

CONTRACT AMENDMENT REQUEST FORM (CARF)



Original Agreement #	500-11-010	Amendment #	1
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Division	Agreement Manager:	MS-	Phone
ERDD	Kiel Pratt	43	916-327-1412

Contractor's Legal Name	Federal ID Number
The Regents of the University of California on behalf of the Davis campus	94-6036494

Revisions: (check all that apply)		
<input checked="" type="checkbox"/> Term Extension	New End Date: 3/31/2015	Include revised schedule and complete items A, B, C, D, & H below.
<input type="checkbox"/> Budget Augmentation	Amendment Amount: \$ 0	Include revised budget and complete items A, B, C, D, E, F, & H below.
<input checked="" type="checkbox"/> Budget Reallocation		Include revised budget and complete items A, B, C, D, & H below.
<input checked="" type="checkbox"/> Scope of Work Revision		Include revised scope of work and complete items A, B, C, D, & H below.
<input type="checkbox"/> Change in Project Location or Demonstration Site		Include revised scope of work and complete items A, B, C, D, G, & H below.
<input type="checkbox"/> DVBE Replacement		Include revised scope of work and complete items A, B, C, D, F, & H below.
<input type="checkbox"/> Novation/Name Change of Prime Contractor/Recipient		Include novation documentation and complete items A, C, D, & H below.
<input type="checkbox"/> Terms and Conditions Modification		Include applicable exhibits with bold/underline/strikeout and complete items A, B, C, D, & H below.

A) Business Meeting Information

Business Meeting approval is not required for the following types of Agreements:

- Operational agreement (see CAM Manual for list) to be approved by Executive Director
- ARFVTP agreements under \$75K delegated to Executive Director.

Proposed Business Meeting Date	11/13/2013	<input checked="" type="checkbox"/> Consent	<input type="checkbox"/> Discussion
Business Meeting Presenter	Kiel Pratt	Time Needed: 5 minutes	

Please select one list serve. Select

Agenda Item Subject and Description

UNIVERSITY OF CALIFORNIA DAVIS Possible approval of Amendment 1 to Contract 500-11-010 with the Regents of the University of California on behalf of the Davis campus to reallocate the budget, enact a 14-month no-cost time extension to March 31, 2015, update the terms and conditions, and enact minor changes to the scope of work to address encountered barriers including the site selection process for remote atmospheric sensing equipment in the Tehachapi wind resource area.(PIER electric funding) Contact: Kiel Pratt (5 minutes)

B) Amendment Justification (For contract amendments only)

- Non Competitive Bid (Attach CEC 96)
- Exempt No-cost time extension

C) List all subcontractors (major and minor) and equipment vendors: (attach additional sheets as necessary)

Legal Company Name:	Budget	SB	MB	DVBE
Dynamic Design	\$ 0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
University of California, San Diego	\$ 0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	\$	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D) List all key partners: (attach additional sheets as necessary)

Legal Company Name:

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E) Budget Information			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
			\$
			\$
			\$
			\$
			\$
			\$
R&D Program Area:	ESRO: ETSI	TOTAL:	\$
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

F) Disabled Veteran Business Enterprise Program (DVBE)

- Exempt (Interagency/Other Government Entity)
- Meets DVBE Requirements DVBE Amount:\$ _____ DVBE %: _____
 - Contractor is Certified DVBE
 - Contractor is Subcontracting with a DVBE: _____
- Contractor selected through CMAS or MSA with no DVBE participation.
- Requesting DVBE Exemption (attach CEC 95)

G) California Environmental Quality Act (CEQA) Compliance

- Is Agreement considered a "Project" under CEQA?
 - Yes (skip to question 2)
 - No (complete the following (PRC 21065 and 14 CCR 15378)): Explain why Agreement is not considered a "Project": Agreement will not cause direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment because .
- If Agreement is considered a "Project" under CEQA:
 - a) Agreement **IS** exempt. (Attach draft NOE)
 - Statutory Exemption. List PRC and/or CCR section number: _____
 - Categorical Exemption. List CCR section number: _____
 - Common Sense Exemption. 14 CCR 15061 (b) (3) Explain reason why Agreement is exempt under the above section: The project involves wind forecasting activities that do not have the potential to cause a significant environmental impact.
 - b) Agreement **IS NOT** exempt. (Consult with the legal office to determine next steps.) Check all that apply
 - Initial Study
 - Negative Declaration
 - Mitigated Negative Declaration
 - Environmental Impact Report
 - Statement of Overriding Considerations

