

# SOLAR UNITED NEIGHBORS

## SUN PATCH Program



**Thank you for your interest in earning the SUN Patch Program!**

Questions? Please feel free to reach out to us at any time at

[getinvolved@solarunitedneighbors.org](mailto:getinvolved@solarunitedneighbors.org)

### **ABOUT SOLAR UNITED NEIGHBORS:**

We are a non-profit organization dedicated to helping people go solar, connect with other solar supporters locally and nationally, and fight for solar -friendly policies that protect the rights and interests of solar owners and solar supporters.



### **WE HELP PEOPLE GO SOLAR IN TWO WAYS:**

- **Solar co-ops:** Solar co-ops are groups of neighbors in a particular community or area who are interested in going solar around the same time. Solar United Neighbors educates local residents about how solar works, generates interest in and facilitates a bulk purchase process, and provides support to co-op participants through the process of going solar.
  - Learn more about our solar co-ops [here](#).
- **On Your Own:** Our Solar Help Desk is staffed by solar experts who help homeowners, farmers, and businesses navigate the process of going solar, connect to local installers, and review proposals to ensure that consumers get the best possible solar pricing and services available.
  - Learn more about how we can help [here](#).

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### PURPOSE OF THE SUN PATCH:

To allow kids to **DISCOVER** how solar works; **CONNECT** solar energy with their lives, community, and the planet; and **TAKE ACTION** on what they've learned to use solar energy as a renewable and pollution-free resource.

*Note: The activities and information contained in this patch program are designed for students in elementary to middle school.*



### Instructions on how your kids can earn the patch:

1. Complete the activities and discussions listed below in the **DISCOVER**, **CONNECT**, and **TAKE ACTION** sections.
2. Leader/Parent-use the information and resources contained here to facilitate conversations, answer questions, and lead activities.
3. Complete the **REPORTING** section at the end of this patch program document to get your Solar United Neighbors patches.



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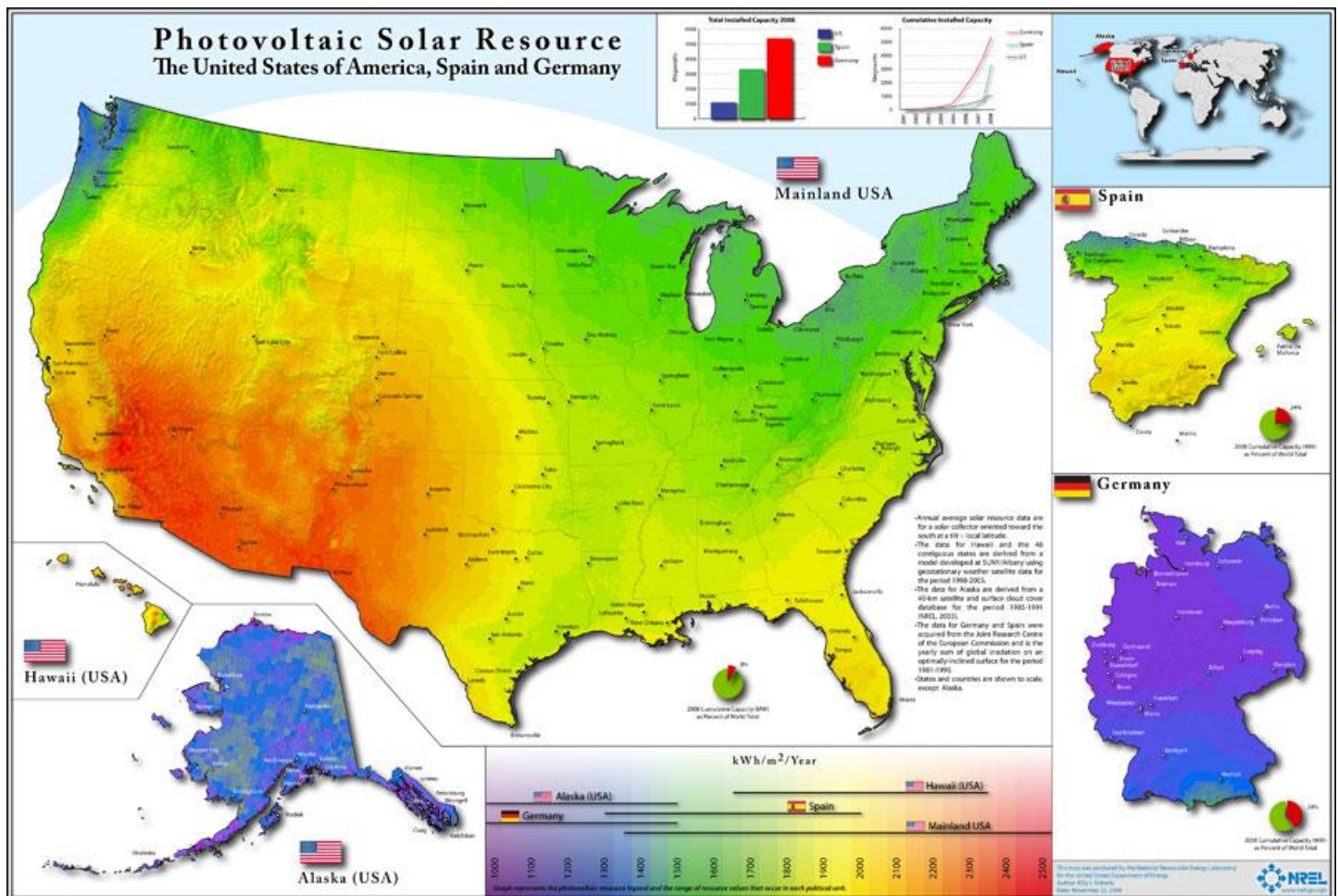


