IREC
INTERSTATE RENEWABLE ENERGY COUNCIL

Municipal Guide To Purchasing Renewable Energy[1]

Background

The new competition in the electricity business creates opportunities for municipalities and local governments to procure their energy needs in a more environmentally responsible manner. In 24 states, plus the District of Columbia, electricity consumers, including municipal entities, can buy their electricity from a competitive supplier and no longer need to accept the electricity generation mix provided by the traditional electric utility.

Electricity service is provided through three distinct, but interconnected, pieces. Large power plants generate electricity and ship that power across great distances through high voltage transmission lines. The high voltage lines then feed local substations that step down the voltage to lower levels. Power at lower voltage levels is distributed through the lines along streets and through neighborhoods to individual residents and businesses. Competition has been brought to bear on the power plant piece allowing consumers, including municipal customers, to choose their electricity generation source. The remainder of the system is still a regulated monopoly and will be used to deliver whatever generation the customer buys.

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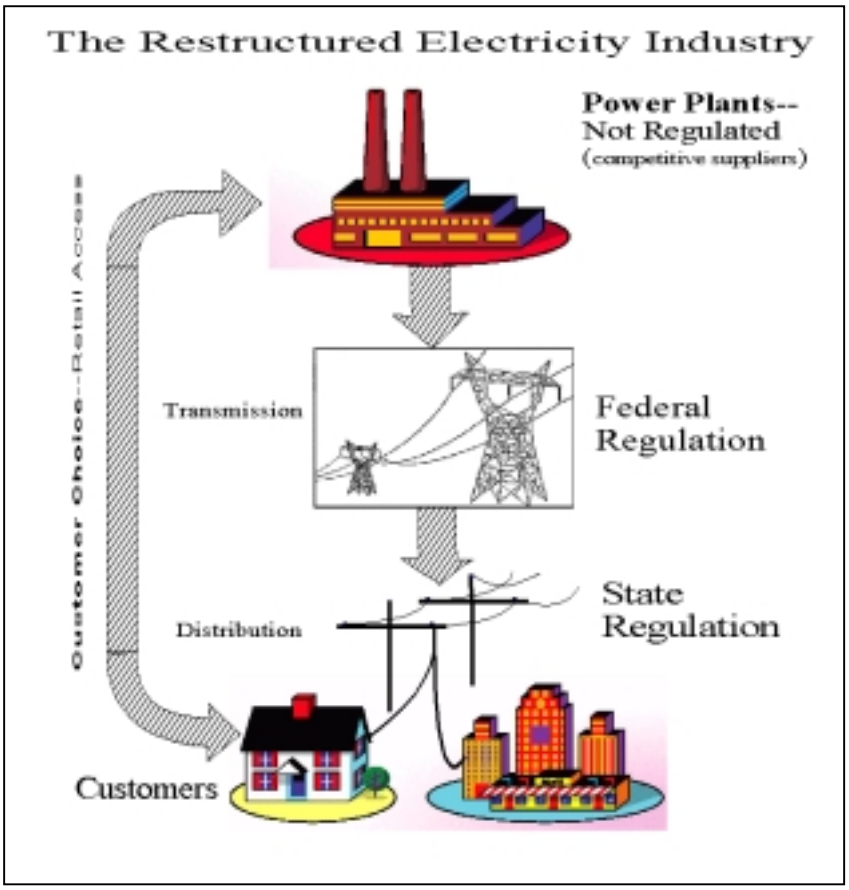

Under regulation, the monopoly utility, in conjunction with the public utility commission, decided what types of power plants would be built to supply electricity. Typically they focused on identifying the least cost type of electric generation with little or no regard to the environmental impact.

Under electricity competition, the consumer has the ability to decide what electricity source is best. If the consumer prefers a more environmentally friendly type of electricity generation, they can contract with a competitive electricity supplier offering clean or renewable generation. The consumer then signs a contract with the competitive supplier to supply all of their electricity needs for the time period of the contract. Collectively, if consumers choose suppliers with more environmentally friendly products, those resources will garner a greater and greater share of the marketplace while polluting resources find they have fewer and fewer customers. Consumers can play a pivotal role in setting a positive environmental direction for electricity and power production.

