Executive Summary
Setting clean energy policies with measurable goals within the City of Tempe’s General Plan or in a strategic plan focused solely on clean energy can significantly strengthen the City’s resiliency in case of natural or man-made disasters, support local jobs and help residents and businesses to lower their electricity bills. The cities of New York, NY, San Jose, CA, and Irvine, CA have each articulated their clean energy policies and measurable goals in the General Plan and/or in a Strategic Energy Plan, and have successfully achieved tangible progress since developing and adopting these Plans. This report provides examples of proven policies and programs that the City of Tempe might be interested in adopting within the 2040 General Plan update, within a separate Strategic Energy Plan, or on an individual program basis. Section I explains the importance of developing strong energy policies at the municipal level. Section II reviews policies articulated in Tempe’s current iteration of its General Plan that can be further developed via strong clean energy policy. Sections III and IV summarize New York, San Jose, and Irvine’s ambitious energy goals as outlined in their General Plans and/or Strategic Energy Plans, to inform the City of Tempe as it develops its energy policies. Section V provides examples of innovative, successful programs that the City of Tempe might use to advance its energy policies and meet its goals.
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I. Introduction to long-term energy planning

Why develop long-term plans that focus on municipal energy consumption and future energy-related industries?

**Tangible results:** Cities consume more than two-thirds of the world’s energy; Mayors and their staffs are in positions that are capable of strongly influencing both local and global energy systems through energy use analysis, planning, and prioritizing. For example, cities with specific emissions reduction targets have reported taking three times as many emissions reduction actions as cities that fail to establish a specific reduction goal. Articulating a city-wide or regional strategic clean energy policy through a strategic plan can profoundly impact a city’s overall economy and public health by signaling a continued commitment to conserving energy, reducing waste and supporting local clean energy industries such as energy efficiency contractors and renewable energy installers. A strategic plan with a core focus on energy policy touches on the many moving parts of a community that city government must consider, such as zoning codes, water use, transportation, poverty alleviation, and local economic development. Drafting and implementing a clearly articulated, forward-thinking energy plan can help cities save money, decrease environmental impact, and lower demand on the electric grid, thereby increasing the overall reliability of the electric system.

**Citizen participation, support, and education:** Substantial community input and collaboration is essential to the success of strategic energy plans. A plan provides citizen-driven guidance and direction for a city’s energy programs. The process of developing a plan can significantly increase a city’s resiliency by including preparation for a potential natural or man-made disaster. It can also act in conjunction with energy education and outreach efforts; as citizens help plan energy goals, they become more informed about their own residential and commercial energy use and available options for conserving and changing to renewable sources.

Strategic energy plans that most effectively achieve clean energy goals link energy efficiency and renewable energy initiatives together. Energy efficiency policies address waste and inefficiency; the Southwest Energy Efficiency Project estimates that energy efficiency programs can help residents and businesses throughout Arizona save $7.3 billion net by 2020.

Renewable energy initiatives further reduce load demand and provide further energy cost savings. A rooftop solar installation on an energy-efficient business or residence can significantly offset a building’s energy costs through the net-metering incentive. A strategic plan that envisions these policies working in tandem could positively impact the Tempe economy.

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1 C40 Cities, Climate Leadership Group. [http://www.c40cities.org/whycities](http://www.c40cities.org/whycities)
2 C40 Cities, *Quantifying the Emissions Benefit of Climate Action in C40 Cities*. June 19, 2012. [http://www.c40cities.org/system/resources/BAhbBlsHOgZmlkIyMDExLzA2LzA5LzA4XzQ2XzA5XzIzM0RdWFudGlmeWluZ190aGVfRW1pc3Npb25zX0JlbmVmaXQucGRm/Quantifying%20the%20Emissions%20Benefit.pdf](http://www.c40cities.org/system/resources/BAhbBlsHOgZmlkIyMDExLzA2LzA5LzA4XzQ2XzA5XzIzM0RdWFudGlmeWluZ190aGVfRW1pc3Npb25zX0JlbmVmaXQucGRm/Quantifying%20the%20Emissions%20Benefit.pdf) P 1.
3 Id. p 2
What does the process look like?

Depending on the intended depth and amount of detail, developing a strategic energy plan can take several months to several years. Based on other cities’ experiences with municipal energy plans, the DOE recommends the following process:

The City of Tempe General Plan 2040 development process provides an excellent opportunity to initiate and develop strategic energy policies. These policies can be integrated as a core part of the 2040 General Plan, or the General Plan process can become the springboard for developing a separate strategic energy plan that addresses goals for clean energy development and a measurement system to track the City’s progress over time.