### DISCOVER

#### PART 1: What is solar energy?

- The sun is a large ball of burning gas in the center of our solar system. It's made of mostly hydrogen that burns hotter than you could ever imagine.
- The sun is the largest source of energy in our solar system.
- More energy from the sun hits the earth in one hour than the ENTIRE world uses in a year. That's a LOT of energy!
- The energy that the sun produces is called solar energy. Solar means "from the sun."

**ACTIVITY:** Use the map below to compare the level of solar resources available in the United States, Spain, and Germany. Which areas have the most solar resources? Which have the least? How does your home state stack up?



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### PART 2: How solar works

- Energy from the sun can be used to create free, clean electricity!
- A solar photovoltaic (PV) cell converts sunlight into electricity.
- Most solar PV cells are made from silicon. Silicon is used to make many other products, including concrete, glass, ceramics, cosmetics, and computers.

Silicon also makes sandy beaches!



A solar panel (also called a “module”) is made of solar PV cells:



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Solar panels are wired together to form a “solar array”:



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arrays can go on your roof:



Or on the ground:

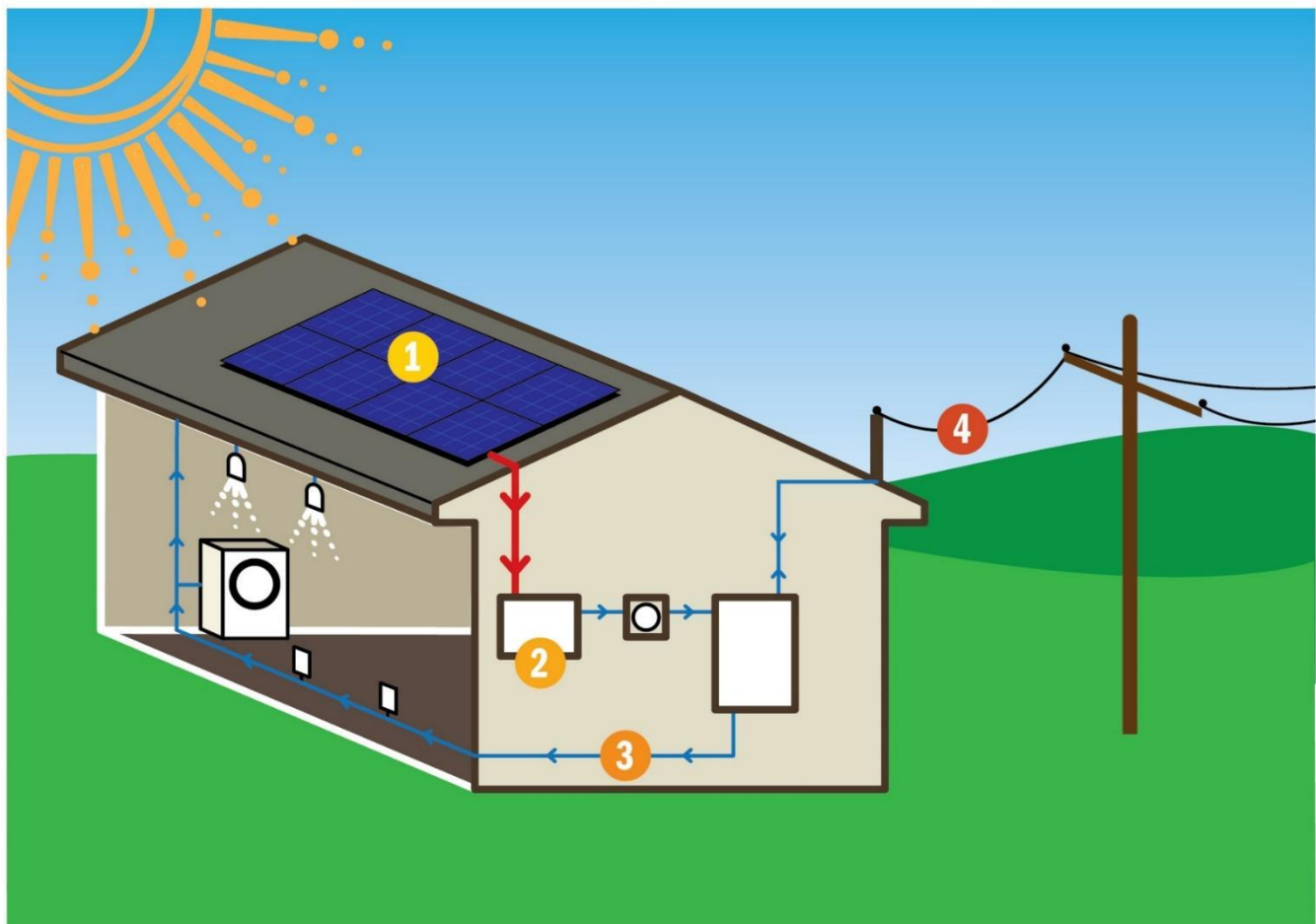


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- Electricity from your solar panels flows into your home to power your appliances and electronic device
- Excess electricity flows through your electric meter to help power your neighbors' homes, too.



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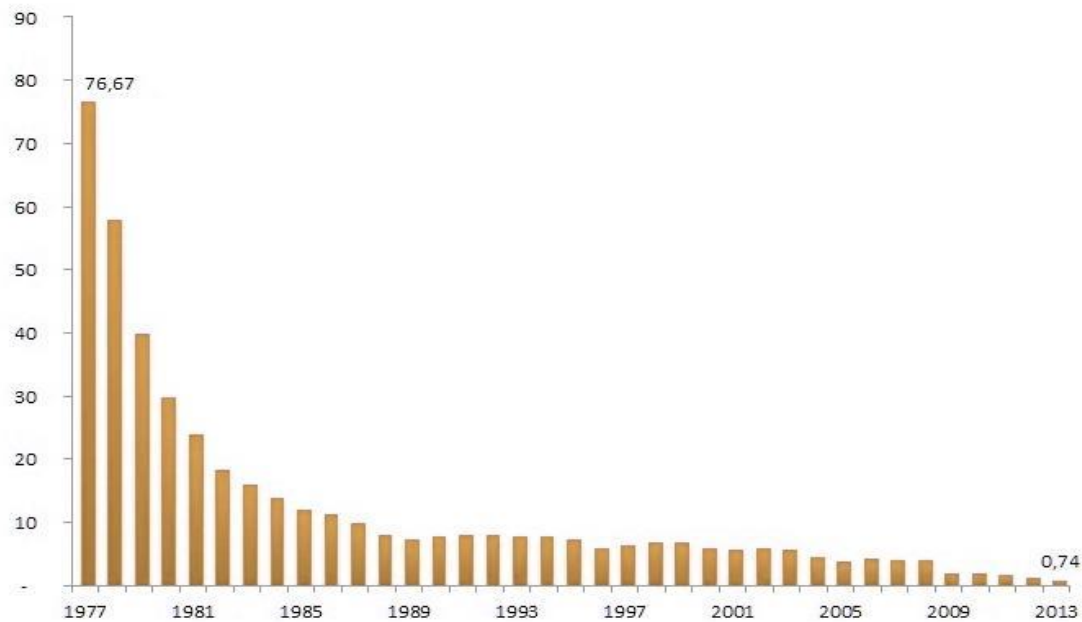


### Solar's growing role in our electric system

- Solar provides clean, renewable, locally produced energy. And solar panels are more affordable than ever! In fact, the cost of solar has dropped 90% since the 1970s.