H) The following items should be attached to this CRF (as applicable)

1. Exhibit A, Scope of Work	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
2. Exhibit B, Budget Detail	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
3. CEC 96, NCB Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
4. CEC 95, DVBE Exemption Request	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
5. CEQA Documentation	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
6. Novation Documentation	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached
7. CEC 105, Questionnaire for Identifying Conflicts	<input type="checkbox"/> N/A	<input type="checkbox"/> Attached

Agreement Manager _____ Date _____ Office Manager _____ Date _____ Deputy Director _____ Date _____

CEC 94/270 Subcontractors and Key Partners

Agreement # [500-11-010-01](#)

Recipient: [The Regents of the University of California on behalf of the Davis campus](#)

Major AND Minor Subcontractors (also include equipment vendors):

1. [Dynamic Design – Minor Sub](#)
2. [University of California, San Diego – Minor Sub](#)

Key Partners:

1. [None](#)

Exhibit A
SCOPE OF WORK

TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2		Subcontractor Request for Qualifications (RFQ)
3	X	Remote Sensing Site Identification, Configuration and Deployment
4		Wind Forecast System Implementation and Operation
5		Technology Transfer Activities

KEY NAME LIST

Task #	Key Personnel	Key Subcontractor(s)	Key Partner(s)
1	C.P. van Dam – UC Davis	None	California Independent System Operator (CAISO)
2	C.P. van Dam – UC Davis	None	CAISO
3	C.P. van Dam – UC Davis	None	CAISO
4	C.P. van Dam – UC Davis	None	CAISO
5	C.P. van Dam – UC Davis	None	CAISO

GLOSSARY

Acronym	Definition
AWRA	Altamont Wind Resource Area
CAISO	California Independent System Operator
CPR	Critical Project Review
CREC	California Renewable Energy Center
CWEC	California Wind Energy Collaborative
DOE	United States Department of Energy
Energy Commission	California Energy Commission
LiDAR	Light Detection and Ranging
LLNL	Lawrence Livermore National Laboratory
NWS	National Weather Service
PIER	Public Interest Energy Research
RD&D	Research, Development & Demonstration

Acronym	Definition
RFQ	Request for Qualifications
RPS	Renewables Portfolio Standard
SGWRA	San Geronio Wind Resource Area
SWRA	Solano Wind Resource Area
TAC	Technical Advisory Committee
TWRA	Tehachapi Wind Resource Area
UC	University of California
UCC.1	Uniform Commercial Code (Financing Statement)

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Problem Statement

The California Independent System Operator (CAISO) requires energy forecasts from individual wind areas in three specific time periods: (1) day-ahead (18-42 hours before the operating hour), (2) real-time (105 minutes before the operating hour) and (3) intra-hour (every 15 minutes for the next 2 hours). These forecasts normally provide a prediction of the average power production for each forecast interval. Real-time and intra-hour forecasts are heavily influenced by the persistence of power production and the atmospheric condition trend from the last few reported data intervals before the forecast was produced. This works fairly well during periods of modest variation but fails especially during periods of large change (i.e., during wind ramp events). This is because the recent history of production at the site contains very little or no information about what important atmospheric feature may be approaching the site or evolving around the site that will result in large and sudden changes in power production (i.e., a big departure from recent trends). Off-site data (either horizontal or vertical) are needed to detect and predict these atmospheric features and resulting large changes in power production.

A recent study by the United States Department of Energy (DOE) Lawrence Livermore National Laboratory (LLNL), WindSense, employed a new set of analytical tools provided by AWS Truepower to identify optimal locations to gather data to improve wind power production forecasts. This agreement will build upon this prior DOE-funded project to assess and refine the analytical targeting tools.

Forecasts for the day-ahead period are based on Numerical Weather Prediction models, which are physics-based models that assimilate many types of atmospheric data over a regional or global area to calculate the variations in wind at the sites of interest. In order to improve forecasts for day-ahead and longer periods, data must be gathered over a large volume (regional, continental or global areas depending on the look-ahead time of interest) of the atmosphere. The day-ahead forecast limitations cannot be effectively addressed by the deployment of local sensors and is not the focus of this agreement.

