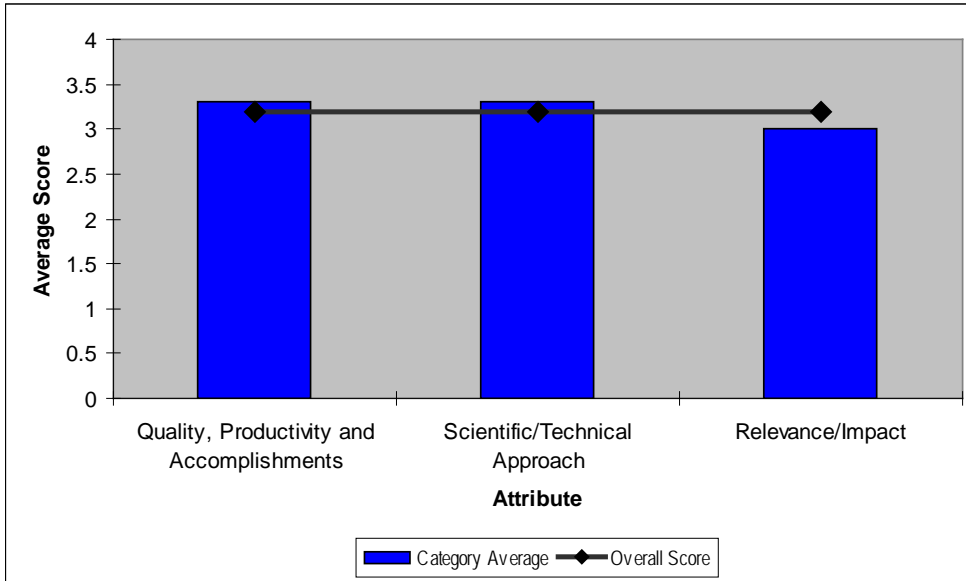


Market and Grid Analysis

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Identifies NREL’s role in CSP market analysis, including environmental impact and policy analysis and solar/wind correlation study, as well as support for grid integration, transmission policy, and BLM PEIS. Achievements include adaptation of the Wind Deployment System Model to include CSP parabolic trough with storage and establishment of a CSP Market Transformation Project.

Quality, Productivity and Accomplishments (Average Rating 3.3)

Rating Comments

3.0 The team assigned to this project seems appropriate.

3.0 It’s not clear who belongs to the project team, as a large number of names from the CSP team at NREL are listed under project team. In addition to the PI’s how the other members are involved in the project is not clear. This project conducts various secondary and cross-cutting analyses as subprograms to major CSP development programs. The results may not be directly linked to a specific project. However, derived inputs from these sub programs are valuable inputs for major CSP projects, even though it may be difficult to show a direct link to the value. Due to too many sub programs and inadequate detailed result on individual projects, it is difficult assess the results.

The following accomplishments are presented:

- A general Regional Energy Deployment System model known as ReEDS was developed that allowed adaptation of the Wind Deployment System Model to include CSP parabolic trough with storage.
- Using ReEDS the policy impact analysis of 30% ITC and R&D impact were done
- Participated and supported regional transmission analysis efforts including the western wind and solar integration study and the Western Renewable Energy Zone (WREZ) study group.
- Established CSP Market Transformation project to encompass the effects of growing and diverse factors (land access, environmental impact, transmission, grid integration, etc.) on CSP market penetration.

3.0 An appropriate number of people, with well recognized technical credentials, have been engaged in this project. The members of the team and collaborators clearly demonstrate their ability to

contribute to the project. The facilities deployed on the project appear to be adequate, but limited, for the task at hand. The work under way is producing an appropriate level of accomplishment relative to the costs incurred. The project team appears to be on schedule, but the project is clearly still in progress and not yet complete.

