An Action Plan to Cut Costs and Red Tape in Salt Lake City
Prepared for Salt Lake City Corporation

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For more information, please visit:
www.eere.energy.gov/solarchallenge

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Wasatch Solar Challenge Partners

➤ Salt Lake City: Mayor Ralph Becker, Vichi Bennett, Lisa Shaffer, Orion Geoff, Sherry Collins
➤ Salt Lake County: Mayor Peter Corroon, Mayor Ben McAdams, Kim Barnett, Brent Unenbach, Rachel Broadbent
➤ Summit County: Summit County Council Members (Chris Robinson, Sally Elliot, Claudia McMullin, Dave Ure, Roger Armstrong, Kim Carson), Anita Lewis, Robert Taylor, Ashley Hohler, Stephanie Dalmatt-Connell, Bill Vanderlin
➤ Park City: Mayor Dana Williams, Tyler Paulson, Roger Evans, Chad Root
➤ Midvale: Mayor Joan Seghini, Christopher Butte, Donna Jackson
➤ West Valley City: Mayor Mike Winder, Paul Isaac, Wayne Pyle, DeAnn Varney, Jason Nau
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➤ Utah Clean Energy: Sarah Wright, Rebecca Nelson, Brandy Smith, Sophie Hayes, Bonnie Christiansen, and Utah Conservation Corps Members, Kate Bowman & Ark Parker
➤ Utah Solar Industry Representatives: Brad Stevens, Green Power Solutions; Bill Wilson, Dwell Tek; Brad Thayn, Hunt Electric; Chad Hoffmein, Synergy Power Inc.; Charlie Bros, Creative Energies; Joe Roycraft, Utah Solar and Alternative Energy; Ken Gardner and Kyle Hartman, Gardner Engineering; Marc and Cammy Staker, Sunlight Solar Systems; Mark Richards, Intermountain Wind & Solar; Rob Adams and Ryan Lambert, S-Power; Thaniel Bishop, Salt Lake Community College.

The authors would also like to thank the following individuals for their contributions to and review of this document:

➤ Kate Bowman, Utah Clean Energy and Utah Conservation Corps
➤ Sophie Hayes, Utah Clean Energy
➤ Ark Parker, Utah Clean Energy and Utah Conservation Corps
The Wasatch Solar Challenge is a diverse partnership of local governments and local non-profit organizations working collaboratively to create a widespread, “solar-friendly” environment that enables increased adoption of residential and commercial solar PV. Through workshops, trainings, and peer-to-peer exchange forums, partners collaborated to identify workable best practices for solar permitting, inspections, interconnection, zoning, and financing. Workshop findings and partner feedback helped inform the development of Customized Action Plans for simplified solar permitting for each jurisdiction. The Action Plans provide near-term, mid-term, and long-term recommendations to guide ongoing efforts to streamline and simplify solar, with the goal of creating more standardized solar processes across all jurisdictions (and, ultimately, across the State and throughout the West).

The Wasatch Solar Challenge partners, led by Project Manager Utah Clean Energy, also spearheaded innovative financing mechanisms and new programs designed to grow the local solar market. For example, the highly successful Salt Lake Community Solar Program (2012) leveraged group buying power to negotiate a 40 percent discount for rooftop solar and installed over 230 kilowatts of residential solar across Salt Lake County. This successful initiative received Utah Business Magazine’s 2012 Sustainable Business Award for Social Impact and was a finalist for the 2013 Governor’s Excellence in Energy award. A similar bulk-purchase program launched in Summit County/Park City in Spring 2013. Learn more at www.mycommunitysolar.org.

The Wasatch Solar Challenge Team is one of 22 teams participating in the U.S. Department of Energy’s Rooftop Solar Challenge. The Challenge is working to spur solar power deployment by cutting red tape — streamlining and standardizing permitting, zoning, metering, and connection processes — and improving finance options to reduce barriers and lower costs for residential and small commercial rooftop solar systems. This Challenge is part of the Department’s larger SunShot Initiative to make solar energy more accessible and affordable, increase domestic solar deployment, and position the U.S. as a leader in the rapidly-growing global solar market. Learn more at http://www.eere.energy.gov/solarchallenge/.

The U.S. Department of Energy SunShot Initiative is a collaborative national initiative to make solar energy cost competitive with other forms of energy by the end of the decade. Reducing the installed cost of solar energy systems by about 75% will drive widespread, large-scale adoption of this renewable energy technology and restore U.S. leadership in the global clean energy race. Learn more at http://www21.eere.energy.gov/solar/sunshot/.

### Key Terms & Acronyms

- **Azimuth**: The orientation (south, southwest, west) of a solar PV system.
- **DOE**: The United States Department of Energy, a cabinet-level federal agency.
- **Electricity Generation (or Output)**: The amount of electric energy produced by transforming other forms of energy, commonly expressed in kilowatt-hours (kWh) or megawatt-hours (MWh).
- **Grid-tied Solar**: A solar PV system that is interconnected with the utility grid via net-metering and interconnection agreements with the utility.
- **International Residential Code (IRC)**: Part of the International Building Code (IBC), the IRC sets building standards for residential structures.
- **Kilowatt (kW)**: Equal to 1000 Watts.
- **Kilowatt-hour (kWh)**: A unit of energy equivalent to one kilowatt (1 kW) of power expended for 1 hour of time.
- **Mounting**: The manner in which a solar PV system is affixed to the roof or ground (i.e. roof mount, ground mount, pole mount).
- **Megawatt (MW)**: Equivalent to 1000 Kilowatts; a measure of the size of electrical power.
- **Megawatt-hour (MWh)**: A unit of energy equivalent to one megawatt (1 MW) of power expended for 1 hour of time.
- **National Electric Code (NEC)**: Sets standards and best practices for wiring and electrical systems.
- **Off-grid Solar**: A solar PV system that is not connected to the utility grid but often requires a battery back-up system (or other back-up generation system) to store electricity for later use.
- **Power**: The rate at which work is performed (the rate of producing, transferring, or using energy). Power is measured in Watts (W), kilowatts (kW), Megawatts (MW), etc.
- **Solar ABCs**: The Solar PhotoVoltaic (Solar PV) technologies and to stimulate market growth.
- **Solar Panel**: Solar systems consisting of photovoltaic cells, made with semiconducting materials, that produce electricity when they are exposed to sunlight.
- **Solar PV System**: A typical PV system consists of PV panels (or modules) that combine to form an array; other system components may include mounting racks and hardware, wiring for electrical connections, power conditioning equipment, such as an inverter, batteries for electricity storage (optional). PV systems can provide electricity for an array of uses, including small, off-grid signs, remote cabins, boats, or RVs, off-grid (with battery back-up) or grid-connected homes, businesses, industrial facilities and farms; and/or, solar-integrated utility grid systems.
- **Thin Film Solar PV**: Solar PV technology used to generate electricity, made by depositing one or more thin layers of photovoltaic material on a substrate. Thin film solar is found in hand-held calculators and in very large modules used in building-integrated installations and vehicle charging systems.
- **Watts (W)**: A measure of the use of electrical power, as defined by the following equation: power (Watts) = voltage (volts) x current (Amps).
The sun rises every day, shining down on more than 200 billion square feet of rooftops across the United States. Tapping into just a fraction of that potential presents an incredible opportunity for communities to meet more of their energy demand from inexhaustible, clean, homegrown solar energy. Standing in the way of that potential are two words that make solar more complex and costly than necessary: Red Tape. Across the country, solar customers and installers face an incomprehensible patchwork of permitting, zoning, and interconnection rules from more than 18,000 cities and 3,000 utilities.

