California Energy Commission
July 26, 2023 Business Meeting
Backup Materials for Agenda Item No 10a:
Integral Consulting Inc.

The following backup materials for the above-referenced agenda item are available in this PDF packet as listed below:

1. Proposed Resolution
2. Grant Request Form
3. Scope of Work

RESOLUTION NO: 23-0726-10a

STATE OF CALIFORNIA

STATE ENERGY RESOURCES
CONSERVATION AND DEVELOPMENT COMMISSION

RESOLUTION: 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-23-001 with Integral Consulting Inc. for a $3,400,868 grant to develop and validate an integrated, real-time, multi-scale system to monitor avian interactions with floating offshore wind turbines; and

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

CERTIFICATION

The undersigned Secretariat to the CEC 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 July 26, 2023.

AYE:
NAY:
ABSENT:
ABSTAIN:

Dated:

_____
Kristina Banaag
Secretariat

STATE OF CALIFORNIA
CALIFORNIA ENERGY COMMISSION

CEC-270 (Revised 9/2022)

GRANT REQUEST FORM (GRF)

A. New Agreement Number

IMPORTANT: New Agreement # to be completed by Contracts, Grants, and Loans Office.

New Agreement Number: EPC-23-001

B. Division Information

1. Division Name: ERDD
2. Agreement Manager: Mark Danielson
3. MS-:51
4. Phone Number: 916-805-7515

C. Recipient's Information

1. Recipient's Legal Name: Integral Consulting Inc.
2. Federal ID Number: 48-1266683

D. Title of Project

Title of project: Integrated, Real-Time, Multi-Scale System for Monitoring Seabird Interactions with Floating Offshore Wind Technologies

E. Term and Amount

1. Start Date: 8/1/2023
2. End Date: 3/31/2027
3. Amount: $3,400,868.00

F. Business Meeting Information

1. Are the ARFVTP agreements $75K and under delegated to Executive Director? No
2. The Proposed Business Meeting Date: 7/12/2023 .
3. Consent or Discussion? Discussion
4. Business Meeting Presenter Name: Mark Danielson
5. Time Needed for Business Meeting: 5 minutes.
6. The email subscription topic is: EPIC (Electric Program Investment Charge).

Agenda Item Subject and Description:

Integral Consulting Inc. Proposed resolution approving agreement EPC-23-001 with Integral Consulting Inc. for a $3,400,868 grant to develop and validate an integrated, real-time, multi-scale system to monitor avian interactions with floating offshore wind turbines, and adopting staff's determination that this action is exempt from CEQA. This project will help minimize non-technical risks associated with environmental permitting and increase knowledge of potential wildlife impacts in marine waters offshore California. (EPIC funding) Contact: Mark Danielson (Staff Presentation: 5 minutes)

G. California Environmental Quality Act (CEQA) Compliance

1. **Is Agreement considered a "Project" under CEQA?**
   Yes

   If yes, skip to question 2.

If no, complete the following (PRC 21065 and 14 CCR 15378) and 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 answer the following questions.**

a) Agreement **IS** exempt?

Yes

Statutory Exemption?
No

If yes, list PRC and/or CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

PRC section number: None

CCR section number: None

Categorical Exemption?
Yes

If yes, list CCR section number(s) and separate each with a comma. If no, enter "None" and go to the next question.

CCR section number: Cal. Code Regs., tit. 14, § 15301 ;

Common Sense Exemption? 14 CCR 15061 (b) (3)
No

If yes, explain reason why Agreement is exempt under the above section. If no, enter "Not applicable" and go to the next section.

This project will involve environmental monitoring technologies research conducted at existing locations and testing facilities.

Cal. Code Regs., tit. 14, Section 15301, Existing Facilities, provides an exemption for the operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing structures, facilities, mechanical equipment or topographical features involving negligible or no expansion of use beyond that existing. This project will conduct research and development almost entirely within already existing facilities. There will be negligible or no expansion of existing use. Therefore, the project falls within Section 15301 and will not have a significant effect on the environment.