Municipal Purchases of Electricity Supply

Because of the new competitive electricity market, many municipal officials and procurement personnel will find they need to create a procurement strategy for electricity. Historically this commodity was offered only by the monopoly utility at rates established by the utility regulatory commission. This meant no action was required to procure electricity. Even if a municipality desired different sources of electrical generation, the central planning of the electricity grid left no choices.

Under competition, however, the full range of procurement options is available to the municipal purchasing agent. In fact, certain municipalities may be compelled to competitively procure electricity (and other energy resources) now that competitive options exist. Since many municipalities either have the affirmative duty to issue competitive procurements or have restrictions against sole source purchasing, the

municipal official may be required to move into the electricity market with a competitive solicitation for supply.

If this obligation exists, it can be turned into an opportunity to select energy resources that include a mix of environmentally friendly renewable resources. Proper structure of the competitive solicitation can ensure that respondents include these new technologies into the delivery of power for the local government. In those areas where few or no renewable resources exist in the present energy mix, renewable energy procurement by local governments will establish a new direction that will significantly reduce the pollution associated with electricity production.

While some municipalities may wish to include renewable energy in their portfolio of energy supply to enhance the environment, others may do so to create local job opportunities and/or diversify the fuel sources for their electricity.

The benefit to the environment from switching to renewable energy is relatively well known and relies on comparatively lower emissions than from traditional large, fossil-fueled power plants. Less understood is the local job impact. Many types of renewable energy facilities are small-scale technologies installed in the same region as the customer's electrical load. Conversely, many fossil-fueled power plants (coal or natural gas) are constructed far from customer load. Moreover, the fossil fuel that supplies these plants often comes from even more remote locations. This means the dollars a municipal customer spends on electricity are often dollars that leave the local or state economy. By contrast, the cost of renewable energy is mostly related to construction – a cost associated with jobs within the state and dollars that remain in the local economy.

Fuel diversity can be a long-term hedge against cost and catastrophic shortage. When the cost of a particular fuel rises (which can be significant and in a short time period), electricity produced from the fuel will rise. If the cost increase is due to a fuel shortage, the electricity consumer may discover there is a related shortage of electricity resulting in brownouts and blackouts. Switching part of the energy requirements to renewable energy helps to avoid these problems. Most renewable energy technologies either have no fuel requirement or are linked to a non-depleting supply. These technologies are immune from fuel-related price spikes and can help level the cost of electricity for the municipality that chooses these resources.

Electricity Procurement Strategy – Designing a Request For Proposals to Include Renewable Energy

The first step in developing a renewable energy procurement strategy involves calculating the total energy needs of the municipality or local government. This requires a review of all the electricity (or other fuel) accounts and combining all of the accounts into a single municipal load. By summing the consumption for all the municipal accounts over 12 months, the municipality can understand how many kilowatt hours it requires to service all of its accounts annually.

Municipal officials should then decide how much renewable energy is appropriate in their mix of supply resources. Choosing the proper amount of renewable energy becomes critical. Since certain types of renewable energy resources may be more expensive than polluting generation, keeping the percentage of renewable energy in the generation mix low, yet not so low as to be insignificant, is a key to cost-effective procurement. However, to encourage the use of renewable energy, the percentage in the portfolio must be greater that the percentage currently in existence in the general fuel supply. (To see each state's current renewable energy mix, visit the web site at www.eren.doe.gov/repis/database). Nationwide, renewable energy comprises about 7.5 percent of total electricity production with 4 percent representing non-conventional hydroelectric generation (i.e. geothermal, biomass, wind and solar).

In most cases the appropriate percentage of renewable energy should be between 4 and 15 percent. This will ensure both that renewable energy is promoted as an energy resource, yet not burden the Request for Proposals (RFP) with significant additional costs.[2] A percentage lower than the existing resource will do little to encourage the use of renewable energy while a high percentage will either result in significant increase in the cost of electricity or will discourage competitive suppliers from bidding on the RFP because of the fear of rejection based on cost. This is not to say that it is inappropriate to seek significantly greater percentages of renewable energy for electricity supply and several municipalities have taken the bold step of seeking 100% renewable energy[3].

