Solar Energy Generation at the Community Level

Briefing Paper Five of

Black, Brown and Green

FOR IMMEDIATE RELEASE

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Renewable Energy is Black Brown and Green

Black, Brown and Green, a program of the Center for Social Inclusion, explores the economic opportunities and hurdles for green business models in communities of color. Black Brown and Green offers resources to communities and companies to help them identify their needs and develop a strategy for entering the Green Energy Sector.

Policy makers, investors and stakeholders need a firm grasp of business structures that protect community control and provide ownership opportunities. They need strategies for raising the right type and levels of capital, and they need knowledge of accessible technology. Control and ownership of the green energy supply enables communities of color to share in the tremendous economic potential of the green energy market and adds depth to the broader economy.

Businesses and communities must lay a foundation for future success, one that strengthens individual and community prospects today. The fifth paper in our series, Solar Energy Generation at the Community Level, explores factors influencing solar energy production today, from environmental conditions and economic changes to current policy and available technology.

About CSI
The Center for Social Inclusion is a national policy advocacy organization with the goal of building opportunity for all by dismantling structural racism. We conduct applied research, support the development of multi-racial alliances, and develop transformative policy models.
Environmental Overview

Solar energy that reaches the Earth can be converted into other forms of energy, such as heat and electricity. The maps of the United States (shown below) represent the availability of solar energy by geographical location for use in electricity generation or other applications such as heating. The Southwestern United States has the highest potential of all the areas for solar energy projects, though this potential is constrained by limited water supplies.

Converting solar energy into useful electricity or heat requires large amounts of water to scale up based on current technology, which we discuss in the next section.

Figure: U.S. Photovoltaic Solar Resource

Figure: U.S. Concentrating Solar Resource
Technology Prospects

Current solar technology is highly scalable allowing small and large, on-grid and off-grid conversion of solar energy directly from the sun into useful electricity.\(^1\) The generation of direct current (DC) electricity from sunlight, consists of two types of technology–solar photovoltaic (PV) and concentrated solar power (CSP). Photovoltaic (PV) technology converts the electromagnetic energy in sunlight into direct current.\(^2\) Electricity is transferred into alternating current (AC) via a power inverter. PV technology works without moving parts or power-plant-size capital investments, think of the solar panels found on people’s roofs. Solar is used in a variety of on and off grid applications, from lighting products to installations that provide bulk power to the grid.

Concentrated Solar Power (CSP) produces electricity by concentrating the sun’s energy using a series of mirrors, which can be made to follow the sun’s movements to optimize the amount of power generated. The heat produced is used to boil water into steam which drives a turbine to generate electricity. Solar CSP generates intense heat and can be used to drive a generator, even after sunset by drawing on the thermal energy stored in fluid used to capture the sun’s heat within CSP technology. Solar CSP technology is still early in its development and the capital and expertise required to build a plant is much higher than PV.

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\(^1\) National Electricity Reliability Council. Accommodating High Levels of Variable Generation. April 2009

\(^2\) Ibid page 27
For these reasons, this section will focus on community development of solar PV.

PV systems are simple, passive systems of energy generation—no moving parts and systems can adapt to the physical constraints of facilities in most communities. They are noise-free and have low maintenance requirements. Since they are modular, systems can be scaled from watt to mega-watt-level generation. The most mature solar PV technology utilizes silicon, which makes up the vast majority of the solar PV market. Silicon technology has two types; multi-crystalline solar PV, which accounts for the majority of global PV manufacturing, is less efficient (14-16%) than mono-crystalline solar PV (16-18%), but is less expensive due to its simpler manufacturing technique. The next generation of PV technology is known as Thin film PV and is still in its early commercialization phase. It promises to consume much less material than crystalline silicon cells and can bend to match the shape and color of building exteriors while achieving efficiencies of 30%, double that of multi-crystalline solar PV.³

There are few companies who operate in every aspect of the solar PV supply chain (see graphic above). High capital costs and required expertise act as barriers to entry in the cell and component manufacturing industries and intense competition. But there are significant business opportunities for communities in the delivery, installation and customer service segments that are in high demand and increasing. The installation space is highly fragmented because small companies and individuals acting as installers frequently concentrate on a small region of the country.