Cal. Code Regs., tit. 14, sect. 15306 consists of basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. This project involves a limited amount of field testing (i.e., testing of sensors and radar outside). This work will not result in a serious or major disturbance to an environmental resource. For these reasons, the proposed project will have no significant effect on the environment and is categorically exempt under section 15306.

The project will not impact an environmental resource of hazardous or critical concern where designated, precisely mapped, and officially adopted pursuant to law

by federal, state, or local agencies; does not involve any cumulative impacts of successive projects of the same type in the same place that might be considered significant; does not involve unusual circumstances that might have a significant effect on the environment; will not result in damage to scenic resources within a highway officially designated as a state scenic highway; the project site is not included on any list compiled pursuant to Government Code section 65962.5; and the project will not cause a substantial adverse change in the significance of a historical resource. Therefore, none of the exceptions to categorical exemptions listed in CEQA Guidelines section 15300.2 apply to this project, and this project will not have a significant effect on the environment.

b) Agreement **IS NOT** exempt.

IMPORTANT: consult with the legal office to determine next steps.

No

If yes, answer yes or no to all that applies. If no, list all as "no" and "None" as "yes".

Additional Documents	Applies
Initial Study	No
Negative Declaration	No
Mitigated Negative Declaration	No
Environmental Impact Report	No
Statement of Overriding Considerations	No
None	Yes

H. Subcontractors

List all Subcontractors listed in the Budget (s) (major and minor). Insert additional rows if needed. If no subcontractors to report, enter "No subcontractors to report" and "0" to funds. **Delete** any unused rows from the table.

Subcontractor Legal Company Name	CEC Funds	Match Funds
Triple HS, Inc. d.b.a. H. T. Harvey & Associates	$ 525,000	**$**0
DeTect, Inc	$ 428,200	**$**0
DOE- Pacific Northwest National Laboratory	$ 224,695	**$**0
SightIR, Inc.	$ 488,465	**$**0
VelvetWire LLC	$ 199,682	**$**0
General Electric Research	$ 269,897	**$**0
DOE - Sandia National Laboratories	$ 359,827	**$**0

I. Vendors and Sellers for Equipment and Materials/Miscellaneous

List all Vendors and Sellers listed in Budget(s) for Equipment and Materials/Miscellaneous. Insert additional rows if needed. If no vendors or sellers to report, enter "No vendors or sellers to report" and "0" to funds. **Delete** any unused rows from the table.

Vendor/Seller Legal Company Name	CEC Funds	Match Funds
No vendors to report	**$**	**$**

J. Key Partners

List all key partner(s). Insert additional rows if needed. If no key partners to report, enter "No key partners to report." **Delete** any unused rows from the table.

Key Partner Legal Company Name
No key partners to report

K. Budget Information

Include all budget information. Insert additional rows if needed. If no budget information to report, enter "N/A" for "Not Applicable" and "0" to Amount. **Delete** any unused rows from the table.

Funding Source	Funding Year of Appropriation	Budget List Number	Amount
EPIC	21-22	301.001I	$ 3,400,868

TOTAL Amount: $ 3,400,868

R&D Program Area: EGRB: Renewables

Explanation for "Other" selection Not applicable

Reimbursement Contract #: Not applicable

Federal Agreement #: Not applicable

L. Recipient's Contact Information

1. Recipient's Administrator/Officer

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

3. 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

M. Selection Process Used

There are three types of selection process. List the one used for this GRF.

Selection Process	Additional Information
Competitive Solicitation #	GFO-22-401
First Come First Served Solicitation #	Not applicable
Other	Not applicable

N. Attached Items

1. List all items that should be attached to this GRF by entering “Yes” or “No”.

Item Number	Item Name	Attached
1	Exhibit A, Scope of Work/Schedule	Yes
2	Exhibit B, Budget Detail	Yes
3	CEC 105, Questionnaire for Identifying Conflicts	Enter Yes or No.
4	Recipient Resolution	Enter Yes or No.
5	Awardee CEQA Documentation	Enter Yes or No.

Approved By

Individuals who approve this form must enter their full name and approval date in the MS Word version.

