ECONOMIC ASSESSMENT OF POTENTIAL SONOMA COUNTY EFFICIENCY FINANCING PROGRAM

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By

James P. Barrett. Ph.D.
Chief Economist
Applied Solutions
I. Introduction

In 2011, the Sonoma County Water Agency (Water Agency) began developing the Sonoma County Efficiency Financing Program (SCEF). The objective of SCEF was to help county schools and other tax exempt institutions reduce their water and energy consumption through water and energy use efficiency retrofits. The SCEF Program aims at solving several problems that often act as obstacles to investments in efficiency retrofit projects: financing up-front costs, small scale of investment, uncertainty of savings promised by energy service companies, cost of capital, long payback periods for deep retrofits, and overhead costs associated with initiating and developing projects.

SCEF is designed to overcome these problems through a variation on a project structure known as a Sustainable Energy Utility (SEU).\(^\text{1}\) The SCEF program would aggregate efficiency projects across a number of public institutions, collecting a large number of relatively small projects under the single umbrella of SCEF. SCEF would then take on the responsibility of identifying and negotiating with potential contractors who can perform the work, and offering a single vehicle to provide tax-exempt municipal bond financing for the projects.

While some individual efficiency projects may offer an attractive return on investment in terms of energy savings relative to the cost of the efficiency measures, schools and other entities often do not undertake them because the time and other resources required to identify the investment potential, to establish a program, create a contract bidding process, and other costs that can outweigh the benefits in terms of energy savings. When costs don’t outweigh the benefits, opportunities for cost-effective efficiency investments often go unexploited because staff are often unaware of the potential and are fully engaged with other priorities.

Similarly, cost effective projects that require up-front investments that are too large to be financed out of cash on hand, often will not move forward because the cost of initiating a financing vehicle outweigh the net energy savings from the project. This is a particular problem for projects that require an expenditure that is too large to be financed from available cashflow and too small to be financed through a dedicated bond offering. This is often the case for projects involving large equipment items such as building heating and cooling systems that have deferred their maintenance schedules beyond the useful lives of the equipment items themselves.

SCEF and the SEU model on which it is based overcome these two problems by aggregating multiple projects under a single vehicle, reducing both the costs of creating and managing an efficiency project and the costs of a bond issuance.

\(^\text{1}\) For more information on the Sustainable Energy Utility model, see http://freefutures.org/seu-initiative/sustainable-energy-as-an-infrastructure-investment
Additional benefits of the SCEF model include:

- No new legislation or appropriations required
- Low-cost financing to encourage “deep retrofit” choices that relieve deferred maintenance items
- Lowers the cost of government - short & long term
- Creates local jobs & economic development
- Customizable to local conditions
- Common contractual documents already proven
- Pre-approved and screened energy service companies (ESCOs) with solid financial backing conduct the engineering and construction work
- Guaranteed & verifiable dollar savings, not just energy and water savings
- Net savings accrue to public agencies
- No upfront capital costs
- Public participants own all improvements & benefits
- Project flexibility – selection of energy & water conservation measures (CMs), renewable energy projects & repayment terms to meet participant needs

This paper presents an analysis of the job creation and overall economic impacts of proposed efficiency projects that could be undertaken under the SCEF program. Section II describes what was analyzed, Section III describes how it was analyzed, Section IV presents the results of the analysis, and Section V concludes.

II. Scope of the Analysis

After the introduction of the SCEF program, the Water Agency received expressions of interest from a number of local government entities, mainly schools. The first step in participating in SCEF is for each potential participant to undergo a preliminary energy audit to identify potential savings, the investment required to achieve those savings, the ongoing operations and maintenance needs associated with the efficiency measures etc. These preliminary audits are conducted by energy service companies (ESCOs) who responded to a Water Agency request for proposals. Proposers were screened and scored based on financial strength and stability and water and energy efficiency use project experience and track record. ESCOs were invited to present their achievements at a Water Agency assembled public gathering of potential SCEF participants. Participants then selected their preferred ESCO to conduct these preliminary audits.

