OVERVIEW OF THE ENERGY EDGE PROJECT DESIGN UPGRADING EFFICIENCY IN COMMERCIAL CONSTRUCTION PRACTICE

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The Bonneville Power Administration (Bonneville) is conducting a research project entitled the Energy Edge. Limited information is available on the economic value of designing and constructing commercial buildings which exceed code requirements.

The Energy Edge project will examine costs and performance of highly efficient new commercial buildings. Due to design stage opportunities, new buildings are considered a first choice conservation resource. Commercial buildings which are not built efficiently today will be expensive to retrofit later.

The information which results from the project will be used to examine commercial building codes. The commercial building sector is expected to grow faster than residential and industrial sectors in the Northwest. The Northwest has approximately 2,000 commercial building starts annually. Many of these are small commercial buildings.

The Energy Edge is challenging developers to upgrade efficiency beyond code requirements. Design efficiencies 30 percent better than the Model Conservation Standards are targeted. Actual performance will be compared to predicted performance. Incentives to cover design and construction costs will be paid to building developers selected through a regional design competition. Emphasis of the project is to find innovative, practical solutions that can make efficiency work without sacrificing construction schedules or tenant comfort.

The purpose of the Energy Edge is to identify design strategies which are successful in meeting the targeted energy budget at a reasonable cost. Applicants to the competition are given extensive design assistance. Energy modeling, using hourly simulations, identifies the optional combination of efficiency features. The incentive request is based on the participants bid to cover extra design and construction work. Some building owners are willing to cost share. Actual costs of design and construction are collected.

Cost information will be correlated to building design performance (predicted and actual).

The Energy Edge competition has been promoted to the commercial real estate industry. Results of the marketing of the competition will be discussed in terms of:

- The strategy of the publicity campaign to promote a design competition in the commercial real estate industry.

- The level of response, number of applications received to date, types of buildings and technologies being proposed.

- Amount of incentive requested, by building category, expressed in dollars per square foot, and as a percentage of total design and construction costs. The increase in design costs and/or construction costs beyond the original project budget.

- The human factor--what motivated the building owner/developer to consider applying to the competition. What types of economic criteria were most frequently cited as important in their decision making.

- Building schedule realities--within the design development sequence what was the most advantageous time that efficiency could be introduced.

- Prestige as it relates to building owners/developers. Perceiving efficiency as part of an amenity package for a quality building.

Initial experience indicates that extra design time and energy modeling can lead to substantial savings while reducing initial construction costs.

The success of this project depends upon:

- Energy modeling as a design tool that can identify economically attractive efficiency features.

- The potential to reduce front-end construction costs through more accurate equipment sizing and specification. Our hypothesis is that it is possible to save on both energy and construction costs through better planning. Specific examples will be given.

- Ability to optimize the primary building energy loads of heating, cooling and lighting. Ability to make use of the interactive effect of these loads.

A large retail/office renovation was selected as a pilot building. Valuable insights into the relationship between design time and construction costs were gained. In the project, efficient lighting systems resulted in a reduced cooling load. Down sizing of the originally planned mechanical system resulted in considerable savings to the building owner.

Marketing to attract project participants will be concluded in the fall. Construction will be completed by winter 1988. Monitoring of actual energy use will be conducted when projects reach 70 percent occupancy. The monitoring will be conducted for three years. An evaluation of the design development process for the buildings which applied to the competition will

be initiated this fall. Bonneville is considering a continued design assistance program for the commercial building community.

Communication between building owner and the design team members is essential to reaching ambitious energy targets. Extra planning and design analysis can leverage energy savings at a reasonable cost in many types of commercial buildings. Significant savings can be realized at little or no total project budget cost. The design analysis must consider the interactive effects of major building systems to be effective.

Building designers need more evidence to sell developers on the value of extensive design services. There is a need for continued exploration in this area to identify building occupancies with greatest energy intensities with greatest opportunity for reduction. The expense of modeling of commercial building designs is a barrier to mainstream acceptance. It is our hope that the results of Energy Edge will help others to justify extra design time as a legitmate investment.