1 **Goals of the Agreement**

2 The goal of this agreement is to deploy an atmospheric remote sensing system at a
3 location that will achieve the largest possible reduction in short-term forecast error at
4 selected wind farm sites in the Tehachapi Wind Resource Area and thereby mitigate the
5 problems and reduce the cost of integrating large amounts of wind-based electric power
6 into the grid.
7

8 **Objectives of the Agreement**

9 The objectives of this agreement are to answer the following questions:

- 10 a) Are Light Detection and Ranging (LiDAR) and radiometer units a cost-effective
11 way to gather data to improve short-term power prediction?
12 b) What is the relative impact of the LiDAR, radiometer and the combined dataset
13 on wind power forecast performance? (i.e., is most of the value in one sensor or
14 the other or is there substantially more value in operating both units?)
15 c) How much improvement in forecast performance can be achieved by the use of
16 data from these sensors?
17 d) What types of forecasts achieve the most and least impact from the LiDAR and
18 radiometer dataset?
19 e) Do the results (i.e., the identified best locations) of the LLNL-sponsored
20 observation targeting study provide effective guidance for the optimal deployment
21 or are deployment strategies based on other approaches more effective?
22 f) What are the physical processes that cause wind ramp events in Tehachapi
23 Pass?
24

25 A secondary objective of this effort is to provide a foundation for the planning and
26 implementation of a larger multi-sensor field campaign in the Tehachapi Wind Resource
27 Area that is envisioned for the 2012-2013 timeframe under a not yet identified
28 sponsorship. The objective of that project will be to deploy a more extensive set of
29 sensors to improve wind power forecasts over a broader range of wind farms and look-
30 ahead time frames.
31
32

1 **TASK 1.0 ADMINISTRATION**

2
3
4 **MEETINGS**

5
6 **Task 1.1 Attend Kick-off Meeting**

7 *The goal of this task is to establish the lines of communication and procedures for*
8 *implementing this Agreement.*

9
10 **The Contractor shall:**

- 11
- 12 • *Attend a “kick-off” meeting with the California Energy Commission (Energy*
13 *Commission) Contract Manager, the Contracts Officer, and a representative of the*
14 *Accounting Office. The Contractor shall bring their Project Manager, Contracts*
15 *Administrator, Accounting Officer, and others designated by the Commission*
16 *Contract Manager to this meeting. The administrative and technical aspects of this*
17 *Agreement will be discussed at the meeting. Prior to the kick-off meeting, the*
18 *Commission Contract Manager will provide an agenda to all potential meeting*
19 *participants.*

20
21 *The administrative portion of the meeting shall include, but not be limited to, the*
22 *following:*

- 23 • *Terms and conditions of the Agreement*
- 24 • *CPRs (Task 1.2)*
- 25 • *Match fund documentation (Task 1.7)*
- 26 • *Permit documentation (Task 1.8)*

27
28 *The technical portion of the meeting shall include, but not be limited to, the following:*

- 29 • *The Commission Contract Manager’s expectations for accomplishing tasks*
30 *described in the Scope of Work;*
- 31 • *An updated Schedule of Deliverables*
- 32 • *Progress Reports (Task 1.4)*
- 33 • *Technical Deliverables (Task 1.5)*
- 34 • *Final Report (Task 1.6)*
- 35 • *Establish the TAC (Task 1.10)*
- 36 • *TAC Meetings (Task 1.11)*

37
38 *The Commission Contract Manager shall designate the date and location of this*
39 *meeting.*

40
41 **Contractor Deliverables:**

- 42 • *An Updated Schedule of Deliverables*
- 43 • *An Updated List of Match Funds*
- 44 • *An Updated List of Permits*
- 45 • *Schedule for Recruiting TAC Members*

1 **Commission Contract Manager Deliverables:**

- 2 • Final Report Instructions

3
4 **Task 1.2 CPR Meetings**

5 The goal of this task is to determine if the project should continue to receive Energy
6 Commission funding to complete this Agreement and if it should, are there any
7 modifications that need to be made to the tasks, deliverables, schedule or budget.

8
9 CPRs provide the opportunity for frank discussions between the Energy Commission
10 and the Contractor. CPRs generally take place at key, predetermined points in the
11 Agreement, as determined by the Commission Contract Manager and as shown in the
12 Technical Task List above and in the Schedule of Deliverables. However, the
13 Commission Contract Manager may schedule additional CPRs as necessary, and, if
14 necessary, the budget will be reallocated to cover the additional costs borne by the
15 Contractor, but the overall contract amount will not increase.

16
17 Participants include the Commission Contract Manager and the Contractor, and may
18 include the Commission Contracts Officer, the PIER Program Team Lead, other Energy
19 Commission staff and Management as well as other individuals selected by the
20 Commission Contract Manager to provide support to the Energy Commission.