Despite the rigorous national standards for safety and code compliance for solar, there is no standardized national approach to local solar processes. Every town, county, state, and utility service territory has a different set of ordinances, procedures, and regulations. The resulting unpredictability and market instability stemming from this inconsistency ultimately leads to higher costs. In fact, recent studies have shown that local rules and procedures can have an enormous impact on the out-of-pocket price paid by the solar consumer—adding upwards of $500 per installed kilowatt of solar (or $2,500 for an average 5-kilowatt residential solar installation).

Over the past four years, the total cost of an installed solar energy system has decreased by thousands of dollars, making solar an increasingly attractive investment for homeowners and businesses. These price declines, however, are largely attributable to falling solar PV module (or panel) prices, which fell by $2 per watt from 2008 to 2011 and continued to decline through 2012. The hardware costs, or “hard” costs, of solar PV include the panels as well as mounting equipment, inverters, conduit, and wires. While continual improvements and breakthroughs are helping to reduce the hard costs of solar PV, the single biggest challenge to reducing solar prices in the U.S. is the non-hardware costs — or “soft costs.” The “soft costs” of solar are associated with permitting, application approval time, fees, inspections, utility interconnection procedures, zoning variance requests, customer acquisition costs, and other administrative costs, and currently make up at least 30-40% of the total installed cost of rooftop solar PV.

As homeowners and businesses weigh the economics of solar, cost and complexity often discourage investment. With limited solar adopters and inadequate economies of scale, market growth suffers, competition languishes, and the cycle of higher-than-necessary solar costs continues. On the other hand, as solar becomes cheaper and easier, more individuals and businesses will be primed to invest in an energy resource that simultaneously improves air and water quality, mitigates risks and costs associated with disruptive climate change, and preserves precious resources for future generations.

Fortunately, the solar game is changing with a national effort to cut through red tape and standardize solar processes. Numerous leading local governments, like Salt Lake City, are turning their attention to the impact of local rules and regulations on the soft costs of solar. As part of the U.S. Department of Energy’s SunShot Initiative and National Rooftop Solar Challenge, local governments and organizations are collaborating nationally and regionally to share best practices, streamline the solar process, and reduce costs to citizens and businesses. Utah’s Wasatch Solar Challenge is one of twenty-two DOE Rooftop Solar Challenge Teams; partners include Salt Lake City, Salt Lake County, Midvale, Park City, Summit County, West Valley City, the Utah Solar Energy Association, and Utah Clean Energy (Team Project Manager). Through peer-to-peer forums, workshops, and regular information sharing, the team has been

**Executive Summary**

The sun rises every day, shining down on more than 200 billion square feet of rooftops across the United States. Tapping into just a fraction of that potential presents an incredible opportunity for communities to meet more of their energy demand from inexhaustible, clean, homegrown solar energy. Standing in the way of that potential are two words that make solar more complex and costly than necessary: Red Tape. Across the country, solar customers and installers face an incomprehensible patchwork of permitting, zoning, and interconnection rules from more than 18,000 cities and 3,000 utilities. Despite the rigorous national standards for safety and code compliance for solar, there is no standardized national approach to local solar processes. Every town, county, state, and utility service territory has a different set of ordinances, procedures, and regulations.

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**Figure ES-1 | Cost of 4 kW Solar PV: United States v Germany**

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit</td>
<td>$20,000</td>
<td>$15,000</td>
</tr>
<tr>
<td>Sales Tax</td>
<td>$15,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>Overhead</td>
<td>$10,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>Customer Acq.</td>
<td>$500</td>
<td>$0</td>
</tr>
<tr>
<td>Permitting</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Supply Chain</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Labor</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Electrical</td>
<td>Hardware</td>
<td>$0</td>
</tr>
<tr>
<td>Inverter</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Panel</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

Figure ES-1: A comparison between the price of solar in the United States and Germany.


Photo Credit: Salt Lake City
working to streamline local solar processes and tackle primary barriers to solar adoption, including expediting the solar permitting process, making zoning more solar friendly, increasing financing options for solar, and preserving or improving strong net metering and interconnection policies.

Each jurisdiction received a score comparing their local permitting and zoning processes to DOE Rooftop Challenge Solar Permitting Best Practices. Each score indicates how close (or far) a jurisdiction is from achieving national best practices in each category; it is assumed that adopting best practices will translate to lower costs, simpler processes, and standardized protocols. The goal of the Wasatch Solar Challenge is to improve each jurisdiction’s score by adopting simplified, streamlined, and standardized local solar processes.

This customized Action Plan is intended to provide a detailed overview of Salt Lake City’s solar permitting and inspection processes, identify best practices, and provide priority recommendations (see Table ES1) to improve Salt Lake City’s overall solar score. The proposed strategies were developed in concert with representatives of Salt Lake City’s Building and Sustainability Departments and reflect feedback from numerous Wasatch Solar Challenge workshops and individual consultations. This plan is intended to serve as a tool and guide for the Salt Lake City Mayor, Salt Lake City Council, and Salt Lake City’s Building, Zoning, and Sustainability Departments as they continue efforts to simplify and streamline their internal solar processes.

Salt Lake City has made significant strides to remove unnecessary and costly governmental barriers to solar adoption. With a continued focus on process improvements and maintenance of the best practices outlined in the Action Plan, the world-renowned Capitol City, home to the 2002 Olympics, stands poised to be recognized as leading solar community in the Utah and the nation.

<table>
<thead>
<tr>
<th>Priority Action Item</th>
<th>Level of Difficulty</th>
<th>Timeframe</th>
<th>Action Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Adopt Solar ABCs Expedited Solar Permitting Process and Forms (Appendix A)</td>
<td>Low</td>
<td>Short-term (&lt; 6 mo.)</td>
<td>Timing</td>
</tr>
<tr>
<td>2 Integrate solar-specific information into current building permit website (solar application, inspection checklist, and fee schedule)</td>
<td>Low</td>
<td>Short-term (&lt; 6 mo.)</td>
<td>Information Access</td>
</tr>
<tr>
<td>3 Provide and/or encourage regular solar trainings for building, inspection, fire, and planning/ zoning officials</td>
<td>Low</td>
<td>On-going</td>
<td>All Action Areas</td>
</tr>
<tr>
<td>4 Pursue Solar Friendly Communities Designation <a href="http://www.solarcommunities.org">www.solarcommunities.org</a></td>
<td>Low</td>
<td>On-going</td>
<td>All Action Areas</td>
</tr>
<tr>
<td>5 Adopt the fee structure outlined in Appendix B</td>
<td>High</td>
<td>Long-term (&gt; 2 years)</td>
<td>Fees</td>
</tr>
</tbody>
</table>

### Table ES1: Top 5 Actions Salt Lake City Can Take to Reduce Costs and Streamline the Solar Permitting Process

The Path to U.S. Solar is Riddled with Red Tape

A standard rooftop solar photovoltaic (PV) electricity generation system installed in the United States today costs nearly twice as much as the exact same system installed on a rooftop in Germany. Although the U.S. has a significantly better solar resource than Germany and relatively lower costs for most commercial goods and services, the home of the Red, White, and Blue has a sizeable problem: Red Tape. Across the United States, solar customers and installers face an incomprehensible patchwork of permitting, zoning, and interconnection rules from more than 18,000 cities and 3,000 utilities. Despite the rigorous national standards for safety and code compliance for solar, there is no standardized national approach to local solar processes. Every town, county, state, and utility service territory has a different set of ordinances, procedures, and regulations. The result is a disjointed and unpredictable system of permitting procedures, interconnection processes, zoning ordinances, and solar regulations that all take time and money to navigate. Recent studies have shown that local government rules and procedures can have an enormous impact on the out-of-pocket price paid by the solar consumer—adding around $2,500 to the cost of a residential solar installation. For an average residential system, that can amount to nearly half of the total installed system cost!