Agreement Manager: Mark Danielson

Approval Date: 5/26/2023

Branch Manager: Kevin Uy

Approval Date: 5/31/2023

Director: Kevin Uy for Angela Gould

Approval Date: 5/31/2023

Exhibit A
Scope of Work
Integral Consulting Inc.

I. TASK ACRONYM/TERM LISTS

A. Task List

Task #	CPR[1]	Task Name
1		General Project Tasks
2		Radar System Validation
3		ThermalTracker Three-Dimensional (TT3D) System Validation
4		Radar and TT3D System Integration and Data Fusion
5	X	Blade Strike Simulations, Validation, and Integration
6		Evaluation of Project Benefits
7		Technology/Knowledge Transfer Activities

B. Acronym/Term List

Acronym/Term	Meaning
BOEM	Bureau of Ocean Energy Management
CAM	Commission Agreement Manager
CAO	Commission Agreement Officer
CEC	California Energy Commission
CPR	Critical Project Review
FOSW	Floating Offshore Wind
LCOE	Levelized Cost of Energy
NGO	Non-government Organization
Recipient	Integral Consulting Inc.
TAC	Technical Advisory Committee
TT3D	ThermalTracker Three-Dimensional
WEA	Wind Energy Area

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

A. Purpose of Agreement

The purpose of this Agreement is to fund the development and validation of an integrated, real-time, multi-scale system to monitor and characterize bird and bat interactions (e.g., collision and avoidance) with floating offshore wind (FOSW) technologies. The Recipient will evaluate and validate radar, three-dimensional thermal imaging, and blade-mounted sensors for macro-, meso-, and micro-scale assessments. Additionally, the Recipient will assess the feasibility of cloud-based infrastructure and artificial intelligence for automated detection and species classification, thereby streamlining environmental monitoring data characterization and reducing the need for human validation and associated costs.

[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.

B. Problem/ Solution Statement

Problem

Regulatory permits and authorizations require offshore wind energy to be planned, constructed, and operated in ways that avoid and minimize environmental impacts, including potential harm to wildlife. The Wind Energy Areas (WEAs) off California are rich with birds under protection by the Migratory Bird Treaty Act and some species are also protected by the Endangered Species Act including albatross, murrelet, and petrel. Some birds (e.g., albatross, shearwaters, and petrels) may be more vulnerable to collision with FOSW because of their reliance on wind-rich areas to propel their long-distance movements between breeding and foraging grounds offshore, often at night, and frequently flying at heights similar to rotor-swept zones (when FOSW are present). Proposed wind energy projects are required to assess the risk of bird fatality, obtain Migratory Bird Treaty Act and Endangered Species Act take authorizations, and commit to long-term monitoring and mitigation requirements to verify, or adjust through mitigation, that they do not exceed authorized take levels. The characterization of risk is frequently based upon bird abundance survey data that have been derived either from human or radar observations and driven by conservative assumptions with respect to the relative relationship between numbers of birds present and frequency of bird strikes. The relationship between bird presence and frequency of strike events is not well understood either in general, or on a species-specific basis. Data are needed to better estimate relative risk in relation to bird densities that incorporate species-specific behaviors including avoidance.

Pelletier et al. (2013)[2] have documented bat activity as far offshore as 805 km (500 miles) from coastal shorelines; however, with the exception of studies performed on California islands (Channel Islands and the Farallon Islands), very little, if any, bat activity data are available for the California coast. The Bureau of Ocean Energy Management (BOEM) is currently supporting a systematic study of offshore acoustic bat activity along the California coastline that will help address regulatory concerns in advance of offshore wind energy development in this region. This BOEM study will evaluate the temporal and spatial distribution of vocalizing bats offshore of the California coast and determine metrics to evaluate mortality risk with offshore wind energy development.