³ Department of Energy, Solar Energies Technology Program
Why Distributed Generation Works for Communities

Today’s energy supply is often generated in large facilities and flows in one direction, from central power stations to transmission and distribution facilities and then to consumers (see graphic).

Changes in technology, consumer preferences, and recent regulation are changing this structure. Distributed Generation is an emerging framework driven by the ability of small operations, even individual households, to generate, use, and sell energy. This approach to harnessing and distributing energy from many small energy sources is fueling new market opportunities and enhanced industrial competitiveness.⁴

Distributed Generation is a powerful model that raises an important question: How can consumers also act as fuel producers? There is more than one answer to this question, and each raises the prospect of new social and economic relationships that have the potential to bring structural changes, improve infrastructure, increase wealth and promote greater political interdependence between communities of color and the larger regional economy.

The energy independence associated with distributed generation makes possible a host of potential benefits. Researchers have calculated an estimated 30% savings on electric bills⁵ from shorter distribution routes alone. Fewer large centralized plants reduce the number of

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⁴ European Union, Energy Research
⁵ Ibid
expensive high-voltage lines.\(^6\) Fewer and shorter lines will result in less land appropriated to host power lines freeing land for conservation and other uses. Reduced reliance on existing technology can decrease congestion on the transmission grid.\(^7\)

Over time the costs of distributed generation will be much lower, but direct costs include outlays for equipment, installation, fuel operation and maintenance (O&M) expenses, and utility fees\(^8\) In a recent article published by VentureBeat, the CEO of EcoVolve said “a distributed energy system has the advantages of being more efficient, low maintenance, less carbon-intensive and, most importantly, cheaper.”\(^9\) Critically important from an ongoing cost perspective, distributed generation “does not require an army of engineers” to achieve economic viability for a generator of any scale.

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**Distributed generation provides new roles for communities to preserve and increase social equity, environmental quality, energy independence and wealth.**

For many communities, particularly communities of color, lack of homeownership and the upfront costs of distributed generation are often significant barriers to the environmental and economic benefits of green energy. Federal, state and municipal governments are offering tax credits, rebates, incentives and grants, but under the most optimal cases these incentives are simply insufficient to cover the costs of purchasing or installing a wind or solar system for on-site use.\(^10\)

\(^6\) Definition used in this report for the term *Distributed Generation* can be found on Wikipedia

\(^7\) Windustry.org

\(^8\) Congressional Budget Office. Prospects for Distributed Electricity Generation. 2003

\(^9\) Jacquot, Jeremy “Distributed energy is the future of renewable energy production, says Ecovolve” VentureBeat October 2, 2009.

\(^10\) Detailed information found at Windustry.org “Property Tax Financing Authorization” http://www.windustry.org/property-tax-financing-authorization
Advocacy groups like Windustry and PaceNow (creator of the Property Assessed Clean Energy Bond) are encouraging property tax financing programs to cover some or all of the costs of installing or upgrading an energy generation system. This type of financing offers several major benefits:\footnote{Ibid}

- First, access to credit can help cover much of the upfront costs, and during tough economic times this program offers an alternative to people who cannot tap into home equity lines or gain low-interest personal loans.
- Second, the obligation to repay the loan stays with the property. Therefore, payments become the responsibility of whoever owns that property and is benefiting from the on-site electricity generation.

These models are an important step to increase access to the renewable energy sector. Yet, based on historic homeownership trends and current conditions, it is clear more must be done about the rising number of homes lost to foreclosure in order to prevent homeownership from becoming a bottleneck to the benefits of distributed generation.