Over the past four years, the price of a residential solar PV system has declined from over $8 per watt in 2008 to about $5 per watt in 2012, making solar an increasingly attractive investment for homeowners. These price declines, however, are largely attributable to falling solar PV module (or panel) prices, which fell by $2 per watt from 2008 to 2011 and continued to decline through 2012. The hardware costs, or “hard” costs, of solar PV include the panels, mounting equipment, inverters, conduit, and wires. While continual improvements and breakthroughs are helping to reduce the hard costs of solar PV, the single biggest challenge to reducing solar prices in the U.S. is the non-hardware costs – or “soft costs”.

“Soft costs” associated with permitting, application approval time, fees, inspections, utility interconnection procedures, zoning variance requests, customer acquisition costs, and other administrative costs currently make up approximately 30-40% of the total installed cost of rooftop solar PV. The most significant “soft costs” are permitting and interconnection fees and the labor associated with regulation...
INRODUCTION

is a financial services and software provider for the solar industry and two non-profits
http://www.nrel.

PV and small-commercial for residential rooftop solar

achieving $1.50 per watt and by the end of the decade, achieving $1.50 per watt price goals for residential rooftop PV and small-commercial solar PV, respectively.6,7

Utah is home to one of the Rooftop Solar Challenge teams: the Wasatch Solar Challenge Team is comprised of six local governments (Salt Lake City, Salt Lake County, Park City, Summit County, Midvale, and West Valley City) and two non-profits (the Utah Solar Energy Association and Utah Clean Energy, which serves as the Project Team Manager) (the Utah Solar Energy Association and Utah Clean Energy, which serves as the Project Team Manager) since February 2012, the Wasatch Solar Challenge team members have been compiling and sharing best practices, collaborating with solar industry representatives, and investigating strategies to standardize the solar market across the participating jurisdictions.

Each jurisdiction received a score comparing their local permitting and zoning processes to DOE Rooftop Challenge Solar Permitting Best Practices. Each score indicates how close (or far) a jurisdiction is from achieving national best practices in each category; it is assumed that adopting best practices will translate to lower costs, simpler processes, and standardized protocols.8 The goal of the Wasatch Solar Challenge is to improve each jurisdiction’s score by adopting simplified, streamlined, and standardized local solar processes.

Local Solar Processes are Cumbersome and Costly across the United States

Inconsistencies and delays relating to solar permitting are by no means unique to Utah. A recent study of solar permitting nationwide, conducted by Clean Power Finance, revealed that solar permitting challenges are pervasive across the country and are having a negative impact on the solar market. A survey of 273 residential installers and data from 500+ installations spanning 12 states, comprising over 90% of the residential solar market, generated the following findings:

➤ 36% of solar installers surveyed indicated they limit or avoid doing business in an average of 3.5 jurisdictions as a result of cumbersome or costly permitting procedures.

➤ Permitting processes vary significantly across jurisdictions—what from each other may even within the same state.

➤ Many jurisdictions have not yet established solar permitting procedures. 11% percent of solar installations occur in jurisdictions without a formal solar protocol.

➤ Jurisdictions commonly report that errors in permitting applications are a major source of delays and require more staff time to remedy. Both solar installers and local officials are hindered by inconsistent or poorly defined permitting procedures.

➤ For those jurisdictions that understand solar and want to work with installers, there is currently no channel by which they can communicate to installers about updates or solar process improvements.

The complete findings are available in Clean Power Finance’s report “Nationwide Analysis of Solar Permitting and the Implications for Soft Costs”, which is available on www.solarpermit.org.

Clean Power Finance is a financial services and software provider for the solar industry and capital markets whose mission is to drive the mass-market adoption of residential solar by building an online business-to-business marketplace to connect the solar industry and the capital markets. To learn more, please visit www.cleapowerfinance.com.

The National Solar Permitting Database (NSPD), supported by the U.S. Department of Energy’s SunShot Initiative, is designed to help streamline and reduce the time and costs associated with the solar permitting process. This community-based, free online tool compiles the most complete and accurate permitting requirements from solar professionals and Authorities Having Jurisdiction (AHJs) from around the United States in one single online location. Users will be able to search the database quickly for complete and accurate information on permitting requirements and other relevant information about AHJs. The NSPD can be accessed at www.solarpermit.org.

Salt Lake City’s Action Plan for Simplified Solar

This customized Action Plan is intended to provide a detailed overview of Salt Lake City’s solar permitting and inspection processes, identify best practices, and provide priority recommendations to improve Salt Lake City’s overall solar score. The proposed strategies were developed in concert with representatives from Salt Lake City’s Building and Sustainability Departments and reflect feedback from numerous Wasatch Solar Challenge workshops and individual consultations. This Action Plan aims to serve as a relevant tool and guide for the Salt Lake City Mayor, Salt Lake City Council, and Salt Lake City’s Zoning, and Sustainability Departments as they continue leading the way to simplified and streamlined solar processes. A corollary zoning guideline document, available online at www.solarsimplified.org, provides more detailed information on solar zoning-related issues and strategies to align Salt Lake City’s zoning with best practices.

Salt Lake City has made significant strides to remove unnecessary and costly governmental barriers to solar adoption. With a continued focus on process improvements and maintenance of the best practices outlined in the Action Plan, the world-renowned Olympic city stands poised to be recognized as leading solar community in the Utah and the nation.

