



GRANT REQUEST FORM (GRF)

A) New Agreement # EPC-19-009 (to be completed by CGL office)

B) Division	Agreement Manager:	MS-	Phone
ERDD	David Stoms	43	916-327-2381

C) Recipient's Legal Name	Federal ID Number
Integral Consulting Inc.	48-1266683

D) Title of Project
A Risk Assessment Framework to Evaluate Effects of Offshore Wind Farms on the California Up-welling Ecosystem

E) Term and Amount

Start Date	End Date	Amount
5/1/2020	12/31/2023	\$ 500,000

F) Business Meeting Information

ARFVTP agreements \$75K and under delegated to Executive Director

Proposed Business Meeting Date 4/8/2020 Consent Discussion

Business Meeting Presenter David Stoms Time Needed: 5 minutes

Please select one list serve. EPIC (Electric Program Investment Charge)

Agenda Item Subject and Description:

INTEGRAL CONSULTING INC.

Proposed resolution approving agreement EPC-19-009 with Integral Consulting Inc. for a \$500,000 grant to investigate the effects of large-scale offshore wind farms on wind stress reduction, its potential impacts to California coastal up-welling, and adopting staff's determination that this action is exempt from CEQA.

G) California Environmental Quality Act (CEQA) Compliance

1. 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

2. If Agreement is considered a "Project" under CEQA:

a) Agreement **IS** exempt.

Statutory Exemption. List PRC and/or CCR section number:

Categorical Exemption. List CCR section number: Class 6 15306

Common Sense Exemption. 14 CCR 15061 (b) (3)

Explain reason why Agreement is exempt under the above section: This project is exempt under Section 15306 because the project may only be collecting



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environmental data related to wind speed, ocean waves, and upwelling to validate the models with no serious major disturbance to sites in the Pacific Ocean.

The project is exempt under the common sense exemption CCR 15061(b)(3) because it can be seen with certainty that there is no possibility that the numerical modeling study of offshore wind farms may have a significant effect on the environment.

Each exemption is an independent basis for finding the project exempt.

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

Legal Company Name:	Budget
DOE- Sandia National Laboratories	\$ 99,999
The Regents of the University of California, Santa Cruz	\$ 60,000
	\$
	\$

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

Legal Company Name:

J) Budget Information

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	18-19	301.001F	\$500,000
			\$
			\$

R&D Program Area: EGRO: EA

TOTAL: \$ 500,000

Explanation for "Other" selection

Reimbursement Contract #: Federal Agreement #:

K) Recipient's Contact Information

1. Recipient's Administrator/Officer

Name: Craig Jones

Address: 200 Washington St Ste 201



STATE OF CALIFORNIA

GRANT REQUEST FORM (GRF)

CEC-270 (Revised 12/2019)

CALIFORNIA ENERGY COMMISSION

City, State, Zip: Santa Cruz, CA
95060-4976

Phone: 831-466- 9630 x872

E-Mail: cjones@integral-corp.com

2. Recipient's Project Manager

Name: Grace Chang

Address: 200 Washington St Ste
201

City, State, Zip: Santa Cruz, CA
95060-4976

Phone: 805-967-5640

E-Mail: gchang@integral-corp.com

L) Selection Process Used

Competitive Solicitation Solicitation #: GFO-19-302

First Come First Served Solicitation Solicitation #:

M) The following items should be attached to this GRF

- | | | |
|-----------------------------------------------------|-----------------------------------------|-----------------------------------|
| 1. Exhibit A, Scope of Work | <input checked="" type="checkbox"/> | Attached |
| 2. Exhibit B, Budget Detail | <input checked="" type="checkbox"/> | Attached |
| 3. CEC 105, Questionnaire for Identifying Conflicts | <input checked="" type="checkbox"/> | Attached |
| 4. Recipient Resolution | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |
| 5. CEQA Documentation | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached |

Agreement Manager

Date

Office Manager

Date

Deputy Director

Date

EXHIBIT A

Scope of Work

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR ¹	Task Name
1		General Project Tasks
2	X	Wind Modeling
3	X	Ocean Circulation Modeling
4		Upwelling Indices
5		Evaluation of Project Benefits
6		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
CAISO	California Independent System Operator
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
COAMPS	Coupled Ocean/Atmosphere Mesoscale Prediction System
CPR	Critical Project Review
GHG	Greenhouse Gas
ROMS	Regional Ocean Modeling System
SOWFA	Simulator of Wind Farm Applications
TAC	Technical Advisory Committee

II. PURPOSE OF AGREEMENT, PROBLEM/SOLUTION STATEMENT, AND GOALS AND OBJECTIVES

A. Purpose of Agreement

The purpose of this Agreement is to fund a desktop numerical modeling study that evaluates the potential impact of floating offshore wind farms on coastal upwelling ecosystems.

B. Problem/ Solution Statement

Problem

The focus of this project is to investigate the effects of large-scale offshore wind farms on wind stress reduction and its potential impacts to California upwelling and coastal nutrient delivery. While there have been previous studies that have found impacts to upwelling, downwelling, and changes to weather patterns in the lee of offshore wind farms, there are no studies that have extended the impact of these changes to nutrient delivery.

Solution

¹ Please see subtask 1.3 in Part III of the Scope of Work (General Project Tasks) for a description of Critical Project Review (CPR) Meetings.