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7 Id. p. 2
What are some drivers of existing comprehensive strategic energy plans in other cities? What are some highlights of those plans?

This report reviews strategic plans from the City of New York, NY, the City of San Jose, CA, the City of Irvine, CA, and the City of Tucson, AZ. The chart below reviews the motivations stated in each city’s plan for developing its energy policies; the City of Tempe might have some similar or additional motivations specific to Tempe.

<table>
<thead>
<tr>
<th>Drivers</th>
<th>NYC</th>
<th>San Jose</th>
<th>Irvine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support &amp; increase quality of life</td>
<td>Continuing &amp; measuring the city’s environmental leadership</td>
<td>To implement policies of the Energy Element in the General Plan</td>
<td></td>
</tr>
<tr>
<td>Attract investment and drive economic growth</td>
<td>Support implementation of environmental best practices</td>
<td>To be a leader in energy efficiency, renewable energy and reducing carbon emissions</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Highlights</th>
<th>NYC</th>
<th>San Jose</th>
<th>Irvine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinpoints key initiatives in areas of greatest impact (i.e., energy efficiency).</td>
<td>Builds on the regional strength of technological innovation</td>
<td>Pinpoints key initiatives and strategies in areas of greatest impact (i.e., energy efficiency, consolidating energy retrofit projects to achieve economies of scale)</td>
<td></td>
</tr>
<tr>
<td>Set measurable goals and established tracking methods</td>
<td>Set measurable goals and established tracking methods</td>
<td>Identifies and plans for program success via participation at multiple levels in government and the private sector</td>
<td></td>
</tr>
</tbody>
</table>

II. An overview of the City of Tempe’s current General Plan 2030

Below is a selection of the key goals, elements and strategies identified in the General Plan 2030 which can be expanded upon using clean energy policies in the General Plan 2040.

**Land Use, Design & Development**
- The Community Design element supports a sense of place and pride. It encourages Tempe to incorporate a sustainable design approach, which includes goals of minimizing environmental impact and reducing energy consumption, encouraging shade and maximizing solar access.

**Economics & Growth**
- The Economic Development element supports stimulating growth in diverse industries that match Tempe’s values. Its objectives include promoting a quality standard of living. A key strategy is to diversify Tempe’s economy by focusing on emerging industries.
- The Cost of Development element requires balancing new business and residential developments with infrastructure capacity and financing capabilities. One objective is to encourage development that does not strain existing infrastructure or service capabilities. The element includes a recommendation to study reducing or eliminating fees for green building, affordable housing or economic development in identified growth areas.
- The Growth Areas element identified seven areas for economic development, including the Warner & I-10 Growth Area. The Warner & I-10 Corridor Growth Area is within SRP’s proposed Price Road Corridor 230 kV transmission project. These added transmission lines

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These cities were selected for review in this report because their plans have been highlighted in community planning resources from the DOE and their planning materials are easily accessible online.
are intended to compensate for increased electricity use from new businesses in the area. The City of Tempe could focus energy efficiency policies on high use areas such as this one to decrease businesses’ electricity bills and spur new construction projects.

Conservation

- The Environment element includes a focus on ambient air temperatures (urban heat island effect, or UHI) and energy resources. The element recommends developing a Comprehensive Environmental Quality Plan to look at the relationships between the various conservation elements outlined and with different City departments. Ambient temperature element objectives are to maintain or reduce temperatures in Tempe and to promote regional temperature monitoring and mitigation efforts. The goal of the energy resources element is to “sustain reliable and efficient energy sources while minimizing energy consumption of non-renewable sources.”

III. Summaries of selected cities’ energy policies articulated within General Plans

New York, NY, and San Jose, CA, have incorporated strategic energy policies within their broader General Plans. This report reviews the approach each city took to incorporate clean energy policy into their General Plans, summarizes the policies promoted, and lists the programs and next steps recommended to implement the policies.

City of NEW YORK (population ~ 8 million)

NY’s approach to energy planning within its General Plan

New York developed its energy goals as part of its general vision for the city, PlaNYC 2030, which was initially published in 2007 and then updated in 2011. The Plan’s framework includes ten main topics including Energy, Air Quality, and Climate Change. Because these topics and goals often intertwine, the plan also sets aside an independent section for “cross-cutting topics” such as public health, natural systems and public engagement. Each topic has long-term policy goals, highlighted in blue, supported by specific, action-oriented initiatives, highlighted in orange. We summarize the most salient sections for each city in the following paragraphs.