<table>
<thead>
<tr>
<th>Solar Permitting Resources for Local Building Officials</th>
</tr>
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<tbody>
<tr>
<td>Local officials tasked with permitting and inspecting solar installations don’t need to go far to learn more about solar technologies and stay up to date on solar technologies. Several free online resources are available to provide training and information:</td>
</tr>
<tr>
<td>➤ FREE on-line Solar Code Official Training at <a href="http://www.nterlearning.org/webi/quest/course-details/cid=402">www.nterlearning.org/webi/quest/course-details/cid=402</a>. The 4-hour online class will give code officials 6 continuing education units and was developed and approved by the US Department of Energy.</td>
</tr>
<tr>
<td>➤ One-Stop-Shop Solar in Utah at <a href="http://www.SolarSimplified.org">www.SolarSimplified.org</a>. Developed by the Wasatch Solar Challenge, this website provides Utah-specific solar permitting, zoning, and code information, along with an interactive solar map, solar calculator, and other helpful resources. The site is designed to serve as a one-stop-shop for local governments, solar customers, installers, and utilities to help streamline, simplify, and standardize the solar process across the state.</td>
</tr>
<tr>
<td>➤ Solar Outreach Partnership at <a href="http://www.SolarOutreach.org">www.SolarOutreach.org</a>. Designed to help accelerate solar energy adoption on the local level by providing best practices, resources, and technical assistance to local governments, this site provides a comprehensive library of reports and information on solar friendly practices geared towards local governments.</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

Cutting Solar Costs, Not Corners

The solar industry certainly recognizes the valuable role that local governments (and utilities) serve in reviewing solar permit plans, inspecting systems, and connecting solar to the grid. Solar permitting and interconnection processes are essential to guaranteeing safety and compliance with existing building codes, while also ensuring quality control and preventing substandard work. However, diverse authorities rarely share a consistent approach or standard protocol for solar regulations. From state and local governments, utilities, and utility regulators, to planning and zoning commissions, building inspectors, and fire code officials, each jurisdiction, and often each individual, has a unique approach to solar. A lack of solar-specific training, education, and exposure among officials often results in further inconsistencies in how existing rules are enforced. This inconsistency in approaches to solar processes arguably does little to improve safety and may, in fact, compromise safety in the long run.

Perspectives on Solar Permitting

| Solar Installer Perspective on Solar Permitting |
| Varying requirements across jurisdictions create confusion, rework, and frictional costs |
| Requirements within the same jurisdiction suffer from inconsistent application |
| Requirements are not readily accessible and can be updated without notice |
| Inconsistent processing and cycle times disrupt sales and operations flows (e.g. scheduling staff time, routing crews, and site visits to customers) |

| Local Official Perspective on Solar Permitting |
| Installer errors and incomplete/inconsistent paperwork (e.g. design doesn’t match documents) creates extra work and delays |
| Local officials are often under-resourced and over-tasked |
| No channel to communicate updates or simplification of processes to installers |
| Solar installations are uncommon; governments are unaware of existing best practices or that a problem even exists |

Understanding that solar is a relatively new technology for many building officials, the solar industry and solar advocates continue to prioritize ongoing solar PV code trainings to improve familiarity with solar technology and reduce time and costs associated with solar project review and inspection (see Solar Permitting Resources for Local Officials).

Time is Money

Time spent acquiring, completing, and submitting permit forms, waiting for approval, and waiting for multiple inspections all add costs to the contractor, which are in turn passed on to customers. By expediting these processes, jurisdictions can simultaneously reduce costs and be more business-friendly. Finding balance between permitting costs and safe processes, without placing undue burdens on the solar industry, is critical to the “soft cost” puzzle.

Fortunately, standard solar technologies and solar installations are required to adhere to a set of rules set forth by the International Residential Code (IRC) and National Electrical Code (NEC). Most residential and small commercial rooftop solar systems follow similar design standards with little variation in technology or design protocol. Employing a standard permit process for the most common systems can save time and costs for all involved (see Figure 2). Appendix A provides an expedited solar PV permitting application template, which was developed by the Solar America Board for Codes and Standards (Solar-ABCs) for national dissemination (supported by the DOE). The Wasatch Solar Challenge has modified this standard permit, providing specific requirements for wind and snow loading.

Adopting the Solar ABCs forms and process is one of the easiest and cheapest ways for a local government to reduce time spent applying for and reviewing solar permits. What’s more, as more jurisdictions adopt this expedited permitting process, the country will be one step closer to a more uniform solar process, which will yield significant economic benefits for decades to come.

Money is Money

The solar industry recognizes that local governments need to charge reasonable fees to cover the work-hours necessary to perform quality reviews and inspections. Jurisdictions can simultaneously ensure safe solar installations and cover costs by adopting reasonable permit fees in line with cost recovery (see Appendix B), in lieu of the more common approach to assess fees based on the total value of solar PV systems (which can quickly add up to several thousand dollars in fees alone).

### Table: Cost and Time Savings from Adopting Solar ABCs and Best Practices

<table>
<thead>
<tr>
<th>Immediate Solution</th>
<th>Savings Estimate %</th>
<th>Average Savings per Install</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar ABCs Standards</td>
<td>90%</td>
<td>$455</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>80%</td>
<td>$200</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$176</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$46</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$27</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$6</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>95%</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$149</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$216</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$403</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$101</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$167</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$38</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$19</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$32</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$26</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$243</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>80%</td>
<td>$96</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$48</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$60</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>80%</td>
<td>$32</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>50%</td>
<td>$7</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>85%</td>
<td>$440</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>80%</td>
<td>$320</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$70</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>100%</td>
<td>$50</td>
</tr>
<tr>
<td>Solar ABCs Standards</td>
<td>76%</td>
<td>$1,906</td>
</tr>
</tbody>
</table>

**Figure 2** | Cost and Time Savings from Adopting Solar ABCs and Best Practices

<table>
<thead>
<tr>
<th>Process for Local Permitting and Inspections</th>
<th>Average cost per Install</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Permit Application</td>
<td>$505</td>
</tr>
<tr>
<td>Draw system plans</td>
<td>$250</td>
</tr>
<tr>
<td>Structure calculations</td>
<td>$176</td>
</tr>
<tr>
<td>Zoning application</td>
<td>$46</td>
</tr>
<tr>
<td>Determine requirements</td>
<td>$27</td>
</tr>
<tr>
<td>Print out permit package</td>
<td>$6</td>
</tr>
<tr>
<td>Delay</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Submit permit application in person</td>
<td>$169</td>
</tr>
<tr>
<td>Pay permit fee</td>
<td>$431</td>
</tr>
<tr>
<td>Variation in build requirements</td>
<td>$581</td>
</tr>
<tr>
<td>Smaller system due to fire setbacks</td>
<td>$202</td>
</tr>
<tr>
<td>Unable to install supply side tab</td>
<td>$167</td>
</tr>
<tr>
<td>Add extra disconnect</td>
<td>$136</td>
</tr>
<tr>
<td>Labeling</td>
<td>$38</td>
</tr>
<tr>
<td>Double flushing</td>
<td>$82</td>
</tr>
<tr>
<td>Extra attachments</td>
<td>$26</td>
</tr>
<tr>
<td>Field Inspections</td>
<td>$329</td>
</tr>
<tr>
<td>Wait for inspector</td>
<td>$121</td>
</tr>
<tr>
<td>Travel to and from customer’s home</td>
<td>$96</td>
</tr>
<tr>
<td>In-process inspection</td>
<td>$40</td>
</tr>
<tr>
<td>Rework and re-inspection</td>
<td>$40</td>
</tr>
<tr>
<td>Inspector conducts inspection</td>
<td>$33</td>
</tr>
<tr>
<td>Solar marketing cost</td>
<td>$520</td>
</tr>
<tr>
<td>Lower close rates from higher cost</td>
<td>$480</td>
</tr>
<tr>
<td>Cancellations due to delay</td>
<td>$70</td>
</tr>
<tr>
<td>Reduced customer referrals</td>
<td>$50</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$2,516</td>
</tr>
</tbody>
</table>
Community Benefits of Streamlined Solar

Fortunately, local governments and local officials have the power and ability to cut through red tape, identify areas ripe for standardization, and streamline local solar processes—all of which can make solar more affordable for homeowners and businesses. Not to mention, adoption of streamlined and standardized processes can help reduce staff-time and resources needed to process solar-related requests. Cutting costs and complexity internally makes for a more cost-effective and efficient local government—an added benefit to taxpayers!