These preliminary audits are distinct from investment-grade audits in that they represent a relatively low-cost assessment of the projects that potential contractors can use as a basis for presenting an efficiency retrofit project proposal. If the participant determines that the preliminary audit would be viable, the participant then enters into an agreement with the ESCO to perform an investment grade audit. Under the rules of the SCEF program, the ESCO’s investment grade audit must meet at least 95% of the savings identified in the preliminary audit. An investment-grade audit is a more intensive examination of the potential project. It
forms the basis of any performance guarantees offered by the ESCO contractor and form part of the basis of the investment decision. Under the investment grade audit agreement, if the participant chooses not to move forward with the efficiency project identified in the investment grade audit, the participant compensates the ESCO for the predetermined cost of preparation of the audit.

To date, no efficiency retrofit project contracts have been executed, primarily due to participants’ hesitancy to move forward based on unfamiliarity with the program approach and competing funding mechanisms that offer grant (not just loan) funding, such as Proposition 39 – the California Clean Energy Jobs Act. This analysis is based on the information provided by potential ESCO contractors as part of the preliminary audits as provided by the Water Agency.

In total, we analyzed nine proposed projects spelled out in the preliminary audits, of which six were for upgrades to schools. Together, all nine projects would involve an initial investment of almost $18 million. The individual projects and investment totals are presented in Table 1 below.

<table>
<thead>
<tr>
<th>Project</th>
<th>Investment, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloverdale United School District</td>
<td>760,000</td>
</tr>
<tr>
<td>Dunham School District</td>
<td>35,000</td>
</tr>
<tr>
<td>Petaluma City Schools</td>
<td>3,700,000</td>
</tr>
<tr>
<td>Piner-Olivet Union School District</td>
<td>320,000</td>
</tr>
<tr>
<td>Sebastopol Union School District</td>
<td>165,000</td>
</tr>
<tr>
<td>Sonoma County Fairgrounds</td>
<td>930,000</td>
</tr>
<tr>
<td>Santa Rosa City Schools</td>
<td>8,200,000</td>
</tr>
<tr>
<td>Windsor Town Facilities</td>
<td>3,550,000</td>
</tr>
<tr>
<td>Valley of the Moon Water District</td>
<td>125,000</td>
</tr>
</tbody>
</table>

The individual investments identified in the preliminary audits covered a wide range of measures, including energy and water efficiency as well as renewable energy technologies. These include the installation of solar panels, replacement of aging equipment, upgrades to heating, ventilation, and air conditioning systems (HVAC), and others.

### III. Methodology

From a modeling standpoint, it is convenient to break retrofit projects such as these into two distinct phases, a construction phase and operations phase. As the name suggests, the construction phase consists of all the activities required to perform the building upgrade. The operations phase covers the ongoing impacts of the upgrades on the operations of the facility. The construction phase does not have a specific time frame attached to it. Instead it is simply defined as the amount of time required to complete the upgrade project, and the preliminary audits do not provide estimates of the amount of time required to complete the suggested
upgrades. While the construction phase may cover a few months to multiple years, in this modeling analysis we treat the construction phase as though it were a single event, and report the resulting jobs and value added\(^2\) not on an annual basis but rather over the course of the construction phase as a whole.

We used the projections from the preliminary audits to identify the cost savings, additional maintenance costs, and finance payments. These are reported as annual flows, and we modeled the annual economic impacts of these cash flows on the Sonoma County economy. We modeled all of the projects as though they were financed in their entirety through the proposed SCEF facility, using a hypothetical joint power authority with bonding capacity equivalent to that of the Sonoma County Water Agency to finance the construction costs and repaying the bonds out of the resulting projected energy savings.