Energy Section

The Energy section identifies four policy goals 1) improve energy planning 2) increase energy efficiency 3) provide cleaner, more reliable and affordable energy and 4) modernize transmission and distribution systems. These policies are to be carried out through seventeen initiatives, comprised of multiple actions:

Policy Goal #1 - Better energy planning (Initiative 1)

The planning initiative is focused on greater cooperation and coordination on strategic and regulatory issues between city and state agencies and utilities.

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10 Soon after the release of PlaNYC, Mayor Bloomberg issued an Executive Order in 2007 to reduce municipal greenhouse gas emissions 30% by 2017. This was incorporated into the 2011 update.
Policy Goal #2 - Increase energy efficiency (Initiatives 2-11)
Because much of the energy system is outside of the City’s control, the initiatives in PlaNYC’s energy section are focused mainly on actions increasing energy efficiency, where the city can have a direct impact.

Many of the initiatives focus on improving the effectiveness of the City’s building codes by implementing proposals from the NYC Green Codes Task Force and streamlining the City’s building codes with the International Green Construction Code, as well as improving energy code compliance and developing online tracking tools and green building report cards (see Fig. 1). Some initiatives emphasize the importance of public and professional education and support friendly energy efficiency competitions between neighborhoods, businesses and city agencies. The City plans to partner with other green programs to educate the public and encourage neighborhood efficiency competitions. Improving access to green energy financing and information. It will develop energy efficiency training for architects, electricians, designers and real estate professionals and partner with local colleges to develop electrical engineering program and increase access to energy data for building occupants.

Fig. 1. Sample Report Card, from Initiative 4. Source: PlaNYC 2011.

Potentially relevant to Tempe:
Initiative 10 Provide energy efficiency leadership in City government buildings and operations by: continuing to reduce municipal greenhouse gas emissions through the use of energy audits, retrofits, and Energy Savings Performance Contracts. Improve operation and maintenance in municipal buildings and address the lack of incentive to prioritize energy efficiency in City agencies due to centrally-paid utility bills. Create a handbook of standards for green renovations of City facilities. Establish a board to assess and pilot new technologies in city-owned buildings. Assist the private sector in addressing the landlord/tenant disincentives to implement energy efficiency projects by developing voluntary model lease language. Pilot a net-zero school, a passive house building and a deep energy retrofit project in city buildings to encourage deep efficiency innovations.
Policy Goal #3 - Provide cleaner, more reliable and affordable energy (Initiatives 12-14)
The City plans on supporting and advocating for upgrades to existing in-city generating power plants. These initiatives also focus on encouraging distributed generation development by working with utilities and project developers to streamline permitting and interconnection processes and researching ways to encourage purchasing of clean energy.

Policy Goal #4 - Modernize transmission and distribution systems (Initiatives 15-17)
These initiatives focus on increasing natural gas consumption by easing the permitting and siting process for new natural gas transmission lines, by developing a build-out plan for infrastructure conversion to natural gas, and by advocating for improved natural gas production regulations at the state and federal level. In addition to natural gas consumption, the City plans on supporting increasing all transmission capacity, increasing the diversity of its energy generation portfolio for both municipal and private consumers, and support the use of smart meter technologies.

Implementation of the General Plan

PlaNYC was created and is treated as a living document. After PlaNYC was compiled in 2007, the City took specific steps to arrive at the policy goals, and checked back in on progress four years later. To the left is an example of the process the City undertook to achieve these results, starting with one policy goal first established in PlaNYC:

Tangible results from PlaNYC 2040:
According to the updated PlaNYC, from 2007-2011, New York has reduced emissions by 13 percent (from 2005 levels) and has started 97 percent of the 127 initiatives identified in the plan. The city has reached about two-thirds of the 2009 milestones set forth in the plan, and has included 400 total milestones to achieve by the end of 2013.\(^\text{11}\)

City of SAN JOSE (population ~ 1 million)
San Jose has two documents setting its energy policy foundation: the fifteen year Green Vision plan, which was adopted in 2007, and Envision 2040, the city’s General Plan that was started in 2007 and completed in 2011. This report summarizes both documents below.

San Jose’s Green Vision plan for 2020

The City of San Jose set ten goals for energy and water conservation, clean tech job growth, recycling, green building development, and other sustainability-focused policies. The 7th goal of the Green Vision was to adopt a General Plan with measurable sustainable development policies; this is discussed below. The City set a fifteen-year timeframe to achieve these goals, and continues to track the each metric’s progress online.