21
22 **The Commission Contract Manager shall:**

- 23
- 24 • Determine the location, date and time of each CPR meeting with the Contractor.
25 These meetings generally take place at the Energy Commission, but they may take
26 place at another location.
 - 27
 - 28 • Send the Contractor the agenda and a list of expected participants in advance of
29 each CPR. If applicable, the agenda shall include a discussion on both match
30 funding and permits.
 - 31
 - 32 • Conduct and make a record of each CPR meeting. One of the outcomes of this
33 meeting will be a schedule for providing the written determination described below.
 - 34
 - 35 • Determine whether to continue the project, and if continuing, whether or not to
36 modify the tasks, schedule, deliverables and budget for the remainder of the
37 Agreement, including not proceeding with one or more tasks
 - 38 • Provide the Contractor with a written determination in accordance with the schedule.
39 The written response may include a requirement for the Contractor to revise one or
40 more deliverable(s) that were included in the CPR.
 - 41

1 **The Contractor shall:**
2

- 3 • Prepare a CPR Report for each CPR that discusses the progress of the Agreement
4 toward achieving its goals and objectives. This report shall include
5 recommendations and conclusions regarding continued work of the projects. This
6 report shall be submitted along with any other deliverables identified in this Scope of
7 Work. Submit these documents to the Commission Contract Manager and any other
8 designated reviewers at least 15 working days in advance of each CPR meeting.
9
- 10 • Present the required information at each CPR meeting and participate in a
11 discussion about the Agreement.
12

13 **Contractor Deliverables:**

- 14 • CPR Report(s)
15 • CPR deliverables identified in the Scope of Work
16

17 **Commission Contract Manager Deliverables:**

- 18 • Agenda and a List of Expected Participants
19 • Schedule for Written Determination
20 • Written Determination
21

22 **Task 1.3 Final Meeting**

23 The goal of this task is to closeout this Agreement.
24

25 **The Contractor shall:**
26

- 27 • Meet with the Energy Commission to present the findings, conclusions, and
28 recommendations. The final meeting must be completed during the closeout of this
29 Agreement.
30

31 This meeting will be attended by, at a minimum, the Contractor, the Commission
32 Contracts Officer, and the Commission Contract Manager. The technical and
33 administrative aspects of Agreement closeout will be discussed at the meeting,
34 which may be two separate meetings at the discretion of the Commission Contract
35 Manager.
36

37 The technical portion of the meeting shall present findings, conclusions, and
38 recommended next steps (if any) for the Agreement. The Commission Contract
39 Manager will determine the appropriate meeting participants.
40

41 The administrative portion of the meeting shall be a discussion with the Commission
42 Contract Manager and the Contracts Officer about the following Agreement closeout
43 items:

- What to do with any state-owned equipment (Options)
 - Need to file UCC.1 form re: Energy Commission’s interest in patented technology
 - Energy Commission’s request for specific “generated” data (not already provided in Agreement deliverables)
 - Need to document Contractor’s disclosure of “subject inventions” developed under the Agreement
 - “Surviving” Agreement provisions, such as repayment provisions and confidential deliverables
 - Final invoicing and release of retention

- Prepare a schedule for completing the closeout activities for this Agreement.

Deliverables:

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

REPORTING

See Exhibit D, Reports/Deliverables/Records.

Task 1.4 Quarterly Progress Reports

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement.

The Contractor shall:

- Prepare progress reports which summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

Deliverables:

- Quarterly Progress Reports

Task 1.5 Test Plans, Technical Reports and Interim Deliverables

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

1 <http://www.energy.ca.gov/contracts/pier/contractors/index.html>

2
3 **The Contractor shall:**

- 4
- 5 • Unless otherwise directed in this Scope of Work, submit a draft of each deliverable
6 listed in the Technical Tasks to the Commission Contract Manager for review and
7 comment in accordance with the approved Schedule of Deliverables. The
8 Commission Contract Manager will provide written comments back to the Contractor
9 on the draft deliverable within 10 working days of receipt. Once agreement has
10 been reached on the draft, the Contractor shall submit the final deliverable to the
11 Commission Contract Manager. The Commission Contract Manager shall provide
12 written approval of the final deliverable within 5 working days of receipt. Key
13 elements from this deliverable shall be included in the Final Report for this project.
- 14

15 **Task 1.6 Final Report**

16 The goal of this task is to prepare a comprehensive written Final Report that describes
17 the original purpose, approach, results and conclusions of the work done under this
18 Agreement. The Commission Contract Manager will review and approve the
19 Final Report. The Final Report must be completed on or before the termination date of
20 the Agreement. When creating these deliverables, the Contractor shall use and follow,
21 unless otherwise instructed in writing by the Commission Contract Manager, the latest
22 version of the PIER Style Manual published on the Energy Commission's web site:

23
24 <http://www.energy.ca.gov/contracts/pier/contractors/index.html>

25
26 The Final Report shall be a public document. If the Contractor has obtained confidential
27 status from the Energy Commission and will be preparing a confidential version of the
28 Final Report as well, the Contractor shall perform the following subtasks for both the
29 public and confidential versions of the Final Report.

