A Beautiful Day in the Neighborhood

Encouraging Solar Development through Community Association Policies and Processes

Prepared by

THE SOLAR FOUNDATION
Research and Education to Advance Solar Energy

For

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SOLAR OUTREACH PARTNERSHIP

Abstract

Community associations play a vital role in protecting a homeowner's investment in their residence and property. In the case of solar energy, association covenants, conditions, and restrictions (CC&Rs) and architectural guidelines can dissuade some owners from pursuing an opportunity to enhance the value of their property while reaping important environmental benefits. Recognizing this, many state legislatures have enacted "solar rights" policies limiting associations' ability to prohibit or restrict solar energy devices. Often, these state-level provisions are a necessary, but not in themselves sufficient, means of ensuring homeowners have access to solar energy and its benefits. Fortunately, there are a number of relatively simple actions an association can take to encourage solar development without further ceding their authority to impose and enforce rules designed to protect the value and quality of the communities they govern. This guide, written for association boards of directors and architectural review committees, discusses the advantages of solar energy and examines the elements of state solar rights provisions designed to protect homeowner access to these benefits. It then presents a number of recommendations associations can use to help bring solar to their communities, including: (1) improving processes and rules through understanding the technical aspects of solar energy and how restrictions can negatively affect a system's performance; (2) improving the clarity and specificity of association solar guidelines and making them easily accessible to homeowners, and; (3) convening stakeholder meetings to produce practical guidelines that accurately reflect the needs and values of the community.

Disclaimer

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I. Introduction

Community associations play a vital role in protecting a homeowner's investment in their residence and property. Through established rules and guidelines governing whether and how certain activities can take place in the communities they manage, associations work to protect and enhance property values and ensure residents are able to enjoy a high quality of life.[1] In the case of solar energy, however, the covenants, conditions, and restrictions (CC&Rs) limiting residents' rights of ownership can have the opposite effect – depriving homeowners of an opportunity to enhance the value of their property, preventing them from fully embracing a clean energy technology that helps protect human health and the environment, and negatively impacting the economic value of their investment in an alternative means of meeting their energy demand. Given this, several states have adopted measures restricting or clarifying the restrictions associations may place on solar energy systems in their communities. On their own, these state laws (or "solar rights provisions") are often not sufficient for striking the balance between association and homeowner interests required to allow solar energy to flourish in these communities. Fortunately, there are a few relatively simple actions associations can take to help facilitate solar development while allowing them to continue to regulate activities that might threaten the value or enjoyment of the communities they govern. This guide provides communities with straightforward recommendations and resources designed to reduce association-based barriers to solar development. Because state solar rights provisions (where they apply) influence which actions an association is permitted to take, a significant portion of this guide is dedicated to examining, classifying, and understanding these laws. Before delving into these topics, however, it is important to understand the basics of solar energy and the benefits it can bring.

II. Solar Energy: Basics, Benefits, and Barriers

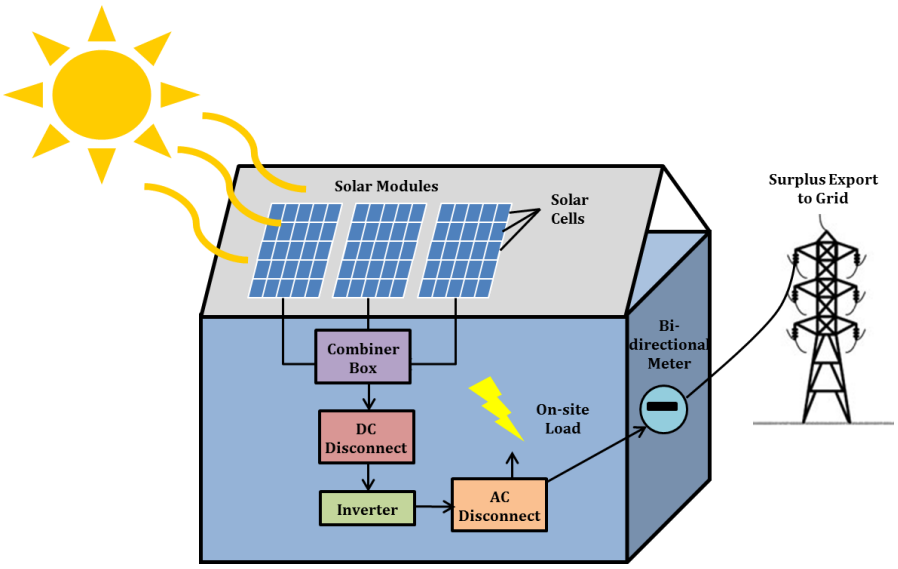
The Opportunity

Association-governed communities hold immense potential for solar energy development. According to the Community Associations Institute, associations represent over 25 million housing units. Of these, approximately 13 million (52%) are structures most suitable for residential solar installations – such as townhouses and homes in gated communities or subdivisions (i.e., properties governed by homeowners associations as opposed to condominiums or cooperatives).[2] If only 5% of these homes were to invest in an average-sized residential solar energy system, it would add 3.3 gigawatts (GW) of clean power capacity to the electric grid – as much solar energy as was added in the entire U.S. in 2012.[3] This figure represents an annual reduction in carbon dioxide (CO_2) emissions of over 6 million tons,[4] or the equivalent of taking over 1.1 million vehicles off the road.[5]

Photovoltaic (PV) arrays are by far the most common form of residential solar installation. These systems collect photons from the sun and convert the energy they contain into useful solar electricity. The fundamental unit of a PV array is a solar cell, composed primarily of a semiconductor material, where the conversion of light to electricity takes place. As the output of these cells is relatively small they are packaged together into larger units called modules (or panels), which in turn are combined to

form PV arrays. Apart from the PV modules, there are a number of "balance of system" components required for the array to function – including inverters, mounting or racking equipment, disconnect switches, combiner boxes, and wires and connectors.[i] Figure 1 below provides a basic illustration of how these components fit together to form a residential solar electric system.

Figure 1: Solar Array and Balance of System Components



The Benefits of Solar Energy

Solar energy, like many renewable energy technologies, is highly regarded for its ability to produce electricity with limited environmental impacts. A national poll, conducted in fall 2012, showed that over 90% of Americans support solar energy development.[6] Despite this strong level of support, many may not be fully aware of the broad range of benefits solar energy provides or that *residential* solar energy is a highly advantageous application of the technology.