EXHIBIT A Scope of Work

1 The Recipient will conduct a numerical modeling study to determine potential changes in coastal
2 upwelling due to offshore wind project development over a variety of environmental conditions. A
3 number of baseline cases (no wind farms) will be modeled for a variety of climatologies, and
4 compared with modeled cases that include simulated offshore wind farms with varying
5 characteristics in identified areas of interest.

6
7 The proposed methodology will combine coupled numerical atmospheric-ocean models. Results
8 from the coupled models will provide an enhanced scientific understanding of the effects of wind
9 energy reduction on nearshore ocean circulation.

10 11 **C. Goals and Objectives of the Agreement**

12 13 **Agreement Goals**

14 The goals of this Agreement are to:

- 15 • Characterize changes in wind stress in the lee of floating offshore wind farms for at least
16 three sites on the California coast;
- 17 • Evaluate the potential impacts of reduced wind stress on coastal wind-driven upwelling.

18
19 Ratepayer Benefits:² This Agreement will result in the ratepayer benefit of lower costs and
20 environmental benefits by facilitating offshore wind policy development, permitting, turbine siting
21 and array evaluation; identifying data gaps to prioritize research; and expediting device
22 deployment, which will contribute to offshore wind project development and increased
23 renewable energy generation in California and further diversification of the State's clean energy
24 portfolio.

25
26 Technological Advancement and Breakthroughs:³ This Agreement will lead to technological
27 advancement and breakthroughs to overcome barriers to the achievement of the State of
28 California's statutory energy goals by understanding potential environmental impacts of offshore
29 wind, identifying data gaps and prioritizing research, informing monitoring and mitigation actions,
30 and streamlining planning through a quantification of ecological risk. This project will directly
31 support the National Environmental Policy Act, California Environmental Quality Act, and other
32 federal, state, and local statutory and regulatory reviews and approvals. These barriers need to
33 be addressed early in California in a comprehensive approach that considers physical processes
34 and their links to biological processes as the scaffold for assessing significance of anticipated
35 environmental changes.

36 37 **Agreement Objectives**

38 The objectives of this Agreement are to:

- 39 • Implement a high-resolution atmospheric model that provides an accurate assessment
40 of the wind field around a wind farm including turbine-turbine interactions.

² California Public Resources Code, Section 25711.5(a) requires projects funded by the Electric Program Investment Charge (EPIC) to result in ratepayer benefits. The California Public Utilities Commission, which established the EPIC in 2011, defines ratepayer benefits as greater reliability, lower costs, and increased safety (See CPUC "Phase 2" Decision 12-05-037 at page 19, May 24, 2012, http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/167664.PDF).

³ California Public Resources Code, Section 25711.5(a) also requires EPIC-funded projects to lead to technological advancement and breakthroughs to overcome barriers that prevent the achievement of the state's statutory and energy goals.

EXHIBIT A Scope of Work

- Couple wind stress fields produced by the atmospheric model to a regional ocean circulation model with higher resolution grids nested around simulated wind farms in three identified California offshore wind regions.
- Compute upwelling indices of relevance to primary production, and potential changes in these indices that allow for the inference of primary production.
- Perform baseline (no wind farms) and modified (with wind farms) atmospheric-circulation modeling to assess potential changes in upwelling and nutrient delivery as a result in wind farm deployment for a variety of environmental conditions.
- Conduct model evaluations to examine environmental variability (larger scale atmospheric and ocean circulation, including that related to climate change) and wind turbine and wind farm characteristics (size, layout, etc.) and the resulting potential changes in upwelling dynamics over the lifecycle of an offshore wind project.

III. TASK 1: GENERAL PROJECT TASKS

PRODUCTS

Subtask 1.1 Products

The goal of this subtask is to establish the requirements for submitting project products (e.g., reports, summaries, plans, and presentation materials). Unless otherwise specified by the Commission Agreement Manager (CAM), the Recipient must deliver products as required below by the dates listed in the **Project Schedule (Part V)**. Products that require a draft version are indicated by marking “**(draft and final)**” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. With respect to due dates within this Scope of Work, “**days**” means working days.

The Recipient shall:

For products that require a draft version, including the Final Report Outline and Final Report

- Submit all draft products to the CAM for review and comment in accordance with the Project Schedule (Part V). The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt, unless otherwise specified in the task/subtask for which the product is required.
- Consider incorporating all CAM comments into the final product. If the Recipient disagrees with any comment, provide a written response explaining why the comment was not incorporated into the final product.
- Submit the revised product and responses to comments within 10 days of notice by the CAM, unless the CAM specifies a longer time period, or approves a request for additional time.

For products that require a final version only

- Submit the product to the CAM for acceptance. The CAM may request minor revisions or explanations prior to acceptance.

For all products

- Submit all data and documents required as products in accordance with the following Instructions for Submitting Electronic Files and Developing Software:

EXHIBIT A Scope of Work

1
2 ○ **Electronic File Format**

- 3 ▪ Submit all data and documents required as products under this Agreement in
4 an electronic file format that is fully editable and compatible with the Energy
5 Commission's software and Microsoft (MS)-operating computing platforms, or
6 with any other format approved by the CAM. Deliver an electronic copy of the
7 full text of any Agreement data and documents in a format specified by the
8 CAM, such as memory stick or CD-ROM.
9

10 The following describes the accepted formats for electronic data and documents
11 provided to the Energy Commission as products under this Agreement, and
12 establishes the software versions that will be required to review and approve all
13 software products:

- 14 ▪ Data sets will be in MS Access or MS Excel file format (version 2007 or later),
15 or any other format approved by the CAM.
16 ▪ Text documents will be in MS Word file format, version 2007 or later.
17 ▪ Documents intended for public distribution will be in PDF file format.
18 ▪ The Recipient must also provide the native Microsoft file format.
19 ▪ Project management documents will be in Microsoft Project file format, version
20 2007 or later.
21

22 ○ **Software Application Development**

23 Use the following standard Application Architecture components in compatible
24 versions for any software application development required by this Agreement
25 (e.g., databases, models, modeling tools), unless the CAM approves other
26 software applications such as open source programs:

- 27 ▪ Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
28 ▪ Microsoft Internet Information Services (IIS), (version 6 and up)
29 Recommend 7.5.
30 ▪ Visual Studio.NET (version 2008 and up). Recommend 2010.
31 ▪ C# Programming Language with Presentation (UI), Business Object and Data
32 Layers.
33 ▪ SQL (Structured Query Language).
34 ▪ Microsoft SQL Server 2008, Stored Procedures. Recommend 2008
35 R2.
36 ▪ Microsoft SQL Reporting Services. Recommend 2008 R2.
37 ▪ XML (external interfaces).
38

39 Any exceptions to the Electronic File Format requirements above must be approved
40 in writing by the CAM. The CAM will consult with the Energy Commission's Information
41 Technology Services Branch to determine whether the exceptions are allowable.
42

MEETINGS

Subtask 1.2 Kick-off Meeting

45 The goal of this subtask is to establish the lines of communication and procedures for
46 implementing this Agreement.
47

The Recipient shall:

- 48 • Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and
49

EXHIBIT A

Scope of Work

1 any other Energy Commission staff relevant to the Agreement. The Recipient will bring its
2 Project Manager and any other individuals designated by the CAM to this meeting. The
3 administrative and technical aspects of the Agreement will be discussed at the meeting.
4 Prior to the meeting, the CAM will provide an agenda to all potential meeting participants.
5 The meeting may take place in person or by electronic conferencing (e.g., WebEx), with
6 approval of the CAM.

7
8 The administrative portion of the meeting will include discussion of the following:

- 9 ○ Terms and conditions of the Agreement;
- 10 ○ Administrative products (subtask 1.1);
- 11 ○ CPR meetings (subtask 1.3);
- 12 ○ Match fund documentation (subtask 1.7);
- 13 ○ Permit documentation (subtask 1.8);
- 14 ○ Subcontracts (subtask 1.9); and
- 15 ○ Any other relevant topics.

16
17 The technical portion of the meeting will include discussion of the following:

- 18 ○ The CAM's expectations for accomplishing tasks described in the Scope of Work;
 - 19 ○ An updated Project Schedule;
 - 20 ○ Technical products (subtask 1.1);
 - 21 ○ Progress reports and invoices (subtask 1.5);
 - 22 ○ Final Report (subtask 1.6);
 - 23 ○ Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
 - 24 ○ Any other relevant topics.
- 25
 - 26 ● Provide an *Updated Project Schedule, List of Match Funds, and List of Permits*, as needed
 - 27 to reflect any changes in the documents.
 - 28

29 **The CAM shall:**

- 30 ● Designate the date and location of the meeting.
- 31 ● Send the Recipient a *Kick-off Meeting Agenda*.
- 32

33 **Recipient Products:**

- 34 ● Updated Project Schedule (*if applicable*)
- 35 ● Updated List of Match Funds (*if applicable*)
- 36 ● Updated List of Permits (*if applicable*)
- 37

38 **CAM Product:**

- 39 ● Kick-off Meeting Agenda
- 40

41 **Subtask 1.3 Critical Project Review (CPR) Meetings**

42 The goal of this subtask is to determine if the project should continue to receive Energy
43 Commission funding, and if so whether any modifications must be made to the tasks, products,
44 schedule, or budget. CPR meetings provide the opportunity for frank discussions between the
45 Energy Commission and the Recipient. As determined by the CAM, discussions may include
46 project status, challenges, successes, advisory group findings and recommendations, final report
47 preparation, and progress on technical transfer and production readiness activities (if applicable).

EXHIBIT A Scope of Work

1 Participants will include the CAM and the Recipient, and may include the CAO and any other
2 individuals selected by the CAM to provide support to the Energy Commission.
3

4 CPR meetings generally take place at key, predetermined points in the Agreement, as determined
5 by the CAM and as shown in the Task List on page 1 of this Exhibit. However, the CAM may
6 schedule additional CPR meetings as necessary. The budget will be reallocated to cover the
7 additional costs borne by the Recipient, but the overall Agreement amount will not increase. CPR
8 meetings generally take place at the Energy Commission, but they may take place at another
9 location, or may be conducted via electronic conferencing (e.g., WebEx) as determined by the
10 CAM.
11

12 **The Recipient shall:**

- 13 • Prepare a *CPR Report* for each CPR meeting that: (1) discusses the progress of the
14 Agreement toward achieving its goals and objectives; and (2) includes recommendations
15 and conclusions regarding continued work on the project.
- 16 • Submit the CPR Report along with any other *Task Products* that correspond to the
17 technical task for which the CPR meeting is required (i.e., if a CPR meeting is required for
18 Task 2, submit the Task 2 products along with the CPR Report).
- 19 • Attend the CPR meeting.
- 20 • Present the CPR Report and any other required information at each CPR meeting.
21