Solution

Real-time, automated detection and identification information may facilitate targeted curtailments by providing the capacity to assess species' presence and abundance. In addition to the need to understand species-specific passage rate of individuals through wind facilities and rotor-swept zones, other metrics that are useful for understanding collision risk include species-specific measures of turbine avoidance or attraction at various scales (macro, meso, and micro) and potential collision covariates such as wind speed, seabird and bat behavior (foraging, transiting, seasonal migration, etc.) and flight characteristics (flapping style, height, speed, and direction relative to wind). No single sensor can provide a holistic picture of bird/bat behavior at remote offshore locations. The Recipient will integrate proven technologies to monitor near-, mid-, and far-field bird and bat behavior – integrating multi-scale data to characterize avoidance, attraction, and changes in flight behavior. Data from multi-scale, diverse sensing systems will be combined seamlessly into relevant information for assessing

[2] Pelletier, S.K., K. Omland, K.S. Watrous, and T.S. Peterson (2013) Information Synthesis on the Potential for Bat Interactions with Offshore Wind Facilities – Final Report. U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2013-01163.119 p.

and managing risk. The value provided by the integrated system is greater than that of the individual sensors, and costs are reduced through shared infrastructure.

C. Goals and Objectives of the Agreement

Agreement Goals

The goal of this Agreement is to:

- Develop, test, and validate an integrated, real-time, multi-scale system in which multiple sensors work together to improve bird monitoring capacity and understanding of bird and bat interactions with FOSW technologies and provide data to better estimate relative risk of bird and bat strike with FOSW projects.

Ratepayer Benefits:[3] This Agreement will result in the ratepayer benefit of lower costs by minimizing risks to wildlife and therefore, de-risking sites prior to offtake. Investment in pre-development activities will reduce developer risk, resulting in reductions in developer uncertainty and a benefit of an estimated $530M over 25 years.[4] Preliminary cost estimates for FOSW environmental monitoring are 0.3-0.5% of levelized cost of energy (LCOE). While current projections of FOSW developments in the U.S. consider development and permitting to account for about 1-2% of the LCOE of a project, the timeline impacts of permit negotiations, delays, and litigation have an outsized impact on an individual project's economic viability that is not examined by those current projections. With respect to wildlife, the better the ability to predict potential effects in a data-driven risk assessment framework, the better the ability to prioritize and evaluate mitigation and monitoring needs and reduce costs to developers, and thus ratepayers, by targeting mitigation and monitoring and developing practical data collection and analysis approaches for meaningful adaptive management and adjustments to management that consider actual baseline conditions.

Technological Advancement and Breakthroughs: This Agreement will lead to technological advancement and breakthroughs to overcome barriers to the achievement of the State of California's statutory energy goals by increasing understanding of potential interactions between birds and FOSW technologies. The results afforded by the developed technology will benefit State and federal government, stakeholder, and developer decision-making for FOSW projects. Integrated, real-time, multi-scale sensing will help define policies, facilitate permitting, evaluate turbine siting and arrays, inform construction and operations, understand trade-offs, identify data gaps and prioritize research, and expedite device deployment, the results of which will be increased renewable energy generation in California and further diversification of the State's clean energy portfolio. Non-government organizations (NGOs) can use information from the developed technology to consider strategies to support sustainable approaches to FOSW development and inform engagement with developers and stakeholders. Agencies, researchers, and NGOs can also use outcomes to evaluate data gaps and prioritize research to address areas of risk. In complex, dynamic systems that are logistically difficult and expensive to study,

[3] 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).

[4] McClellan Press, K. and G. Lampman. 2019. New York's Predevelopment Activities Advance Offshore Wind. North American Clean Energy. 40–41.

data gaps will require an assessment of risk and application of well-considered mitigation and monitoring to inform adaptive management.

Agreement Objectives

The objectives of this Agreement are to:

- Integrate macro (far-field) radar and meso- and micro- (mid/near) range ThermalTracker Three-Dimensional (TT3D) data into a common sensing system that is capable of combining far-field patterns of distribution with mid-range to near-field patterns of behavior and potential bird and bat strike risk exposure.
- Validate real-time capabilities of the integrated monitoring system for improved capacity for seabird and bat monitoring, detection, and identification.
- Simulate impact strikes of representative turbine blades and analyze the structural response of wind turbine blades to simulated bird and bat collisions to develop blade strike sensor requirements and optimize sensor configurations for maximum sensitivity and minimal aerodynamic impact (target detectability percentage of 15 – 33% for static blades and 10 – 25% for operational).
- Successfully detect (90% probability of detection) a drone in the macro-scale range (between 2 and 6 miles and up to 360°), track its movement into the meso-scale range (within 2 miles and 20°), and demonstrate accurate detection of simulated seabird and bat collisions at the micro-range using blade-mounted sensors (80% accuracy in vibration sensing only mode).
- Successfully demonstrate the ability to identify up to three different bird morphologies/flight style groups, in addition to bat flight characteristics, which are markedly different from bird flight styles.