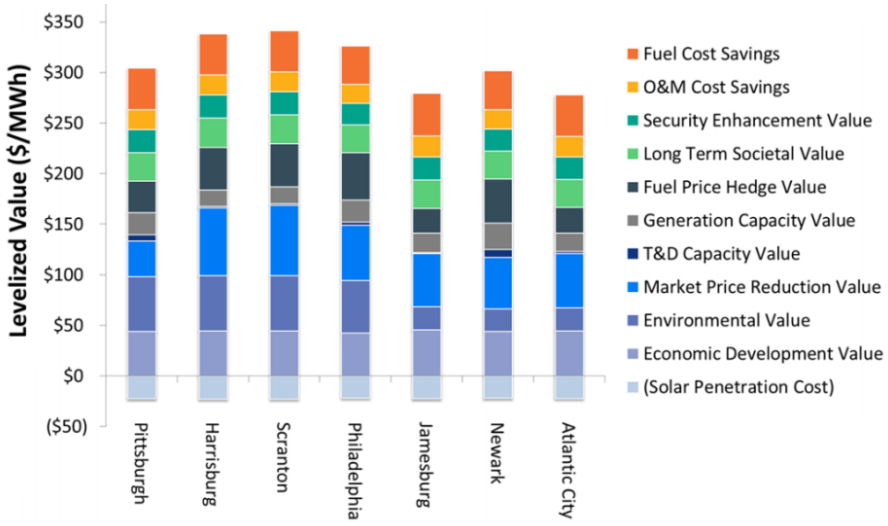
A major environmental concern with conventional electricity production is the release of greenhouse gases (GHG), which exacerbate the potential impacts from global climate change.[7] Renewable energy technologies, such as solar, are advantageous in this regard because they do not emit greenhouse gases while producing electricity. Though conventional sources of energy might be used to produce PV equipment (releasing GHGs in the process), it only takes two years for a solar PV module to generate enough energy to offset the GHGs released in its manufacture.[8] With most solar manufacturers now providing 25-year warranties for their modules – and with PV panels continuing to function long after these guarantees expire – consumers can expect that the vast majority of the electricity produced over a module's lifetime will be GHG-free.

[i] For more detail on these components, please visit the U.S. Department of Energy's webpage, "Balance-of-System Equipment Required for Renewable Energy Systems" at http://energy.gov/energysaver/articles/balance-system-equipment-required-renewable-energy-systems

Comparing solar to other sources of energy reveals the magnitude of the technology's climate change mitigation benefits. A conventional coal-fired power plant, for example, emits nearly one thousand times the amount of GHGs per kilowatt-hour of energy produced over its lifetime compared to the lifecycle of solar PV.[9] In addition to climate related pollutants, solar energy helps reduce emissions of fine particulate matter associated with fossil fuel-based sources of energy. Exposure to pollutants like PM 2.5 (airborne particles smaller than 2.5 micrograms) and ozone have been linked to increased risk of cardiac arrest.[10]

While the production of emissions-free electricity is certainly its chief benefit, numerous studies show that developing solar locally can provide long-term societal value by avoiding high electricity transmission costs for ratepayers, enhancing grid security and minimizing transmission losses by producing power near sources of demand, providing work for local electrical and construction workers[11], as well as avoiding the health costs discussed above.[12, 13] In addition, the increased economic activity associated with solar development can help expand the local tax base, making it a winning opportunity for local governments and other interested parties. These benefits are represented in Figure 2 and explained in detail in the corresponding report from which it was sourced.[14] Looking briefly at the figure, which shows the calculated value of the range of benefits from solar energy development in several locations, it is clear that solar energy provides a net positive benefit for society.

Figure 2: Benefits of PV Development[14]



Though environmental and other secondary benefits are indeed important, there are other advantages of solar energy that may be especially attractive to homeowners and their associations. According to a study prepared by the Lawrence Berkeley National Laboratory (LBNL), solar arrays substantially increase home resale value.[15] By comparing market data on California homes with solar PV arrays against figures for non-solar homes, LBNL showed that the presence of a solar energy system increased the average resale value of a home by about $17,000, or $5.50 per watt of installed solar energy capacity. Furthermore, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy has found that a solar home will sell twice as fast as a home without solar in either a bear or bull market.[16]

Of course, one of the major economic benefits solar provides is to current homeowners. Studies confirm that solar energy can pay for itself by saving homeowners money on their monthly electricity utility bills. On average, the typical payback period for a solar array is 7 to 15 years, with residents of states with more robust renewable energy policies seeing a payback in as short as 4 years.[17] After earning back the money from their solar investment, homeowners can spend their savings from reduced utility bills however they choose, including reinvesting in their home.

Table 1: Resources on the Benefits of Solar Energy

The Value of Distributed Solar Electric Generation to New Jersey and Pennsylvania
Clean Power Research

This study examines the value of various regional benefits and impacts of solar energy development.

http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf

An Analysis of the Effects of Residential Photovoltaic Energy Systems on Home Sales Prices in California
Lawrence Berkeley National Laboratory

Detailed analysis showing that homes with solar PV systems have sold for a statistically significant premium over homes without such systems.

http://eetd.lbl.gov/ea/ems/reports/lbnl-4476e.pdf

National Solar Jobs Census 2012
The Solar Foundation

Provides research findings on current and projected employment in the solar industry.

www.thesolarfoundation.org/research/national-solar-jobs-census-2012

Association Motivations to Restrict Solar

Despite the value of these benefits and the availability of the technological means to obtain them, solar energy continues to face significant barriers (both public and private) at the local level. In community and homeowners associations, these barriers typically take the form of CC&Rs and guidelines limiting solar development. It is important to keep in mind, however, that an association is not necessarily acting arbitrarily in developing and enforcing these restrictions. In fact, there are a number of legitimate reasons an association would want to restrict solar energy development in the communities they govern. As later sections of this guide will show, it is possible for a solar-savvy association to develop carefully crafted and clearly worded guidelines that promote solar energy development while protecting other community interests, including:

Community Aesthetics

Planned communities are often designed with a particular aesthetic theme or appeal in mind. Subsequent development or property improvements that are incongruous with established community aesthetics can diminish property values or threaten owners' ability to use and enjoy their property. Prioritizing aesthetics over solar development often means restricting a solar energy system's size, placement, tilt, or orientation (or all of these). As discussed in Section IV of this guide,

such restrictions can have a negative impact on a solar array's electricity production, which in turn reduces the economic value of the solar investment.

Tree Preservation and Planting

Tree coverage can not only contribute to a community's aesthetic appeal, but can provide important environmental and economic benefits as well. Trees absorb carbon dioxide (CO_2), a harmful greenhouse gas, and help trap other pollutants that can threaten human health. These and other plants help manage stormwater runoff and reduce soil erosion. Shade produced by trees can increase comfort both inside the home (reducing the amount of sunlight entering through windows – thereby helping to manage cooling demands) and outdoors. Unfortunately, shade from trees can block a solar collector's access to sunlight and impair its ability to function as designed.

Health and Safety

Associations may also wish to control the placement of solar energy systems in order to ensure residents' health and safety. Fortunately, industry certifications, product safety standards, and local and national codes governing electrical and structural work have greatly reduced the need for associations to assume this responsibility.

III. Solar Rights Provisions

The economic feasibility of a homeowner's investment in solar energy hinges on the amount of solar electricity a system is able to produce, which in turn depends upon the amount of solar radiation (i.e., sunlight) the system collects. As noted above, the control some CC&Rs give to associations over whether and how a solar energy system can be installed can negatively impact a system's access to sunlight and result in a significant reduction in the value of the homeowner's investment. Recognizing this, many states have chosen to ensure ***solar access*** through legislation containing either a provision protecting ***solar rights*** –the ability of a homeowner to install a solar energy system on his or her property – or allowing for the creation of ***solar easements***, which are legally binding agreements that protect a system from future obstructions.[ii]

Solar rights provisions target public and/or private prohibitions or restrictions on the installation of solar energy systems, and are therefore the aspect of solar access law of greatest interest (or concern) to community and homeowners associations. As of the writing of this guide, 22 states have adopted solar rights provisions that expressly limit (to varying degrees) associations' abilities to exercise control over solar energy installations through their CC&Rs.[iii]

[ii] Solar access laws in some states include *both* solar rights and solar easement provisions. See www.dsireusa.org/documents/summarymaps/Solar_Access_Map.pdf for a visual summary of state solar access laws.