22 **The CAM shall:**

- 23 • Determine the location, date, and time of each CPR meeting with the Recipient's input.
- 24 • Send the Recipient a *CPR Agenda* and a *List of Expected CPR Participants* in advance
25 of the CPR meeting. If applicable, the agenda will include a discussion of match funding
26 and permits.
- 27 • Conduct and make a record of each CPR meeting. Provide the Recipient with a *Schedule*
28 *for Providing a Progress Determination* on continuation of the project.
- 29 • Determine whether to continue the project, and if so whether modifications are needed to
30 the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM
31 concludes that satisfactory progress is not being made, this conclusion will be referred to
32 the Deputy Director of the Energy Research and Development Division.
- 33 • Provide the Recipient with a *Progress Determination* on continuation of the project, in
34 accordance with the schedule. The Progress Determination may include a requirement
35 that the Recipient revise one or more products.
36

37 **Recipient Products:**

- 38 • CPR Report(s)
- 39 • Task Products (draft and/or final as specified in the task)
40

41 **CAM Products:**

- 42 • CPR Agenda
- 43 • List of Expected CPR Participants
- 44 • Schedule for Providing a Progress Determination
- 45 • Progress Determination
46

47 **Subtask 1.4 Final Meeting**

48 The goal of this subtask is to complete the closeout of this Agreement.

EXHIBIT A

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1
2 **The Recipient shall:**

- 3 • Meet with Energy Commission staff to present project findings, conclusions, and
4 recommendations. The final meeting must be completed during the closeout of this
5 Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The
6 meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval
7 of the CAM.
8

9 The technical and administrative aspects of Agreement closeout will be discussed at the
10 meeting, which may be divided into two separate meetings at the CAM's discretion.

- 11 ○ The technical portion of the meeting will involve the presentation of findings,
12 conclusions, and recommended next steps (if any) for the Agreement. The CAM will
13 determine the appropriate meeting participants.
14 ○ The administrative portion of the meeting will involve a discussion with the CAM and
15 the CAO of the following Agreement closeout items:
16 ▪ Disposition of any state-owned equipment.
17 ▪ Need to file a Uniform Commercial Code Financing Statement (Form UCC-1)
18 regarding the Energy Commission's interest in patented technology.
19 ▪ The Energy Commission's request for specific "generated" data (not already
20 provided in Agreement products).
21 ▪ Need to document the Recipient's disclosure of "subject inventions" developed
22 under the Agreement.
23 ▪ "Surviving" Agreement provisions such as repayment provisions and
24 confidential products.
25 ▪ Final invoicing and release of retention.
26 • Prepare a *Final Meeting Agreement Summary* that documents any agreement made
27 between the Recipient and Commission staff during the meeting.
28 • Prepare a *Schedule for Completing Agreement Closeout Activities*.
29 • Provide *All Draft and Final Written Products* on a CD-ROM or USB memory stick,
30 organized by the tasks in the Agreement.
31

32 **Products:**

- 33 • Final Meeting Agreement Summary (*if applicable*)
34 • Schedule for Completing Agreement Closeout Activities
35 • All Draft and Final Written Products
36

37 **REPORTS AND INVOICES**

38 **Subtask 1.5 Progress Reports and Invoices**

39 The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is
40 made towards achieving the project objectives of this Agreement; and (2) ensure that invoices
41 contain all required information and are submitted in the appropriate format.
42

43 **The Recipient shall:**

- 44 • Submit a monthly *Progress Report* to the CAM. Each progress report must:
45 ○ Summarize progress made on all Agreement activities as specified in the scope of
46 work for the preceding month, including accomplishments, problems, milestones,
47 products, schedule, fiscal status, and an assessment of the ability to complete the
48 Agreement within the current budget and any anticipated cost overruns. See the

EXHIBIT A Scope of Work

1 Progress Report Format Attachment for the recommended specifications.

- 2 • Submit a monthly or quarterly *Invoice* that follows the instructions in the “Payment of Funds”
3 section of the terms and conditions, including a financial report on Match Fund and in-state
4 expenditures.

5 6 **Products:**

- 7 • Progress Reports
- 8 • Invoices

9 10 **Subtask 1.6 Final Report**

11 The goal of this subtask is to prepare a comprehensive Final Report that describes the original
12 purpose, approach, results, and conclusions of the work performed under this Agreement. The
13 CAM will review the Final Report, which will be due at least **two months** before the Agreement
14 end date. When creating the Final Report Outline and the Final Report, the Recipient must use
15 the Style Manual provided by the CAM.

16 17 **Subtask 1.6.1 Final Report Outline**

18 19 **The Recipient shall:**

- 20 • Prepare a *Final Report Outline* in accordance with the *Style Manual* provided by the CAM.
21 (*See Task 1.1 for requirements for draft and final products.*)

22 23 **Recipient Products:**

- 24 • Final Report Outline (draft and final)

25 26 **CAM Product:**

- 27 • Style Manual
- 28 • Comments on Draft Final Report Outline
- 29 • Acceptance of Final Report Outline

30 31 **Subtask 1.6.2 Final Report**

32 33 **The Recipient shall:**

- 34 • Prepare a *Final Report* for this Agreement in accordance with the approved Final Report
35 Outline, Style Manual, and Final Report Template provided by the CAM with the following
36 considerations:
 - 37 ○ Ensure that the report includes the following items, in the following order:
 - 38 ▪ Cover page (**required**)
 - 39 ▪ Credits page on the reverse side of cover with legal disclaimer (**required**)
 - 40 ▪ Acknowledgements page (optional)
 - 41 ▪ Preface (**required**)
 - 42 ▪ Abstract, keywords, and citation page (**required**)
 - 43 ▪ Table of Contents (**required**, followed by List of Figures and List of Tables,
44 if needed)
 - 45 ▪ Executive summary (**required**)
 - 46 ▪ Body of the report (**required**)
 - 47 ▪ References (if applicable)