There are a number of arguments for and against renewable generation at community level and there are arguments for and against centralized large scale generation (see table).
### Central versus Distributed Generation approach

#### Distributed System

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low transmission or distribution losses</td>
<td>Few accessible tools to promote greater individual responsibility</td>
</tr>
<tr>
<td>Can operate with or without connection to the transmission grid; Supports micro-grid systems</td>
<td>Ownership rights over wind, solar, waste resources is unclear</td>
</tr>
<tr>
<td>Expand business opportunity, technology and policy innovations into communities at the local level</td>
<td>Lack of standards for quality and cooperation</td>
</tr>
</tbody>
</table>

#### Central Systems Serving Community

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities and policy infrastructure are well understood by the industry</td>
<td>Transmission and distribution losses</td>
</tr>
<tr>
<td>Reliable supply and established monitoring protocols</td>
<td>Dependence on imported fuels</td>
</tr>
<tr>
<td>Clearly defined industry participants</td>
<td>Environmental impact of GHG and other pollutants</td>
</tr>
<tr>
<td></td>
<td>Ongoing maintenance and upgrade expense for transmission and distribution facilities</td>
</tr>
</tbody>
</table>

### Solar as a Distributed Generation Source

Solar energy is expected to be a growing part of our nation’s attempt to achieve energy independence, grow our economy and advance our sustainability goals. Similar to wind, solar technology is mature and is producing more efficient, attractive and small scale commercial applications. As of 2008, the U.S. had about 8,800 megawatts (MW) of installed solar capacity\(^{12}\)—enough electricity to power nearly 900,000 ‘average-electricity’\(^{13}\) consuming-households per year. Small generators are expected to lead the way in solar energy generation. Pike Research forecasts that the U.S. will become the largest market for small solar energy installations by 2011, surpassing Germany.\(^{14}\)

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\(^{12}\) Solar Energy Industry Association

\(^{13}\) Defined as 11,232 kilowatt-hours annually in 2007 based on analysis of EIA data by the author

\(^{14}\) Pike Research
Although technology makes it possible to generate solar energy in diverse climates and conditions, there are several factors communities must consider. Local capacity is influenced by the sun’s variability (whether the sun is shining), operations (whether solar cells are out of service or operating at reduced output for part of the time due to equipment failures or routine maintenance) and economics (whether the market price of electricity is too low to justify production expenses).

Distance from the grid is a major hurdle for distributed generation operations that seek to provide power to the transmission grid. The region of the US with the greatest solar potential (the Southwestern U.S.) may be too far from population centers to transmit the electricity generated and will require a high-voltage transmission system and inter-regional agreements, neither of which exists currently.

**Case Examples**

The following two case studies show different approaches to developing the capacity for greater reliance on solar energy at the community level.

**Solar for Sakai (Bainbridge Island, Washington)**

Sakai Intermediate School has been generating 5.1 KW of solar power since last year, and it’s planning to double that output if ongoing community participation can be expanded. Sakai’s experience showcases an innovative model for financing a renewable energy project that benefits the community at large.

Active community members sought to increase reliance on renewable energy on Washington’s Bainbridge Island, a Puget Sound community that lies 35 minutes by ferry from Seattle. They formed a private non profit, Community Energy Solutions, to aggregate community investment and install a single PV system on a public building.
A local utility, Puget Sound Energy, provided a $25,000 grant to cover the cost of the first kilowatt hour. Direct contributions from community members funded the $30,000 needed for the project’s remaining 4.1 KW. If community investment continues Sakia Intermediate School will add another 5.1 KW to its production capacity this year.

In this case, the school owns the solar-power system and is the sole recipient of the generated energy. Community investors benefit from a tax deduction for their contribution to the project and, as tax payers, from budget savings the public school derives from lower energy costs.

For more information visit—http://www.nwcommunityenergy.org/solar/solar-case-studies/copy2_of_the-vineyard-energy-project

Solar Shares (Sacramento, CA)
Sacramento’s utility, known as SMUD, began offering its customers a chance to buy shares in a local solar farm in 2008. The utility put out to bid for the construction and operation of the solar farm. SMUD and the bid winner, Enxco, have agreed to a twenty year contract for the sale and distribution of generated power, with Enxco owning the facility outright.