[iii] In total, however, 28 states have adopted some form of solar rights provision. Six of these states are excluded from this guide by virtue of not expressly limiting associations' rights (MO), being applicable only to local governments (IN), or not applying statewide (MN, NE, UT, and NY provide for a "local option" permitting government subdivisions to enact their own solar rights ordinances).

Common Elements

Solar rights provisions pertaining to community or homeowners associations vary significantly between states. Some add only a few lines of broad language to existing state statutes, while others are much more specific on which policies or practices are permissible and on the roles and responsibilities of the parties to which the laws apply. Despite this diversity, a review of current solar rights provisions reveals a number of common elements that help protect citizens' rights to go solar.

Statement of Legislative Intent

Several states with solar rights provisions include within them a statement of legislative intent, which provides insight into the state legislature's purpose in adopting the law and establishes a public policy preference for solar energy. Such a statement can be an important factor in resolving legal disputes over solar energy installations between associations and homeowners. In their legal analyses, courts of law may look to the legislative intent of a statute to determine how it should be interpreted. Clearly laying out the intent of the law can have a meaningful impact on how court cases are decided – as one court noted in its interpretation of Arizona's solar rights provisions: "[o]ur goal in interpreting statutes is to fulfill the intent and purpose of the legislature."[18] Furthermore, establishing a public policy preference for solar energy through these statements (or simply by the act of adopting solar rights provisions) can set solar installations apart from other activities subject to association CC&Rs. This suggests that legal precedents set in disputes over other types of property improvements or uses may not apply to disagreements over solar energy.[19]

Voiding Prohibitions Against Solar

An essential element of most existing solar rights provisions is a clause that renders all CC&Rs prohibiting the installation of solar energy systems "void and unenforceable", causing them to lose their legally binding effect and preventing a court from enforcing these rules. Often, association prohibitions need not be overt in order for this element of a state's solar rights provisions to apply – in these cases, association rules that merely have the *effect* of prohibiting solar energy development can be rendered invalid. For example, in *Garden Lakes Community Association vs. William Madigan, et al.*, the Arizona Court of Appeals found that the association's requirement that homeowners adopt (what were ultimately considered) impractical or costly placement and screening measures "effectively prohibited" the installation and use of a solar energy system, even though solar was not expressly prohibited by the community's architectural guidelines.[20]

Allowable Restrictions

Language dictating what kind of restrictions associations are able to place on solar energy systems is another key feature of solar rights provisions. In some states, significant portions of the text of these laws are dedicated to outlining what kind of, and under what conditions, restrictions on solar installations are permissible. Due to both the great variety in allowable restrictions between states and the power these restrictions have to limit solar energy development, they are discussed in greater detail in the following section ("Typology of Solar Rights Provisions").

Applicability to Structures

While the majority of states' solar rights provisions do not specify the types of properties to which these protections apply, some laws do include such limitations. When specific property types are mentioned, they often limit a law's applicability to either "residential property" (usually excluding condominiums) or "single-family dwelling units".

Awarding of Attorney's Fees

Because of the great expense often associated with seeking remedies in a court of law, associations or homeowners may be reluctant to pursue legal action. Seven states (listed in Table 2 on the next page) have taken steps through their solar rights provisions to potentially mitigate the financial impact of litigation by awarding costs and reasonable attorney's fees to the prevailing party in disputes over solar.

Grandfathering Clause

In order to avoid the retroactive application of new solar rights provisions to existing CC&Rs, six states have included "grandfathering clauses" in the text of their statutes. In these cases, associations whose governing documents prohibited or restricted solar energy systems before the state solar rights provision went into effect are still able to enforce these rules, even if doing so would be an apparent violation of other elements of the law.

HOA Policy Creation Mandate

Conflicts between associations and homeowners over solar energy can arise when residents are unsure of the standards, rules, and requirements affecting the type of solar installation an Architectural Review Committee (or "ARC" – the body responsible for reviewing and approving plans for property improvements) will authorize. Recognizing this, two states require associations to adopt detailed guidance for homeowners to follow in their pursuit of a solar energy system. The State of Hawai'i sets a statutory deadline by which "each private entity" must adopt rules that "facilitate the placement of solar energy devices."[21] In Illinois, associations are required to adopt an "energy policy statement," within 120 days of a homeowner's request for one, outlining "the location, design, and architectural requirements of solar energy systems."[22]

No Avoidance or Delay

Some associations may seek to circumvent solar rights provisions by withholding approval of a homeowner's application for a solar energy system. Three states have made this action a violation of the law by expressly prohibiting such a practice, and in some cases giving associations a time frame in which applications must be processed (60 or 90 days).

Provisions for Ground Mounted Systems

Because rooftop arrays are the most common application of solar technology, the majority of state solar rights provisions focus on these types of systems. Recognizing that homeowners may also wish to install a ground mounted solar energy system, three states have included specific provisions governing the restrictions associations may place on these installations.

Table 2: Common Elements of State Solar Rights Provisions Pertaining to Associations

	Legis. Intent	Void Prohib.	Reasonable Restrictions	*Applicability*		Atty. Fees	Grandfather Clause	HOA Policy Creation	No Avoidance or Delay	Ground Mount Provision
				Non-Specific	Single Family Homes/ Residential Prop.					
AZ		X	X	X		X				
CA	X	X	X	X		X			X	
CO		X	X	X		X				
DE		X	X		X		X			X
FL	X	X		X		X				
HI		X			X			X		
IL	X	X		X[iv]		X		X	X	
LA			X	X						
MA		X	X	X						
MD			X	X						
ME	X	X	X		X		X			
NC	X	X	X		X	X				X
NJ		X			X					
NM		X	X[v]	X			X			
NV		X	X	X						
OR		X		X			X			
TX		X	X	X					X	X
VA		X	X	X			X			
VT	X	X			X	X				
WA		X	X		X					X
WI		X[vi]	X	X						
WV	X	X[vii]	X	X			X			

Typology of Solar Rights Provisions

A key substantive difference between states' solar rights provisions centers on which restrictions can be placed on solar energy development by a community or homeowners association. A state with no or poorly defined limits on the restrictions CC&Rs can place on solar energy systems allows the association to retain broad control over how these systems are installed. More clearly defined or even quantifiable limits on these restrictions can afford homeowners more freedom and flexibility to adopt solar energy and provide them with increased certainty that the benefits of their investment will be more fully and

[iv] However, the Illinois statute does not apply to buildings greater than 30 feet in height.

[v] Though the text of the state's solar rights provision makes no reference to 'reasonable restrictions', the New Mexico Attorney General issued *Opinion No. 11-02* in February 2011, concluding that the law precludes restrictions that make solar installations "unreasonably difficult or costly."