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- 1 ▪ Glossary/Acronyms (If more than 10 acronyms or abbreviations are used,
2 it is required.)
- 3 ▪ Bibliography (if applicable)
- 4 ▪ Appendices (if applicable) (Create a separate volume if very large.)
- 5 ▪ Attachments (if applicable)
- 6 ○ Ensure that the document is written in the third person.
- 7 ○ Ensure that the Executive Summary is understandable to the lay public.
- 8 ▪ Briefly summarize the completed work. Succinctly describe the project
9 results and whether or not the project goals were accomplished.
- 10 ▪ Identify which specific ratepayers can benefit from the project results
11 and how they can achieve the benefits.
- 12 ▪ If it's necessary to use a technical term in the Executive Summary,
13 provide a brief definition or explanation when the technical term is first
14 used.
- 15 ○ Follow the Style Guide format requirements for headings, figures/tables, citations, and
16 acronyms/abbreviations.
- 17 ○ Ensure that the document omits subjective comments and opinions. However,
18 recommendations in the conclusion of the report are allowed.
- 19 ○ Include a brief description of the project results in the Abstract.
- 20 • Submit a draft of the report to the CAM for review and comment. The CAM will provide
21 written comments to the Recipient on the draft product within 15 days of receipt
- 22 • Consider incorporating all CAM comments into the Final Report. If the Recipient disagrees
23 with any comment, provide a written response explaining why the comment was not
24 incorporated into the final product
- 25 • Submit the revised Final Report and responses to comments within 10 days of notice by
26 the CAM, unless the CAM specifies a longer time period or approves a request for
27 additional time.
- 28 • Submit one bound copy of the *Final Report* to the CAM along with *Written Responses to*
29 *Comments on the Draft Final Report*.

30 31 **Products:**

- 32 • Final Report (draft and final)
- 33 • Written Responses to Comments on the Draft Final Report

34 35 **CAM Product:**

- 36 • Written Comments on the Draft Final Report

37 38 **MATCH FUNDS, PERMITS, AND SUBCONTRACTS**

39 **Subtask 1.7 Match Funds**

40 The goal of this subtask is to ensure that the Recipient obtains any match funds planned for this
41 Agreement and applies them to the Agreement during the Agreement term.

42
43 While the costs to obtain and document match funds are not reimbursable under this Agreement,
44 the Recipient may spend match funds for this task. The Recipient may only spend match funds
45 during the Agreement term, either concurrently or prior to the use of Energy Commission funds.
46 Match funds must be identified in writing, and the Recipient must obtain any associated
47 commitments before incurring any costs for which the Recipient will request reimbursement.

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1 The Recipient shall:

- 2 • Prepare a *Match Funds Status Letter* that documents the match funds committed to this
3 Agreement. If no match funds were part of the proposal that led to the Energy Commission
4 awarding this Agreement and none have been identified at the time this Agreement starts,
5 then state this in the letter.

6
7 If match funds were a part of the proposal that led to the Energy Commission awarding
8 this Agreement, then provide in the letter:

- 9 ○ A list of the match funds that identifies:
 - 10 ▪ The amount of cash match funds, their source(s) (including a contact name,
11 address, and telephone number), and the task(s) to which the match funds will
12 be applied.
 - 13 ▪ The amount of each in-kind contribution, a description of the contribution type
14 (e.g., property, services), the documented market or book value, the source
15 (including a contact name, address, and telephone number), and the task(s) to
16 which the match funds will be applied. If the in-kind contribution is equipment
17 or other tangible or real property, the Recipient must identify its owner and
18 provide a contact name, address, telephone number, and the address where
19 the property is located.
 - 20 ▪ If different from the solicitation application, provide a letter of commitment from
21 an authorized representative of each source of match funding that the funds or
22 contributions have been secured.
- 23 • At the Kick-off meeting, discuss match funds and the impact on the project if they are
24 significantly reduced or not obtained as committed. If applicable, match funds will be
25 included as a line item in the progress reports and will be a topic at CPR meetings.
- 26 • Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional
27 match funds.
- 28 • Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds
29 are reduced during the course of the Agreement. Reduction of match funds may trigger a
30 CPR meeting.

31 32 **Products:**

- 33 • Match Funds Status Letter
- 34 • Supplemental Match Funds Notification Letter (*if applicable*)
- 35 • Match Funds Reduction Notification Letter (*if applicable*)

36 37 **Subtask 1.8 Permits**

38 The goal of this subtask is to obtain all permits required for work completed under this Agreement
39 in advance of the date they are needed to keep the Agreement schedule on track. Permit costs
40 and the expenses associated with obtaining permits are not reimbursable under this Agreement,
41 with the exception of costs incurred by University of California recipients. Permits must be
42 identified and obtained before the Recipient may incur any costs related to the use of the permit(s)
43 for which the Recipient will request reimbursement.

44 45 **The Recipient shall:**

- 46 • Prepare a *Permit Status Letter* that documents the permits required to conduct this
47 Agreement. If no permits are required at the start of this Agreement, then state this in the
48 letter. If permits will be required during the course of the Agreement, provide in the letter:

EXHIBIT A

Scope of Work

- 1 ○ A list of the permits that identifies: (1) the type of permit; and (2) the name,
2 address, and telephone number of the permitting jurisdictions or lead agencies.
- 3 ○ The schedule the Recipient will follow in applying for and obtaining the permits.
4

5 The list of permits and the schedule for obtaining them will be discussed at the Kick-off
6 meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and
7 copies of the permits will be developed. The impact on the project if the permits are not
8 obtained in a timely fashion or are denied will also be discussed. If applicable, permits will
9 be included as a line item in progress reports and will be a topic at CPR meetings.