1: Create 25,000 Clean Tech Jobs as the World Center of Clean Innovation:

[Clean Tech Jobs Performance Metric Graph]

2: Reduce Per Capita Energy Use by 50%: In 2010, per capita energy use was 8,109 kWh; 2020 goal is 4,249 kWh.

3: Receive 100% of Our Electrical Power from Clean, Renewable Sources: Between 2007-2010, the City increased its use of renewable energy power from 14% to 17%.

4: Build or Retrofit 50 Million Square Feet of Green Buildings: Certified Green Building Space in San Jose increased from 1 million square feet in 2007 to 5.4 million square feet in 2011.

5: Divert 100% of waste from Landfill and Convert Waste to Energy: As of 2011, San Jose recycled 71% of their waste. The city increased also its kWhs from waste converted to energy from 20.7 kWhs in 2007 to 31.9 kWhs in 2011.

6: Recycle or Beneficially Reuse 100% of our Wastewater: In 2007, the City recycled 10.2 million gallons of water per day; in 2011 it recycled 8.1 millions gallons per day (note: this is the only metric that has not progressed between 2007 and 2010 or 2011).


8: Ensure that 100 Percent of public Fleet Vehicles Run on Alternative Fuels: In 2007, 34 percent of the city’s vehicles ran on alternative fuels. By 2011, 40 percent ran on alternative fuels.

9: Plant 100,000 New Trees and Replace 100 Percent of Our Streetlights with Smart, Zero Emission Lighting: 6,617 new trees were planted in 2011, up from zero in 2007. 297 streetlights were upgraded in 2011, up from zero in 2007.

10: Create 100 Miles of Trails connecting with 400 miles of on-street bikeways: The city added 14.6 miles of off-street bicycle trails between 2007 and 2011.

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Tangible results:

San Jose’s approach to energy planning within its General Plan

Envision San Jose 2040 planning process began in March 2007 and was adopted by the San Jose City Council in November 2011. The Plan includes its energy policies within the Environmental Leadership chapter. Its subchapter “Measurable environmental sustainability” focuses on the following energy-related topics: Green Building, Recycling/Zero Waste, Air Quality, Energy Conservation, Water Supply, Conservation, Recycling and Quality, Community Forest.

Energy section

Reducing energy consumption and increasing efficiency, increasing renewable energy sourcing and promoting energy security are pinpointed as main energy policy concerns in the Energy Conservation portion. As indicated in the subchapter title “measurable environmental sustainability,” the energy policies as articulated in the plan set out concrete savings and production goals with specific timeframes for the City to meet, and identify a path for the City to follow to reach those goals.

Reducing energy consumption and increasing efficiency (Policies 14.1-14.5 & Actions 14.6-14.8)

Specific goals and timeframes: 1) By 2040, the City will reduce its per capita energy consumption by at least 50 percent (compared to 2008 levels). 2) By 2040, the City will maintain or reduce its net aggregate energy consumption levels (equivalent to the projected levels in 2022).

The supporting policies when developing existing neighborhoods focus on increasing neighborhood walkability, bikability and public transit access. The City will implement green building policies that include optimized energy systems and passive solar designs, and require energy efficiency audits and retrofits before or at the same time as installing solar rooftop equipment. The San Jose plan reiterates the state’s long-term energy efficiency plan mandate that, where possible, all new residential and commercial building designs incorporate net zero principles. Specific actions include 1) replacing 100% of the city’s traffic signals and streetlights with zero emission lighting by 2022; 2) measuring and reporting the city’s total carbon footprint; 3) developing policies requiring residents and businesses undertake business and appliance energy saving retrofits.

Increasing renewable energy sourcing (Policies 15.1-15.6 & Actions 15.7-15.9)
Specific goals and timeframes: 1) By 2022, obtain 100% of electrical power from renewable sources. 2) Increase renewable energy generation within the City to meet its own consumption needs (as much as possible).
The City established a supporting policy that identifies and works to decrease demand-side barriers to increasing renewable energy generation (e.g., constrained workforce availability and limited public awareness). A significant policy focus is on supporting research and adoption of innovative technologies, especially energy efficiency, solid waste and biosolids, and other clean technology developments, and implementing demonstration projects. As part of the efforts to attain the first goal listed above, the city plans to help residents and businesses install 100,000 solar roofs by 2022 and 200,000 by 2040. The City intends host energy efficiency and renewable energy competitions, and other events, as well as provide workforce development opportunities for both city staff and the public, and to promote energy efficiency and renewable energy installation best practices through educating building code enforcement and development review staff.