The program is designed to appeal to those who can’t put up their own solar panels; homeowners with an unsuitable site, people who can not afford the investment, and renters. The Solar Shares program requires customers to pay a flat fee to join the program. The fee is determined by each customer’s energy consumption the previous year—the greater the energy consumption, the higher the fee. Customer accounts receive a credit determined the amount of power generated at the solar farm. Typically the credit is larger than the fee. On average, customers see an overall savings of a few dollars a month. The program is popular. No more shares are currently available.

Community Commercialization

**Community Suitability:** MODERATE

**Community Entry Risk:** MODERATE

Our analysis of suitability and entry risk considers required expertise availability of turn-key technology, environmental impact, financing models and competitive risk of different renewable technology in the energy market. Entry and suitability risks are assessed on a scale “of Low”, “Moderate” and “High.” We have determined that solar commercialization at the community scale has a moderate suitability rating for communities of color and a moderate level of entry risk to businesses interested in entering this segment of the market.

Opportunities

*Solar is the preferred distributed generation energy source.* Any innovation that increases renewable energy capacity at the community level is likely to come from solar technology. No access to the transmission grid is required for several interesting solar applications, such as roadside signage, warning lights, communications towers for cellular phones and other devices as well as homes in remote areas.”\(^{15}\)

*Established wind projects provide useful models for structuring equity partnerships that can be applied to solar projects.* Partnerships between investors and community-held assets or individual landowners have been structured so that the investor owns nearly all of the interest in the project for a specified time. After that period ownership switches, or “flips,” to the individual or community-owned business.\(^{16}\) Communities can create their own structures, such

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as co-ops or limited liability companies and pool resources to acquire the necessary renewable technology assets and then sell the power generated through a Power Purchase Agreement.

How Policy Can Help Communities
Communities need supportive public policy and technological assistance to get a toehold in the market for solar energy generation. The Federal Government has demonstrated a willingness to provide tax credit and R&D support for solar projects and this has resulted in lower costs for solar cells.

States and municipalities can take the lead and support Federal efforts to leverage their renewable assets with policies that promote ownership and control at the community level. The National Renewable Energy Laboratories tracks the incentives and policies at the federal, state, and sub-state level that allow communities to generate solar power (shown below).
Changes in policy so far have not kept pace with the growing popularity of solar energy. But in states like Washington and Michigan demand is being matched by tax credits and more for broad participation in renewable energy creation. In most states, however, policy and changes in technology are moving independently, leaving many communities without critical public support to generate renewable solar energy. For example, less than half the states have provisions supporting distributed generation and solar.

Technology and policy that encourages broad participation in energy generation are critical to establishing community access to renewable energy. Research by the North American Electricity Reliability Council shows that over 50% of the increase in renewable energy capacity (non-hydro) from the late 1990s through 2007 occurred in states (and provinces) with mandatory Renewable Portfolio Standards.  

**Suitability**

The ability to deploy on-site small scale systems makes solar energy important for communities with or without grid access in the near term. Accordingly, “community solar is less defined by the size of a single installation, although municipal or educational buildings can certainly be a cornerstone of the development, than by the cumulative benefits that go beyond any single individual or business.”

A report by the Government Accountability Office demonstrates another reason why PV technology should be brought to the community level regardless of the presence of the grid. According to the report off-grid uses of photovoltaic technologies “can provide electricity at a lower cost than the traditional option of extending an electrical line and purchasing power from an electric company or relying on remote generating equipment.” Off-grid applications are possible regardless of suburban, urban or rural settings and should be considered wherever grid access is too costly in environmental and economic terms.

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20 Ibid. Page 26
Entry Risks

Community scale solar requires expertise (legal, technical and business) that often exists outside of communities. For instance, a landowner may rely on an attorney to ensure the lease protects the landowner’s interests. A financial adviser should provide direction and understanding about the income and tax implications of various ownership structures and lease payment options. University of Texas officials indicated that legal and technical resources were critical for negotiating a favorable lease agreement for a wind project on university property. Similar resource demands and complexities exist for solar projects as well making it imperative for communities to have access to technical and business support as well.