An important question to answer in planning for a competitive solicitation is whether renewable resources will need to compete with non-renewable resources. For a variety of reasons, this approach is not recommended. A better and more straightforward approach is to identify a percentage of renewable energy that will be required as part of the supply mix to qualify as a responsive bid. In the infancy of electricity competition, many competitive suppliers will simply ignore convoluted requests for procurement. Thus, complicating the bid process by requesting competing bids from each supplier showing price with and without renewable may be deemed to complex to warrant a response.

To allow competitive suppliers the opportunity to meet the renewable energy requirement in the most cost-effective manner, the renewable requirement should be stated as a simple percentage of the total kilowatt hour combined load of all municipal accounts. This will allow the supplier to choose the most appropriate mix at the lowest possible cost.

To avoid misjudging the highest percentage of renewable energy that competitive suppliers can cost effectively deliver, municipal officials should make a preliminary investigation of the market. In many competitive markets, renewable or "green" power providers have already assembled a packaged product line for residential customers

[2] Municipal procurement personnel should decide in advance of the RFP issuance whether they would accept bids that are higher in price than a standard offer service provided by the incumbent regulated utility. If not, the RFP should so state.

[3] In 1999 the City of Santa Monica, California became the first City to seek 100% renewable energy supply. The City selected Commonwealth Energy, a certified supplier of green power through a competitive solicitation that included 14 competing offers.

that incorporates a percentage of renewable energy. In most cases, as the percentage of renewable energy in the mix increases, so does the price. By comparing the magnitude of price increase over non-renewable resources offered to residential customers, the municipality should obtain a general understanding of an appropriate percentage of renewable energy that can be incorporated without a significant increase in price. In jurisdictions where there are no competitive suppliers offering a packaged "green" product, the municipality should look to other states in their region where such products are offered.

If a municipality decides to take a cautious approach and requests a renewable percentage only slightly above their State's average (see chart of state averages StateAvg.pdf), they can provide an additional option to have the supplier establish a municipal fund for on-site renewable energy (described in detail below). If the fund is simply a check-off option for bidders (i.e. they will either meet the renewable percentage and establish a fund or just meet the renewable percentage without a fund), both competitive supplier bidders and the municipality are protected. If suppliers are having difficulty meeting the renewable energy percentage, most will not be willing to create a separate additional fund. If some suppliers can easily meet the percentage without significant cost increase, they should be happy to enhance their bid by also creating a fund. Municipal reviewers of the bid response can elevate those with both the required percentage and the optional fund above those that include only the required percentage of renewable energy.

For samples of RFP language that will effectuate the incorporation of renewable energy into a municipality's electricity supply, click here RFPSamp.pdf. For samples of green power packages offered by competitive suppliers, click here greenpow.pdf .

Cautions

Municipalities should add language to their RFP to ensure that bidders are not meeting the renewable energy requirement with repackaged existing resources. There have been allegations from consumer protection groups that competitive suppliers are simply buying power from existing renewable energy generators, marking up the price of the electricity, then selling it to consumers who believe they are promoting these environmentally friendly technologies. In reality, since these existing units are already generating, repackaging does not encourage power producers to install new facilities nor does it help reduce emissions. Therefore, the municipal RFP should either limit the total amount of existing resources that may be used to meet the RFP percentage, or all of the renewable energy should be from new or planned generation facilities (for example, built after 1997).

The largest existing (and most controversial) renewable resources include large-scale hydroelectric dams and un-segregated municipal waste to energy generators (a.k.a. trash incinerators). Since these facilities were constructed to sell electricity based on price alone without the need for renewable encouragement, municipalities may wish to exclude these resources from eligibility. Since it is unlikely that any new large-scale hydro facilities will be constructed in the United States and new trash incinerators

always provoke a negative reaction from environmentalists, a clause as suggested above (*new or planned facilities*) would effectively eliminate these controversial generating technologies.

Understanding Resources That Are Considered Renewable Energy

While not critical to the function of an RFP provision promoting renewable energy, it may be useful for the municipal official to understand the types of renewable resources that the competitive supplier will use to meet the RFP target. For this reason, the RFP should request a non-binding listing of the types and quantities of renewable resources that will meet the RFP percentage specifications. These might include:

- Biomass
- Digester gas
- Geothermal
- Landfill gas
- Micro hydro
- Solar PV
- Solar Thermal (central)
- Segregated Waste to Energy
- Wind

Biomass
Biomass generation results from the combustion of a dedicated agricultural crop or a crop by-product. Biomass electricity may be created in a power plant dedicated to burning these crops or the biomass may be co-fired into an existing coal power plant. While co-firing is one of the least expensive renewable resources, only the percentage of biomass used in the plant should be counted towards meeting the renewable percentage in a municipal procurement.

