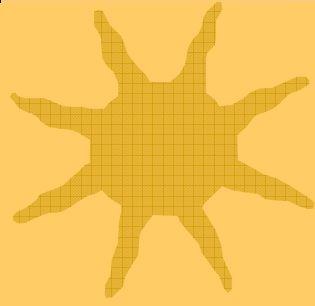
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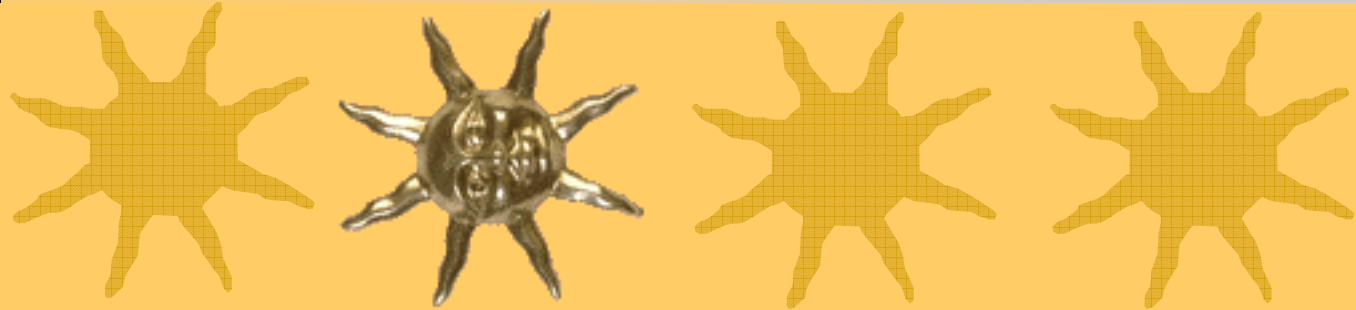
Sandia
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Global Energy Use

Renewable Energy Consumption and Electricity Preliminary Statistics, 2007
Release Date: May 2008

Energy Source	2003	2004	2005	2006	2007	Percent of Total	Percent of Renewable
Total	98.21	100.35	100.50	99.86	101.61		
Fossil Fuels						84.89%	
Coal	84.08	85.83	85.82	84.66	86.25		
Coal Coke Net Imports	22.32	22.47	22.80	22.45	22.79		
Natural Gas ^a	0.05	0.14	0.04	0.06	0.03		
Petroleum ^b	22.90	22.93	22.58	22.19	23.63		
Electricity Net Imports	38.81	40.29	40.39	39.96	39.82		
Nuclear	0.02	0.04	0.08	0.06	0.11	0.10%	
Renewable	7.96	8.22	8.16	8.21	8.42	8.28%	
Biomass ^c	6.15	6.26	6.44	6.92	6.83	6.72%	
Biofuels	2.82	3.02	3.15	3.37	3.62		3.56%
Waste	0.41	0.51	0.60	0.80	1.02		
Wood Derived Fuels	0.40	0.39	0.40	0.41	0.43		
Geothermal	2.00	2.12	2.16	2.17	2.17		
Hydroelectric Conventional	0.33	0.34	0.34	0.34	0.35		0.35%
Solar/PV	2.83	2.69	2.70	2.87	2.46		2.42%
Wind	0.06	0.07	0.07	0.07	0.08		0.08%
	0.12	0.14	0.18	0.26	0.32		0.31%

