# INDUSTRIAL APPLICATION EXPERIMENT SERIES

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## ABSTRACT

This paper presents the objectives and implementation plan for the Industrial Application Experiment Series of the Applications Development element of the Thermal Power Systems Project. The first experiment in the series will be the Industrial Thermal Module Experiment. The approach to implementing the experiment is presented and an implementation schedule is provided.

## INTRODUCTION

The Industrial Application Experiment Series will accomplish the deployment of experimental parabolic dish systems into the industrial sector for the purpose of providing user, supplier, sponsor, and developer with a realistic assessment of system feasibility in selected near-term industrial applications. System feasibility, step three in a five step model of the commercialization process,* is the deployment of technologically-ready components, properly integrated into working, experimental modules, for evaluation in user environments. The modules are not mass-produced. However, the design of the module and components may be compatible with mass production techniques.

## OBJECTIVES

The objectives of the Industrial Application Experiment Series are:

1. Verify that selected parabolic dish systems can produce energy from solar radiation to meet the energy requirements of selected industrial applications during designated test periods.

2. Determine to what extent the parabolic dish systems can be considered firm energy resources for the selected industrial applications during designated test periods.

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* An adaptation of the commercialization process of the National Photovoltaic Program, the five step process suggested here consists of technical feasibility of components, technical readiness of components, system feasibility, system readiness, and commercial readiness.

3. Characterize the total performance of the plant (site preparation, components, subsystems, modules, and plant) as a function of load characteristics, industrial activities at the site, insolation, weather, operations and maintenance activities, safety regulations, environmental regulations, seismic factors, and legal and socio-technical factors.

4. Identify and understand the failure modes of the selected parabolic dish systems.

5. Identify and quantify the impact of operating the parabolic dish systems on the daily operations activities of user personnel and on user manning requirements.

6. Identify and quantify the impact of the installation and operation of the selected parabolic dish systems on the local environment.

7. Identify and quantify the impact of the installation and operation of the selected dish systems on potential acceptance of commercial units by local industrial officials representing labor and management, local public officials, and the local public.

8. Provide accurate input data to life-cycle energy cost models, based on required O&M activities and energy displacement.

9. Provide feedback to the component and system-level hardware and software design processes.

## IMPLEMENTATION

The implementation of the Industrial Application Experiment Series will be accomplished initially through the Industrial Thermal Module Experiment and later through additional experiments involving thermal, electric, and combined thermal and electric systems. The approach is to progress through a series of steps, from single-module to multi-module systems, from thermal-only applications to more complex combined thermal and electric applications. The experience of other solar thermal experiments, particularly those involving parabolic dish hardware, will be utilized to the fullest extent possible in experiment planning and implementation.

## INDUSTRIAL THERMAL MODULE EXPERIMENT

The Industrial Thermal Module Experiment will accomplish the objectives of the Industrial Application Experiment Series within the limited scope of near-term thermal applications, small systems size and existing developed hardware. The experiment will also provide an early stimulus to the collector industry, primarily through the reduction of risk to potential users and, secondarily, through the purchasing of hardware by the Government.

The key elements of the approach to the Industrial Thermal Module Experiment are:

- o Rapid deployment of existing technology
- o Small, low cost, low risk experiments
- o Near-term thermal applications
- o Industrial user and system supplier on contractor team
- o Industrial sites
- o Developed hardware
- o Verification testing of systems required prior to deployment
- o Involvement of small business

To accomplish the rapid deployment required for this Experiment, implementation is accelerated in each of the five phases of the plan. In the first phase, proposal preparation, developed hardware is selected by a prospective Contractor team for a thermal application at a particular industrial site. The second phase, contractor selection, involves identification of site, system, user, and supplier; the level of verification testing required at the JPL Parabolic Dish Test Site at Edwards Air Force Base, California, is negotiated. During the design phase, plant design is completed very soon after contract award in order to permit the placement of orders for hardware in FY1980. During the fourth phase, verification testing is accomplished at the Parabolic Dish Test Site, if required. Three levels of testing at the Parabolic Dish Test Site may be required:

1. None: System-level testing has already been completed.
2. Minimum: A short (two month) test period is needed. No modification to the hardware is necessary. The hardware is then qualified for system feasibility evaluation at the user's site.
3. Maximum: Two short test periods are required, the second following modifications to the hardware to correct problems identified as solvable through minor modifications (requiring two months of downtime).

At the end of verification testing, a go/no-go decision is made by JPL on deployment of hardware, based on test findings and the recommendation of the Contractor. During the fifth phase, the system is installed, checked-out, tested and evaluated at the user's site. Plant installation during FY1981 is highly desirable.

Early events in the implementation of the Industrial Thermal Module Experiment are scheduled as follows:

1. CBD Announcement February 1980

2. RFP Release Second Quarter 1980

Organizations interested in receiving an RFP should contact:

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