Biomass that uses a dedicated feed crop (i.e. one specifically planted to be burned for power production) may be considered a non-greenhouse gas emitting technology. Even though the combustion process will produce carbon emissions, these will be consumed by the crops that are planted to produce the power. The net effect of the carbon emissions and carbon consumption can be designed to be zero.

Digester gas
Digester gas is created from an anaerobic process typically used in sewage treatment. The gas, after cleaning, can be used like natural gas to provide electricity from combustion in a turbine or a piston engine. Since the gas is otherwise burned as a flare, converting it to electricity offsets other greenhouse gas emissions.

Geothermal
Geothermal electricity production is available in the areas of the United States that have active geological conditions. Geothermal power plants utilize heat that lies below the surface of the earth to generate electricity. The supply of heat is continually replenished

from the center of the earth, making it a renewable resource. Geothermal plants emit virtually no air emissions.

Landfill gas

Landfill gas generation is created by piping the gas that accumulates under a capped solid waste landfill into a combustion generator. These may be simple internal combustion engines or more complex high-speed combustion turbines. Some landfill gas generators are augmented through the use of a natural gas supply that may be nearby. Only the landfill gas portion of electricity generated should be counted for the RFP renewable requirement.

While landfill gas still involves combustion that produces carbon emissions, the alternative for landfill gas is to burn the gas in a flare that creates even greater emissions. By comparison, the landfill gas generation should be considered a net positive against the emissions that are otherwise created from flaring.

Micro hydro

While large-scale hydroelectric facilities are controversial because of the large amount of land they consume and their impact on river flow, micro hydro avoids many if not all of these concerns. Micro hydro resources are most often associated with existing small dams used for municipal water supply and flood control. New micro hydro generation technologies are being designed for installation into rivers without disturbing the river flow or adversely impacting fish and other aquatic life.

Solar PV

Solar photovoltaics is the direct conversion of sunlight to electricity. The technology is fully described earlier on this CD. Solar PV produces no emissions during electricity production.

Solar thermal (central)

Heat from the sun when concentrated through the use of mirrors or other devices can create temperatures high enough to produce steam. That steam can in turn be used to produce electricity using ordinary steam generator technology. As the heat source is solar, these production facilities produce no emissions.

Segregated waste to energy

While non-segregated waste to energy facilities are controversial because of certain toxic emissions that result from burning everything that may be found in municipal garbage, segregated waste to energy avoids this problem. By targeting only non-toxic waste streams that may include paper, wood, pallets, tree and lawn trimmings, electricity can be produced without harmful emissions. However, even though this resource is renewable, it will be a source of carbon emissions.

Wind

The power of the blowing wind can be captured and converted into electricity through the use of wind turbines. While much more sophisticated and efficient than the traditional windmill, the source of power production mirrors that age-old technology.

To assist the municipal official in understanding the availability of renewable resources in your area, a chart indicating renewable resources available in different regions of the country can be found on the web at http://rredc.nrel.gov.

A competitive supplier that can meet a renewable energy requirement in a municipal electricity supply RFP will likely use a combination of several of the above resources. While it may be tempting to specify a certain percentage of each type of renewable resource in the RFP, such a detailed guess of the market's ability to deliver renewable may be counterproductive. It is best to specify an overall percentage and leave the internal mix to the supplier.

Certification Programs

Because of the confusion created in the marketplace over what constitutes renewable energy (nuclear power for instance creates no air emissions but is not renewable), several organizations have created certification programs to ensure those resources marketed as renewable are of high quality. The most well know label is Green-e.