30
31 ***Task 1.6.1 Final Report Outline***

32
33 **The Contractor shall:**

- 34
- 35 • Prepare a draft outline of the Final Report.
 - 36
37 • Submit the draft outline of Final Report to the Commission Contract Manager for
38 review and approval. The Commission Contract Manager will provide written
39 comments back to the Contractor on the draft outline within 10 working days of
40 receipt. Once agreement has been reached on the draft, the Contractor shall submit
41 the final outline to the Commission Contract Manager. The Commission Contract
42 Manager shall provide written approval of the final outline within 5 working days of
43 receipt.
- 44

1 **Deliverables:**

- 2 • Draft Outline of the Final Report
3 • Final Outline of the Final Report
4

5 ***Task 1.6.2 Final Report***
6

7 **The Contractor shall:**
8

- 9 • Prepare the draft Final Report for this Agreement in accordance with the approved
10 outline.
11
12 • Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract
13 Manager will provide written comments within 10 working days of receipt.
14
15 Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic
16 version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager
17 shall provide written approval to the Contractor within 5 working days.
18
19 • Submit one bound copy of the Final Report with the final invoice.
20

21 **Deliverables:**

- 22 • Draft Final Report
23 • Final Report
24

25 ***MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT***
26

27 ***Task 1.7 Identify and Obtain Matching Funds***

28 The goal of this task is to ensure that the match funds planned for this Agreement are
29 obtained for and applied to this Agreement during the term of this Agreement.
30

31 The costs to obtain and document match fund commitments are not reimbursable through this Agreement. While the PIER budget
32 for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in
33 advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated
34 commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.
35

36 **The Contractor shall:**
37

- 38 • Prepare a letter documenting the match funding committed to this Agreement and
39 submit it to the Commission Contract Manager at least 2 working days prior to the
40 kick-off meeting:
41
42 1. If no match funds were part of the proposal that led to the Energy
43 Commission awarding this Agreement and none have been identified at the
44 time this Agreement starts, then state such in the letter.
45
46 2. If match funds were a part of the proposal that led to the Energy Commission
47 awarding this Agreement, then provide in the letter:
48
49 • A list of the match funds that identifies the:
50 • Amount of each cash match fund, its source, including a contact name,

1 address and telephone number and the task(s) to which the match
2 funds will be applied.

- 3
4 • Amount of each in-kind contribution, a description, documented market
5 or book value, and its source, including a contact name, address and
6 telephone number and the task(s) to which the match funds will be
7 applied. If the in-kind contribution is equipment or other tangible or
8 real property, the Contractor shall identify its owner and provide a
9 contact name, address and telephone number, and the address where
10 the property is located.

- 11
12 • A copy of the letter of commitment from an authorized representative of
13 each source of cash match funding or in-kind contributions that these
14 funds or contributions have been secured.

- 15
16 • Discuss match funds and the implications to the Agreement if they are significantly
17 reduced or not obtained as committed, at the kick-off meeting. If applicable, match
18 funds will be included as a line item in the progress reports and will be a topic at
19 CPR meetings.
- 20
21 • Provide the appropriate information to the Commission Contract Manager if during
22 the course of the Agreement additional match funds are received.
- 23
24 • Notify the Commission Contract Manager within 10 working days if during the course
25 of the Agreement existing match funds are reduced. Reduction in match funds may
26 trigger an additional CPR.

27
28 **Deliverables:**

- 29 • A letter regarding Match Funds or stating that no Match Funds are provided
- 30 • Letter(s) for New Match Funds
- 31 • A copy of each Match Fund commitment letter
- 32 • Letter that Match Funds were Reduced (if applicable)

33
34 ***Task 1.8 Identify and Obtain Required Permits***

35 The goal of this task is to obtain all permits required for work completed under this
36 Agreement in advance of the date they are needed to keep the Agreement schedule on
37 track.