Promoting energy security
Specific goals and timeframes: provide access to clean, renewable and reliable energy for all residents and businesses by 2040
The City set policy to promote clean energy financing and retrofitting tools and services to all residents in order to expand access to energy efficiency savings and renewable energy procurement. The new policy also focuses on increasing generation through neighborhood-based renewable energy programs. In its future policy analyses, the City will consider both the benefits and risks of alternative energy sources. To support the goal of energy security, the City will specifically develop partnerships to conduct outreach public programs on energy efficiency opportunities available to residents and businesses and to improve both the efficiency and reliability of production and supply. For new housing, the City will set minimum energy efficiency and renewable energy generation capacity requirements.

Strategic Clean Energy Plan summary: City of Irvine, CA

City of IRVINE, CA¹⁴ (population ~ 213,000)

Irvine’s approach to developing the clean energy plan
The City of Irvine Energy Plan was created in 2008, and is a comprehensive overview of the city’s energy use profile, as well as the various local, state and federal energy plans affecting the City, and sets forth the City’s four specific energy policy goals with an accompanying roadmap of steps to take to achieve those goals. This report lists the four goals and looks at the next steps and strategic programs recommended in the clean energy plan.

Four Goals:
1) Involve 100% of Irvine residents and businesses in the Energy Plan
2) Irvine will reduce its energy use in buildings citywide 30 percent by 2015 compared to 2003 levels.
3) Increase the percentage of renewable energy used in new buildings

citywide:
• 40 percent of the energy used by new buildings citywide will be derived from renewable sources by 2015
• 60 percent of the energy used by new buildings citywide will be derived from renewable sources by 2020

4) Reduce greenhouse gas (GHG) emissions (goals based on CA state law):
• to 2000 levels by 2010 (This reduction is equivalent to about 11 percent below the anticipated 2010 emissions under a business-as-usual scenario.)
• to 1990 levels by 2020 (25 percent below the anticipated business-as-usual scenario) to 80 percent below 1990 levels by 2050

The next steps outlined in the Irvine’s strategic energy plan are to:
Step One - Create an energy management team. The team will identify early project speedbumps and work to increase collaboration and build consensus as the projects advance. The core staff will be comprised of city staff and personnel from various city departments, who will also work as an in-house energy team to advise on municipal projects. Citizens from non-profits and local businesses will be added on an as needed, project basis. The team’s success will be measured by
• staking out a clearly defined, long-term direction for the city’s energy policies and programs
• gathering strong political support from key City leaders and
• gaining support from staff in all City departments and at all levels

Step Two - Calculate Irvine’s GHG emissions baseline & current total emissions. After calculating current emissions, Irvine can then calculate the necessary emissions to align with the state emissions reduction goal of returning to 1990 levels by 2020 (or about a 25 percent reduction from a business-as-usual scenario).

Step Three - Track and monitor progress. The plan lists recommended energy program metrics to ensure accurate data collection in order to effectively advance the policies and programs developed by the Energy Management Team.

Energy efficiency programs should track:
• initial target savings
• number and type of installations
• anticipated/actual savings per measure
• costs per measure

Renewable energy programs should track:
• number and type of installations
• projected generation
• installation costs
• operations and maintenance costs

Energy education programs should track:
• number of participating staff
• number of workshops
• types of education/information available.
Step Four - Energy program financing. The plan gives a brief overview of other cities’ financing programs that the City of Irvine might want to consider

- **Revolving Funds** – A revolving fund to finance energy efficiency or renewable energy projects which is replenished with the cost savings (or “cost avoidance”) from implementing the programs. The City of Phoenix has a successful program operating since the 1970s.
- **City of Portland’s 1 Percent for Energy** – 1 percent surcharge (with a ceiling of $15,000/department) on department energy bills to support a city energy specialist position.
- **City of Boulder’s Climate Action Tax** – Tax collected by utility and is based on per-kWh usage with annual tax. The tax revenues are used to decrease emissions from building energy use, vehicles, and landfill gas emissions.
- **California Energy Commission Local Government loan program** – The CEC provides low-interest loans for government energy retrofits and some new construction projects; loans are repaid out of the energy cost savings.
- **Adjusting cost-effectiveness analysis** – Revise the current cost evaluation of solar and energy efficiency projects by using total life-cycle cost, net savings, savings to investment ratio, and internal rate of return, instead of simple payback analysis. Longer timeframes for analyzing cost effectiveness should also be used than the City of Irvine’s current two-five year timeframe.
- **REC purchasing program** – A City-run program to help businesses and residents to purchase renewable energy credits.