Green-e is a label attached to certain renewable electricity products offered in the competitive marketplace. The Green-e logo is a way for municipal customers to easily identify "green" electricity products. The project is the nation's first voluntary certification and verification program for "green" electricity products. The criteria employed to use the Green-e logo include:

- At least 50% of the electricity supply for the product comes from renewable electricity resources.
- Renewable electricity resources are generated from the sun, water, wind, biomass, and geothermal only.
- Air emissions are reviewed including: sulfur dioxide (which causes acid rain), nitrogen oxide (which causes smog), and carbon dioxide (which causes global warming).
- The company offering the product agrees to abide by the Green-e Program's Code of Conduct, which requires that providers disclose the sources of electricity.
- The product does not contain any nuclear power other than what is contained in system power purchased for the eligible product's portfolio.
- One year after deregulation, the product must contain at least 5% new renewable electricity. This requirement increases to 10% in the next year. Green-e intends to increase the new renewable requirements 5% each year until 25% of the total product content is from new renewable resources.
- The company offering the product agrees to undergo a biannual review of advertising materials to ensure they are not making any false or misleading statements about their products.
- The company offering the product agrees to submit to an annual third party process audit to ensure that they have purchased enough renewable power to satisfy what they sold to customers.

The Green-e logo is an easy certification that can be incorporated into the municipal RFP to ensure only the highest quality renewable energy resources are used to meet the RFP requirements. Municipalities should be sure that Green-e has established criteria for their particular state.

Regional versus National Renewable Resources

In designing the renewable aspect of the electricity procurement RFP, municipal officials should decide whether the renewable resources must be based in the region. Since much of the air emissions associated with power production can be produced far from the region being served, it may make sense to allow any renewable power anywhere in the nation to meet the RFP requirements.

This issue begs the question of how the renewable energy actually gets to the municipal loads to be served. In reality, no electricity follows the dictates of a paper contract. Instead electricity, governed only by the laws of physics, follows a path of least resistance. In practical terms this means electricity to serve a municipality's accounts is probably coming from the generator closest to the municipality. This is true even if there is no contractual agreement in place with that specific generator.

In the competitive electricity world, it does not matter which particular generator is serving which customer or load. The market place acts as a clearinghouse ensuring that electricity generation put into the electrical system is equal to that taken out by customers. As long as all customers' meters balance against all generation put into the system, no one is really concerned about which electrons flow where.

This same principal can be applied to renewable energy. Since the actual electrons produced from the renewable resource will not likely go to the customer who is buying that renewable energy, there does not need to be specific renewable plants allocated to specific customers. Provided that total renewable production balances against total renewable customer loads, everyone should be satisfied.

This situation has created the opportunity to employ a concept know as renewable or green "tags" and tradable renewable certificates (TRCs). These tags or certificates are separated from the actual electricity flow, allowing a generator of renewable energy to sell the renewable aspect of that generation to anyone in the country[4]. This separation makes the purchase of renewable energy much more practical.

For the municipality desirous of using their electricity purchasing dollars to promote renewable energy, the concept of tags or TRCs is viable and cost effective. Whereas it may be costly or impractical to build a wind generation farm on the east cost, that same farm sited in the upper mid west will still provide renewable energy but at a fraction of the cost. Irrespective of where the renewable electricity is produced in the United States, it will offset some other polluting resource and create the benefit of reduced air emissions.

[4] Some proponents of Green Tags and TRCs argue that the renewable aspect can be traded anywhere in the world.

If a municipality decides the renewable resource may be located anywhere, it should structure its RFP to include an option to meet the renewable energy percentage with green tags or TRCs. The generator of the tags or TRCs will certify that specific amount of kilowatt hours have been generated from his or her generation plant and those certificates will be matched against the municipality's consumption to meet the RFP specified percentage.

If a municipality decides to promote only local renewable energy resources, the RFP should clearly state that the resource must be located in the region. The "region" should be defined as the electric transmission grid region serving the particular municipality. Requesting the resource to be sited within the local jurisdiction or the municipality's state is probably too specific. Instead, a requirement that a renewable energy facility be located in the region of the electric transmission system operator serving the local government (these operators are often called the "independent system operator") will facilitate accounting and verification that the renewable facility provided the power it agreed to provide. The transmission system operator considers any power plants in its region as available to serve any customer in that region.

Alternatives to a RFP Percentage of Renewable Energy

Because of the shear lack of sufficient renewable energy available in certain markets, municipal officials may need to consider alternatives to those the competitive market can supply. When the electricity supply market is either too limited to generate much interest in a municipal request for procurement as a whole, or there are too few resources to meet the demand for renewable energy, municipal officials should consider eliminating the requirement for a percentage of renewable energy in the electricity supply and supplanting that with one of two principal alternatives: set-aside funding for small distributed renewable projects or construction of municipal-based renewable energy power plants.