[vi] Wisconsin has a slightly different standard than other states in this category, having issued a prohibition on "all restrictions…that prevent or *unduly* restrict" solar energy systems. (Emphasis added)

[vii] While West Virginia's solar rights provision renders new CC&Rs prohibiting or restricting solar "void and unenforceable", associations may, "by vote of its members, establish or remove a restriction" that prohibits or restricts solar energy systems.

properly realized. It is on this basis – how a state treats an association's ability to restrict solar energy development within its jurisdiction – that solar rights provisions may be classified.

Type I: No Limits on Restrictions

The most basic form of a solar rights provision is one that renders CC&Rs prohibiting the installation or use of solar energy systems "void and unenforceable", but stop short of limiting an association's ability to place restrictions on these systems.

Type II: Undefined "Reasonable" Restrictions

Type II provisions include the essential ban on prohibiting the installation or use of solar energy systems and confine the restrictions an association can place on these systems to a standard of "reasonability." States in this category do not define what is meant by the term "reasonable," ostensibly leaving it up to the association and its homeowners to determine. Ultimately, however, it is up to the courts to determine what constitutes a "reasonable restriction" and to interpret other ambiguous statutory language. In the oft-cited decision in *Palos Verdes Homes Association v. Rodman*, the court notes "whether [an] Association's Guidelines are a 'reasonable restriction'…is a question of fact to be determined by the trier of fact" – that is, a judge or jury hearing a legal case.[23] While an association may attempt to apply meaning to this vague language by referring to cases in which courts have determined what is "reasonable" for non-solar restrictions, it should be noted that this is not always a guaranteed strategy. As noted earlier (see "Statement of Legislative Intent" under "Common Elements" in Section III), the existence of a public policy preference for solar can make cases involving non-solar restrictions "readily distinguishable" from those involving solar disputes.[24] That is, what is deemed a "reasonable" limitation on most activities under association control may not apply to restrictions governing solar development.

For most, a potentially costly and protracted legal battle is the least desirable means of determining whether a given restriction is acceptable. For associations averse to legal action, it may be best to adopt a conservative interpretation of what constitutes a "reasonable restriction." While a better defined standard might be of greater use in determining what associations can or cannot restrict before a system is installed, the flexibility inherent in this interpretive standard allows restrictions and their impacts to be evaluated on a case-by-case basis.[25]

Type III: Qualified "Reasonable" Restrictions

Solar rights protections in this category invalidate association prohibitions on solar installations while preserving their power to impose "reasonable" restrictions on these systems. These provisions, however, differ from those in Type II in that states in this category provide some guidance as to either how the term "reasonable" may be interpreted or to which specific aspects of the system this standard may (or may not) apply. Table 3 on the following page lists the nine states classified as Type III, summarizing the system characteristics to which restrictions may apply and where limits exist on the impact these standards can have on cost and performance.

Table 3: Allowable Restrictions by State

	Allowable Restrictions						*Limits*
	Placement/ Visibility	**Aesthetics**	**Orientation**	**Size**	**Historical Preservation**	**Health/ Safety**	**Cost/ Efficiency**
AZ	X						X
CO	X	X		X		X	X
DE	X				X		
ME		X			X	X	
MD					X		X
NC	X						
VA	X			X			
WA	X	X				X	X
WV					X	X	X

It should be noted, however, that attaching qualifying language to the reasonability standard does not necessarily mean all ambiguity is removed from the statute. For example, Colorado's allowance for association control over installation aesthetics, size, and placement apply only if these restrictions do not "significantly" increase system costs or decrease performance or efficiency.[26] The law, however, does not define what is meant by "significant." Maryland's solar rights provisions are similarly vague in this regard – relying on an unclear standard of "significant" impacts on costs and efficiency to determine whether or not a restriction is reasonable.[27] In a similar vein, Arizona law limits allowable restrictions, in part, to those that do not "adversely affect" cost or efficiency, but does not indicate what the threshold is (if one even exists) for an impact to be considered "adverse."[28]

Type IV: Quantified Restrictions

Provisions in the fourth and final category are those that place quantifiable limits on an association's ability to restrict solar energy installations. While these provisions are the most stringent in terms of the flexibility they afford associations to develop restrictions, the level of specificity they contain makes it very clear which restrictions are permissible, helping to minimize the chances that an association will be embroiled in a costly and time consuming legal dispute over solar energy.

A state's inclusion in this category does not imply that all allowable restrictions in that state have quantified limits. For example, Texas and New Jersey are grouped in this category because of the numerical limits placed on one or more allowable restrictions, but these states permit associations to enforce other restrictions (either qualified restrictions or those bound only by a "reasonability" standard) as well.[29, 30] Where they exist, these quantifiable limits apply to one or more of the following system characteristics:

- Orientation: Three states (listed in Table 4 on the following page) have placed quantifiable limits on the restrictions an association can place on system orientation (i.e., the direction the array faces). The language of these provisions is quite similar between states. In each, an association "may determine the specific location" where a solar array "may be installed on the roof within

an orientation to the south or within 45° east or west of due south" as long as "this determination does not impair the effective operation" of the system.[31, 32, 33]

- Performance: States have also placed limits on the amount by which a given restriction can decrease a system's performance or efficiency. Where they exist, these limits are often paired with a "reasonability" standard or qualified restrictions, allowing an association to enforce such restrictions as long as system performance does not decrease by a given percentage (between 0-25%).
- Cost: A few states have also chosen to place caps on the amount by which restrictions imposed by an association can increase the total cost of system installation.[viii] In California, restrictions are only "reasonable" (and thus permitted by law) if they increase installed system costs by $2,000 or less.[34] New Jersey and Hawai'i express these limits as a percentage of system cost, prohibiting restrictions that would increase installation costs by 10% and 15%, respectively.[35, 36]

Table 4: Types of Quantified Restrictions by State

	Restriction Type		
	Orientation	**Efficiency/Performance**	**Cost**
California		X	X
Florida	X		
Hawai'i		X	X
Illinois	X		
Nevada		X	
New Jersey		X	X
Texas		X	
Vermont	X		

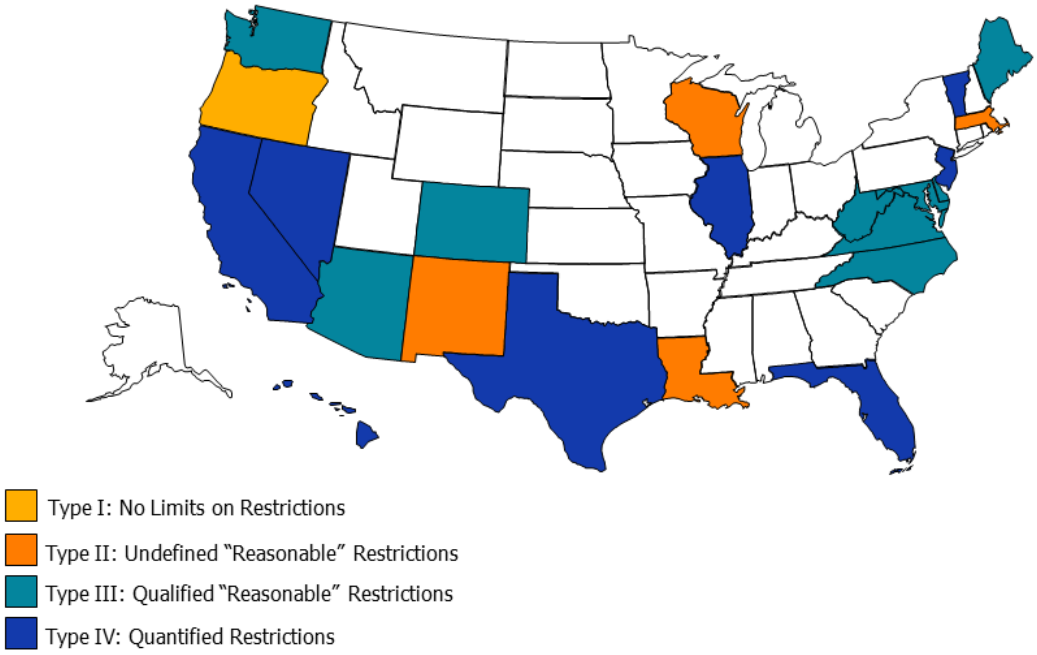
The map in Figure 3 on the following page provides a visual representation of the states that have adopted solar rights provisions and the category into which they fall.