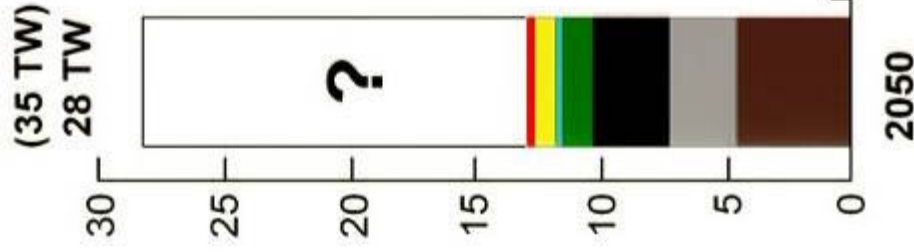
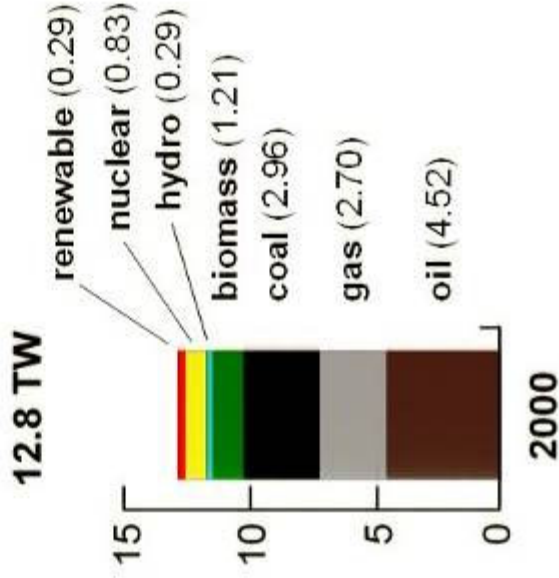


Global Energy Demand Growth

Lewis and Nocera. 2006. *Powering the Planet: Chemical challenges in energy utilization*

Global Energy Inventory

Lewis (Caltech) and Nocera (MIT)
PNAS Perspective, 2006



$$\dot{E} = N \cdot (\text{GDP}/N) \cdot (\dot{E}/\text{GDP})$$

\dot{E} = world energy consumption rate

N is population (9.4 billion)

GDP/N is per capita GDP

GDP/N = 2.3% per yr
\$7,500²⁰⁰¹ to \$15,000²⁰⁵⁰

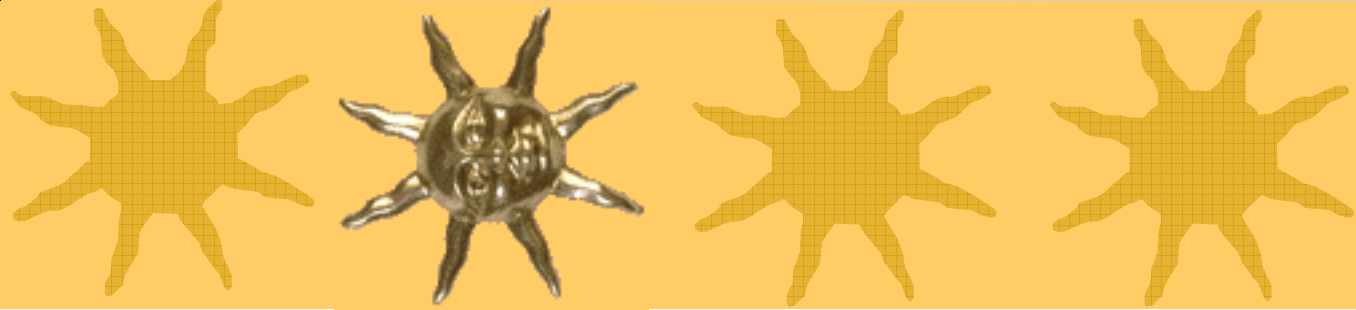
\dot{E}/GDP is energy intensity

(energy consumed per unit of GDP)

$\dot{E}/\text{GDP} = -0.8\%$ per yr
0.29 W/(\$/yr)²⁰⁰¹ to 0.20 W/(\$/yr)²⁰⁵⁰

therefore \dot{E} will grow on average:

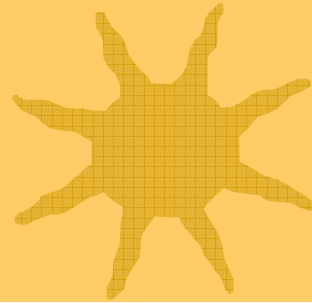
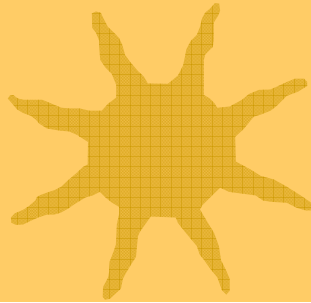
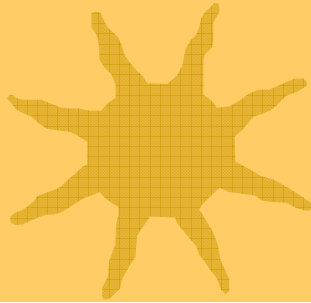
2.3%/yr - 0.8%/yr = **1.5%/yr**