Communities with strong solar potential may be shut out of the market because developing the necessary infrastructure requires high up-front costs, such as expenses for construction to connect power lines to the transmission grid. According to the Department of Energy (DOE), the average cost of building new power lines to the transmission grid could be $100,000 or more per mile, depending on such factors as the size of the project, terrain and the transmission line rating. The required technology is readily available though it is mostly manufactured overseas. Industrial policy supporting domestic production of equipment and technology would reduce supply risks and overall costs.

Affordability could also shut out communities with strong solar potential Lending institutions charge more to evaluate the creditworthiness of many small projects versus one large project. Institutional capacity and resource constraints and lack of familiarity with emerging renewable technologies make community projects appear riskier. Higher risk causes these institutions to lend to projects at higher interest rates. Higher financing costs are significant for renewable energy projects including solar because these sources generally require higher initial

investments per unit of electricity produced than fossil fuel plants, even though renewable sources have virtually zero marginal costs and lower operating costs.

*Federal financing alternatives are not sensitive to the business cycle nor are they aligned with community ownership structures.* Federal Production Tax Credit (PTC), suffer from short authorization periods and lapses resulting from delays in reauthorization. This has had the effect of creating boom and bust periods in the industry. Not-for-profit entities are also ineligible for some of these tax credits. Tax credits, especially non-refundable tax credits, are especially sensitive to downturns in the general economy and limit the number of investors willing to undertake community scale projects.

**Build Out Costs**

There is significant economies of scale in PV—the installed PV cost of a system <2kW was $9.0/W verses the cost of a system >750kW was $6.8/W in 2007. Installing PV in new construction is also $0.6/W less expensive than residential retrofit systems. Average installed costs also vary widely across states.²²

<table>
<thead>
<tr>
<th>State</th>
<th>Average Cost</th>
<th>Weighted Average Cost</th>
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<tbody>
<tr>
<td>AZ</td>
<td>$7.80</td>
<td>$7.60</td>
</tr>
<tr>
<td>CA</td>
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<td>$7.50</td>
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<tr>
<td>CT</td>
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<td>$8.30</td>
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<tr>
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<td>$12.40</td>
<td>$8.50</td>
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<tr>
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<td>OR</td>
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<tr>
<td>WI</td>
<td>$8.40</td>
<td>$8.30</td>
</tr>
</tbody>
</table>

*Source: LBNL

Many utility companies are offering subsidies as much as 50% of the cost of a system. Because capital costs are high, PV systems should be able to operate maintenance free for lifetimes of 20+ years. The ability to maintain efficiency and minimize the exposure to harsh weather is important.

²² Lawrence Berkeley National Laboratory; *Tracking the Sun: The Installed Cost of Photovoltaics in the US from 1998-2007*, Feb 2009
Financing Community Solar

*Non-community owned—One* option of developing community solar is to get solar energy from a company that will install and maintain a solar system in return for a Power Purchase Agreement (PPA) or Feed-in-Tariff (FiT) with the customer. The benefit of this approach is that there are zero upfront costs, the company pays for the entire project including installation, maintenance and trouble-shooting, and a community can leverage the company’s experience to install the project quickly. The PPA that the customer enters into with the company is predictable and at parity with retail electricity rates. The downside to this is that the community does not own the solar project and must still pay for electricity.

SunEdison and Recurrent Energy, for profit companies based in Maryland and California respectively, are the leading companies who employ this business model. Both focus on commercial clients, but also work with government facilities, municipal agencies, schools, and universities. Other companies and non-profits are just starting to explore this type of business model for residential customers. One non-profit of note, SolSolutions, is in its infancy, but uses this business model to target schools in underprivileged areas in the US.

*Community-owned Solar*—If a community wants to own a solar project, the upfront capital costs will need to be financed. There are at least two options for a community to enable its residents and organizations to install solar PV.