IV. How Associations Can Facilitate Solar Development

As the previous sections of this guide have hopefully made clear, there are significant environmental, public health, and economic benefits associated with solar energy. State solar rights provisions are designed to help protect individual access to these benefits. These laws are often a necessary – but not in themselves sufficient – means of bringing solar to planned communities. In order to help ensure homeowners within their jurisdiction are able to fully and properly realize the benefits of solar, associations should view the solar rights provisions in their state as a starting point, and not as a final remedy, for facilitating solar development. Fortunately, there are actions associations and their ARCs can take to open their neighborhoods up to solar without ceding their authority to protect the value and enjoyment of the properties under their control.

[viii] The cost and performance impact of a given restriction may be difficult to determine in advance for an entire community. Because of this, it might be challenging to design standards that will completely protect an association against legal action. Adopting standards with cost and performance in mind can only minimize an association's exposure to possible litigation. As noted earlier, associations may further reduce their legal risk through the use of a more conservative standard.

Figure 3: Typology – Solar Rights and CC&Rs



Advance Community Education on Solar Energy

In order for an association or its Architectural Review Committee to develop rules for solar that protect a homeowner's return on investment while maintaining a community's aesthetic value, it is essential that these entities cultivate a solid understanding of the technical aspects of solar energy and how restrictions that alter these characteristics can negatively affect a system's performance. The list below outlines a number of factors commonly impacted by restrictions permitted under some states' solar rights provisions and the effect suboptimal parameters for these characteristics can have on system performance.

Array Size

Homeowners looking to go solar will typically base the size of the system they desire on the amount of conventional electricity consumption they would like their system to offset. Because each solar module is rated for a fixed power output, homeowners wanting to meet a larger portion of their electricity demand with solar will require systems that are physically larger (i.e., composed of a greater number of modules). Some associations, however, may not approve of larger systems that take up the majority of the roof plane, preferring instead that these systems occupy less space or that special restrictions apply for larger systems.[ix] The figure on the following page provides estimates of roof area required for systems of a given size and efficiency.[37]

[ix] See the CountrySide Community's (Loudon County, VA) *Community Guidelines Handbook* for an example: www.countryside-va.com/docs/Guidelines_20130101.pdf

Figure 4: Roof Area Required for Solar Energy Systems[x]

Approximate Roof Area Needed in Square Feet					
PV module Efficiency	**Desired PV System Capacity Rating (Watts)**				
	1,000	**2,000**	**4,000**	**8,000**	**10,000**
8%	150	300	600	1,200	1,500
12%	100	200	400	800	1,000
16%	80	160	320	640	800
20%	55	110	220	440	550
For example, to generate 2,000 watts from a 16% efficient module, you need 160 square feet of roof area.					

Array Orientation

System orientation describes the cardinal (North, East, South, West) or intermediate direction a PV array faces. Because the sun traces a path through the southern sky as the day progresses in the northern hemisphere, the optimal orientation for a solar energy system is typically due south. In some cases, optimizing system orientation means placing the array on the front roof slope of a residence (thus making it more visible from the street or neighboring properties) or in another location that may impact community aesthetics. Before choosing to restrict the orientation of a solar energy system, an association or its ARC should consider what effect this action will have on system production. Table 5 below (created using a hypothetical system located in Fairfax County, Virginia) provides a very rough estimate of how sensitive solar electricity output can be to system orientation.

Table 5: Impact of Orientation on System Production and Payback

Orientation	**Annual Solar Energy Production Value ($0.1114/kWh)**[xi]	**Installed Cost ($5.04/W)**[xii]	**Cost After Federal Tax Incentives (30% ITC)**[xiii]	**Simple Payback Period**	**Net Benefit After 40 Years**[xiv]
South (180°)	$666.19	$25,200	$17,640	27 Years	$12,737.52
East (90°)	$511.96	$25,200	$17,640	34 Years	$4,454.46
West (270°)	$510.51	$25,200	$17,640	34 Years	$4,376.66

As the table indicates, requiring a system to be oriented to the east or west rather than due south can reduce annual solar energy production by nearly 25%, extend the system payback period by seven years, and eliminate over 65% of the net benefit of the investment over a 40 year period. More reasonable restrictions on system orientation will have less of a detrimental impact on system production. Limiting array orientation to within 45° of due south (a practice a few states have

[x] Adapted from a figure produced by the U.S. Department of Energy in *A Consumer's Guide: Get Your Power From the Sun*, available at www.nrel.gov/docs/fy04osti/35297.pdf . Figure updated by The Solar Foundation to reflect current commercial module efficiencies.

[xi] Estimated for a 5 kW system based on solar resource and electricity rate data for Fairfax County, Virginia provided by the National Renewable Energy Laboratory's *PVWatts Viewer*, available at: http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html

[xii] Based on the most recent residential installed cost data, provided by GTM Research/Solar Energy Industries Association in *U.S. Solar Market Insight Report 2012 Year in Review*. Available at www.seia.org/research-resources/us-solar-market-insight-2012-year-review

[xiii] For more on the Federal Solar Investment Tax Credit, visit the Database of State Incentives for Renewables & Efficiency (DSIRE) at http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=US37F&re=1&ee=1

[xiv] Values not adjusted to reflect the time value of money

codified in their solar rights provisions) will reduce electric output by only about 7%, which is likely to have less of an impact on system economics.[38]

Array Tilt

In states allowing for restrictions to be placed on system location or visibility, some associations require modules to be mounted flush with the roof or otherwise conform to the roof slope, thus limiting the angle of panel tilt to the angle of the roof itself. As shown in Table 6 below, such restrictions are likely to have a significant impact on system production only in limited cases. This table lists a number of common roof pitches (both as a ratio of inches of rise to run and as an angle) and the impact on system production of a requirement that a system (located in Fairfax County, Virginia at 38.8° of latitude) be installed to conform to the slope of the roof.