38
39 Permit costs and the expenses associated with obtaining permits are reimbursable
40 under this Agreement. Permits must be identified in writing before the Contractor can
41 incur any costs related to the use of the permit(s) for which the Contractor will request
42 reimbursement.

1 **The Contractor shall:**

- 2 • Prepare a letter documenting the permits required to conduct this Agreement and
3 submit it to the Commission Contract Manager at least 2 working days prior to the
4 kick-off meeting:
5
6 1. If there are no permits required at the start of this Agreement, then state such in
7 the letter.
8
9 2. If it is known at the beginning of the Agreement that permits will be required
10 during the course of the Agreement, provide in the letter:
11
12 • A list of the permits that identifies the:
13 • Type of permit
14 • Name, address and telephone number of the permitting jurisdictions or
15 lead agencies
16 • Schedule the Contractor will follow in applying for and obtaining these
17 permits.
18
19 • The list of permits and the schedule for obtaining them will be discussed at the kick-
20 off meeting, and a timetable for submitting the updated list, schedule and the copies
21 of the permits will be developed. The implications to the Agreement if the permits
22 are not obtained in a timely fashion or are denied will also be discussed. If
23 applicable, permits will be included as a line item in the progress reports and will be
24 a topic at CPR meetings.
25
26 • If during the course of the Agreement additional permits become necessary, then
27 provide the appropriate information on each permit and an updated schedule to the
28 Commission Contract Manager.
29
30 • As permits are obtained, send a copy of each approved permit to the Commission
31 Contract Manager.
32
33 • If during the course of the Agreement permits are not obtained on time or are
34 denied, notify the Commission Contract Manager within 5 working days. Either of
35 these events may trigger an additional CPR.
36

37 **Deliverables:**

- 38 • A letter documenting the Permits or stating that no Permits are required
39 • Updated list of Permits as they change during the Term of the Agreement
40 • Updated schedule for acquiring Permits as it changes during the Term of the
41 Agreement
42 • A copy of each approved Permit
43

44 **Task 1.9 Electronic File Format**

1 The goal of this task is to unify the formats of electronic data and documents provided to
2 the Energy Commission as contract deliverables. Another goal is to establish the
3 computer platforms, operating systems and software that will be required to review and
4 approve all software deliverables.

5
6 **The Contractor shall:**
7

- 8 • Deliver documents to the Commission Contract Manager in the following formats:
 - 9 • Data sets shall be in Microsoft (MS) Access or MS Excel file format.
 - 10 • PC-based text documents shall be in MS Word file format.
 - 11 • Documents intended for public distribution shall be in PDF file format, with the
12 native file format provided as well.
 - 13 • Project management documents shall be in MS Project file format.
 - 14 • Request exemptions to the electronic file format in writing at least 90 days before
15 the deliverable is submitted.

16
17 **Deliverables:**

- 18 • A letter requesting exemption from the Electronic File Format (if applicable)

19
20 **TAC**

21 **Task 1.10 Establish the TAC**

22 The goal of this task is to create an advisory committee for this Agreement.

23 The TAC should be composed of diverse professionals. The number can vary
24 depending on potential interest and time availability. The Contractor's Project Manager
25 and the Commission Contract Manager shall act as co-chairs of the TAC. The exact
26 composition of the TAC may change as the need warrants. TAC members serve at the
27 discretion of the Commission Contract Manager.

28 The TAC may be composed of qualified professionals spanning the following types of
29 disciplines:

- 30 • Researchers knowledgeable about the project subject matter
- 31 • Members of the trades who will apply the results of the project (e.g., designers,
32 engineers, architects, contractors, and trade representatives)
- 33 • Public Interest Market Transformation Implementers
- 34 • Product Developers relevant to project subject matter
- 35 • U.S. Department of Energy Research Manager
- 36 • Public Interest Environmental Groups
- 37 • Utility Representatives
- 38 • Members of the relevant technical society committees

39 The purpose of the TAC is to:

- 1 • Provide guidance in research direction. The guidance may include scope of
2 research; research methodologies; timing; coordination with other research. The
3 guidance may be based on:
 - 4 -technical area expertise
 - 5 -knowledge of market applications
 - 6 -linkages between the agreement work and other past, present or future
7 research (both public and private sectors) they are aware of in a particular
8 area.
- 9
- 10 • Review deliverables. Provide specific suggestions and recommendations for
11 needed adjustments, refinements, or enhancement of the deliverables.
- 12 • Evaluate tangible benefits to California of this research and provide
13 recommendations, as needed, to enhance tangible benefits.
- 14 • Provide recommendations regarding information dissemination, market pathways
15 or commercialization strategies relevant to the research products.

