**Budget Narrative**

**Equipment:** Major expenditures under this project will be for solar arrays and battery systems to power center pivots for row crop production and small-scale solar irrigation for vegetable production. Since the number and size of the vegetable systems are uncertain and the expense of the bigger pivot systems are so much larger as in the project narrative, we will assume the size of the pivots will each be 140 acres. Then a 1 ½ acre solar array should provide the needed power (see Technical Appendix B). Based on current prices we expect the 1 ½ acre array will cost between $300,000 and $500,000. For the budget we assume, to be conservative $450,000 for the array. In the project narrative we assumed 12 systems would be funded. But this may be 10-11 full arrays with the remainder being the smaller vegetable arrays. In the budget we have 12 $450,000 arrays for a total of $5,400,000, We also estimate that battery systems for the pivot operations will be $113,000 each. These may not be just battery systems but equipment working with the power grid to provide power in non-daylight hours or weak solar forcing. For example, there may be a need for single-phase to three-phase converters to provide power in weak solar forcing. We estimate for 12 battery/inverter systems the total will be approximately $1,356,000. There may also need for additional systems required by power providers to provide power levels and protection for input onto the electrical grid. We estimate $25,000 per system for these monitors/handlers if needed. The total for the 12 systems is $7,056,000.

**Technical Support:** The project will require technical analyses for evaluating equipment and interacting with potential contractors. There will also be a need to coordinate with farmers to educate them on the solar systems. Under this project there will also be considerable interaction with power providers on the local scale (where the solar arrays will be located) and with their corporate offices to establish appropriate policies for these commercial pivot scale solar arrays. There is also the additional need for keeping track of the GHG reductions and preparing reports both to EPA and other interested agencies in the State. This technical support will be divided among staff at the Alabama Soil and Water Conservation Committee (ALSWCC), the University of Alabama in Huntsville and Auburn University. These three entities have worked together on the Alabama Universities Irrigation Initiative (AUII). Each institution has specific skills and experience in different parts of the project.

**Alabama Soil and Water Conservation Committee Statement of work:**

ALSWCC along with selected conservation districts will work with producers to implement the project. ALSWCC will be the grant holder and will provide administrative and project oversight to ensure that the project meets all goals and objectives. Work will include engagement with electric utilities and producers, development of standards for equipment, oversight of equipment installation, tracking and reimbursement of producers for work completed, oversight of all sub-agreements and outreach and engagement of interested producers.

**ALSWCC Budget Narrative:**

ALSWCC total budget request for the project is $348,750. This includes $312,500 for partial salaries and fringe benefits for three staff members to complete the project and 10% indirect cost for salaries and $2,500 indirect for sub-agreements. All other expenses will be absorbed ALSWCC.

**University of Alabama in Huntsville Statement of work:**

UAH will be collaborating with the Alabama Soil and Water Conservation Committee {ALSWCC) and Auburn University to fulfil the commitments under the proposed project entitled "Establishment of Solar/Charging Infrastructure Supporting Irrigation in Rural Alabama." UAH will help in the administrative and technical aspect of the project. These activities comprise gathering relevant information with respect to the design requirements of the pivots, solar power requirements, best practices in irrigation scheduling and the application of fertilizer for minimizing GHG emissions and fertilizer runoff, and providing environmental factors affecting farming practices and GHG emissions. UAH will also arrange and participate in the meetings to educate and transfer the needed information to farmers and other project participants.

Furthermore, UAH will monitor the progress and the implementation of the project and will estimate the actual GHG reductions as the project proceeds. This will ensure the success of the project in achieving its GHG reduction goals.

**UAH Budget Narrative:**

The total UAH budget requested for this project is $1,219,663 over 5 years {$266 K/yr for the first four years and $155 K for year 5). This reflects salary, operating cost, and the indirect cost to successfully fulfil UAH commitments under this project. Most of the budget is for personnel to help ALSWCC in carrying out the study of pivot locations, power requirements, solar system design, estimating and monitoring GHG reductions. The PI, Dr. Arastoo Pour-Biazar {20% for the first four years, 10% year 5), and the Co-PI, Dr. Lee Ellenburg {10% for the first 4 years and 5% year 5), will be responsible for the overall management of the project and will monitor the progress of UAH activities. They will be assisted by two research associates {50% efforts each) and a student specialist {835 hours). The research associates will be helping in creating tools for analyzing weather data and advising the farmers on fertilizer application and irrigation scheduling. They will also help in GHG reduction estimates and report preparations. The student specialist will help in report preparation and with time-consuming tasks, such as data downloads and data preparation to alleviate the workload for senior scientists.

In addition to project management, the PI will be responsible for estimating GHG reductions, devising tools for advising the farmers on best practices, and participating in meetings to communicate and educate the farmers on the benefits of the project. The Co-PI, with the help of the research associates, will help in coordinating UAH activities with ALSWCC, Auburn University, and the farmers. He will participate in meetings to convey the information produced by UAH and receive feedback from participants.

The budget also allows for publication, miscellaneous, and travel expenses for meetings. UAH facilities will be used as needed in this project. A standard indirect cost of 48% has been applied in the budget.

**Auburn University Statement of work:**

Dr. Eve Brantley, Auburn University Water Resources Center, and Dr. Andre da Silva, Auburn University Department of Horticulture, are both Specialists with the Alabama Cooperative Extension System. They will collaborate with the Alabama Soil and Water Conservation Committee and the University of Alabama in Huntsville to implement the objectives of the proposed project entitled “Establishment of Solar/Charging Infrastructure Supporting Irrigation in Rural Alabama.” This includes working with research focused on vegetable production and farmers in the Blackbelt of Alabama to identify demonstration project locations, facilitating technology transfer with key stakeholders, identifying future research needs, and sharing project lessons learned through in-person meetings, Extension publications, and online resources.

**Auburn Budget Narrative:**

Salary is requested for 2 months (16%) of Eve Brantley and for a Research Associate (to be determined) for four years. ($40,000 per year for four years, total $160,000). $15,000 allocated to the Research Associate and $25,000 allocated to Brantley.

Salary is requested for a graduate student supervised by Andre da Silva for all four years. ($18,723 per year for four years, total $74,892).

Fringe is requested at 30.9% for Brantley and the Research Associate ($12,360 per year for four years, total $49,440), and 3.8% for the graduate student ($711 per year for four years, total $2,844).

Supplies are requested at $200 per year for four years (total $800) and may include costs for meeting supplies such as easels, large chart paper, nametags, and other.

Travel is requested at $5,766 per year for four years (total $23,064) and is estimated for mileage rates and per diem to the Blackbelt from Auburn as described below:

240 miles (round trip) x $0.67 x 20 trips = $3,216 per year, four years

$85 per diem x 2 days x 15 trips = $2,550 per year, four years

Tuition remission is requested at 10% of the graduate student’s salary ($1,872 each year for four years)

**Indirect Costs:**

Estimated at 26% of MTDC $20,218 for four years (total $80,872)

**Total Request:**

$399,400 ($99,850 for four years)