In most cases (six out of the nine projects), the energy saving benefits are assumed to last only as long as the bond tenor, i.e. once the bonds are paid off, the energy savings are assumed to end. In none of the projects, are the measures assumed to yield savings beyond 25 years. These two assumptions result in an underestimation of the benefits of the projects that is likely to be significant. In general, we rely on conservatively low estimates of the benefits of these projects to avoid overstatement. This is one such case.

As mentioned above, we separate each project into a construction phase and an ongoing operational phase. We aggregated the two phases across all of the projects to provide an overall estimate of the impacts of the entire SCEF program on the Sonoma County economy. The length of the operational phases of the projects range from 15 to 25 years, and our analysis projects impacts through 25 years, with individual projects falling out of the analysis as they expire. To perform the analysis, we used standard input-output framework using the RIMS II modeling system from the U.S. Bureau of Economic Analysis. RIMS II provides jobs and value added multipliers at the county level, allowing us to model the impacts of the proposed projects on the Sonoma County economy, accounting for the structure of the local economy, including the flow of dollars into and out of the county based on the capabilities of local businesses to meet increased local demand.

\(^2\) “Value added” is the local analog to Gross Domestic Product (GDP) at the national level, and represents the market value of goods and services produced in the area sold to final consumers.
What is a “Job”?  

We will note here that the jobs estimates in this report are more appropriately called job-year equivalents. Each “job” represents an increase in demand for employment sufficient to employ one person for one year. The distinction between a job as a permanent position and job-years is particularly evident in considering the construction phase of the projects. The 214 “jobs” created are a direct result of the temporary increase in demand for construction. Once the stimulus of the construction expenditures ends, these employment impacts will also end.

Additionally, while we report employment impacts as “jobs” (or job-years), not all of the jobs reported represent a net new hire. When the economy is running at or near full employment, new additional workers are more difficult to find, and it is likely that a substantial number of the jobs created would be filled by hiring workers away from other jobs. In this case, the job creation does not result in a net new hire for the local economy. In the current economic climate, where the economy is far from full employment and the construction industry has particularly high unemployment, this issue is minimal.

Finally, except where we note otherwise, the job (and value added) projections we report include direct, indirect, and induced impacts.

- Direct impacts cover the jobs created as a direct result of the expenditures we model. For example, in the construction phase, it covers workers at the construction site as well as management, accounting, and other activities within the construction companies to conduct and support the upgrades.
- Indirect impacts cover the jobs created when the construction company increases purchases along its supply chain and similar inputs to the project, including lumber, concrete, equipment to be installed, and consulting services.
- Induced impacts include the broader economy-wide impacts of the project resulting from increased expenditures from workers both at the construction company and along the supply chain. If workers leave the construction site at the end of the day to go out to dinner together, increased employment at local restaurants would be included in the indirect impacts.

The RIMS II modeling system only identifies induced impacts separately, so where we distinguish between types of impacts in this report, we only distinguish between induced impacts vs all others.

For the construction phase, we modeled the projects as expenditures in the broadly defined construction sector. Because the projects are all assumed to be financed through the SCEF program, we accounted for the costs of the construction as annual payments deducted from the savings that result from the projects. As a result, the construction phase of the projects appears as a pure stimulus to the local economy, an injection of over $17 million.\(^3\) This injection

\(^3\) Unless otherwise noted, all dollar values in this report are inflation adjusted to 2013.
is an increase in final demand for the construction sector resulting in over 200 jobs created and $16.9 million in local value added.

For the ongoing phase of the projects we model multiple different economic flows, some that act as a stimulus, and some that act as an anti-stimulus. The two largest impacts are the reduced energy and water purchases resulting from the projects and the bond repayments participants make to finance the projects. We model both of these as flows into or out of the general budget of the local government as appropriate. Several of the projects result in decreased operating and maintenance expenditures, utility rebates for specific equipment purchases, and material cost savings, which we model as a stimulus.