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). All products submitted which will be viewed by the public, must comply with the accessibility requirements of Section 508 of the federal Rehabilitation Act of 1973, as amended (29 U.S.C. Sec. 794d), and regulations implementing that act as set forth in Part 1194 of Title 36 of the Federal Code of Regulations**.** All technical tasks should include product(s). 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:

- **Electronic File Format**
  - Submit all data and documents required as products under this Agreement in an electronic file format that is fully editable and compatible with the California Energy Commission's (CEC) software and Microsoft (MS)-operating computing platforms, or with any other format approved by the CAM. Deliver an electronic copy of the full text of any Agreement data and documents in a format specified by the CAM, such as memory stick.

  The following describes the accepted formats for electronic data and documents provided to the CEC as products under this Agreement, and establishes the software versions that will be required to review and approve all software products:
  - Data sets will be in MS Access or MS Excel file format (version 2007 or later), or any other format approved by the CAM.
  - Text documents will be in MS Word file format, version 2007 or later.
  - Project management documents will be in Microsoft Project file format, version 2007 or later.

- **Software Application Development**
  Use the following standard Application Architecture components in compatible versions for any software application development required by this Agreement (e.g., databases, models, modeling tools), unless the CAM approves other software applications such as open-source programs:
  - Microsoft ASP.NET framework (version 3.5 and up). Recommend 4.0.
  - Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5.
  - Visual Studio.NET (version 2008 and up). Recommend 2010.
  - C# Programming Language with Presentation (UI), Business Object and Data Layers.
  - SQL (Structured Query Language).
  - Microsoft SQL Server 2008, Stored Procedures. Recommend 2008 R2.
  - Microsoft SQL Reporting Services. Recommend 2008 R2.
  - XML (external interfaces).

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

MEETINGS

Subtask 1.2 Kick-off Meeting

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

The Recipient shall:

- Attend a "Kick-off" meeting with the CAM, the Commission Agreement Officer (CAO), and any other CEC staff relevant to the Agreement. The Recipient will bring its Project Manager and any other individuals designated by the CAM to this meeting. The administrative and technical aspects of the Agreement will be discussed at the meeting. Prior to the meeting, the CAM will provide an agenda to all potential meeting participants. The meeting may take place in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The administrative portion of the meeting will include discussion of the following:
  - Terms and conditions of the Agreement;
  - Invoicing and auditing procedures;
  - Administrative products (subtask 1.1);
  - CPR meetings (subtask 1.3);
  - Match fund documentation (subtask 1.7);
  - Permit documentation (subtask 1.8);
  - Subcontracts (subtask 1.9); and
  - Any other relevant topics.

  The technical portion of the meeting will include discussion of the following:
  - The CAM's expectations for accomplishing tasks described in the Scope of Work;
  - An updated Project Schedule;
  - Technical products (subtask 1.1);
  - Progress reports (subtask 1.5);
  - Final Report (subtask 1.6);
  - Technical Advisory Committee meetings (subtasks 1.10 and 1.11); and
  - Any other relevant topics.

- Provide *Kick-off Meeting Presentation* to include but not limited to:
  - Project overview (i.e. project description, goals and objectives, technical tasks, expected benefits, etc.)
  - Project schedule that identifies milestones
  - List of potential risk factors and hurdles, and mitigation strategy

- Provide an *Updated Project Schedule, Match Funds Status Letter,* and *Permit Status Letter*, as needed to reflect any changes in the documents.

The CAM shall:

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

Exhibit A
Scope of Work
Integral Consulting Inc.