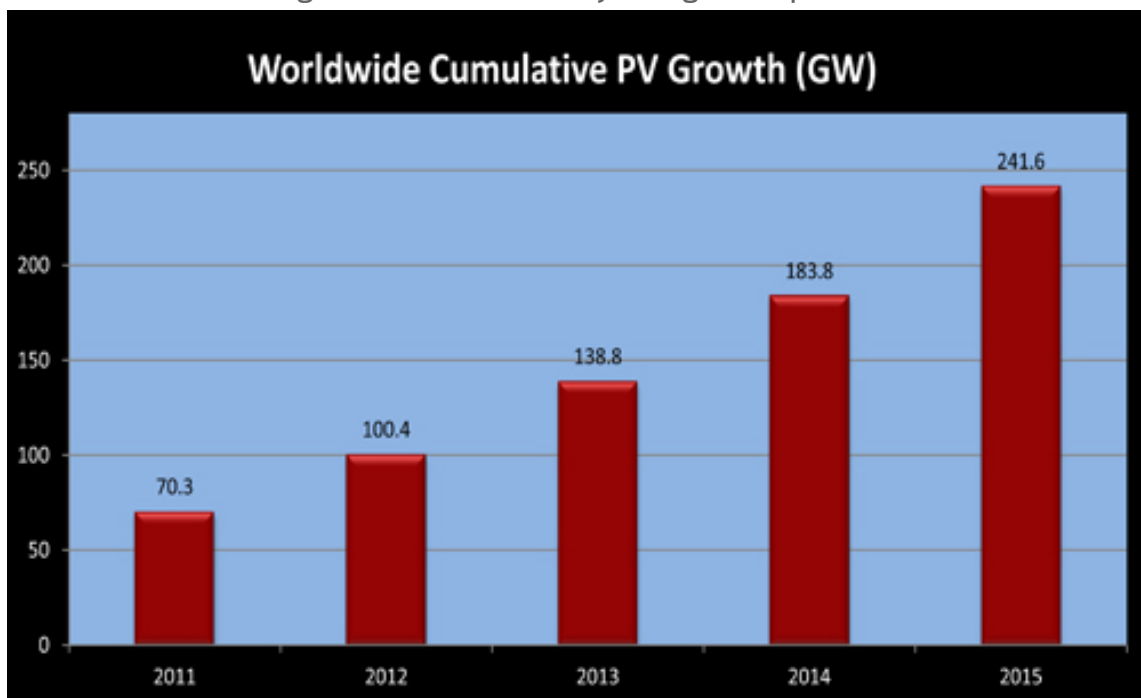
#### The Swanson effect

Price of crystalline silicon photovoltaic cells, \$ per watt



Source: Bloomberg New Energy Finance

- Around the nation and the world, more and more homes, businesses, schools, libraries, and governments are making their own electricity using solar panels.





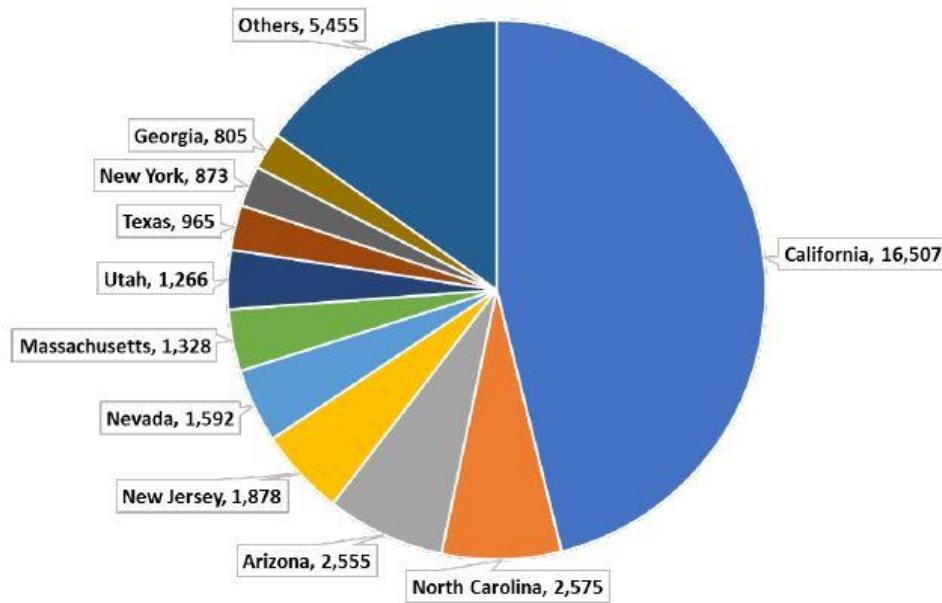
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- In the United States, California leads the way in solar installations:

Cumulative Solar Capacity through Q3 2016 (MW)



### ACTIVITY:

Is your home state listed on this chart? Find out more about solar in your state using [the interactive map available here](#). How many solar arrays have been installed in your state? How many solar jobs are in your state?