Solar Energy Supply Growth

Solar Energy Supply Growth Rates Required to meet Market Share Goals, assuming 1.5% Global Energy Demand Growth

Market Share by 2027	Required Solar energy Supply
0.08%	1.50%
1.00%	16.03%
10.00%	30.98%
20.00%	35.84%
30.00%	38.77%
40.00%	40.89%



DOE's Approach to Solar Market Transformation

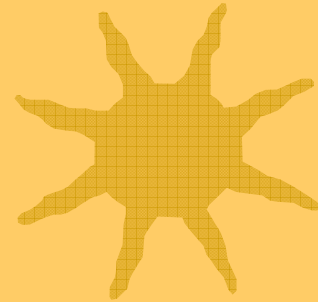
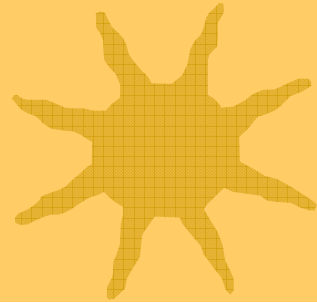
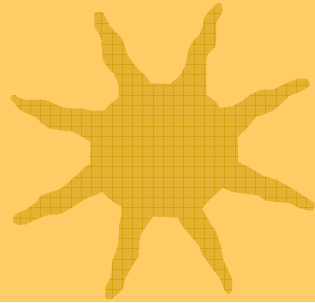
Reduce market barriers and promote market expansion of solar energy technologies.

Activities

- ★ Solar America Cities
- ★ Solar America Showcases
- ★ Government Solar Installation Projects
- ★ Solar America Board for Codes and Standards
- ★ State Technical Outreach
- ★ Utility Technical Outreach
- ★ Workforce Development
- ★ Solar Decathlon



Solar America Cities



Solar America Cities contribute to DOE's goal of making PV cost-competitive with conventional grid electricity by 2015.

OBJECTIVE

- ★ Partner with cities committed to achieving a sustainable solar infrastructure through a comprehensive, city-wide approach to solar technology that facilitates mainstream adoption and provides a model for others.

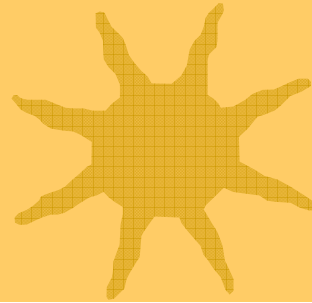
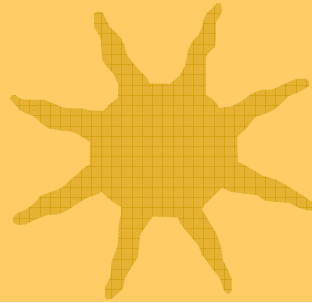
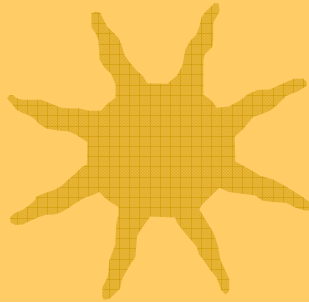