- 10 ● If during the course of the Agreement additional permits become necessary, then provide
11 the CAM with an *Updated List of Permits* (including the appropriate information on each
12 permit) and an *Updated Schedule for Acquiring Permits*.
- 13 ● Send the CAM a *Copy of Each Approved Permit*.
- 14 ● If during the course of the Agreement permits are not obtained on time or are denied,
15 notify the CAM within 5 days. Either of these events may trigger a CPR meeting.
16

17 **Products:**

- 18 ● Permit Status Letter
- 19 ● Updated List of Permits (*if applicable*)
- 20 ● Updated Schedule for Acquiring Permits (*if applicable*)
- 21 ● Copy of Each Approved Permit (*if applicable*)
22

23 **Subtask 1.9 Subcontracts**

24 The goals of this subtask are to: (1) procure subcontracts required to carry out the tasks under
25 this Agreement; and (2) ensure that the subcontracts are consistent with the terms and conditions
26 of this Agreement.
27

28 **The Recipient shall:**

- 29 ● Manage and coordinate subcontractor activities in accordance with the requirements of
30 this Agreement.
- 31 ● Incorporate this Agreement by reference into each subcontract.
- 32 ● Include any required Energy Commission flow-down provisions in each subcontract, in
33 addition to a statement that the terms of this Agreement will prevail if they conflict with the
34 subcontract terms.
- 35 ● If required by the CAM, submit a draft of each *Subcontract* required to conduct the work
36 under this Agreement.
- 37 ● Submit a final copy of the executed subcontract.
- 38 ● Notify and receive written approval from the CAM prior to adding any new subcontractors
39 (see the discussion of subcontractor additions in the terms and conditions).
40

41 **Products:**

- 42 ● Subcontracts (*draft if required by the CAM*)
43

44 **TECHNICAL ADVISORY COMMITTEE**

45 **Subtask 1.10 Technical Advisory Committee (TAC)**

46 The goal of this subtask is to create an advisory committee for this Agreement. The TAC should
47 be composed of diverse professionals. The composition will vary depending on interest,

EXHIBIT A Scope of Work

1 availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC
2 is to:

- 3 • Provide guidance in project direction. The guidance may include scope and
4 methodologies, timing, and coordination with other projects. The guidance may be based
5 on:
 - 6 ○ Technical area expertise;
 - 7 ○ Knowledge of market applications; or
 - 8 ○ Linkages between the agreement work and other past, present, or future projects (both
9 public and private sectors) that TAC members are aware of in a particular area.
- 10 • Review products and provide recommendations for needed product adjustments,
11 refinements, or enhancements.
- 12 • Evaluate the tangible benefits of the project to the state of California, and provide
13 recommendations as needed to enhance the benefits.
- 14 • Provide recommendations regarding information dissemination, market pathways, or
15 commercialization strategies relevant to the project products.

16
17 The TAC may be composed of qualified professionals spanning the following types of disciplines:

- 18 • Researchers knowledgeable about the project subject matter;
- 19 • Members of trades that will apply the results of the project (e.g., designers, engineers,
20 architects, contractors, and trade representatives);
- 21 • Public interest market transformation implementers;
- 22 • Product developers relevant to the project;
- 23 • U.S. Department of Energy research managers, or experts from other federal or state
24 agencies relevant to the project;
- 25 • Public interest environmental groups;
- 26 • Utility representatives;
- 27 • Air district staff; and
- 28 • Members of relevant technical society committees.

29 30 **The Recipient shall:**

- 31 • Prepare a *List of Potential TAC Members* that includes the names, companies, physical
32 and electronic addresses, and phone numbers of potential members. The list will be
33 discussed at the Kick-off meeting, and a schedule for recruiting members and holding the
34 first TAC meeting will be developed.
- 35 • Recruit TAC members. Ensure that each individual understands member obligations and
36 the TAC meeting schedule developed in subtask 1.11.
- 37 • Prepare a *List of TAC Members* once all TAC members have committed to serving on the
38 TAC.
- 39 • Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from
40 each TAC member.

41 42 **Products:**

- 43 • List of Potential TAC Members
- 44 • List of TAC Members
- 45 • Documentation of TAC Member Commitment

EXHIBIT A Scope of Work

Subtask 1.11 TAC Meetings

The goal of this subtask is for the TAC to provide strategic guidance for the project by participating in regular meetings, which may be held via teleconference.

The Recipient shall:

- Discuss the TAC meeting schedule with the CAM at the Kick-off meeting. Determine the number and location of meetings (in-person and via teleconference) in consultation with the CAM.
- Prepare a *TAC Meeting Schedule* that will be presented to the TAC members during recruiting. Revise the schedule after the first TAC meeting to incorporate meeting comments.
- Prepare a *TAC Meeting Agenda* and *TAC Meeting Back-up Materials* for each TAC meeting.
- Organize and lead TAC meetings in accordance with the TAC Meeting Schedule. Changes to the schedule must be pre-approved in writing by the CAM.
- Prepare *TAC Meeting Summaries* that include any recommended resolutions of major TAC issues.