Monetary Set-Aside – Escrow Fund

Instead of requiring a competitive supplier to include a percentage of renewable resources in the electricity supply they provide to serve municipal accounts, a municipality may direct that the competitive supplier create an escrow fund for small-scale renewable energy systems to be sited within the municipality. A major advantage of this approach is that the renewable resource can be located within the municipal boundaries creating local jobs and better local public relations. The procurement of electricity will not need to rely on the volume of renewable resources available in the region.

When a competitive supplier seeks renewable resources to meet a percentage that a municipality has included in a procurement request, any resources they provide will include overhead and financing costs. These costs are passed on to the municipality through higher rates included in the RFP bid response. By contrast, projects undertaken by or on behalf of the municipality eliminate much of the overhead and financing. Since the municipality requires no profit margin and would finance a capital project at lower

rates than the competitive market, installations within the town may be more cost effective that those incorporated into the generation supply mix by a for profit competitive supplier.

To implement a monetary set-aside, the municipality would either target a percentage of savings from the electricity procurement or direct a specific charge per kilowatt hour be incorporated into the rates submitted in response to the bid. The competitive supplier that won the bid for municipal electricity supply would then make monthly payments into the fund. The fund could be either controlled by the supplier or by the municipality. In either case, when sufficient funds accrued to be able to finance a renewable project, the municipality would direct that a project be constructed.

A suggested set-side amount to include in a procurement would be either 20 percent of the savings from the new electricity supply or 1 mill per kilowatt hour (one tenth of one cent), whichever is larger. This level of set-aside would create a steady stream of revenue to fund municipal renewable energy systems, but would be a small enough to be seen as insignificant in the total electricity charges paid by the municipality.

A set-aside fund would be especially useful for the installation of solar photovoltaic and solar thermal projects. Since these are modular technologies that can be implemented in intervals, the set-aside renewable fund could be drawn down incrementally to provide a continuous stream of funding for small projects. If these installations are located on municipal buildings and schools, the renewable energy will have the added benefit of reducing not only the electricity supply costs, but the distribution costs as well. In many cases this *doubles* the value of the renewable energy. In states where net metering is law, any excess production from the municipal PV system will be credited against future electricity purchases ensuring that every kilowatt hour produced is used by the municipality for its own purposes.

The municipality would need to take an active role in identifying specific projects and an installation contractor. It might need to issue a second RFP to seek bids for the installation of the small-scale renewable systems. To simplify this process and integrate it with the concept of the set-aside fund, the municipality should issue a contract for the delivery of installation services over a specified period (one year). Then as sufficient funds are available to pay for the projects, the municipality simply calls their selected contractor and identifies the building on which to install the project. Assuming solar PV is the chosen technology, within a few weeks of selecting a site, the solar installer should have a new renewable energy system up and running.

The set-aside fund concept could be incorporated into the competitive solicitations of other fuels as well as electricity. Combined natural gas or other fuels procurements could incorporate a set-aside that would also supply revenues for the municipal renewable fund.

Construction of a Municipal Renewable Energy Power Plant

A number of renewable generation technologies rely on resources that are often under the control of a municipality. These include:

- Landfill Gas Generation
- Digester Gas Generation
- Micro Hydro Generation
- Segregated Waste to Energy Generation

In considering incorporation of renewable energy into a competitive procurement of energy, it makes perfect sense to utilize the renewable resources that may be in the municipal back yard. These will be the most cost-effective renewable resources available and can often help to reduce the existing price of electricity. Many of these resources can be developed at less cost that new non-renewable electricity sources in the market.

Landfill Gas Generation

Landfill gas generation, as mentioned briefly above, relies on the methane gas that is produced when garbage decays. Since the US Environmental Protection Agency now requires most dormant landfills to be capped to prevent release of the methane into the air (methane is a powerful greenhouse gas contributor) the costs to capture the gas must be borne by the municipality. Once captured, the gas is often simply ignited and flared to prevent dangerous buildup under the capped landfill.