Step Five - Initiate 100% participation initiative. To achieve the energy policy goals, the City will develop a comprehensive and continuous program to encourage total participation. Collaborative partnerships are critical, especially with the Chamber of Commerce and Homeowner’s Associations. The City will educate every City employee on the Plan.

**Strategies for goal implementation.** The Plan estimates the impact strength of various strategies by sector and approach. For instance, Under Existing Municipal Operations, a higher impact strategy for conservation and improved efficiency projects is to determine the status of previous audits of municipal facilities, identify cost effective retrofits and evaluate alternative project financing mechanisms. A lower impact strategy listed is to replace conventional lighting in parks with solar powered lights.

**Sample strategies & impacts highlighted in the Plan**

<table>
<thead>
<tr>
<th>Sector</th>
<th>High impact sample strategy</th>
<th>Lower impact sample strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial/industrial</td>
<td>Work with local utilities, energy and business interest groups to develop a program for recommissioning existing commercial properties.</td>
<td>Recommend that all new commercial and retail buildings be built solar ready.</td>
</tr>
<tr>
<td>City-wide transportation</td>
<td>Work with businesses to provide employees with up-to-date public transportation information.</td>
<td>Evaluate construction of covered parking areas to provide preferential parking which also serve as solar PV generation sites.</td>
</tr>
</tbody>
</table>
Residential | Work with utilities, local energy interest groups, business groups etc to provide information on energy and water efficiency benefits of fixtures and appliances. | Establish a regular energy policy review workshop for elected officials, staff and the public to keep up to date on developments at national and local levels.

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III. Policy tools available to the City of Tempe

Each policy tool can be implemented in furtherance of a citywide strategic clean energy plan or as single initiatives.

**Policy tool #1: Entering into Energy Savings Performance Contracts for municipal buildings**

<table>
<thead>
<tr>
<th>Places that have used this tool</th>
<th>Schools throughout AZ; Empire State Building in NY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential benefits (additional to the clean energy benefits)</td>
<td>When coupled with solar installations, retrofitting municipal buildings using financing from savings accounts can help the Climate Action Plan’s requirement of 15 percent of renewable energy sourcing by 2025.</td>
</tr>
</tbody>
</table>

| Energy cost savings |

During the 2011-2012 legislative session, cities were granted authority to enter into energy savings performance contracts to retrofit municipal buildings.

Energy savings performance contracts (ESPCs) are long-term contracts that provide customers with comprehensive solutions to the hurdles involved in implementing energy efficiency projects. Through an ESPC, an energy service company (ESCO) provides a customer (often a municipal entity) with: 1) initial energy auditing of a building 2) a set of energy efficiency improvement recommendations 3) up-front financing to implement the improvements 4) cost savings guarantees 5) long-term monitoring and verification of project savings. The customer repays the ESCO for its up-front financing and its energy efficiency services with energy cost savings over a period of 20 years or less (see Fig. 1).
Key points of A.R.S. §9-499.16 for the City of Tempe:

- Rather than continuing to pay APS for energy efficiency initiatives as part of its monthly electricity bill, the City of Tempe could keep that money to pay for specific energy savings projects for the city's buildings and operations.
- The City of Tempe may not use an ESPC to fund distributed generation solar equipment on its buildings, but city school districts may if the installations meet statutory requirements.

**Policy tool #2: Implementing Solar Ambassador program and/or an Energy Efficiency Coach Program**

| Jurisdictions that have used this tool | Solar Ambassadors: Buckeye, AZ; Casa Grande, AZ; Cave Creek, AZ; Clarkdale, AZ; Cottonwood, AZ; Flagstaff, AZ; Goodyear, AZ; Prescott, AZ; Sun City West, AZ; Yuma, AZ; Payson, AZ; Anthem, AZ; Sunnyslope, AZ
| Energy Efficiency Coaches: Boulder, CO |
| Potential benefits (additional to the clean energy benefits) | Revitalize neighborhoods and assist with energy costs for lower-income residents
| Assist businesses decrease energy costs |
| | Educates residents and businesses and changes perceptions about energy efficiency projects and the solar rooftop installation process using a grassroots approach |
Using AZ Smartpower’s Solar Ambassador program as a model, this approach relies on grassroots efforts by volunteer citizen solar ambassadors who already have solar equipment installed on their homes (whether it involves a lease or solar equipment ownership). Solar ambassadors talk to their neighbors about the process, benefits, and costs for residential solar equipment installation. When a neighbor wants more information, the Ambassadors pass on contact information for an organization that can provide more detailed guidance as well as a directory of qualified solar installers (AZ Smartpower is one such organization).

