ENERGY MASTER PLANNING FOR LOCAL GOVERNMENT PROJECTS

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BACKGROUND

The City of San Jose's Office of Environmental Management (OEM) is developing a program to integrate energy efficient design in the building process. The program has two goals. The first is to maximize the utilization of cost-effective energy conservation measures in new structures built in San Jose focusing on redevelopment areas. The second is to successfully market Energy Analysis Services.

The origin of the program is rooted in the problems experienced in contributing to the energy design of large public projects. These problems occurred in the City's Convention Center project, the City's Airport Expansion project, and in attempts to alter the design of several private projects. In all these cases, the energy studies managed by the City's Energy Office were not adequately integrated into the plans, schedules and budgets of the capital projects. Moreover, in these cases, State of California Title 24 did not address the technologies which were subsequently reviewed consisting of cogeneration, thermal energy storage and district energy systems. It was determined that energy considerations should be a part of the early planning in order to prevent the frustration of attempting to modify an approved project. This decision is supported by findings which show that energy conservation opportunities which would be too expensive or impossible to retrofit can be installed at no cost if they are considered early enough in the design process.

PROGRAM

Under this program, the City of San Jose will evaluate advanced energy efficient design options as part of new construction. Design options include, but are not limited to:

- Daylighting
- Orientation
- Landscaping
- Configuration & Use Patterns
- Solar Active/Passive Systems
- Thermal Envelope
- HVAC Optimization
- Non Refrigerated Cooling
- Thermal Energy Storage
- Energy Management and Control Systems
- Cogeneration
- Heat Recovery
- Alternative/Renewable Energy Sources
- District Heating and Cooling

The emphasis is on buildings which will be built and financed by the City's Redevelopment Agency. The majority of these facilities will be operated directly or indirectly by the City. Assessments of the advanced energy design options and technologies will enable the City to develop strategies which will encourage energy efficient new construction.

The San Jose City Council has approved the development of the Energy Master Planning project managed jointly by the Office of Environmental Management and the San Jose Redevelopment Agency. As part of the program, the following objectives for Energy Management are proposed for adoption by the City's Redevelopment Agency:

1. The Redevelopment Agency will review major capital projects in the design phase of development and incorporate, where appropriate and feasible, recommendations for energy efficiency and energy conservation planning as part of the Energy Master Plan effort.

   Major Capital projects will be those which are contained in the adopted 5-Year Capital Improvements Program. These projects are funded with public dollars through Redevelopment Agency districts or elsewhere in the City.

2. The Redevelopment Agency will offer Energy Management Services to privately funded projects to support economic development through evaluating energy efficiency as part of new construction in order to reduce the costs of operation borne by future tenants and users.

3. The following criteria will be applied:

   - Cost-effectiveness of alternatives to reduce energy demand and use will be the first priority criteria for judging choices.

   - Central plant energy systems with future fuel switching and utility rate advantages will be the second priority criteria to be used to guide the design of projects.

PRODUCTS AND SERVICES

The following constitutes the products and services which are expected to be available under the Energy Master Planning Program:

1. Energy Analysis: Energy Analysis Computer Programs will be selected for use by the City to evaluate the energy options and strategies of new construction. The City anticipates that computer models will be used in the application of energy analysis techniques. The suitability of existing programs including DOE-2 will be evaluated. From the various work products to be completed under contract, it is intended that the City of San Jose will be capable of providing energy analysis services.

   Energy analysis is defined as the use of guidelines and computer programs for use in the design of new construction. These guidelines and computer programs will take building parameters such as roof systems, building envelope, building orientation, lighting, HVAC systems, etc., and analyze them to produce the most energy efficient design available. The analysis will be expected to provide short and long-term cost savings figures to the developer. This analysis will include savings due to capital costs, operational and maintenance costs, and energy savings.

2. An Energy Conservation Opportunities Matrix will be used as a tool for initial screening of energy conservation opportunities in specific building types. For each energy conservation opportunity, the most appropriate method to evaluate energy savings will be identified.

3. Case Study Examples: The City will provide case study analyses of different building types including information which illustrates the benefits of various energy conservation measures. These examples will include studies performed by other Energy Task Force cities. The City of San Jose has access to Energy Task Force studies which will be made available to developers providing information on the design of energy efficient buildings.

4. City Owned Energy Efficient Facilities: City owned facilities can and will be used as examples, such as the Cogeneration Plant at the San Jose Convention Center/Super Block. Studies, analysis and actual operational data will be shared with developers regarding present and future City owned energy efficient facilities which can enhance future development.

CONSULTANT WORK SCOPE

The program to develop the products and services consists of the following consultant work scopes:

A. Technical Information. Services to develop technical information for use by the City in promoting the energy efficient design of new buildings. Categories of technical information include design criteria, guidelines, and analytical tools.

B. Preparation of a Marketing Analysis Plan. Services to develop marketing strategies to disseminate the availability of the technical service to the design and building industry in the public and private sector. The marketing program will be designed to include targeting building design and cost information to the appropriate audiences, and evaluating the relative strengths of a variety of voluntary information and incentive techniques. Specific constituents to be addressed include city officials, developers, financial institutions, architects, engineers, consultants and building managers. Particular attention will be paid to developers who may look at city involvement in the design process as one more barrier to overcome.

C. Building-Specific Analysis of a Redevelopment Project. Services pertaining to the building design and energy analysis of a specific building.

D. Service Delivery Plan. Services to develop management recommendations regarding the scope of services, staffing and budget for the provision of the products and services to be provided by the City of San Jose's Office of Environmental Management.

The information will be used to determine cost-effective levels of service, evaluate regulatory options, and prepare a cost benefit budget proposal for consideration for program continuation. The adoption of recommendations by the building developer/architect will be the result of timely presentation of information through the energy analysis services. If information alone is not sufficient to increase the adoption of energy efficient measures, incentives and regulations will be considered.

Specifically, the following consultants' tasks will be used to develop information from which the energy analysis services will be designed:

1. Develop an inventory of guidelines, analysis tools, and techniques used to identify and evaluate cost-effective energy opportunities beyond Title 24 of the State of California Administrative Code in new construction.

2. Prepare a matrix of energy opportunities appropriate to the City. The matrix will be categorized by building type, size, etc., to assist in determining potential applications for each energy conservation opportunity.

3. Recommend criteria to evaluate the feasibility of energy design options. Criteria will include evaluation of economics and energy use. Methods (i.e.. key indicators, software, simplified calculation methods) which are appropriate to justify inclusion of added energy design features will be evaluated.

4. Prepare a strategy to promote voluntary acceptance and use of the energy design services and guidelines. Evaluate the need for incentives which may be necessary to increase the acceptance of energy design services and guidelines.

5. Develop a work program to support implementation of the energy conservation analysis: when, by whom, for whom, what information, and other strategic information.

6. Prepare a report for the Urban Consortium of the Energy Task Force describing the City of San Jose's development of the Energy Master Planning guidelines, tools and services.

SUMMARY

In providing energy analysis services, the City will develop cost-effective recommendations for energy conservation that respect the need of building owners to maintain attractive rentable space. It is expected that during the first year of operation, approximately 300,000 sq. ft. within the downtown area will be identified for energy analysis services.

This work is part of a grant funded by the U.S. Department of Energy through the Energy Task Force and by the City of San Jose's Redevelopment Agency. The title of this Energy Task Force project is "Energy Master Planning for Local Government Projects". The Energy Task Force is a consortium of cities working to solve common energy problems. The Urban Consortium Energy Task Force (UCETF) has a special focus to improve energy management and technology within urban governemnts.