Many landfills will produce a sufficiently reliable level of methane to power a combustion turbine or simple piston engine for decades. The turbine or engine is then connected to a generator that produces electricity. Since the landfill gas contains some trace elements that could be harmful to the generation equipment, the methane must be cleaned or scrubbed before use. This cleansing process further reduces emissions associated with the electricity production.

Because it is relatively simple to add electricity generation to a capped landfill, the effective cost of this electricity resource is often less than the municipality would pay for fossil fuel-based electricity. Landfill gas generation should be a priority consideration among local governments that own landfills.

Digester Gas

Anaerobic breakdown of sewage creates methane. For municipalities that either have or are considering this technology for sewage treatment, the methane by-product can be used for electricity production. While the technology of anaerobic digestion may not justify the expense of the digester solely to produce electricity, it, like landfill gas, can be a very cost-effective renewable electricity resource if the investment in a digester must be made for some other purpose. Once that cost is sunk, the cost of adding the additional equipment to produce electricity is very reasonable. The end production cost of electricity may also be less expansive than current market prices.

Micro hydro

This electricity generation resource often relies on existing municipal dams used for water supply. Because the dam is already in place, there are limited or no environmental consequences to adding electricity generation. Adding generation will not

affect the quality of water in the municipal water supply since the mechanical equipment can be designed to prevent introduction of any foreign matter into the water. Generation equipment will be added upstream from potable treatment of the municipal water supply.

Hydroelectric turbines do not rely on combustion, so it is a generation resource that produces no emissions. Since the cost of this source of renewable energy is limited to the addition of a turbine and electrical generator to an existing dam, it can be very cost effective. Like other municipal resources mentioned above, the cost of constructing a small dam solely for the purpose of generating electricity would not likely be cost effective.

Micro hydro may also be available on the effluent of tertiary water treatment facilities. Many of these facilities discharge treated water into a river or other body of water at sufficient elevation to create head for hydroelectric power. Since this water should have no aquatic life, using it for electricity production will have no environmental impact.

Municipal officials may find other micro hydro resources including dams build for recreational purposes and storm water management. In any area where there is a significant drop in height of flowing water, micro hydro should be evaluated.

Segregated Waste to Energy

Provided there is a steady stream of a clean combustible feedstock, a municipality should consider a small, steam-generation plant that uses segregated waste. The waste might include paper products, waste wood, lawn and tree trimmings, pallets, mill residue, or agricultural by-products. While many municipalities use un-segregated municipal solid waste to generate electricity, because of emissions associated with burning all types of garbage, this technology is controversial and often excluded as a renewable resource.

Identifying the combustible waste stream is the key to the cost effectiveness of this technology. In most cases, the waste stream must either be obtained at no cost or include a payment for removal of the waste. Unlike other generation options, the cost of construction of a power plant must be borne solely by the electricity production. Adding a cost for the fuel to supply the power plant will, in most cases, make this an uneconomical renewable energy option.

While a municipality can construct a geothermal plant or wind generation plant if it has those resources available, in many cases those technologies are more cost effective when constructed in unit sizes greater than most municipalities will require for their own loads. However, if the municipality needs a large electricity resource, financing the construction from municipal bonds can lower the overall cost of production.

Financing – Low-Cost Municipal Bonds

Municipalities and local governments have access to low-cost financing over long terms that more appropriately match the type of capital investment required for a larger-scale renewable facility. For a municipality that decides to construct its own renewable

generation plant to serve municipal loads, use of municipal tax-free financing is legitimate.

Financing costs contribute significantly to the overall cost of renewable energy. Since many renewable technologies have little or no fuel cost, the entire cost of electricity production is related to the capital investment. When the municipality uses lower cost financing, it will reduce the cost of electricity coming from the renewable facility.

Municipal finance cost (i.e. discount rates) is about 5.75 percent. By contrast, the private, for profit competitive supplier might have a combined cost of capital of 10 to 11 percent. For every 10 million dollar capital investment required for a renewable facility, this capital cost differential would add one-half million dollars annually to the cost of power from that facility. By using lower-cost financing, the municipality will save significant annual sums in electricity costs. For specific examples on the cost impact of financing, click here finexm.pdf.