Not only will these concerted efforts lead to greater market certainty and reduced costs for the solar industry and end-users, but communities with solar-friendly rules can better attract economic activity stemming from solar market growth. More dollars circulating in the local economy, more revenue, and more jobs all have a positive ripple effect throughout a community.

Lastly, as communities remove barriers to solar adoption, more individuals and businesses will be primed to invest in an inexhaustible, homegrown, secure, and economic energy resource—one that simultaneously improves air and water quality, mitigates risks and costs associated with disruptive climate change, and preserves finite resources for future generations.

With little to lose and a lot to gain, local governments across the country are taking the scissors to solar red tape and empowering their communities with clean, secure, local solar energy.

### Solar PV: Roof Space is a Precious Commodity

Solar PV systems consist of arrays of individual panels that are wired together to achieve a higher electrical output. Panel sizes vary depending on the model and wattage.

- On average, a 200-250 Watt panel requires approximately 15 to 25 square feet of roof space.

- To generate one kilowatt (1000 watts) of power requires approximately 75-100 square feet of roof space, depending on the panel used.

- The average Utah home uses approximately 9600 kilowatt-hours of electricity annually in northern Utah.

- A solar PV system sized to meet 100% of an average Utah home’s annual electricity needs would be approximately 6-7 kilowatts, which would require upwards of 700 square feet of roof space.

- Shading, pipes, chimneys, and fire access requirements all limit the available roof space suitable for solar. Local regulations or requirements that unreasonably limit the amount of roof space for solar can seriously hinder the viability of solar projects.

### Solar Best Practices: How Does Salt Lake City’s Permitting Stack Up?

The Rooftop Solar Challenge identified and categorized solar permitting best practices, assigning a point system to evaluate and score existing practices. A total score of 460 for permitting indicates that a jurisdiction has adopted all the recognized best practices for solar permitting and has the procedures in place to make solar a fast, simple, and streamlined process for all parties (including the jurisdiction staff tasked with reviewing the permit).

At the onset of the Wasatch Solar Challenge in 2012, Salt Lake City’s received a Solar Permitting Score of 253. Many processes were put into motion over the course of the past year, and Salt Lake City’s 2013 score increased to 361. It is important to note that the 2013 score does not take into account any improvements that are currently in process or planned. As such, it is highly likely that Salt Lake City’s efforts will yield a considerably improved score over the coming months and years, provided that Salt Lake City continues to focus on aligning current practices with best practices.

| DOE Rooftop Solar Challenge Solar Permitting Best Practices Score | 460 points |
| SALT LAKE CITY’S 2012 SOLAR PERMITTING SCORE (pre-Wasatch Solar Challenge) | 253 points |
| SALT LAKE CITY’S 2013 SOLAR PERMITTING SCORE (post-Wasatch Solar Challenge) | 361 points |

The score above addresses five action areas, which represent the main categories that comprise solar permitting: Information Access, Timing, Number of Approvals Required, Expedited Model Processes, and Fees. Table 2 on the next page provides a description of what each Action Area entails.
Gearing Up for Solar Success

Salt Lake City is proactively exploring and carefully considering improvements to its solar permitting processes and zoning ordinances in anticipation of future solar market growth. The price of solar has fallen dramatically in recent years, and more Salt Lake City residents and businesses are eager to adopt solar. As such, improvements to Salt Lake City’s permitting process are quite timely.

Salt Lake City has a number of important pieces of the permitting puzzle already in place, all of which help to simplify and streamline the process. Particularly notable are Salt Lake City’s fast and transparent on-line permitting system with live permit tracking and single inspection requirement for solar projects.

While Salt Lake City has made progress toward best practices throughout the Wasatch Solar Challenge, there remain several action areas ripe for improvement that will help align Salt Lake City with best practices. Table 3 outlines five priority actions that Salt Lake City should consider in order to reduce solar costs and delays.

Table 3 | Top 5 Actions Salt Lake City Can Take to Reduce Solar Costs and Streamline the Solar Permitting Process

<table>
<thead>
<tr>
<th>Priority Action Item</th>
<th>Level of Difficulty</th>
<th>Timeframe</th>
<th>Action Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adopt Solar ABCs Expedited Solar Permitting Process and Forms (Appendix A)</td>
<td>Low</td>
<td>Short-term</td>
<td>Timing</td>
</tr>
<tr>
<td>2. Integrate solar-specific information into current building permit website (solar application, inspection check list, and fee schedule)</td>
<td>Low</td>
<td>Short-term</td>
<td>Information Access</td>
</tr>
<tr>
<td>3. Provide and/or encourage regular solar trainings for building, inspection, fire, and planning/zoning officials</td>
<td>Low</td>
<td>On-going</td>
<td>All Action Areas</td>
</tr>
<tr>
<td>4. Pursue Solar Friendly Communities Designation (<a href="http://www.solarcommunities.org">www.solarcommunities.org</a>)</td>
<td>Low</td>
<td>On-going</td>
<td>All Action Areas</td>
</tr>
<tr>
<td>5. Adopt the fee structure outlined in Appendix B</td>
<td>High</td>
<td>Long-term</td>
<td>Fees</td>
</tr>
</tbody>
</table>

Each of these recommendations and additional recommendations for each Action Area are described in further detail on the next page.

Table 2 | Solar Permitting Action Areas and Description

<table>
<thead>
<tr>
<th>Action Area</th>
<th>Description</th>
</tr>
</thead>
</table>
| Information Access | - How and where solar installers and citizens obtain information on solar permitting (e.g., online, in-person, via email)  
- Ease of permit application and submittal process  
- How and where permit progress is tracked  
- Solar contacts within the jurisdiction |
| Timing | - The amount of time different steps in the permit process require to complete  
- Adoption of any means to accelerate the solar process and thereby decrease costs |
| Number of Approvals Required | - Number of applications required for submittal  
- Number of approvals required  
- Amount of paperwork and number of professional verifications required |
| Expedited Processes | - Adoption of a standardized expedited permitting process  
- Adoption of Solar American Board of Codes and Standards (Solar ABCs)  
- Expedited Solar PV Permitting Process forms (modified with wind and snow loads for Utah) |
| Fees | - Reasonable fees and fee structures |

These Action Areas are expanded upon in detail for Salt Lake City in the tables below, each of which identifies the following:

- Salt Lake City’s current practices in a given Topic Area;
- Best Practices in that Topic Area;
- Strategies and plans to achieve best practices; and
- Benefits of those best practices for the jurisdiction, industry, and residents.
Information Access