The TAC shall:

- Help set the project team's goals and contribute to the development and evaluation of its statement of proposed objectives as the project evolves.
- Provide a credible and objective sounding board on the wide range of technical and financial barriers and opportunities.
- Help identify key areas where the project has a competitive advantage, value proposition, or strength upon which to build.
- Advocate on behalf of the project in its effort to build partnerships, governmental support and relationships with a national spectrum of influential leaders.
- Ask probing questions that insure a long-term perspective on decision-making and progress toward the project's strategic goals.

Products:

- TAC Meeting Schedule (draft and final)
- TAC Meeting Agendas (draft and final)
- TAC Meeting Back-up Materials
- TAC Meeting Summaries

IV. TECHNICAL TASKS

Products that require a draft version are indicated by marking “(draft and final)” after the product name in the “Products” section of the task/subtask. If “(draft and final)” does not appear after the product name, only a final version of the product is required. Subtask 1.1 (Products) describes the procedure for submitting products to the CAM.

TASK 2: WIND MODELING

The goal of this task is to implement a high-resolution wind model such as the Simulator of Wind Farm Applications (SOWFA) to accurately model reductions in wind stress at the sea surface from the presence of an offshore wind farm.

EXHIBIT A

Scope of Work

1
2 **The Recipient shall:**

- 3
- 4 • Compile data sources for the development, calibration, and validation of a high-resolution
 - 5 wind model (such as SOWFA) for at least three different offshore wind sites, such as the
 - 6 Humboldt, Morro Bay, and Diablo Canyon offshore wind call areas.
 - 7 • Calibrate and validate the atmospheric model for baseline case. This includes:
 - 8 ○ Development of the model grids at the offshore wind sites
 - 9 ○ Configuration and compilation of the model.
 - 10 ○ Calibration and validation of model output to minimize mismatch to data sources.
 - 11 • Incorporate at least two different simulated wind turbines into the atmospheric model and
 - 12 verify that changes in wind fields are consistent with published results.
 - 13 • Run atmospheric model cases for various seasonal and interannual baseline (no wind
 - 14 turbines) and modified (with wind farm) cases at 10-meter height above the ocean surface.
 - 15 • Prepare an *Atmospheric Model Report* that describes, at a minimum, atmospheric model
 - 16 data sources, model set-up and boundary conditions, inputs, outputs, and
 - 17 error/uncertainty.
 - 18 • Prepare a *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
 - 19 • Participate in a CPR meeting.

20 **Products:**

- 21 • Atmospheric Model Report
 - 22 • CPR Report #1
- 23
24

25 **TASK 3: OCEAN CIRCULATION MODELING**

26 The goal of this task is to implement a regional ocean circulation model such as the Regional
27 Ocean Modeling System (ROMS) with local refinements in model resolution at up to three offshore
28 wind sites in Task 2.

29

30 **The Recipient shall:**

- 31 • Compile data sources for the development, validation, and calibration of an ocean
- 32 circulation model (such as ROMS) at the three California offshore wind sites.
- 33 • Develop high-resolution nested grids around these offshore wind sites.
- 34 • Calibrate and validate the ocean circulation model for the baseline cases (no turbines),
- 35 with Coupled Ocean/Atmosphere Mesoscale Prediction System (COAMPS) winds in the
- 36 regional model domain and model-generated winds from Task 2 on the high-resolution
- 37 nests of the offshore wind sites. This includes:
 - 38 ○ Configuration and compilation of model
 - 39 ○ Calibration and validation of model output to minimize mismatch to data sources.
- 40 • Run ROMS or similar model approved by the CAM for various seasonal and interannual
- 41 baseline and modified (with wind farm, incorporating at least two different simulated wind
- 42 turbines) cases to produce model tracer fields, such as temperature and salinity for
- 43 baseline and modified model cases.
- 44 • Prepare an *Ocean Circulation Model Report* that describes, at a minimum, circulation
- 45 model development, circulation model data sources, model set-up and boundary
- 46 conditions, inputs, outputs, and error/uncertainty.
- 47 • Prepare a *CPR Report #2* in accordance with subtask 1.3 (CPR Meetings).

EXHIBIT A Scope of Work

- Participate in a CPR meeting.

Products:

- Ocean Circulation Model Report (draft and final)
- CPR Report #2

TASK 4: UPWELLING INDICES

The goal of this task is to compute upwelling indices for circulation and nutrient supply for ocean circulation model runs (baseline and modified) when locally forced by high-resolution winds, parameterized using the atmospheric model.

The Recipient shall:

- Compute physical and biogeochemical upwelling metrics for baseline cases (no turbines) and compare with past estimates.
- Compute physical and biogeochemical upwelling metrics for modified cases (with wind farm, incorporating at least two different simulated wind turbines).
- Prepare an *Upwelling Metrics Model Report* that describes, at a minimum, data sources, model set-up and boundary conditions, inputs, outputs, error/uncertainty and a comparison of the upwelling metrics for the baseline and modified cases.

Products:

- Upwelling Metrics Model Report (draft and final)

TASK 5: EVALUATION OF PROJECT BENEFITS

The goal of this task is to report the benefits resulting from this project.