Recipient Products:

- Kick-off Meeting Presentation
- Updated Project Schedule *(if applicable)*
- Match Funds Status Letter (subtask 1.7) *(if applicable)*
- Permit Status Letter (subtask 1.8) *(if applicable)*

CAM Product:

- Kick-off Meeting Agenda

Subtask 1.3 Critical Project Review (CPR) Meetings

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

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

The Recipient shall:

- Prepare and submit a *CPR Report* for each CPR meeting that: (1) discusses the progress of the Agreement toward achieving its goals and objectives; and (2) includes recommendations and conclusions regarding continued work on the project.
- Attend the CPR meeting.
- Present the CPR Report and any other required information at each CPR meeting.

The CAM shall:

- Determine the location, date, and time of each CPR meeting with the Recipient's input.
- Send the Recipient a *CPR Agenda* with a list of expected CPR participants in advance of the CPR meeting. If applicable, the agenda will include a discussion of match funding and permits.
- Conduct and make a record of each CPR meeting. Provide the Recipient with a schedule for providing a Progress Determination on continuation of the project.
- Determine whether to continue the project, and if so whether modifications are needed to the tasks, schedule, products, or budget for the remainder of the Agreement. If the CAM concludes that satisfactory progress is not being made, this conclusion will be referred to the Deputy Director of the Energy Research and Development Division.
- Provide the Recipient with a *Progress Determination* on continuation of the project, in accordance with the schedule. The Progress Determination may include a requirement that the Recipient revise one or more products.

Recipient Products:
- CPR Report(s)

CAM Products:
- CPR Agenda(s)
- Progress Determination

Subtask 1.4 Final Meeting
The goal of this subtask is to complete the closeout of this Agreement.

The Recipient shall:
- Meet with CEC staff to present project findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement. This meeting will be attended by the Recipient and CAM, at a minimum. The meeting may occur in person or by electronic conferencing (e.g., WebEx), with approval of the CAM.

  The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be divided into two separate meetings at the CAM's discretion.
  - The technical portion of the meeting will involve the presentation of findings, conclusions, and recommended next steps (if any) for the Agreement. The CAM will determine the appropriate meeting participants.
  - The administrative portion of the meeting will involve a discussion with the CAM and the CAO of the following Agreement closeout items:
    - Disposition of any procured equipment.
    - The CEC's request for specific "generated" data (not already provided in Agreement products).
    - Need to document the Recipient's disclosure of "subject inventions" developed under the Agreement.
    - "Surviving" Agreement provisions such as repayment provisions and confidential products.
    - Final invoicing and release of retention.
- Prepare a *Final Meeting Agreement Summary* that documents any agreement made between the Recipient and Commission staff during the meeting.
- Prepare a *Schedule for Completing Agreement Closeout Activities*.
- Provide copies of *All Final Products* on a USB memory stick, organized by the tasks in the Agreement.

Products:
- Final Meeting Agreement Summary *(if applicable)*
- Schedule for Completing Agreement Closeout Activities
- All Final Products

REPORTS AND INVOICES

Subtask 1.5 Progress Reports and Invoices
The goals of this subtask are to: (1) periodically verify that satisfactory and continued progress is made towards achieving the project objectives of this Agreement; and (2) ensure that invoices contain all required information and are submitted in the appropriate format.

Exhibit A
Scope of Work
Integral Consulting Inc.

The Recipient shall:

- Submit a quarterly *Progress Report* to the CAM. Each progress report must:
  - Summarize progress made on all Agreement activities as specified in the scope of work for the preceding quarter, including accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. See the Progress Report Format Attachment for the recommended specifications.
- Engage in monthly check-in calls with the CAM to discuss, at a minimum:
  - Progress made on all Agreement activities as specified in the scope of work for the preceding month, including summaries of accomplishments, problems, milestones, products, schedule, fiscal status, and an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns.
- Submit a monthly or quarterly *Invoice* that follows the instructions in the "Payment of Funds" section of the terms and conditions, including a financial report on Match Funds and in-state expenditures.