Easy access to solar permitting information can provide immediate time and cost-saving benefits for all parties. With more information and processes online, fewer vehicle trips need to be made to the permitting office, fewer staff-hours are taken up answering questions, and wait times are reduced. Table 4 compares Salt Lake City’s practices to best practices for information access, including where permit applications are made available, how completed permits may be submitted, and where interested parties can gather information on their solar permit status.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Where is the solar permit application accessible?</td>
<td>Allow online permitting</td>
<td>Permit applications available to the public online; but solar-specific application not available</td>
<td>• Integrate solar-specific information into current building permit website (including a solar-specific permit application, inspection checklist, and fee schedule)</td>
</tr>
<tr>
<td>How do I submit the permit application?</td>
<td>Allow online permitting</td>
<td>Online permitting (including submissions) available at <a href="https://data.slcgov.com/explore">https://data.slcgov.com/explore</a></td>
<td>• Adopt electronic, user-interactive Solar ABCs Expedited Solar PV Permitting forms for various solar PV projects (see Appendix A)</td>
</tr>
<tr>
<td>How is the permitting process information accessible?</td>
<td>Make all permitting information easily accessible online</td>
<td>Permitting information is easily accessible to the public online; however, solar-specific information not easily accessible</td>
<td>• Maintain regular updates to on-line solar permitting information.</td>
</tr>
<tr>
<td>Is there an accessible designated point of contact for solar permitting?</td>
<td>Assign a designated point of contact, knowledgeable and familiar with solar</td>
<td>Designated point of contact available</td>
<td>• Provide and/or encourage staff participation in regular training for building and inspection staff to ensure familiarity with solar PV permits.</td>
</tr>
<tr>
<td>Where is information on permit fees made available?</td>
<td>Put information online</td>
<td>Fees available to the public online, however, no solar-specific fees</td>
<td>• To facilitate standardization across jurisdictions, share best practices with and/or mentor surrounding jurisdictions on streamlined solar processes and online permitting.</td>
</tr>
<tr>
<td>How is information on inspection requirements made available?</td>
<td>Put information online</td>
<td>General permitting inspection information is available to the public online, however, solar-specific inspection requirements and/or checklists not available</td>
<td>• Applicants and permit reviewers save both time and money.</td>
</tr>
</tbody>
</table>

Benefits of Best Practices

- Decrease driving miles and wait times
- Attract local solar development
- Permit projects faster and cheaper

Timing

The amount of time that each step in the solar permit application process takes to complete directly impacts the costs that installers have to pass along to their customers and the time that Salt Lake City staff has to spend reviewing and inspecting projects. Improvements in this Action Area can simultaneously accelerate the solar installation process and decrease costs. Table 5 summarizes Salt Lake City’s practices relative to best practices on the issues relating to solar permit timing, including application review time, approval time, time between approval and inspection, and the time spent waiting for a local inspection to occur.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the average time required to complete a permit application?</td>
<td>Residential applications can be completed in a half day or less. Commercial applications can be completed in one day or less.</td>
<td>Current Policy: Residential permit decisions: 4-10 days Commercial decisions: 6-15 days Salt Lake City tracks permits with online system</td>
<td>• Adopt Expedited Solar ABCs permitting process to further reduce the time required to approve permits and save staff time in the review and inspection process.</td>
</tr>
<tr>
<td>Is there a policy to issue/deny permits within a specified number of days?</td>
<td>Establish a policy to render a decision in within 3-5 business days.</td>
<td></td>
<td>• Identify strategies to reduce the inspection appointment window to less than 2 hours (or provide an exact time).</td>
</tr>
<tr>
<td>Does the jurisdiction track the number of days each permit takes to process?</td>
<td>Track the time permits take to complete the process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the average number of business days between application submission and decision?</td>
<td>provides a decision on each permit application within three business days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the average number of business days from inspection request to actual inspection?</td>
<td>Inspection occurs less than two days from inspection request</td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the typical window of time given to the installer for final onsite inspection?</td>
<td>Reduce the inspection appointment window to two hours or less</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Benefits of Best Practices

- Faster decisions on permitting applications, shorter wait times, improved customer service
- Reduced lag time for solar projects
- More installers eager to do business in Salt Lake City and stimulate local economic activity

Table 4 | Solar Permit Information Access in Salt Lake City, a Comparison with Best Practices

Table 5 | Timing Protocols for Solar Permitting in Salt Lake City, a Comparison with Best Practices
Number of Approvals and Inspections Required

As approvals and inspections take time to complete, limiting the number of steps required to ensure safety and adherence to local building and fire codes can save time for both the local government staff and solar customers and installers. Limiting the number of inspections reduces the need for time-consuming waiting periods (as identified above), excessive trips to job sites, and per-hour costs associated with any professional approvals (engineers, inspectors, etc.). Table 6 summarizes the number of separate solar applications that must be submitted across Salt Lake City’s departments, the number of departments that must review and approve a permit application, and the number and type of inspections that take place during and after the solar installation.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How many departments require applications?</td>
<td>One</td>
<td>One</td>
<td>To facilitate standardization across jurisdictions, share best practices with and/or mentor surrounding jurisdictions on streamlined solar approval and inspection protocols.</td>
</tr>
<tr>
<td>What types of departmental approvals are required?</td>
<td>Eliminate reviews that do little to validate the safe and efficient operation of a proposed PV system.</td>
<td>Structural</td>
<td>Provide and/or encourage staff participation in regular trainings for building and inspection officials to ensure familiarity with solar PV permits.</td>
</tr>
<tr>
<td>What approvals from Prof. Engineers are required?</td>
<td>Eliminate reviews that do little to validate the safe and efficient operation of a proposed PV system.</td>
<td>One single comprehensive inspection</td>
<td></td>
</tr>
<tr>
<td>How many separate inspection trips are required?</td>
<td>Eliminate multiple inspections.</td>
<td>One</td>
<td></td>
</tr>
</tbody>
</table>

Benefits of Best Practices

- One application to one department saves time and money
- Eliminating excessive reviews from expensive professionals reduces the total cost to the customer without compromising safety
- Officials with solar-specific training can speed up the process and ensure proper safety protocols have been met

Model Expedited Permitting Process

Adoption of the Solar ABCs Expedited Solar PV Permitting Process (and affiliated standardized forms) is one of the easiest steps Salt Lake City can take to decrease the soft costs of solar. In doing so, Salt Lake City would join a growing number of communities (including Wasatch Solar Challenge Partners Summit County and Park City) that have adopted the Expedited Solar PV Permitting Process, contributing to greater national standardization for solar permitting. The Wasatch Solar Challenge has modified the Solar ABCs expedited permitting form to account for wind and snow loading in higher elevation areas of Utah. (see Appendix A). This form will allow for quicker and easier reviews of solar permits for average residential rooftop systems or small commercial rooftop systems of less than 15 kilowatts. Table 7 outlines the status of Salt Lake City’s adoption of the model Solar ABCs expedited permitting process.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTION AREA: Model Expedited Permitting Process Protocol</td>
<td>Adopt a standardized model process.</td>
<td>Solar ABCs Expedited Permitting Process and forms not adopted.</td>
<td>Consider the adoption of the Solar ABCs model expedited permit and electronic, user-interactive Solar ABCs forms to ensure a quick process (see Appendix A).</td>
</tr>
</tbody>
</table>

