

N85-32445

# ADVANCED MODULE DEVELOPMENT OVERVIEW

JET PROPULSION LABORATORY

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## Objective

Development of advanced module designs supporting achievement of DOE Five-Year Research Plan module cost and efficiency goals

## DOE Milestones: Crystalline-Silicon Modules

<u>Year</u>	<u>Module Parameters</u>	<u>For Energy Cost of</u>
1985	12%, \$100/m <sup>2</sup>	21¢/kWh
1988	15%, \$90/m <sup>2</sup>	15¢/kWh

## APPROACH

- Perform module efficiency vs cost tradeoff based on energy cost criteria
- Choose specific silicon technology
- Prepare preliminary module design
- Award module contracts
- Conduct module reliability investigation
- Specify final module design
- Develop prototype module

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## MODULE DEVELOPMENT AND ENGINEERING SCIENCES

### Efficiency-Cost Tradeoff: Initial Results

21 ¢/kWh goal more likely to be achieved by exceeding 12% module efficiency, based on:

Sensitivity of efficiency/cost tradeoff

Module efficiency predictions

Module cost models:

Float-zone ingot

Dendritic-web ribbon

### Completed Activities

- Decision made: focus on both float-zone and dendritic-web silicon
- Preliminary module packaging configuration selected: glass/EVA/plastic film
- Contract issued to Spire for high-efficiency modules
- Procurement plan initiated for dendritic-web modules

### Spire Corp. Contract

- Deliverables:
  - 53-cm<sup>2</sup> float-zone cells for evaluation
  - 84-cell modules for evaluation
  - 12-cell modules for reliability investigation
- Module efficiency goals:
  - At 25°C: 12.6%
  - At NOCT: 11.5%
- Major problem:
  - Supply of float-zone wafers

## MODULE DEVELOPMENT AND ENGINEERING SCIENCES

### FY85 Schedule

- **Delivery of sample FZ 84-cell module** 10/84
- **Delivery of FZ 84-cell modules for qualification test** 5/85
- **Delivery of FZ 12-cell modules for reliability tests** 6/85
- **Initiate reliability tests on FZ modules** 7/85
- **Delivery of dendritic-web modules for reliability tests** 8/85
- **Initiate reliability tests on dendritic-web modules** 9/85