Several of the audits include an ongoing contract for monitoring and verification services to ensure that the upgrades are performing as they should. We modeled these as expenditures that are paid for by the energy savings. These service payments will create jobs to perform the monitoring and service activities, and we modeled these as an increased in demand for engineering services, with the assumption that no more than half of that would be spent on local companies. The interest portion of the bond repayments and any finance fees associated with the projects are assumed to leave the local economy in their entirety, functionally assuming that the capital to finance the projects comes entirely from outside of the local economy, so that the returns on that financing leave the economy as well.

The energy and water savings are modeled as savings for the local government entities and as a loss in revenue for electricity, natural gas, and water utilities. In accounting for the local impacts of these reduced revenues, the RIMS II system indicates that reductions in electricity purchases have zero negative impact on the local electricity industry. This is likely due to the fact that what electricity generating facilities exist in Sonoma County are largely geothermal, which involve relatively high fixed costs and low operating costs (because there is no fuel to purchase). As a result, the marginal cost of generation (i.e. the cost of producing a single additional kilowatt hour) for geothermal plants tends to be low compared to traditional sources that require fuel for generation (like natural gas plants). This means that when electricity demand falls, the plants reducing their electricity output will not be geothermal plants. Put another way, because geothermal plants have no fuel costs, reducing generation saves less money than it does at a natural gas generator, which means that when revenues fall, generators will reduce output at the natural gas plant in order to save the most money. All of this means that, because much of the local electricity generation is geothermal, any reductions in revenues to the electricity sector accrue to generators outside of Sonoma County, so that there is no anti-stimulus effect from reduced electricity consumption in Sonoma County.

This does not hold true for gas and water utilities, so that any reductions in demand for natural gas and water result in reduced revenues for local gas and water utilities with an associated negative economic impact.
IV. Results

The net result of all of these flows is an increase in demand for local workers and increases in local economic output or value added. Charts 1 and 2 below show the ongoing impact of the energy investments. Assuming that the savings begin to accrue in 2015, these charts show the impacts of ongoing savings on all nine projects for the county as a whole. The notable jump in both jobs and GDP measures in 2030 are the result of the fact that eight of the nine projects are projected to retire their debt after 15 years reducing the anti-stimulative effect of bond repayments on the economy. At the same time, four of the nine projects continue to generate savings after 2030, maintaining their stimulative effect after the anti-stimulus of the finance payments has expired.
In addition to the ongoing impacts with annual employment increases ranging between nine and 31 jobs per year and adding as much as $2.2 million to value added in the final year, the construction phase of the projects would employ 214 people and generate local value added increases of about $17 million. Not adjusting for time preference, the ongoing impacts increase employment by more than twice the construction phase.

To calculate the net benefits of the projects as a whole, we compute the present value of the ongoing energy savings and compare them to the present value of ongoing bond payments, finance fees, and operations and maintenance costs. Using a 5% discount rate, we find that the net present value of the energy savings are almost $30 million, nearly twice the $15.5 million present value of the costs performing the upgrades, including financing costs. This outcome should not be surprising given that the intent of the SCEF program and the SEU model it is based on is to design a financing and implementation scheme that produces positive net savings in every year of the project.

V. Conclusion
Well-designed energy and water efficiency projects can increase productivity, reduce costs, and spur local economic development. Local governments often do not take advantage of potential efficiency projects for a variety of reasons discussed in this report. The Sonoma County Efficiency Financing Program was designed to overcome many of the barriers that keep local governments form taking advantage of energy efficiency to a fuller extent. This analysis demonstrates that by lowering these barriers the SCEF program could generate substantial economic development and employment opportunities in Sonoma County.
If all of the projects considered in this report were undertaken, they would create in aggregate over 200 local jobs in the implementation phase of the projects and a sustained increase in local employment growing from about nine jobs to 30 jobs per year. We find that the efficiency investments would be cost effective, saving local governments almost twice in energy and water costs than the required investment and other associated costs. The SCEF program would help local governments unlock efficiency investments in a number of areas, saving taxpayer money and creating local jobs while reducing pollution and the demands placed on local water systems.