Benefits of Best Practices

- Allows for simpler and quicker plan reviews, saving staff time and resources
- Creates greater standardization for solar, in line with national goals
- Enables staff to more easily detect applications submitted incorrectly
- Reduces the number of department approvals, saving local government resources and staff time.
Fees

Adopting an appropriate fee structure for solar permits is critically important to minimizing excessive solar costs. Local governments must strike a balance that allows for jurisdictional cost recovery without adding unreasonable costs to solar development. This is one of the most tangible areas where soft cost can be reduced. An unfortunately common approach to fees uses a value-based system, whereby the solar permit fee is determined based on the total cost of the solar energy system. For medium-sized to larger systems, this cost can be tens or hundreds of thousands of dollars. According to best practices, the fees for solar PV permits should instead be correlated directly with the time spent by local staff reviewing solar PV permits and inspecting projects and should utilize a flat or tiered structure. Appendix B provides a sample tiered fee structure for systems of differing sizes; this fee structure has been reviewed and approved by Utah solar installers and is considered a best practice in Utah. Since most solar energy systems are fairly standard, the amount of time necessary to conduct the reviews and inspections should be expedited once a common level of understanding and familiarity is achieved among staff. Table 8 summarizes Salt Lake City’s current fee structure as it relates to national best practices.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fees</td>
<td>Establish reasonable fees correlated with solar PV system size (with fees or cap caps) Base fees on internal cost-recovery, not the total cost or value of the solar PV project.</td>
<td>Residential solar permit fees based on cost-recovery ($ - $4 higher than best practices) Commercial solar permit fees based on cost-recovery ($3 - $4 higher than best practices)</td>
<td>• Adopt the fee structure outlined in Appendix B to ensure appropriate cost-recovery for systems of all sizes, while also providing adequate revenue to cover staff time for permit processing and inspection.</td>
</tr>
<tr>
<td>Fee Structure</td>
<td>Adopt a tiered fee structure that aligns with jurisdictional cost recovery</td>
<td>No tiered fee structure in place for solar</td>
<td></td>
</tr>
</tbody>
</table>

Benefits of Best Practices

- An appropriate fee structure will ensure that the building department can recover applicable staff time and costs associated with issuing solar permits, while also providing reasonable and predictable costs for solar customers.
- A favorable fee structure can help drive solar adoption, reduce the total price of solar, and increase the environmental benefits associated with more solar-powered homes and buildings within the community.

Table 8 | Fee Structure in Salt Lake City, a Comparison with Best Practices

Conclusion:

Local jurisdictions across the United States are in a unique position to have a huge impact on current and future solar prices and market viability. With sharpened pencils and even sharper scissors, local governments have the chance to prevail as the solar heroes of our time.

Improvements to local solar processes and standardization across jurisdictions will have a measurable impact on the DOE SunShot’s goal of making homegrown solar energy cost-competitive with conventional energy and subsidy-free by the end of 2020. Adopting reasonable fees, enforcing simplified procedures, and cutting red tape will go a long way to level the playing field for the U.S. solar industry and help America’s communities become solar (em)powered.

The six local governments of the Wasatch Solar Challenge Team, along with other Rooftop Solar Challenge Teams, are at the leading edge of this national movement. As a core member of the team, Salt Lake City has made a public commitment to tackling the soft costs of solar through a close examination of local policies, procedures, and protocols.

In nearly all Action Areas, Salt Lake City is meeting or exceeding best practices for solar permitting. With continued focus, the on Action Areas outlined in this Plan, Salt Lake City is slated to become one of the most solar-friendly communities in the Country. The myriad benefits that come with a more robust local solar industry and a community powered with inexhaustible, clean energy will accrue for generations to come.

Become a Designated Solar Friendly Community

The Solar Friendly Communities Program offers a way to recognize and reward communities that go to the effort of making their solar energy permitting system more streamlined. The application presents communities with a menu of options to allow for maximum flexibility and choice, laying out a menu of options for a community to earn recognition at varying levels: Bronze, Silver, Gold, and Platinum. Learn more at: www.solarcommunities.org.
Required Information for Permit:

1. Site plan showing location of major components on the property. This drawing need not be exactly to scale, but it should represent relative location of components at site (see supplied example site plan). PV arrays on dwellings with a 3' perimeter space at ridge and sides may not need separate fire service review.

2. Electrical diagram showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, required signs, and ac connection to building (see supplied standard electrical diagram).

3. Specifications sheets and installation manuals (if available) for all manufactured components including, but not limited to, PV modules, inverter(s), combiner box, disconnects, and mounting system.

Step 1: Structural Review of PV Array Mounting System

Is the array to be mounted on a defined, permitted roof structure? Yes ☐ No ☐

If No due to non-compliant roof or a ground mount, submit completed Structural Worksheet on the next page.

Roof Information:

1. Is the roofing type lightweight (Yes = composition, lightweight masonry, metal, etc.) ☐

2. Is the roof have a single roof covering? Yes ☐ No ☐

3. Does the roof have a single roof covering? Yes ☐ No ☐

4. Provide method and type of weatherproofing roof penetrations (e.g. flashing, caulk).

Mounting System Information:

1. Is the mounting structure an engineered product designed to mount PV modules? Yes ☐ No ☐

2. For manufactured mounting systems, fill out information on the mounting system below:
   a. Mounting System Manufacturer ☐
   b. Total Weight of PV Modules and Rails (lbs) ☐
   c. Total Number of Attachment Points ☐
   d. Weight per Attachment Point (lbs) if greater than 45 lbs, see Structure What ☐
   e. Maximum Spacing Between Attachment Points on a Rail ☐
   f. Total Surface Area of PV Modules (square feet) ☐
   g. Distributed Weight of PV Module on Roof (lbs) if distributed weight of the PV system is greater than 5 lbs/ft², see WKSI

Step 2: Electrical Review of PV System (Calculations for Electrical Diagram)

In order for a PV system to be considered for an expedited permit process, the following must apply:

1. PV modules, utility-interactive inverters, and combiner boxes are identified for use in PV systems.

2. The PV array is composed of 4 series strings or less per inverter, and 15 kW or less.

3. The total inverter capacity has a continuous ac power output 13,440 Watts or less.

4. What is the excess capacity remaining in the top chord taking into consideration dead loads and wind and snow point loads? ☐

Express the excess capacity as a percentage of the International Residential Code’s live load requirements (20 psf) ☐ if the percentage is less than 100, please refer to WKSI.

Structure Worksheet

If array is roof mounted

This section is for evaluating roof structural members that are site built. This includes rafter systems and site built trusses. Manufactured trusses and roof joint systems, when installed with proper spacing, meet the roof structure requirements covered in item 2 below.

1. Roof construction: ☐ Rafters ☐ Trusses ☐ Other:

2. Describe site-built rafter or site-built truss system.
   a. Rafter Size: ___ x ___ inches
   b. Rafter Spacing: ___ inches
   c. Maximum unsupported span: ___ feet, ___ inches
   d. Are the rafters over-spanned? Yes ☐ No ☐
   e. If Yes, complete the rest of this section.