- A community can adopt a business model such as SunEdison and pay for the costs of a system in return for constituents signing a PPA. In order for this to work, a community must provide the capital or financing or arrange for it.
- A community can help organize information regarding federal and state incentives and negotiate equipment and installation group discounts for constituents interested in installing solar.
- A community can create a co-op as part of a green power program where the community connects customers who want to produce solar and wind power with other
local customers who want to support the development of new, renewable energy. Under such a program, customers opt-in to pay a higher utility bill to support solar (or any renewable) power. The fees are collected by the program and distributed to the customers generating renewable electricity.

**Hurdles**

*Solar power's costs for both materials and installation are high.* Although prices for both will likely fall in the future, the average installed cost per watt for a residential system is $7.6 per watt.\(^{23}\) The average installed cost of $11,400 for a 1.5 kW system may not seem expensive in comparison to the capital outlay required for a power plant, but for an average home owner, this may mean a payback period of 10+ years without any incentives or subsidies. Thus, state and federal subsidies and policies play an important role in installing PV.

*Solar power requires significant amounts of land and water to scale* which means communities must have adequate access or partnerships that provide for these requirements. Researchers estimate it takes over 10,000 gallons of water per year per household to generate the electricity demands of the average U.S. household using solar thermal technology\(^ {24}\) (This is seven times less water than is required to produce the same amount of electricity from fossil fuel). In terms of land use five acres of land are often needed for each megawatt of capacity. The amount of land required for utility-scale solar power plants is approximately one square kilometer for every 20-60 megawatts (MW).\(^ {25}\) PV can eliminate the land use impacts by integrating the generators into building construction, eliminating the need for dedicating land use to PV generation.\(^ {26}\)

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\(^ {23}\) Lawrence Berkeley National Laboratory; *Tracking the Sun: The Installed Cost of Photovoltaics in the US from 1998-2007*, Feb 2009

\(^ {24}\) IEEE Spectrum “How Much Water Does It Take to Make Electricity?”


\(^ {26}\) Power Scorecard http://www.powerscorecard.org/tech_detail.cfm?resource_id=9
Solar energy is non-dispatchable meaning all of its energy production must be taken when it is available rather than scaled to match demand such as biomass or fossil-fueled electricity generation. Variable resources differ from conventional ones in a fundamental way: their fuel source (wind, sunlight, and moving water) is not often able to produce energy when it is in demand. This problem is exacerbated by a lack of commercially viable electricity storage solutions. Solar CSP technology may provide interim storage solutions, but the technology requires investment and expertise that is best suited for large scale, non-community deployment at this time.

Community energy producers with the capacity to generate bulk power need a transmission grid that offers smaller generators preferred footing on the grid. The North American Electricity Reliability Council is in the process of developing a reference manual to educate and guide large companies in the electric industry...“integration of variable resources.” Advocacy must be done to encourage federal agencies to support the needs of small scale generators, possibly in partnership with bulk power generators.

**Step by Step Guide**

1) **Identify Opportunity:** Around the United States, available sunlight varies considerably as a result of differences in cloud cover and latitude, and also varies with the seasons. In the summer, longer daylight hours and a higher sun angle provide more solar power, compared to the winter when the sun is up for fewer hours and at a lower position in the sky. These variations must be taken into consideration when planning solar collection facilities. The most favorable region in the US for solar PV is the Southwestern US. In fact, it is one of the best regions globally for this. While the Southwest is a region ideal for solar power, some locations, even in regions not commonly thought of as sunny or hot, are also suitable for solar PV.

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28 Ibid. Page ii.
2) **Pre-Construction Planning:** Engineers will need to draft construction plans and secure necessary permits. Equipment will need to be ordered as well as project financing will need to be finalized. In general, with a panel that is 12% efficient, in order to generate 1 kW, you would need 100 sq ft. of solar panels if the sun shined 24 hours per day. The length of daylight and average cloud cover varies by season and region. The less sunshine a location gets, the more panels required. Thus, the size of a solar panel that generates 1 KW will range from 400 to 800 sq ft depending on where you live. Discussions with the local utility about interconnection will also need to be initiated prior to construction.