Solar America Cities

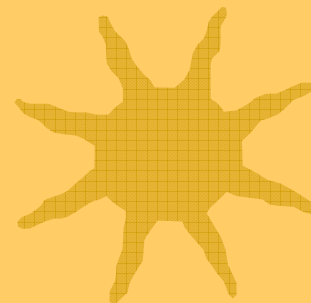
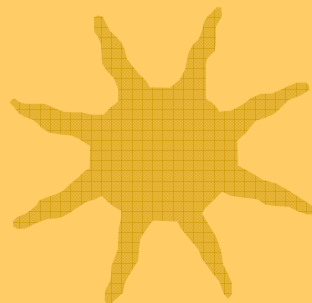
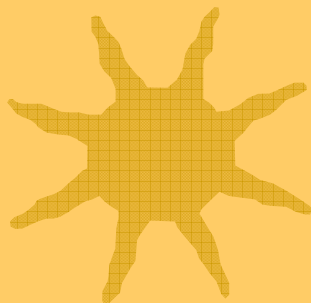
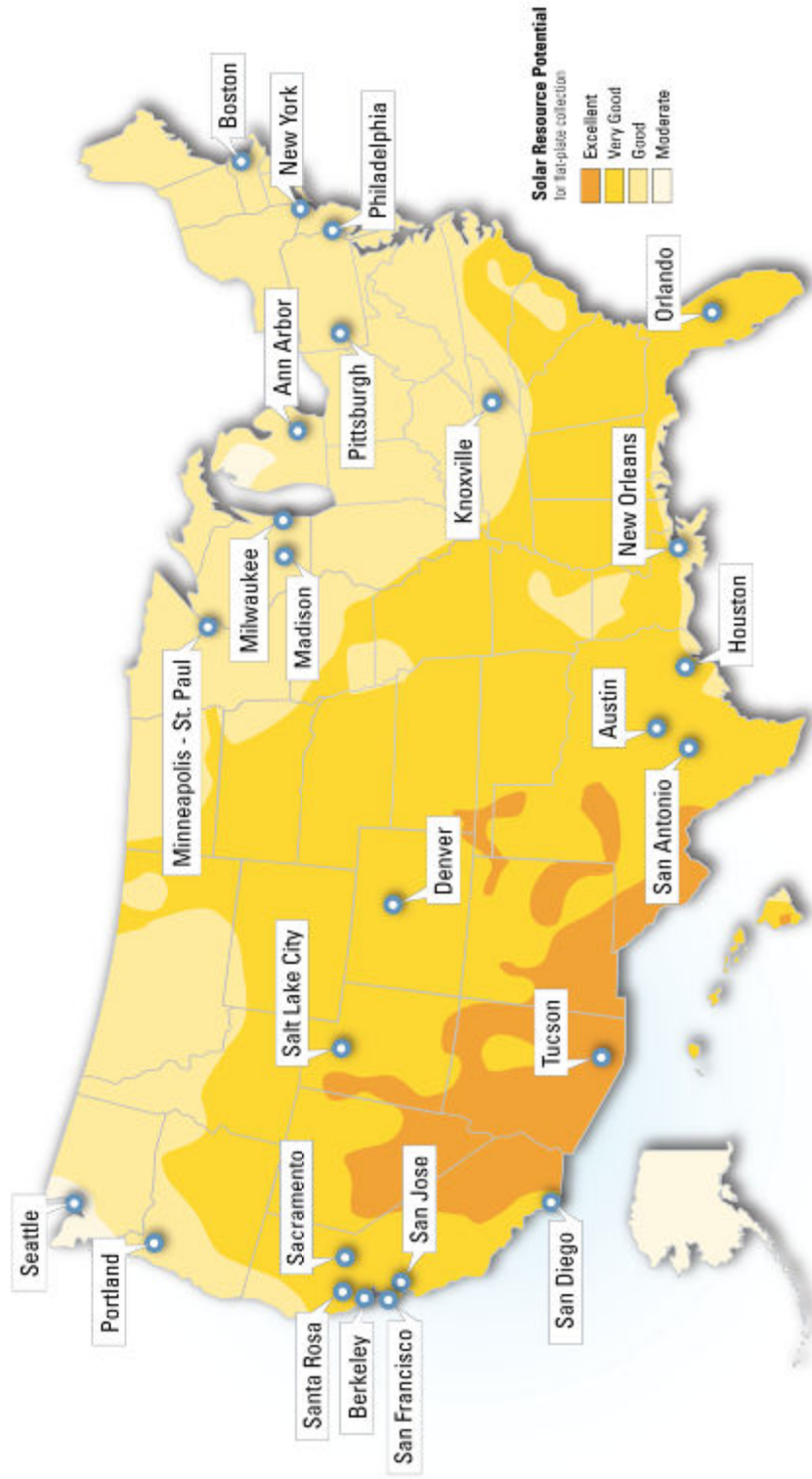
SELECTION PROCESS