Snow and Wind Information

Snow and Wind Information

Please refer to the snow and wind potential chart

1. What is the ground snow load at the system location? ☐

2. What is the designed wind load of the system? ☐

Calculate snow and wind potential load from WKSI and attach the calculations to this application

3. For rooftop systems, does the top chord have sufficient capacity to hold point loads produced by the ground snow and wind loads combined with the dead loads of the system and the roofing material? Yes ☐ No ☐

4. What is the excess capacity remaining in the top chord taking into consideration dead loads and wind and snow point loads? ☐

Express the excess capacity as a percentage of the International Residential Code’s live load requirements (20 psf) ☐ if the percentage is less than 100, please refer to WKSI.

APPENDIX

EXPEDITED SOLAR PV PERMIT (adapted from Solar ABCs)
3. If the roof system has
   a. over-spanned rafters or trusses,
   b. the array over 5 lbs/ft² on any roof construction, or
   c. the attachments with a dead load exceeding 45 lbs per attachment or
   d. Excess capacity after the summation of dead loads, with snow and wind loads of less than IRC
      requirements for live loads;

   It is recommended that you provide one of the following:
   i. A framing plan that shows details for how you will strengthen the rafters.
   ii. Confirmation certified by a design professional that the roof structure will support the array.

If array is ground mounted:

1. Show array supports, framing members, and foundation posts and footings.
2. Provide information on mounting structure(s) construction. If the mounting structure is unfamiliar to the local
   jurisdiction and is more than six (6) feet above grade, it may require engineering calculations certified by a
   design professional.
3. Show detail on module attachment method to mounting structure.

Zoning Related Items

1. Does the property have zoning restrictions due to its location (e.g. Historic District, Historic Home,
   Forest, Canyon, etc)?
   Yes ☐ No ☐

   If Yes, please explain the restrictions and the circumstances that will allow the system to receive a variance:

   ______________________________________________________
   ______________________________________________________

2. Are there any private covenants (For example Homeowners Associations) that can claim jurisdiction over the
   property?
   Yes ☐ No ☐

   If Yes, please provide a written letter of approval from the governing body of the covenant for the system that is to be installed.

   ______________________________________________________
   ______________________________________________________

After completing this section please provide technical details about the system by using the standard forms on
the following pages. If the electrical system is more complex than the standard electrical diagram can effectively
communicate, please provide an alternative diagram with appropriate detail.
PERMITTING FORMS FOR OTHER SYSTEM TYPES:

The standard form provided with this document covers only one type of solar PV system, as such it will not be applicable for all projects. The following links from the Solar America Board for Codes and Standards provide similar standard expedited permit forms for the other main types of small-scale solar PV installations.

- Micro-Inverter:

- AC Module:
  http://www.solarabcs.org/about/publications/reports/expedited-permit/pdfs/Example3-ACModule.pdf

- Supply-Side Connection forms:
  http://www.solarabcs.org/about/publications/reports/expedited-permit/pdfs/Example4-Supply-SideConnection.pdf

The supplied Standard String Inverter system’s interactive PDF can be found at:

All of the aforementioned forms can be found at:
http://www.solarabcs.org/permitting/

### Sample Solar PV Tiered Fee Structure

In lieu of a flat fee schedule, consider the following tiered Solar PV Fee Schedule:

- For systems 0-4 kW: ≤ $50–$75
- For systems 5-10 kW: ≤ $150
- For systems 11-50 kW: ≤ $300
- For systems 51-100 kW, ≤ $500
- For systems 101-300 kW, ≤ $1,000
- For systems 301 - 1000 kW, ≤ $3,000
- For systems 1 - 2 MW, ≤ $5,000

Explanation (from Solar ABCs Expedited Permit Process for PV Systems):

Costs for permits are often based on the overall project cost. This works well for many conventional projects because this accurately represents the scale of the project. However, with a PV installation, the equipment costs are much higher than with other projects of similar scope. It is therefore recommended that an alternative permit fee scale be used for PV system installations. The scope of a PV installation is similar to that of installing a retrofitted residential HVAC system. The permitting costs for a PV system should be similar to those for an HVAC system.

Although initial plan review and field inspection costs may be slightly higher for the first few systems, those costs should reduce as the local jurisdiction becomes familiar with the installations. A subdivision of more than 10 units should be considered for an additional fee reduction based on the repetitive nature of the reviews.

*Fee schedule adapted from Solar ABCs Expedited Permit Process for PV Systems (http://www.solarabcs.org/about/publications/reports/expedited-permit/pdfs/Expermitprocess.pdf) with input from solar industry representatives in Utah. This proposed schedule conforms with best practices outlined by Vote Solar, Sierra Club, and the U.S. Department of Energy.
The following list of steps has been adapted from Summit County’s checklist and provides a template that can be enhanced with information specific to individual jurisdictions.

The following information will be required:
1. A complete Expedited Solar Permit Application.
2. The installing contractor’s name, license type, and number (please provide photocopy of license).
3. Application fee (also serves as the price of the permit).

Using the application form for the most applicable type of PV system, please include:
4. A permit application with:
   • The location of the proposed installation
   • Information about the strength of the structure to which the installation will be attached
   • Any strengthening of roofs that must take place to ensure structural safety (if applicable)
   • Information about the mounting system that will be used to construct the array
   • Any zoning-related information that may impact the installation
5. A to-scale site plan showing:
   • Equipment locations
   • Types of panels and inverters
   • Types and sizes of conduits and conductors
   • Lengths of runs
   • A grounding diagram showing electrodes and grounding electrode conductors
6. A wiring diagram showing:
   • All circuitry
   • Equipment
   • Fusing
   • Points of connection
   • Disconnects
   • Array wiring
   • Equipment grounding
7. Cut sheets and instruction manual for the inverter with the applicable model numbers highlighted and the UL or comparable listing noted.
8. Cut sheets for the PV modules, which need to include VOC rating, ISC rating, PMAX, maximum series fuse rating, voltage at PMAX and current at PMAX.
9. Cut sheets on batteries, if applicable, and connection diagrams with cable sizes.
   Identify:
   • Battery fusing and fuse holders
   • Amp hour of battery bank
   • Charge capacity of charge system
   • Details for battery storage and venting
10. Identify wire types and connectors of all cables.
11. Provide details for array mounting and engineering for the supporting structure.
12. Verify the ability of PV systems installed on three phase supplied systems to cease to export power on loss of voltage in any phase.
13. Show all warning signs and their locations.

Ensure that all required materials have been completed and compiled and submit them to:
• Online: [www.onlinepermittingwebsite.gov]
• In Person: [Building Department Address]
• By Email to: [buildingdept@jurisdiction.gov]
Endnotes


12 Paragraph References:


13 Customer acquisition costs (i.e. sales, marketing, and educating consumers about solar technology) are also highly variable and can add considerable costs to the total price of solar. A recent report found that the process of finding and educating consumers alone adds $670 to each kilowatt of solar installed. (NREL) The solution to customer acquisition soft costs is better public awareness and education about how solar technologies operate and ways they can be adopted. A number of groups both nationally and in Utah are working to lower these costs through education and outreach efforts.


15 For more information on the DOE Rooftop Solar Challenge, visit: <http://www.eere.energy.gov/solarchallenge/lin>

16 For more information on the DOE SunShot Initiative, visit: <http://www.energy.gov/sunshot/lin>

17 see note 7

18 see note 4

See note 8
See note 8