The Solar Ambassador program was implemented in the various cities in the Phoenix-metro area competing in the Solar Challenge. The initial goal of the Challenge was to install solar generation equipment on 5 percent of all residential rooftops with by 2015. As of October 2012, over 10 percent of all residences in Buckeye, Cave Creek, Cottonwood, Clarkdale, Goodyear and Sun City West had installed solar generating equipment (see Fig. 2 for Challenge rankings.)

The EnergySmart Energy Advisor program in Boulder, CO, sets a specific, reachable goal and timeframe, like the Solar Ambassador program. In Boulder, the Energy Advisor helps residents and businesses identify and implement energy efficiency projects. Energy Advisors guide residents and businesses through each step of an energy efficiency project, with a goal of reaching 3,000 businesses and 10,000 households by June 2013. (See Fig. 3 for Boulder’s energy efficiency project rankings.)

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15 See EPIC’s Spotlight on Goodyear Mayor Georgia Lord for more information on their program: http://energypolicy.asu.edu/energy-policymaker-in-the-spotlight-goodyear-mayor-georgia-lord/
Key points for the City of Tempe:
- Both the energy efficiency advisor program in Boulder and the solar ambassador program in the AZ Solar Challenge Cities (Buckeye, Casa Grande, Cave Creek, Clarkdale, Cottonwood, Flagstaff, Goodyear, Prescott, Sun City West, Yuma, Payson, Anthem, Sunnyslope) were mobilized to reach specific benchmarks.
- The Solar Challenge and the EnergySmart programs track progress and provide the results online. In the Solar Challenge program, milestones are celebrated to keep program momentum.

**Policy Tool #3: DOE-led initiative Brownfields to Brightfields**

<table>
<thead>
<tr>
<th>Jurisdictions that have used this tool</th>
<th>The Merrimack Valley Planning Commission in Massachusetts; Chicago, IL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential benefits</td>
<td>Revitalize neighborhoods and assist with energy costs for lower-income residents</td>
</tr>
<tr>
<td>(additional to the clean energy benefits)</td>
<td>Assists with urban infill projects</td>
</tr>
<tr>
<td></td>
<td>Attract environmentally conscious businesses to previously neglected areas</td>
</tr>
<tr>
<td></td>
<td>Educates residents and businesses about solar energy</td>
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</tbody>
</table>

A “Brownfields to Brightfields” program enlists communities to identify contaminated and otherwise vacant or unusable lands located within city limits as potential sites for solar power plants and solar manufacturing plants. In the Massachusetts program, communities nominated potential sites in their neighborhoods and an engineering firm conducted a “fatal flaw” analysis to determine solar installation feasibility. Out of eleven nominated sites, five were found to have potential.\(^\text{16}\) After the sites were designated, they were leased or sold to a third party renewable developer. The developer installs the equipment and runs the general operations, and the city signs a Power Purchase Agreement (PPA) for the energy generated.\(^\text{17}\)

Brightfields often attract environmentally conscious businesses to the area and serve as educational tools for communities. In Chicago, the largest urban solar development in the world was built on an abandoned industrial site in 2009. The project created 200 construction jobs and increased city revenues through taxes and lease proceeds. The Brightfields program could be implemented in conjunction with a community solar program (see Policy Tool #5). Depending on the financial viability, the City could

Key points for the City of Tempe:
- The Massachusetts projects were largely community driven, which ensured community buy-in and support for the projects.
- Local elected officials who are invested in the project are also critical to maintaining project momentum, providing funding and planning guidance, and ensuring the projects remained focused.

Policy Tool #4: Solar Empowerment Zones

<table>
<thead>
<tr>
<th>Jurisdictions that have used this tool</th>
<th>New York, NY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potential benefits</td>
<td></td>
</tr>
<tr>
<td>(additional to the clean energy benefits)</td>
<td>Educates residents and businesses about solar energy</td>
</tr>
<tr>
<td></td>
<td>Increases grid resiliency</td>
</tr>
</tbody>
</table>

Solar Empowerment Zones are geographical regions within the city boundaries strategically selected for their technical viability and benefits in easing peak use of the grid. SEZs are intended to increase grid resiliency by including neighborhoods with higher projected demand and increased capacity needs. Within the SEZs, the City promotes outreach and program development and established a more streamlined and uniform permitting process. Solar generating systems within the SEZs receive free data monitoring devices to communicate with the grid and provide system performance data to consumers. Interested owners and managers of buildings located within an SEZ also receive technical and incentives application guidance from solar ombudsmen.