Table 6: System Production Impact of Array Tilt

Array Tilt		***Production Impacts***	
Roof Pitch (Rise:Run)	**Roof Angle**	**Annual Energy Production (kWh)**	**% Difference from Latitude Tilt**
0:12 (Flat Roof)	0°	5196	-13.1%
3:12	14°	5751	-3.8%
4:12	18°	5852	-2.1%
5:12	23°	5942	-0.6%
6:12	27°	5987	+0.2%
7:12	30°	6004	+0.4%
8:12	34°	6006	+0.5%
9:12	37°	5992	+0.2%
Latitude Tilt	38.8°	5978	0%

As the table above demonstrates, the optimum tilt for solar modules that are not adjusted seasonally (i.e., a "fixed-tilt" system) is for the angle of the solar panels to be slightly less than the number of degrees latitude at which the site of a planned system is located.[39] In this example, output for an array tilted to match roof slope will be optimized only if the roof pitch is 8:12 (or 34°). However, achieving this tilt will only result in a minuscule increase in output. Only owners of homes with the smallest of roof pitches should expect to experience a significant decrease in system production as a consequence of the placement restrictions discussed in this section.

System Shading

Shading can also negatively impact solar production and can come from a variety of sources. In the context of a planned community, the biggest shading threats are vegetation and structures. Restrictions that prioritize aesthetics over shading avoidance can have an impact on array output that is disproportionate to the amount of shading to which the installation is subjected. Because of the way solar cells and modules are wired together, partial shading of even one cell can result in a

dramatic drop in system production.[xv] Field test results have shown that shading of just 10% of a solar array can reduce output by over 50%.[40] Depending on how the shadow falls on the array, a small amount of shading can result in total power loss.[41]

While this section of the guide has endeavored to outline some of the most basic and vital technical characteristics of solar energy arrays, there are a number of other excellent resources and tools association leaders can use to further their understanding of solar technology and policy in order to evaluate the impact restrictive CC&Rs might have on system performance.

Table 7: Resources and Tools on Solar Energy System Performance

PVWatts Viewer
National Renewable Energy Laboratory
A web-based tool that allows users to estimate system production and analyze the value of energy produced by a solar energy system.
http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html

System Advisor Model (SAM)
National Renewable Energy Laboratory
A modeling program (free to download) that allows users to predict system performance and cost of energy based on a number of real-world system design parameters.
https://sam.nrel.gov/

Photovoltaic Installer Resource Guide
North American Board of Certified Energy Practitioners
This guide, designed to help train future solar installers, provides detailed yet easy-to-understand explanations of the technical aspects of solar energy.
www.nabcep.org/wp-content/uploads/2012/03/NABCEP-PV-Installer-Resource-Guide-March-2012-v.5.2.pdf

Building America Best Practices Series: Solar Thermal & Photovoltaic Systems
U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy
Written for home builders, this guide provides a thorough breakdown of the components of rooftop installations.
http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/41085.pdf

Database of State Incentives for Renewables & Efficiency
North Carolina Solar Center at NC State University
An extensive database of state, local, utility, and federal solar incentives and policies. Provides summaries of state solar rights provisions and links to the full text of these laws.
www.dsireusa.org/solar

[xv] This is becoming less of an issue, however, as the use of solar micro-inverters (power electronics that convert direct current power to alternating current for one or two modules, rather than for an entire system) continues to expand.

From Theory to Practice: How One Community Association Improved Their Rules Through Understanding Solar

In 2010, officials at Lakelands Community Association in Gaithersburg, Maryland received a request from a homeowner wishing to install solar panels on his rooftop. The association granted the request, provided the homeowner agreed to have the system installed on his home's rear roof plane or otherwise out of sight from the street. The homeowner appealed the decision, citing language in Maryland's solar rights provisions stating that restrictions resulting in a "significant" increase in cost or decrease in performance are unenforceable. In order to develop a fair interpretation of the term "significant", the association sought advice from a local solar installer and, "after much debate and gathering of information", established that "significant" would be defined as ≥ 20%. Once a solar professional determined that the association's original placement recommendations would increase installation costs by more than 20% (about $5 per week), the homeowner's request was approved without the original placement condition.[42]

Clearly Define what is Permissible

Once an association has developed the knowledge necessary to determine the sort of restrictions it can reasonably place on solar development, the next step is to specify just what these restrictions are and publish them in the association's architectural guidelines or other documents. Clearly communicating to homeowners the rules and standards governing solar energy development helps to eliminate informational barriers between residents and association board or ARC members. This helps to promote process transparency and the proper setting and management of expectations while reducing the "hassle factor" of the homeowner having to reapply or appeal a decision (and the committee having to review the request anew) made according to ambiguous or unstated restrictions. Just as association guidelines and rules contain specific standards dictating which design elements or property improvements are acceptable (such as the color and manufacturer of exterior paint or siding; materials for walls and fences; exterior lighting uses, color, and placemen; etc.), so too can they designate – within the confines of state solar rights provisions – standards for solar energy systems.

The importance of recording standards for solar energy in an association's governing documents has a firm grounding in state legal thought (through court decisions) and solar rights legislation, as well as in actual design guidelines currently used by many communities. For example, in Arizona, *Garden Lakes Community Association vs. William Madigan, et al.* establishes that, "[r]estrictive covenants and architectural guidelines that are clear and unambiguous are generally enforceable against the individual homeowners within the association."[43] That is, if an association wishes to place certain requirements on the homeowners in their community, it is best for these rules to be clearly stated. Some state legislatures have also recognized the importance of developing straightforward rules for solar energy and have included requirements in their solar rights provisions that associations develop standards accordingly. As mentioned in a previous section, Hawai'i requires "each private entity" to adopt rules that "facilitate the placement of solar energy devices."[44] In Illinois, associations are required to produce

an "energy policy statement", within 120 days of receiving a homeowner's request for one, describing "the location, design, and architectural requirements of solar energy systems."[45]

Even in the absence of a state mandate, many associations have elected to incorporate standards designed to minimize ambiguity into their community guidelines. Examining the nature of the standards these communities have adopted (i.e., those designed to protect community aesthetics, tree preservation and planting, and health and safety) and the language they have chosen to communicate them can be instructive for associations seeking to specify rules for solar energy in their own guidelines.

Community Aesthetics

As noted in Section II and highlighted in the previous discussion on community education, associations often seek to safeguard community aesthetics by placing restrictions on system design elements such as size, placement, tilt, and orientation. Enforcing such restrictions is often fully within an association's rights; however, taking extra steps to clearly communicate these restrictions to residents in advance can minimize the frequency of enforcement actions. Furthermore, specific standards should make it clear to homeowners which systems will be approved by the ARC, which can reduce the occurrence of appeals on applications denied because residents found association rules to be confusing or unclear.

Consider the following passage, taken from the architectural standards of a community in North Carolina:

> ***Solar Collectors.*** *The construction of solar energy collector panels and attendant hardware is subject to Architectural Review and Use Committee approval. An application for solar collectors should include detailed plans and specifications. If a commercial product is to be installed, the manufacturer's specifications and promotional literature or photographs of similar installations should be provided with the application. A solar collector installation must also meet all [town] requirements.*[46]

While the ARC for this association may have already developed rules for evaluating applications for solar energy systems (though there is no guarantee it has), the brief standard reproduced above does not effectively communicate them to homeowners. North Carolina's solar rights provisions permit an association to establish and enforce restrictions that "regulate the location and screening of solar collectors" provided these regulations do not "have the effect of preventing the reasonable use of a solar collector".[47] Given this, the association could provide details on its placement and screening requirements and under what conditions these restrictions would or would not apply.