\$535k FY08
ReEDS Model

- 4.0 ReEDS model – multi regional model of capacity expansion
Supply curves
Renewables and intermittency is used
Time value of storage for CSP
Shift generation
Western regional – 100 GW of solar
Life cycle assessment
Accomplished following milestones:
• Updated Wind Deployment System Model to include CSP parabolic trough with storage.
• Established Regional Energy Deployment System model – ReEDS by adding other renewable energy models.
• Used ReEDS in FY08 for policy impact analysis (30% ITC) and R&D impact analysis.
• Supported following regional transmission analysis efforts: + Western Wind and Solar Integration study + Western Renewable Energy Zone (WREZ) study group.
• Established CSP Market Transformation

Scientific/Technical Approach (Average Rating 3.3)

| Rating | Comments |
|--------|--|
| 3.0 | The technical approach seems appropriate. |
| 3.0 | Good, well thought out approach has been applied in the projects. |
| 3.0 | The project team applied an appropriate technical approach in pursuit of project objectives. The design and execution of the approach are good. |
| 4.0 | Grid Integration and Optimized Dispatch Analysis is very timely project. Evaluating the role of CSP as an enabling technology for wind and other variable renewables will be a key component of this analysis. |

Relevance/Impact (Average Rating 3.0)

| Rating | Comments |
|--------|---|
| 3.0 | The different goals of this project are targeted to facilitate the planning and market penetration of CSP technologies and to address some technical issues. Particularly relevant because of the generality of its application is the activity regarding Life Cycle Analysis. |
| 3.0 | The following studies were conducted: CSP Market Analysis (Environmental Impact Analysis, Policy Analysis (RECs, financing, GHG emissions), Solar/Wind Correlation Study, Grid Integration and Optimized Dispatch analysis, Transmission Policy Support, Support BLM PEIS for Solar. These may not be directly related to specific projects; however, their contribution is important and may seem like of indirect and secondary nature. |
| 3.0 | Regional Energy Deployment System Model Carbon cap and carbon tax analysis with a specific bent towards renewables Policy analysis impacts analysis RETI – renewable energy transmission initiative Noon solar peek vs 4pm electrical peak Life cycle analysis – deconstruction topic first mention thereof Correlation between wind and solar Power flow modeling for the grid itself ReEDAS vs NEMS Use of this tool to recommend policy directions will drive the market towards renewables |

- 3.0 The following accomplishments provide progress towards the project goals and objectives:
 ReEDS Model:
- model of capacity expansion in the electric sector and later expansion to transportation sector
 - market potential of renewable energy for the next 20 to 50 years under different technology development and policy scenarios

Overall (Average Rating 3.2)

Rating Comments

- 3.0 This is a very specific and well targeted project that will facilitate the development of commercial CSP plants. In so doing, it will contribute to the cost reduction of CSP technologies. Particularly relevant because of the generality of its application is the activity regarding Life Cycle Analysis.
- 3.0 Difficult to assess the value and show a direct link. The focus of this program seems supporting studies, analyses, models, etc. which may or may not be directly linked with any specific project. They may provide secondary input into major projects. This study is like the BLM study, will be helpful indirectly. 4-6 hrs of thermal storage may be optimum to shift the solar peak to the demand peak. Did a 20% wind penetration study, for DOE, will do similar study for CSP.
- 3.0 CSP Market Analysis dealing with secondary areas relevant to decision making. Grid analysis very important field now. This needs to be coordinated with the other grid analysis studies under way in parallel, particular PV reports and studies.
- 3.6 Thermal storage life cycle cost available for 2 tank and thermocline
 DOE studies were provided for.
 Addition of CSP parabolic trough with storage and other renewable energy models to the Wind Deployment System Model added value to this project.
 Working in cooperation with other regional integration efforts is a well worth effort.
- CSP Market Analysis:
 The project deals with secondary areas relevant to decision making.
 Grid analysis very important field now. This needs to be coordinated with the other grid analysis studies under way in parallel, particular PV reports and studies.