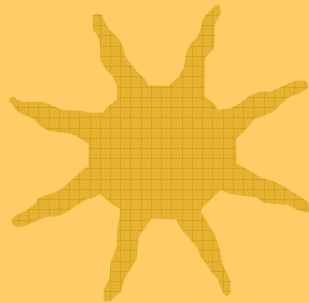
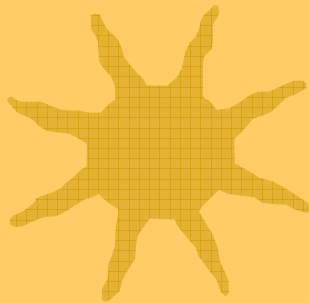
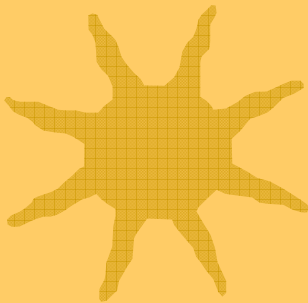
Competitive awards granted to cities of 100,000 or more committed to:

- achieving a sustainable solar infrastructure
- through a comprehensive, city-wide approach
- that facilitates mainstream adoption of solar
- and serves as a model for other cities to follow.



The 25 Solar America Cities





Solar America City: Tucson, Arizona



“Tucson Solar Initiative”

Goals

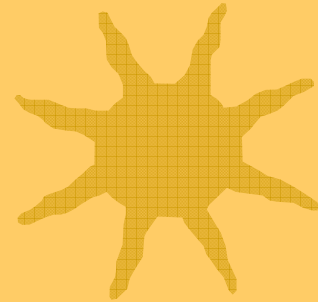
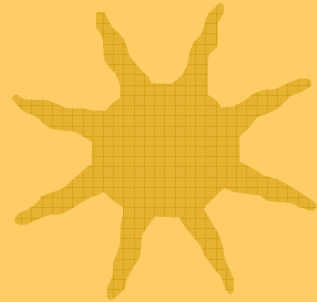
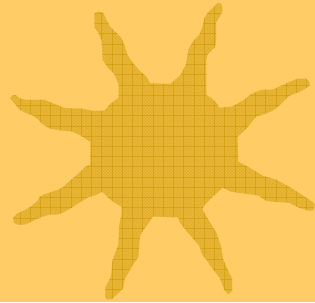
- Expand the Tucson solar energy market through accelerated investments and establish a mechanism for sustainable solar energy integration for the next 10 years
- Transform knowledge and financing market barriers into opportunities for solar installations

Project Highlights

- Implement a City of Tucson Solar Energy Integration Plan and a Greater Tucson Solar Energy Development Plan
- Enhance financing techniques for large-scale solar energy installations
- Develop and disseminate solar best practices and other outreach



Participants: The City of Tucson, Tucson Electric Power, Greater Tucson Coalition for Solar Energy, Tucson-Pima Metropolitan Energy Commission, the Arizona State Department of Commerce Energy Office



Solar America City Partnerships

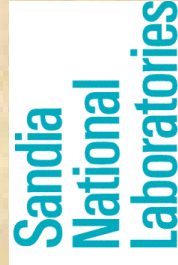
Financial Assistance:

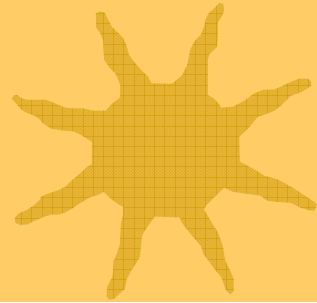
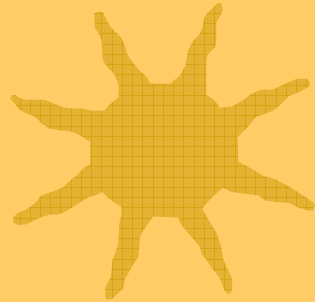
~\$200,000 per city