3) **Construction:** It is a good idea to use a contractor familiar with solar PV installation. Ten states currently require contractors to be licensed in order to install solar systems: Arizona, Arkansas, California, Connecticut, Florida, Hawaii, Michigan, Nevada, Oregon, and Utah. In addition, contractors can be certified in solar PV installation. In order to become North American Board of Certified Energy Practitioners (NABCEP) certified, Installers must pass an exam, sign a code of ethics, and take continuing education courses for re-certification every three years.

4) **Secure landowner agreements**—Legally binding agreements involving all parties should be signed early in the planning process.

5) **Acquire necessary permits**—The NIMBY-ism frequently encountered in wind projects is much less significant for solar projects and will likely be less of an issue for a community development. However, it is still important to work with local permitting authorities and elected officials early in the planning process as well as research regulation requirements.

6) **Secure a Power Purchase Agreement (PPA)**—A utility will need to agree to buy the power from a solar project before financing will be granted. A PPA typically lasts 20 years and acts as an asset against which the solar project can get project financing. Through states’ Renewable Portfolio Standards (RPS) many utilities are required to buy renewable energy. Several states also encourage community based development of renewable energy. For example, Colorado credits utilities buying electricity from community-based renewable
energy generation. In order to qualify, the resource must be owned by individual residents or local entities, not larger than 30 MW and supported by the local government.

7) **Inspection:** Before the system goes into use, there should be a complete system inspection and performance evaluation.

**Looking Ahead**

The electric industry in North America is on the “brink of one of the most dynamic periods in its history.”\(^{29}\) In the previous briefing paper tracking wind power, we examined wind as a stand alone renewable energy resource. New research published by NREC suggests a more integrated approach between wind and solar may create new opportunities for community scale generation projects. Researchers in California determined solar and wind energy production can be complementary. Under the right conditions, solar generated energy is at its highest output during the hours when wind resources are least likely to be available.\(^{30}\) Communities considering either renewable alternatives may be encouraged to audit their community resource potential for both, which opens up new models, funding and wealth building opportunities for communities with the right capacity.

In the near term, federal policy to advance clean energy, foster independence from the global energy market, and stimulate immediate economic activity has produced a dedicated budget of $22 billion for green energy as part of the American Recovery and Reinvestment Act (ARRA).

Unfortunately, U.S. manufacturers are not poised to take full advantage of the funding available for the production of solar panels and wind turbines. Competitors in Germany, China and elsewhere, who enjoy more supportive subsidy schemes in their home countries, dominate the manufacturing market. A recent report by the Renewable Energy Policy Project, a Washington based research organization found that 1,000 megawatts of installed wind power corresponded

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\(^{30}\) Ibid. Page 23
to about 1 billion dollars of investment and created 4,300 jobs. The bulk of that employment, 3,000 jobs, is created in manufacturing, a sector primarily located overseas.

But it doesn’t have to be that way. These employers often need the underutilized talent found in many communities. In particular, people with 'middle skill' credentials (graduates of high school with some college experience) are well positioned to provide services to the renewable energy manufacturing sector. Without greater support for manufacturing, those jobs are being created overseas. Of the first billion dollars spent so far out of the ARRA grants for green energy, 84% of those dollars went to overseas companies manufacturing wind turbines and other equipment.

Advocates and community leaders should identify the policies and subsidies they need and the strategies to win them from the federal government, in order to bring to their communities the business and good jobs associated with the manufacture of green equipment.

**Resources**
Listing of incentives by state: http://www.dsireusa.org/
SunEdison: http://www.sunedison.com
Recurrent Energy: http://www.recurrentenergy.com
SolSolution: http://www.sol-solution.org
Information on green power co-op program: http://www.chelanpud.org/start-a-snap-program-at-your-utility.html
The Center for Social Inclusion (CSI) is a national policy advocacy organization. CSI’s mission is to build a fair and just society by dismantling structural racism, which undermines opportunities for all of us.

CSI partners with communities of color and other allies to build a strong multi-racial movement for new policy directions that create equity and opportunity.

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