## CONNECT

**ACTIVITY 1:** Do you know anyone who has solar panels on their house? Do you have solar panels on your house? If you know someone with solar panels, *ask them about it!*

- Suggested questions:
  - Why do you have solar panels?
  - When were your solar panels installed?
  - How do your solar panels benefit you?
  - What has happened since you installed your solar panels?

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Neighborhood Scavenger Hunt - take a walk (or drive) around your neighborhood and look up!  
Have you ever looked up at the roofs of houses before?

- How many solar panels can you find in your community? Don't forget to check stop lights, street lamps, construction signs...even on the ground!
- Can you find solar panels in five locations in your neighborhood? What are the solar panels powering?



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### TAKE ACTION

#### Activities for Elementary and Middle School Students:

1. Watch [the videos on this page](#) to learn why people choose to go solar.
2. Ask 5 friends, teachers, or family members what they know about solar energy and if they think it is important - why or why not?
3. Create a collage about why you think solar energy is important. Include things you've learned from these activities and heard from your friends, family, and teachers.
4. Make s'mores with the sun! Follow the instructions to make a solar oven:



#### SOLAR S'MORES OVEN INSTRUCTIONS:

##### 1. WHAT YOU'LL NEED:

- Cardboard pizza box (the kind delivered pizza comes in)
- Aluminum foil
- Clear tape
- Plastic wrap
- Black construction paper
- Ruler, wooden spoon or stick
- Graham crackers, chocolate bars, marshmallows

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### 2. WHAT YOU DO:

- Cover the inner side of the top and bottom of the box with aluminum foil so that it will reflect rays from the sun. To do this, tightly wrap foil around it, then tape it to the back, or outer sides.
- Line the bottom of the box with black construction paper where the s'mores will be placed— black absorbs heat.
- Place the s'mores ingredients in the box as shown in the picture.
- Use clear plastic wrap to create an airtight window for sunlight to enter into the box. Do this by opening the box and taping a double layer of plastic wrap over the inside of the box as seen in the picture above. Leave about an inch of plastic overlap around the sides and tape each side down securely, sealing out air.
- The best hours to set up your solar oven are when the sun is high overhead - from 11 am to 3 pm. Take it outside to a sunny spot and adjust the flap until the most sunlight possible is reflecting off the aluminum foil and onto the plastic-covered window. Use a ruler, wooden spoon, or stick to prop the lid at the right angle.
- Reposition your solar oven when needed, so that it faces direct sunlight. You should check periodically on your oven to make sure it is in the sun. Make sure that the foil-covered flap is reflecting light into the box through the plastic-covered window.
- Wait until the chocolate gets soft and the marshmallows are warm and toasty. Then peel back the plastic, combine the s'mores together and enjoy your warm, tasty treat from the sun!

### 3. WHAT HAPPENED?

The heat from the sun was trapped inside your solar oven, and it got very hot in there. Ovens like this one are called collector boxes, because they collect sunlight. As it sat out in the sun, your oven eventually heated up enough to melt the chocolate and marshmallow!

### 4. HOW DOES IT HAPPEN?

Rays of light are coming to the earth at an angle. The foil reflects the light ray and bounces it directly into the opening of the box. Once it has gone through the plastic wrap, it heats up the air that is trapped inside. The black paper absorbs the heat at the bottom of the oven, and the plastic wrap keeps it from escaping out the sides of the oven. Your solar oven will reach about 200° F on a sunny day, and it will take longer to heat things than a conventional oven. Although this method will take longer, it is very easy to use, and it is safe to leave alone while the energy from the sun cooks your food.

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### REPORTING

Congratulations! You've completed the SUN patch! Solar United Neighbors thanks you for learning about solar energy and helping to spread the word about solar in your community!

#### **Instructions on how to get your SUN patches:**

To receive your patch(es), please provide the information requested below and send by email to [getinvolved@solarunitedneighbors.org](mailto:getinvolved@solarunitedneighbors.org).

Contact Name and Address:

Number of kids who participated in the program:

Number of patches requested:

Total number of hours spent on the program:

How did you hear about the SUN patch?

What did your kids learn from this program?

Additional feedback about the SUN patch program?

Mailing address that you would like us to mail your patches to:

Optional: Photos of your kids earning the SUN patch!



Once we receive your patch request information, we will work on getting your desired number of patches mailed out to you. We are happy to provide you with the patches your children have earned free of charge.