Contrast the language excerpted above with two examples of much more specific language, both taken from the guidelines of associations located in Virginia:[xvi]

[xvi] While differences exist between the solar rights provisions adopted by North Carolina and Virginia, the statutes are similar enough to allow for the comparison made herein. First, both states are classified as having *Type III: Qualified "Reasonable" Restriction* provisions. More

Article 6. Solar Panels

Due to differing house styles and new advancements in solar technology resulting in new panels, designs and changes in size requirements, each request for approval will be considered individually on its own merits.

A panel which lies flat with the roof pitch would be the most readily accepted. When a flat installation is not possible, design considerations must be given to how the installation will blend in with the design of the building.

Installations which are more easily seen from the street or neighboring properties require more attention towards blending them in as inconspicuously as possible with the existing structure.

6.1 Panel, Mounting and Color

6.1.1 The panels should be mounted as close to flat on the roof as possible.

6.1.2 No part of the installation should be visible above the peak of the roof on which it is mounted.

6.1.3 All non-absorbing parts must be painted to match the roof or in certain circumstances, be enclosed and painted to match the background.

6.1.4 There should be minimal space between panels.

6.1.5 Piping, wiring and color devices must be hidden or minimally visible.

6.2 Additional Application Requirements for Solar Panels

The application for solar panels should include the following:

6.2.1 Drawings and/or photos showing proposed location on the roof, with color photos taken from street.

6.2.2 Detailed information regarding size, installation details, materials and color. Manufacturers' brochure would be helpful.[48]

The example above provides a homeowner with a much clearer picture of the restrictions and standards they would be required to abide by if they chose to go solar. It also clearly describes the materials that must accompany an application for a solar installation. If it hasn't already done so, this association might contemplate including these application requirements, explained in as much detail as possible, on the application form itself.[xvii] Consider a second example, on the following page:

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importantly, both states allow for reasonable restrictions on system location or placement. Much of the language highlighted above focuses on these sort of restrictions.

[xvii] See the the Forest Heights Homeowners Association's "Architectural Review Application: Solar Rooftop Device" at www.fhhoa.com/wp-content/uploads/2012/12/ARC_Solar.current.pdf or the Carino Canyon Homeowners Association's "Architectural Design Change Request Form" at www.carinocanyon.org/files_documents/CC_Arch_Change_Request_Form_Rev_Feb2011.pdf for examples of how this might be done effectively.

53. Solar Panels (single family, townhouse, and manor homes)

Solar panels shall be placed so as to cause minimum visual impact on surrounding residences. Unless the panels would be otherwise inoperable due to shade, panels should be placed on the rear roof of a home. Panels should be centered laterally on the highest roof area and located near the ridge line. Panels should be far enough from the ridge line so that they do not protrude above the house outline when viewed from adjacent properties. Panels should be of the same size and shape and placed together to avoid gaps between individual panels. The collector surface should be parallel to the roof (flat against) and as close as mounting hardware permits. Pipes, wires, and mounting hardware must be unobtrusive. Large collector systems will be disallowed unless roof is constructed up around the system to give the appearance of being part of the roof, like a dormer. When allowed, panels mounted to the front side of the roof must be flush with the roof.

Application Contents – site plat (other), dimensions, elevation, color[49]

Again, note the difference between this example and the North Carolina example in how restrictions on location are described. In addition, the guidelines listed above indicate under what conditions some form of screening would be required (i.e., for "large collector systems") and how a contractor might go about achieving such concealment.

Tree Preservation and Planting

The nature of solar energy production often puts solar development and tree growth – both of which can improve quality of life in the community – in competition with one another. While some communities have chosen to pursue one of these goals at the expense of the other, it is possible for associations to develop standards that achieve a balance between these competing interests. At least one Colorado association has recognized that trees and solar can peacefully coexist, and has included language reflecting this in its ARC guidelines:

An Owner shall take into consideration the future height of neighbors' trees/shrubs when planning placement [of a solar energy device]. Under no circumstances shall a neighbor be required to remove or prune established plantings. However, once a solar system is approved, adjoining neighbors may not build or plant structures that will obstruct solar collection, without prior approval from [the] neighbor owning the solar collectors.[50]

The balance achieved in this standard hinges on where the right to tree growth lies both before and after a solar energy system is installed. Prior to installation, preference is given to existing trees. Once a system is put in place, however, future tree growth must conform to the array's need for sunlight. The language and purpose of this standard very closely resembles another state-level policy to protect solar access – the solar easement. Where they exist, these provisions allow for system owners to negotiate voluntary agreements with their neighbors to prevent future

obstruction of a solar collector's access to sunlight.[xviii] The standard above, however, is more stringent than most state solar easement provisions as the system owner in this community has an *automatic* right to limit future obstructions (preventing them from having to negotiate a *voluntary* agreement). Table 8 below provides a list of key resources for readers interested in learning more about solar easements or developing easement-like rules for their own associations.

Table 8: Resources on Solar Easements

DSIRE Solar Policy Guide: A Resource for State Policymakers
North Carolina Solar Center at NC State University
Provides a brief yet informative overview of solar easements and other state solar access provisions.
http://dsireusa.org/solar/solarpolicyguide/?id=19

A Comprehensive Review of Solar Access Law in the United States
Solar America Board for Codes and Standards
Covers the legal basis of solar access laws (including both solar rights and easements) and presents model language for developing effective state-level policies.
www.solarabcs.org/about/publications/reports/solar-access/pdfs/Solaraccess-full.pdf

Shadows on the Cathedral: Solar Access Laws in a Different Light
Troy A. Rule, University of Missouri School of Law
Provides a legal analysis of existing solar access laws and recommends an approach to solar easements that respects both property rights and public interests.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1466224

This sample standard also encourages harmony between solar development and tree growth by acknowledging that the ultimate height of existing trees may impact solar energy production. In this example, it is the system owner has a duty to consider the effects of future tree height. Other standards make this the responsibility of the ARC when approving new plantings: *"Consideration of the eventual height of trees shall be exercised [by the ARC] for protection of existing view and solar access."*[51]

While the consequences of future tree placement and growth are often weighed on a case-by-case basis, it may be possible to take a more systematic approach to protecting access to sunlight. The development of "solar access zones" for each parcel under association control can help homeowners understand whether and which plants can be placed on a property without jeopardizing solar array performance.[52] These zones are areas adjacent to residential buildings in which plantings are restricted to species that will not impair solar collection. The size of these zones can be determined as a function of the ultimate height of a plant species and building height – the

[xviii] As of February 2013, 30 states have enacted legislation allowing for solar easements. See http://dsireusa.org/documents/summarymaps/Solar_Access_Map.pdf . More information on solar easements can be found at http://dsireusa.org/solar/solarpolicyguide/?id=19

distance from the ground a rooftop solar energy system would be installed. The resources listed in Table 9 below provide more information on this and other strategies for balancing competing sustainability interests.