Key points for the City of Tempe:
- Some areas of a city are more suitable for rooftop solar development, and these areas can see explosive solar development by concentrating limited resources on those areas deemed most feasible.

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The SEZ tool breaks down multiple barriers to solar rooftop development, including onerous permitting processes and consumer perceptions of solar as too expensive or complicated to install.

**Policy Tool #5: Community Solar**

<table>
<thead>
<tr>
<th>Jurisdictions that have used this tool</th>
<th>Salt River Project Power and Water in Florence, AZ; Tucson Electric Power in Tucson, AZ; TRICO Electric Cooperative in southern AZ; Seattle, WA; Colorado</th>
</tr>
</thead>
</table>

Potential benefits (additional to the clean energy benefits) Provides access to renewable sources of energy for lower-income residents, renters and residents in homes unsuitable for solar rooftop installations.

Community solar programs allow customers to purchase shares or subscriptions to a centrally owned and operated solar plant. Many utility customers are interested in installing solar on their home or business rooftops, but may not be able to do so due to several barriers including more attractive investor-owned utility rate prices and high upfront capital costs for rooftop installations. Also, only about 27 percent of existing residential rooftops in warm/arid climates in the U.S. are physically suitable for solar, which means a large market segment is currently left out. Community solar programs can provide competitive rate pricing, eliminate upfront installation costs and lower overall installation costs. It can also expand the distributed generation solar market to any resident or business willing to pay for it, regardless of their building’s solar feasibility.

There are several pricing and ownership variations for community solar. SRP currently offers a community solar program with a simple solar rate through their 20MW solar installation in Florence, AZ. A resident or business can power up to 50 percent of their annual electricity use through the community solar program (provided enough shares are available). This can level out electricity bills throughout the year, although the program increases the average bill by $3-4 each month. TEP Bright Tucson offers a 20 year price lock in its community solar program whereas TRICO offers customers the opportunity to “own a panel” within the community solar installation. Similarly, Seattle City Lights (a municipal utility) offers solar panel ownership within their community solar installation in a park, which additionally acts as an educational and outreach tool.

Key points for the City of Tempe:
- These programs are run through electric utilities, but Tempe could take a leadership role by working with APS and SRP to develop small-scale community solar projects on city land or other appropriate city-owned property.
- Alternatively, the City could put out an RFP from third-party solar developers on city land or other appropriate city-owned property.

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V. Conclusion

The policy tools identified here can be implemented with or without a City of Tempe strategic energy plan in place. However, as noted in Section I, a citywide strategic clean energy plan can signal a cohesive policy direction to city agencies, businesses and residents and help the city note milestones in clean energy advancements. It can help Tempe become more resilient by planning for energy contingencies in the event of a disaster or energy shortage and by growing its clean energy economy.

The cities pinpointed in this report have successfully articulated strong clean energy policies by setting targeted goals, developing measurable standards for progress and tracking and monitoring their commitment to the policies. The City of Tempe’s General Plan 2040 update provides an excellent opportunity for the City to set its own clean energy policy to ensure greater electricity reliability and lower long-term bills to its residents and businesses, and to support local job growth and environmental health.

In addition to setting clean energy policy in the General Plan update or in a separate Strategic Energy Plan, the City can adopt successful clean energy programs already implemented in other municipalities throughout the U.S. Of the policy tools listed here, entering into an Energy Savings Performance Contract for municipal buildings is likely the easiest to implement in administrative terms due to its proven economic benefits to schools throughout Arizona. The Solar Ambassador program and the Energy Efficiency Coach program have also been successful here in Arizona, especially when framed within a competition between communities. The DOE-led Brownfields to Brightfields program and the Solar Empowerment Zone program are similar (although scaled-down) to the federal Bureau of Land Management’s Solar Programmatic Agreement process which has led to the approval of 11 utility-scale projects and 5 rights-of-ways to facilitate utility-scale solar development on private lands. These programs support solar energy development in a holistic way rather than via piecemeal efforts. A community solar program would grant renters, lower-income residents, and residents without suitable rooftops access to solar power, and could be particularly potent when coupled with a Brownfields to Brightfields initiative or a Solar Empowerment Zone project. While the listed policy tools are not comprehensive by any means, they have been identified as programs that are likely to successfully address the City of Tempe’s clean energy goals.