Technical Assistance:

~\$250,000 per city

Multi-institutional, multi-disciplined “tiger teams” provide tailored assistance based on city’s needs





Key Barriers to Solar Commercialization

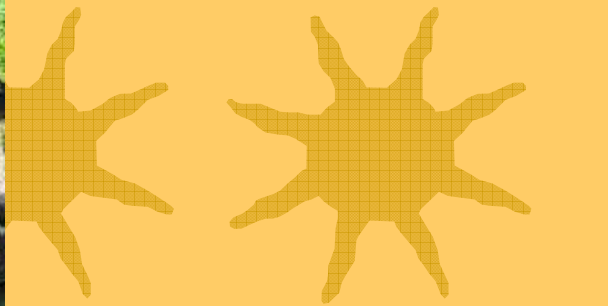
- ★ Lack of communication, information dissemination, and consumer awareness
- ★ Inadequate codes and standards
- ★ Lack of appropriate, consistent interconnection standards
- ★ Lack of equitable and effective net-metering guidelines
- ★ Inconsistent utility rate structure practices
- ★ Complex permitting procedures and fees
- ★ Inconsistent and lack of widespread incentives and other drivers
- ★ Limited education/experience of key building trades with solar technology
- ★ Lack of trained technical personnel, reliable installers, and maintenance services
- ★ Lack of flexible, sophisticated, proven financial approaches

Market barriers increase the price of solar systems and the time before use.

Market transformation activities aim to reduce prices and time, resulting in widespread deployment.



Solar America City Projects



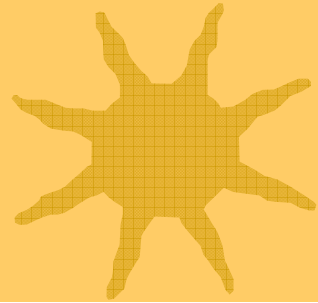
- Streamlined permitting
- Solar access laws
- Building/zoning code review
- Creative financing programs
- Economic development studies
- Workforce development
- Code official/installer training
- K-12 Education
- Solar Mapping
- Public outreach



What Makes Solar America Cities Unique?



- Federal/City partnership
- Financial assistance PLUS hands-on Technical Assistance to Cities
- Strong City and DOE network facilitates information sharing and replication potential.





Solar America Cities – Maximizing the Network

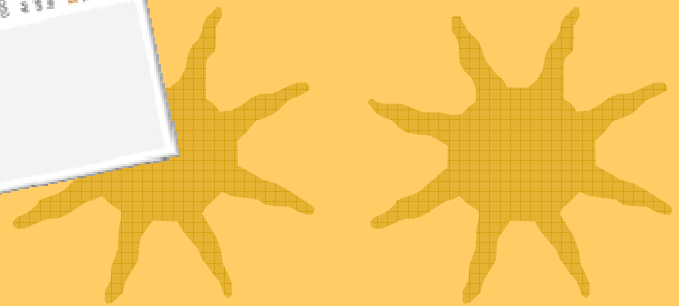


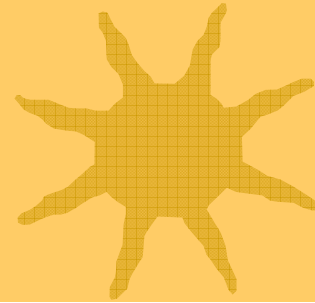
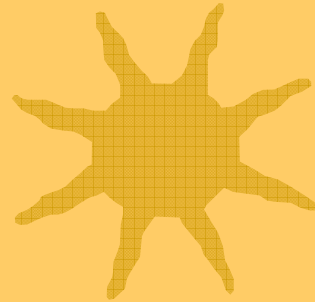
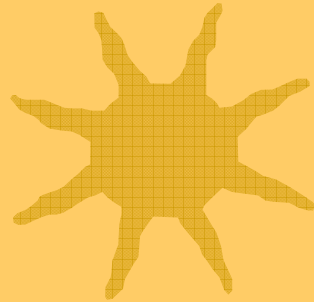
Crosscutting Analysis