Table 9: Resources for Balancing Solar Development with Other Interests

Solar Briefing Papers: Balancing Solar Energy Use with Potential Competing Interests
American Planning Association

Though it covers topics mostly of interest for a public planning audience, this paper outlines several actions communities under private governance can take to encourage both solar development and tree preservation.

www.planning.org/research/solar/briefingpapers/pdf/potentialcompetinginterests.pdf

Trees and Solar Power: Coexisting in an Urban Forest Near You
Daniel C. Staley

Introduces the concept of "Solar Access Zones" and how these can be implemented on both a parcel and neighborhood scale.

http://danstaley.net/Staley%202012%20Trees%20And%20Solar%20Power%20Coexisting%20in%20an%20Urban%20Forest%20Near%20You%200012%20WREF%20Solar%202012%20FINAL.pdf

Health and Safety

Finally, an association may wish to restrict solar development on the basis of protecting community health and safety. Fortunately, current industry standards, local building and national electric codes, and product certifications are often sufficient on their own to ensure installations are performed safely. Given this, association guidelines typically reference these external standards when specifying the health and safety criteria an installation must meet:

> *All installations must comply with all applicable building codes and other governmental regulations, and must be secured so that they do not jeopardize the safety of residents or cause damage to adjacent properties.*[53]

While the examples cited throughout this section represent improvements over guidelines lacking in detail, readers should not understand them to be the "gold standard" for clearly written community rules on solar energy. Associations across the nation have adopted much more clearly defined and lengthy standards, some of them so long that we are unable to reproduce them in this guide. Table 10 on the following page directs readers to examples of communities with detailed and completely separate policies regarding solar development. In reviewing these sample documents, however, readers should keep in mind that each document was created according to the limitations imposed by the solar rights provisions of the state in which each community is located. Please consult the solar rights provisions in your own state before using these examples to develop your own guidelines. Information on solar laws and policies in your state can be found at www.dsireusa.org/solar.

Table 10: Associations with Stand-alone Solar Energy Policies

Architectural Committee Policies – Policy 17: Renewable Energy Generation Devices and Energy Efficiency Measures
Cherry Creek Springs Homeowners Association (Colorado Springs, Colorado)
www.cherrycreeksprings.com/AC/AC%20Documents/Policies/ACPolicy17-RenewableEnegyGen.pdf

So You Want to Install a Solar Power System: A Helpful Guide for the High Desert Homeowner
High Desert Residential Owners Association (Albuquerque, New Mexico)
www.highdesertliving.net/highdesertliving/external.html?mode=d&xlink=dwnldfile.html%3Fa%3Dsnd%26file_id%3D1226

Guidelines for Solar Energy Devices
Lakewood Cove Homeowners Association (Houston, Texas)
http://lakewoodcovehoa.org/GuidelinesSolarDevices.pdf

Design Guidelines and Application Requirements for Solar Energy Systems, Roof Windows, Skylights, and Other Roof Mounted Fixtures, Features and Equipment
Park Estates Homeowners Association (Long Beach, CA)
www.parkestateshoa.com/images/pdf/bl/PE%20Solar%20Guidelines.pdf

Architectural Rules, Regulations & Guidelines: Solar Energy Devices
Fairwood Greens Homeowners' Association (Renton, Washington)
www.fairwoodgreens.org/documents/rulesandregulations/SolarPanels.pdf

Coproduce a Lasting Solar Solution

While borrowing or adapting language from existing examples of solar guidelines will suffice for some associations, others may have difficulty in identifying current standards that both conform to applicable solar access laws and reflect the unique values and preferences of the communities they govern. In these cases, associations may wish to convene a meeting of relevant stakeholders in order to coproduce a set of design guidelines for solar. Such gatherings would provide a forum for community members to communicate their values and preferences, forming the basis for standards that are meaningful and uncontroversial. These ideas can then either be tempered or strengthened through the participation of a diverse set of professionals whose expertise will help define the limits of what is technically practical, legally permissible, or most impactful in terms of balancing competing interests and serving the needs of the community.

Though it may be difficult to bring all stakeholders to the table, there are several advantages to taking a coproduction approach. Obtaining the direct participation of a wide variety of stakeholders helps ensure the standards produced by the effort reflect the diverse perspectives of the groups they impact. Such a strategy allows all stakeholders to have access to the same relevant information and can help break down communication barriers between homeowners and association representatives through its encouragement of face-to-face discussions.[54]

Table 11 below and on the following page provides a list of potential stakeholders to involve in these community meetings.[xix] Note that this list is not meant to be comprehensive, nor will it be necessary for all stakeholders from the list to participate in all cases; the decision on who to involve should be based on the specific needs and values of the community.

Table 11: Solar Energy Stakeholders in a Planned Community

Community Developer

Having originally designed the community with a particular aesthetic appeal in mind, the developer can provide valuable insight into which standards will sufficiently protect or unreasonably violate their vision for the community.

Architectural Review Committee (ARC)

Tasked with reviewing proposed property improvements for compliance with existing architectural guidelines, as well enforcing these rules and recommending their emendation, these stakeholders (often community owners themselves) can bring to the table a knowledge of current guidelines and ideas on which changes will be practical.

Community Owners

Because the association and its CC&Rs and architectural guidelines exist chiefly for the benefit of the owners to whom they apply – and because owner support is typically required to amend governing documents – it is important that residents be represented at these meetings.

Local Solar Contractor

Promoting community aesthetics or competing interests above solar development frequently comes at the expense of reduced performance or added cost of a solar energy system. A qualified and experienced solar installer will be able to educate other stakeholders on the factors influencing system output and cost and evaluate the impact proposed guidelines can have on a homeowner's investment in solar.

Solar Access Legal Expert

Communities located in states with solar rights provisions limiting an association's ability to restrict solar development must ensure design guidelines are established and enforced in accordance with these laws. A legal expert well-versed in state solar access law can help determine the legality of any proposed standards.

Knowledgeable Facilitator

Having a facilitator familiar with both solar energy and community associations arrange and conduct the stakeholder meeting will help ensure the event is structured with effective decision-making as the goal. These individuals can also serve as an impartial mediator to help resolve any conflicts that may arise.

[xix] This list was adapted, in part, from "Table 1: Key Players Influencing the Aesthetics of Solar Energy Systems" in *Bringing Solar Energy to the Planned Community: A Handbook on Rooftop Solar Systems and Private Land Use Restrictions*, available at www.consumerenergycenter.org/erprebate/documents/CC+Rs_and_solar_rights.pdf

Professional Arborist or Urban Forester

These professionals can provide input on which tree species and placements are compatible with solar to communities seeking to balance tree preservation and growth with solar energy development.

Local Code Officials

Communities concerned about the health and safety impact of solar installations can invite code officials to discuss the local, national, and industry safety and quality standards governing solar energy development.

Historical Preservation Expert

Additional restrictions may apply when association-controlled communities coincide with designated historic preservation districts. Stakeholders with expertise in these supplementary requirements can help ensure guidelines are drafted to protect historically significant properties.

Still Need Help? The Solar Outreach Partnership is here for you!

Interested in bringing more solar to your community, but still unsure how to get started? Let us do the work for you! The Solar Outreach Partnership provides complimentary technical assistance services to local governments and communities across the U.S. seeking to increase the use and integration of solar energy. If you would like assistance implementing any of the recommendations covered in this guide or with other topics focused on promoting solar energy locally, please visit www.solaroutreach.org/ta and submit a request for technical assistance, or contact solar-usa@iclei.org.

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