

UTILITY APPLICATIONS STUDY OF SOLAR CENTRAL  
RECEIVER TECHNOLOGY

I. OBJECTIVES

The objectives of this Project are to assess the cost-effectiveness, both now and in the future, of a large solar central receiver plant in the range of 10-to-100 MWe capacity as it would impact the Italian electric grid; and to gain an understanding of how U.S.-developed central receiver technology could be used in the Italian utility grid.

II. WORK SCOPE, SCHEDULE, AND MILESTONES

To accomplish these objectives, a one-year collaborative Project will be undertaken by the Department of Energy of the United States of America (DOE), by the Ministry of Industry, Commerce and Handicraft of Italy (MOI), and by the Ente Nazionale per l'Energia Elettrica of Italy (ENEL) (hereinafter referred to as the Parties). ENEL has been designated by MOI to perform certain responsibilities as set forth in this Annex and in accordance with all the terms and conditions of a Party to the Memorandum of Understanding Between the Government of the United States and the Government of the Italian Republic Concerning Energy Cooperation signed 17 October 1979 and the Addendum signed 4 June 1980.

Task 1 will last approximately six (6) months and will begin with the transfer to Italy, from the United States, of all available and appropriate cost data, study reports, and computational tools in the area of technical and economic evaluation of central receiver plants at different grid penetration levels. This transfer will take place before, during, and after an Italian team visit to the United States. Italian analytical studies will begin after this visit and will be based on information received from DOE and during the visit to the United States. The DOE studies will be utilized in the specific context of the Italian electric grid, and will lead to an interim report at the end of the task. These studies will include analyses of technology state

of the art, optimum plant size and type, heliostate field size and configuration, optimum tower, receiver and boiler characteristics, thermal cycles, and internal storage capacity, and the future trends and improvements in components and systems (especially with mass production methods). Site selection criteria will also be defined under this task.

Task 2 will begin approximately 3 months after the initiation of Task 1 and will continue to the end of the 1-year Project. DOE will undertake to provide ENEL with a preliminary study concerning the impact of such a central receiver plant on the Italian electric grid, especially giving consideration to the utilization of U.S.-developed technology. ENEL will undertake a detailed technical/economic analysis based on the DOE and other ENEL studies.

Joint meetings will take place during the year at which interim or final results of the work will be critically evaluated based on DOE experience and on-going DOE simulation studies and analyses, and a final report will be written by MOI.

Milestones are as follows:

- (1) DOE source data and tools transferred to Italy (Spring, 1980).
- (2) Interim report of preliminary analytical studies completed (Summer, 1980).
- (3) Final report of technical/economic analysis of central receiver plant in the Italian grid complete (Winter, 1980-1981).

### III. MANAGEMENT AND REPORTING REQUIREMENTS

A. The Project will be managed and implemented on a day-to-day basis by the Parties as set forth in Paragraph II above.

B. In addition to reports as provided in paragraph VI of this Annex, each Party will provide the other Party with periodic reports as mutually agreed during the Project, and a final report will be written by ENEL at the end of the Project. Project progress and direction will be assessed periodically by the Parties to allow for unanimous approval of modification, expansion, contraction, or termination of the Project.

#### IV. FUNDING

DOE and ENEL will each fund its own activities without any transfer of funds. The DOE funding will in no case exceed \$80,000 for the Project.

#### V. INCORPORATION BY REFERENCE

Paragraphs 4 and 5 of the Memorandum of Understanding Between the Government of the United States and the Government of the Italian Republic Concerning Energy Cooperation signed 17 Octobre 1979 and Articles 3, 5, and 9 of Annex I thereto and the Addendum to the Memorandum of Understanding signed June 4, 1980, are hereby incorporated by reference.

#### VI. INFORMATION AND INTELLECTUAL PROPERTY

(a) Subject only to the restrictions applying to patents and copyrights, the Parties will have the right to publish all information developed prior to

or outside the Project and provided to the Project and all information arising from this Project.

(b) Information developed prior to or outside the Project owned or controlled by the Party which are necessary for or utilized in the Project and information arising in the course of or under the Project ("arising information") will be freely available to both Parties for use and dissemination. Proprietary information will not be utilized in the Project.

(c) Reports containing arising information and information developed prior to or outside the Project necessary for and used in the Project will be exchanged by the Parties and will cover the work performed by each Party under this Project.

(d) Inventions made or conceived in the course of or under this Project ("arising inventions") will be owned by ENEL in Italy and by DOE in the United States and third countries. Each Party will license such arising inventions to the other Party, its Government and its nationals designated by it royalty-free.

(e) Either party may take appropriate measures necessary to protect copyrightable material generated by it under this Project. Copyrights obtained will be the property of the Party; provided, however, that both Parties may reproduce and distribute such material, but will not publish it with a view to profit.

(f) Each Party will, without prejudice to any rights of inventors or authors under its national laws, take all necessary steps to provide the cooperation from its authors and inventors required to carry out the provisions of paragraph VI. Each Party will assume the responsibility to pay

awards or compensation required to be paid to its employees according to the laws of its country.

VII. TERM

The term of this Project will be one year from the date of signature, unless extended or amended in writing by the Parties.

Done at Washington, D.C. this 4th day of June, 1980.

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Italian Ministry of Industry,  
Commerce and Handicraft

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Department of Energy of the  
United States of America

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Ente Nazionale per l'Energia  
Elettrica of Italy