- Solar mapping
- Interconnection in area/spot networks
- Creative financing
- Rate structures
- PV and Solar Hot Water Training
- Solar Economics Development
- Prospective Solar Owner Agent

Outreach Tools

- 2nd Annual Meeting, March 30 – April 2, 2009 in San Antonio
- Solar America Cities website
- Regional workshops





Solar America Cities – Going Forward

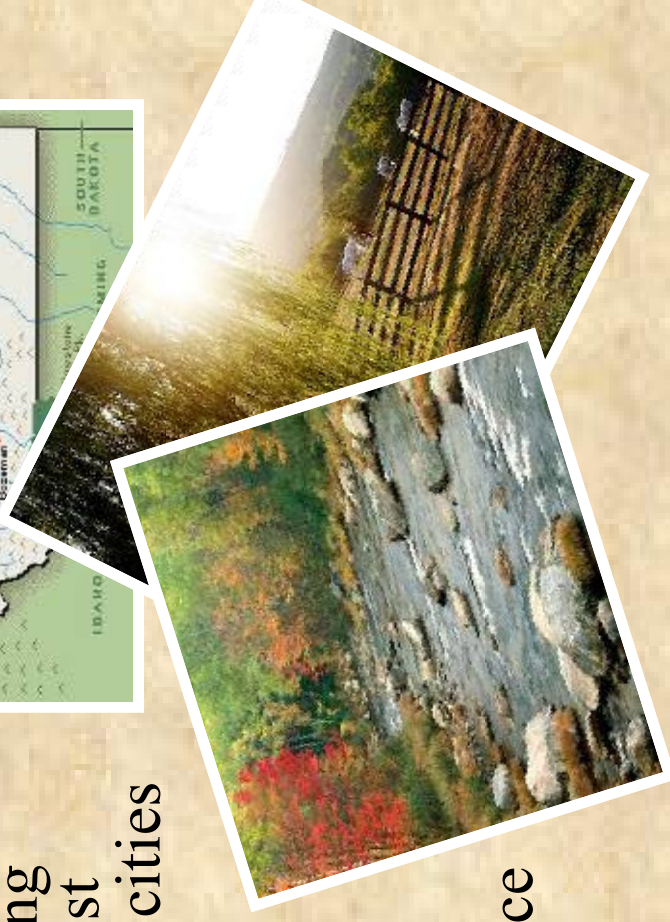
- Focus on helping 25 partner cities develop sustainable local solar markets

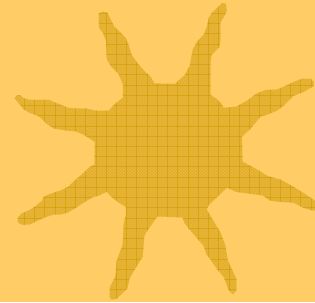
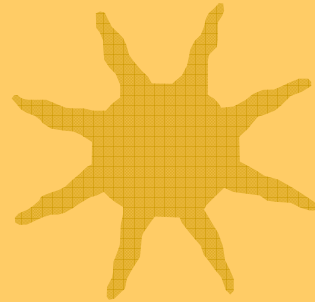
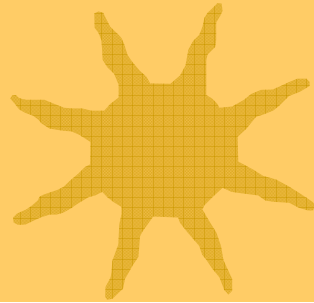
- **Potential New Activities**
 - Solar America Cities Special Projects
 - Additional funding to cities ready to raise the bar
 - City Technical Outreach
 - Provides technical assistance to non-Solar America Cities.
 - Uses a series of learning modules to provide best practices interested cities across the U.S.



Possible New Activities: *City Outreach*

- Provides technical assistance to non-Solar America Cities.
- Uses a series of learning modules to provide best practices to interested cities across the U.S.
- Modules are mostly uniform across cities.
- Informational assistance only; no partnerships formed or financial assistance provided.





Visit us on the Web!

Powering the Cities of Today



www.solaramericacities.energy.gov