The Recipient shall:

- Complete three Project Benefits Questionnaires that correspond to three main intervals in the Agreement: (1) *Kick-off Meeting Benefits Questionnaire*; (2) *Mid-term Benefits Questionnaire*; and (3) *Final Meeting Benefits Questionnaire*.
- Provide all key assumptions used to estimate projected benefits, including targeted market sector (e.g., population and geographic location), projected market penetration, baseline and projected energy use and cost, operating conditions, and emission reduction calculations. Examples of information that may be requested in the questionnaires include:
 - For Product Development Projects and Project Demonstrations:
 - Published documents, including date, title, and periodical name.
 - Estimated or actual energy and cost savings, and estimated statewide energy savings once market potential has been realized. Identify all assumptions used in the estimates.
 - Greenhouse gas and criteria emissions reductions.
 - Other non-energy benefits such as reliability, public safety, lower operational cost, environmental improvement, indoor environmental quality, and societal benefits.
 - Data on potential job creation, market potential, economic development, and increased state revenue as a result of the project.

EXHIBIT A Scope of Work

- 1 ▪ A discussion of project product downloads from websites, and publications in
2 technical journals.
- 3 ▪ A comparison of project expectations and performance. Discuss whether the goals
4 and objectives of the Agreement have been met and what improvements are
5 needed, if any.
- 6 ▪ Additional Information for Product Development Projects:
 - 7 • Outcome of product development efforts, such copyrights and license
8 agreements.
 - 9 • Units sold or projected to be sold in California and outside of California.
 - 10 • Total annual sales or projected annual sales (in dollars) of products
11 developed under the Agreement.
 - 12 • Investment dollars/follow-on private funding as a result of Energy
13 Commission funding.
 - 14 • Patent numbers and applications, along with dates and brief descriptions.
- 15 ▪ Additional Information for Product Demonstrations:
 - 16 • Outcome of demonstrations and status of technology.
 - 17 • Number of similar installations.
 - 18 • Jobs created/retained as a result of the Agreement.
- 19 ○ For Information/Tools and Other Research Studies:
 - 20 ▪ Outcome of project.
 - 21 ▪ Published documents, including date, title, and periodical name.
 - 22 ▪ A discussion of policy development. State if the project has been cited in
23 government policy publications or technical journals, or has been used to
24 inform regulatory bodies.
 - 25 ▪ The number of website downloads.
 - 26 ▪ An estimate of how the project information has affected energy use and
27 cost, or have resulted in other non-energy benefits.
 - 28 ▪ An estimate of energy and non-energy benefits.
 - 29 ▪ Data on potential job creation, market potential, economic development,
30 and increased state revenue as a result of project.
 - 31 ▪ A discussion of project product downloads from websites, and publications
32 in technical journals.
 - 33 ▪ A comparison of project expectations and performance. Discuss whether
34 the goals and objectives of the Agreement have been met and what
35 improvements are needed, if any.
 - 36 • Respond to CAM questions regarding responses to the questionnaires.

37
38
39 The Energy Commission may send the Recipient similar questionnaires after the Agreement
40 term ends. Responses to these questionnaires will be voluntary.

41 **Products:**

- 42 • Kick-off Meeting Benefits Questionnaire
- 43 • Mid-term Benefits Questionnaire
- 44 • Final Meeting Benefits Questionnaire

EXHIBIT A Scope of Work

TASK 6: TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

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

The Recipient shall:

- Prepare an *Initial Fact Sheet* at start of the project that describes the project. Use the format provided by the CAM.
- Prepare a *Final Project Fact Sheet* at the project's conclusion that discusses results. Use the format provided by the CAM.
- Prepare a *Technology/Knowledge Transfer Plan* that includes:
 - An explanation of how the knowledge gained from the project will be made available to the public, including the targeted market sector and potential outreach to end users, utilities, regulatory agencies, and others.
 - A description of the intended use(s) for and users of the project results.
 - Published documents, including date, title, and periodical name.
 - Copies of documents, fact sheets, journal articles, press releases, and other documents prepared for public dissemination. These documents must include the Legal Notice required in the terms and conditions. Indicate where and when the documents were disseminated.
 - A discussion of policy development. State if project has been or will be cited in government policy publications, or used to inform regulatory bodies.
 - The number of website downloads or public requests for project results.
 - Additional areas as determined by the CAM.
- Conduct technology transfer activities in accordance with the Technology/Knowledge Transfer Plan. These activities will be reported in the Progress Reports.
- When directed by the CAM, develop *Presentation Materials* for an Energy Commission-sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the California Energy Commission.
- Provide at least (6) six *High Quality Digital Photographs* (minimum resolution of 1300x500 pixels in landscape ratio) of pre and post technology installation at the project sites or related project photographs.
- Prepare a *Technology/Knowledge Transfer Report* on technology transfer activities conducted during the project.

Products:

- Initial Fact Sheet (draft and final)
- Final Project Fact Sheet (draft and final)
- Presentation Materials (draft and final)
- High Quality Digital Photographs
- Technology/Knowledge Transfer Plan (draft and final)
- Technology/Knowledge Transfer Report (draft and final)

V. PROJECT SCHEDULE

Please see attached Excel spreadsheet.

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION - RE: INTEGRAL CONSULTING INC

RESOLVED, that the State Energy Resources Conservation and Development Commission (CEC) adopts the staff CEQA findings contained in the Agreement or Amendment Request Form (as applicable); and

RESOLVED, that the CEC approves Agreement EPC-19-009 with Integral Consulting Inc. for a \$500,000 grant to investigate the effects of large-scale offshore wind farms on wind stress reduction and the potential impacts on coastal upwelling; and

FURTHER BE IT RESOLVED, that the Executive Director or his/her designee shall execute the same on behalf of the CEC.

CERTIFICATION

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the CEC held on April 8, 2020.

AYE:

NAY:

ABSENT:

ABSTAIN:

Cody Goldthrite
Secretariat