16 **The Contractor shall:**

- 17 • Prepare a draft list of potential TAC members that includes name, company,
18 physical and electronic address, and phone number and submit it to the Commission
19 Contract Manager at least 2 working days prior to the kick-off meeting. This list will
20 be discussed at the kick-off meeting and a schedule for recruiting members and
21 holding the first TAC meeting will be developed.
- 22 • Recruit TAC members and ensure that each individual understands the member
23 obligations described above, as well as the meeting schedule outlined in Task 1.11.
- 24 • Prepare the final list of TAC members.
- 25 • Submit letters of acceptance or other comparable documentation of commitment for
26 each TAC member.

27 **Deliverables:**

- 28 • Draft List of TAC Members
- 29 • Final List of TAC Members
- 30 • Letters of acceptance, or other comparable documentation of commitment for each
31 TAC Member

32

33 **Task 1.11 Conduct TAC Meetings**

34 The goal of this task is for the TAC to provide strategic guidance to this project by
35 participating in regular meetings or teleconferences.

36

37 **The Contractor shall:**

- 38 • Discuss the TAC meeting schedule at the kick-off meeting. The number of face-to-
39 face meetings and teleconferences and the location of TAC meetings shall be
40 determined in consultation with the Commission Contract Manager. This draft

- 1 schedule shall be presented to the TAC members during recruiting and finalized at
2 the first TAC meeting.
- 3 • Organize and lead TAC meetings in accordance with the schedule. Changes to the
4 schedule must be pre-approved in writing by the Commission Contract Manager.
 - 5 • Prepare TAC meeting agenda(s) with back-up materials for agenda items.
 - 6 • Prepare TAC meeting summaries, including recommended resolution of major TAC
7 issues.

8
9 **Deliverables:**

- 10 • Draft TAC Meeting Schedule
- 11 • Final TAC Meeting Schedule
- 12 • TAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- 13 • Written TAC meeting summaries, including recommended resolution of major TAC
14 issues

15
16 **TECHNICAL TASKS**

17
18 The Contractor shall prepare all deliverables in accordance with the requirements in
19 Task 1.5. Deliverables not requiring a draft version are indicated by marking “(no draft)”
20 after the deliverable name.

21
22
23 **Task 2 Subcontractor Request for Qualifications (RFQ)**

24
25 The goal of this task is to identify and select a subcontractor with the necessary
26 expertise in atmospheric modeling and wind plant forecasting to meet the technical
27 goals of Tasks 3 and 4.
28

1 **The Contractor shall:**

- 2 • Develop an RFQ to include:
- 3 ○ Necessary background information, tasks, deliverables, and timelines. Tasks
- 4 will include:
- 5 ○ ~~Application of the WindSense analytical tools to identify multiple~~
- 6 ~~deployment points for the remote sensing equipment.~~
- 7 ○ Generation of 0 to 6 48 hour forecasts of wind power, with and without
- 8 the data from the wind sensing equipment for the windplant(s) in the
- 9 general vicinity of the equipment.
- 10 • Develop metrics for selecting the winning submission.
- 11 • Submit the RFQ to the Energy Commission for approval to ensure that it meets
- 12 all state requirements.
- 13 • Send the approved RFQ to organizations with the necessary expertise to perform
- 14 the tasks.
- 15 • Evaluate the submitted quotes and select an awardee with the approval of the
- 16 Energy Commission Contract Manager.
- 17 • Send an award notification letter to the selected subcontractor.
- 18 • Conduct a Kick-off meeting with the selected subcontractor. Submit the
- 19 kick-off meeting materials required in Task 1.1 to the Commission Contract
- 20 Manager.

21

22 **Deliverables:**

- 23 • RFQ
- 24 • Metrics document for selecting awardee
- 25 • Award notification letter (no draft)
- 26 • Kick-off meeting materials (no draft)
- 27
- 28

29 **Task 3 Remote Sensing Site Identification, Configuration and Deployment**

30

31 The goal of this task is to define the atmospheric remote sensing equipment required for

32 long-term data collection and to identify the deployment sites for the equipment within

33 the Tehachapi Wind Resource Area. This area is the focus of the project because its

34 installed wind-based power generation capacity is increasing significantly

35 (approximately 4000 megawatts of new capacity is projected to be installed over the

36 next 5-10 years), resulting in a large percentage of California's wind power generation

37 located in a relatively small region. This raises the concern of large changes in wind

38 plant power output occurring (large ramp rates) due to weather events and the related

39 power grid management issues.