A municipality need not take control of construction or operation of a renewable energy-based electrical generator in order to use low-cost financing. In fact, since few municipalities have expertise in the construction or operation of generation plants, it is highly recommended that municipal officials seek a turnkey solution to their renewable energy needs. The municipality should limit its involvement in the construction and operation of a renewable energy plant to providing financing. The rest of the risk of operation should be turned over to a contractor/operator who will guarantee that the facility operates and provides power at a steady rate. The municipality's obligation post construction will be to purchase all of the output from the plant at the pre-established rate. Should the plant fail to produce, it will be the contractor/operator's obligation to replace the renewable energy at no additional cost to the municipality.

Energy Efficiency

Municipal officials may wish to consider incorporating energy efficiency into any set-aside funds they establish as part of the renewable energy procurement. Combining energy efficiency projects with renewable energy is not only a sensible method to maximize the effect of renewable energy production and emissions reduction, it is also very economical.

Many energy efficiency projects can be implemented at an overall cost savings. Savings accrue from a reduction in electricity (or other energy source) consumption. Each kilowatt hour saved is translated into a monetary amount that can be used to pay for the cost of installation of the energy efficiency equipment.

For example, from the municipal customer's perspective, a $1,000 per month electric utility payment is the same whether all of it goes to purchase electricity or a portion pays for electricity and the remainder pays for an investment in energy efficiency. Thus, an energy efficiency investment is considered cost effective if the combined reduction in amount of electricity needed (and cost) is greater than the monthly cost of the investment over a time period. The following is an illustration:

EXAMPLE

- Monthly electricity bill (single building) before energy upgrade = $1000
- Monthly bill after upgrade =$700
- Cost of upgrade $18000
- Life of new equipment = 10 years
- Cost of upgrade if payments made in equal monthly installments = $195 per month[5]
- Total new bill with reduced energy and monthly installment payments = ($700+195)=$895

NET Monthly savings = $105

In the above example, the energy efficiency investment is cost effective and has reduced the net cost of electricity service by over 10 percent. But to realize this savings, the municipal customer must make an up front investment that will be repaid over time.

In the above example, if instead of financing the project, moneys were provided by a municipal set-aside fund, the monthly payment decreases by 45 dollars and the savings increases to 15 percent. This means the municipal customer's bill is reduced by 15 percent if the program is funded from a set-aside fund.

A municipality would need to identify a performance contractor who would install the energy efficiency measures and guarantee that equipment would perform as designed. Under the performance contract approach, if the equipment fails to deliver the savings, the contractor must pay the difference. Using this approach protects a local government from any risk.

As with the set-aside fund for renewable energy, the municipality would need to wait until sufficient funds accrue to pay the cost of the energy efficiency project. When accrued funds were equal or greater than the cost to make the energy efficiency investment, the municipality would request a draw and let a contract to begin the work. To accelerate the accumulation of funds for both energy efficiency and renewable energy, municipal officials could consider a larger set-aside (e.g. 1.5 mills or 0.15 cents per kilowatt hour) amount in the electricity procurement RFP.

As an alternative to the set-aside, the municipality could provide the financing for the energy efficiency work, and then repay the bond (or off books financing) through a charge that would appear on each monthly electric bill provided by the generation supplier. This arrangement would need to be included as a billing option to be provided by a competitive electricity supplier.

A municipality making this additional monthly bill payment would in essence be paying itself back. However, the repayment would be drawn from an operating budget (that

[5] This assumes 5.5% cost of financing – municipal tax-free rates.

would otherwise pay an electric bill) instead of a capital budget. If a performance contractor undertakes the energy efficiency work, then the municipality can be assured that the monthly charge on the electric bill for the equipment is less than the city would have paid for monthly electricity to service that building or account.

Conclusion

Whether a municipality or local government is seeking the inclusion of renewable energy for environmental, local economic development or fuel diversity reasons, each should be accomplished in the manner that results in the greatest impact on the energy market at the lowest cost. No municipal government can afford to waste their limited resources on programs that will fall short of accomplishing the renewable energy goals of the municipality. The municipality must determine whether its renewable energy acquisition plan will be through competitive solicitation of energy supply that incorporates a percentage of renewables; creation of a set-aside (escrow) fund for the purchase of small-scale technologies and energy efficiency; or construction of larger renewable facilities that will provide power to municipal loads. A well thought out and detailed plan can make renewable energy a sustainable part of the energy supply needs for a municipality and make the air we breathe a little cleaner.