40

41 **The Contractor shall:**

- 42 • Identify the optimal wind LiDAR or SoDAR (to provide high-resolution vertical
- 43 profiles of wind speed and direction up to a height of a few hundred meters),
- 44 radiometer (to provide measurements of temperature, humidity and liquid water
- 45 concentrations up to a height of a few kilometers), and other sensing equipment
- 46 needed to perform the data acquisition.

- 1 • Prepare a Selected Sensing Equipment Report that discusses the specifications
- 2 of the LiDAR **or SoDAR** and how it will be deployed.
- 3 • Arrange to lease the remote sensing units from Southern California Edison **or**
- 4 **qualified vendor** for the duration of this study.
- 5 ~~• Apply the WindSense developed analytical tools to identify multiple (3-4)~~
- 6 ~~deployment points for the remote sensing equipment.~~
- 7 • **Choose deployment sites based on the results of the previous WindSense**
- 8 **studies.**
- 9 • Arrange agreements with property owners for installation of equipment,
- 10 equipment security, and electric power supply.
- 11 • Prepare a Deployment Locations Report that discusses how they are deployed
- 12 and aimed to obtain the necessary coverage.
- 13 • Participate in a CPR as per Task 1.2.
- 14 • Deploy equipment along with needed infrastructure for physical security and
- 15 communication for data transfer.
- 16 • Collect real-time data with LiDAR, radiometer, and other sensing equipment.

17 **Deliverables:**

- 18 • Selected Sensing Equipment Report (no draft)
- 19 • Deployment Locations Report (no draft)
- 20 • CPR Report

21 **Task 4 Wind Forecast System Implementation and Operation**

22
23
24 The goal of this task is to implement and operate the wind forecast system for the
25 selected windplants in the Tehachapi Wind Resource Area with and without the
26 additional atmospheric remote sensor data acquired in this project. Each version of the
27 forecast system (i.e., with and without the use of the remote sensor data) will be used to
28 generate 0 to 6 hour ahead forecasts of the wind power production for the selected
29 windplants for the sensor deployment period.

30 **The Contractor shall:**

- 31 • Generate 0 to ~~6~~ **48** hour ahead forecasts of wind power with and without the data
- 32 from the LiDAR, radiometer, and other remote sensor data for the windplant(s) in
- 33 the general vicinity of the equipment. The forecasts will be generated for a period
- 34 of twelve months including the wind season in the Tehachapi Wind Resource
- 35 Area.
- 36 • Analyze the performance of each of the location forecasts to determine the
- 37 impact of the LiDAR **or SoDAR**, radiometer and other remote sensor data on the
- 38 performance of each type of forecast.
- 39 • Analyze the performance of each of the location forecasts to determine the
- 40 impact of the analytical tools on site selection.
- 41 • Conduct a cost benefit analysis on the use of the remote sensor equipment for
- 42 the improvement of wind-based power forecasts.
- 43
- 44
- 45

- 1 • Prepare a Findings Report documenting the findings of the above, to include but
2 not be limited to the following:
 - 3 ○ effectiveness of previously developed methodology in determining optimal
4 remote sensor locations
 - 5 ○ impact of remote sensor equipment on the accuracy of 0 to 6 hour ahead
6 wind-based power forecasts
 - 7 ○ operations and maintenance characteristics of remote sensor equipment
 - 8 ○ cost benefit of the use of LiDAR and radiometer for improving forecasts.
9 (Include forecasts to illustrate where appropriate)

10
11 **Deliverables:**

- 12 • Findings Report (no draft)
- 13
14

15 **Task 5 Technology Transfer Activities**

16 *The goal of this task is to develop a plan to make the knowledge gained, experimental*
17 *results and lessons learned available to key decision-makers.*

18

19 **The Contractor shall:**

- 20 • Prepare a Technology Transfer Plan. The plan shall explain how the knowledge
21 gained in this project will be made available to the public. The level of detail
22 expected is least for research-related projects and highest for demonstration
23 projects. Key elements from this report shall be included in the Final Report for this
24 project.
 - 25
 - 26 • Conduct technology transfer activities in accordance with the Technology Transfer
27 Plan. These activities shall be reported in the Quarterly Progress Reports.
- 28

29 **Deliverables:**

- 30 • Technology Transfer Plan