Products:

- Progress Reports
- Invoices

Subtask 1.6 Final Report

The goal of this subtask is to prepare a comprehensive Final Report that describes the original purpose, approach, results, and conclusions of the work performed under this Agreement. When creating the Final Report Outline and the Final Report, the Recipient must use the CEC Style Manual provided by the CAM.

Subtask 1.6.1 Final Report Outline

The Recipient shall:

- Prepare a *Final Report Outline* in accordance with the *Energy Commission Style Manual* provided by the CAM.

Recipient Products:

- Final Report Outline (draft and final)

CAM Product:

- Energy Commission Style Manual
- Comments on Draft Final Report Outline
- Acceptance of Final Report Outline

Subtask 1.6.2 Final Report

The Recipient shall:

- Prepare a *Final Report* for this Agreement in accordance with the approved Final Report Outline, Energy Commission Style Manual, and Final Report Template provided by the CAM with the following considerations:
  - Ensure that the report includes the following items, in the following order:

- Cover page (**required**)
- Credits page on the reverse side of cover with legal disclaimer (**required**)
- Acknowledgements page (optional)
- Preface (**required**)
- Abstract, keywords, and citation page (**required**)
- Table of Contents (**required**, followed by List of Figures and List of Tables, if needed)
- Executive summary (**required**)
- Body of the report (**required**)
- References (if applicable)
- Glossary/Acronyms (If more than 10 acronyms or abbreviations are used, it is required.)
- Bibliography (if applicable)
- Appendices (if applicable) (Create a separate volume if very large.)
- Attachments (if applicable)

- Submit a draft of the Executive Summary to the TAC for review and comment.
- Develop and submit a *Summary of TAC Comments on Draft Final Report* received on the Executive Summary. For each comment received, the recipient will identify in the summary the following:
  - Comments the recipient proposes to incorporate.
  - Comments the recipient does propose to incorporate and an explanation for why.
- Submit a draft of the report to the CAM for review and comment. The CAM will provide written comments to the Recipient on the draft product within 15 days of receipt.
- Incorporate all CAM comments into the *Final Report*. If the Recipient disagrees with any comment, provide a *Written Responses to Comments* explaining why the comments were not incorporated into the final product.

- Submit the revised *Final Report* electronically with any Written Responses to Comments within 10 days of receipt of CAM's Written Comments on the Draft Final Report, unless the CAM specifies a longer time period or approves a request for additional time.

Products:

- Summary of TAC Comments on Draft Final Report
- Draft Final Report
- Written Responses to Comments *(if applicable)*
- Final Report

CAM Product:

- Written Comments on the Draft Final Report

MATCH FUNDS, PERMITS, AND SUBCONTRACTS

Subtask 1.7 Match Funds

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

While the costs to obtain and document match funds are not reimbursable under this Agreement, the Recipient may spend match funds for this task. The Recipient may only spend match funds during the Agreement term, either concurrently or prior to the use of CEC funds. Match funds must be identified in writing, and the Recipient must obtain any associated

commitments before incurring any costs for which the Recipient will request reimbursement.

The Recipient shall:

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

  If match funds were a part of the proposal that led to the CEC awarding this Agreement, then provide in the letter:
  - A list of the match funds that identifies:
    - The amount of cash match funds, their source(s) (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied.
    - The amount of each in-kind contribution, a description of the contribution type (e.g., property, services), the documented market or book value, the source (including a contact name, address, and telephone number), and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Recipient must identify its owner and provide a contact name, address, telephone number, and the address where the property is located.
    - If different from the solicitation application, provide a letter of commitment from an authorized representative of each source of match funding that the funds or contributions have been secured.
- At the Kick-off meeting, discuss match funds and the impact on the project if they are significantly reduced or not obtained as committed. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide a *Supplemental Match Funds Notification Letter* to the CAM of receipt of additional match funds.
- Provide a *Match Funds Reduction Notification Letter* to the CAM if existing match funds are reduced during the course of the Agreement. Reduction of match funds may trigger a CPR meeting.

Products:

- Match Funds Status Letter
- Supplemental Match Funds Notification Letter *(if applicable)*
- Match Funds Reduction Notification Letter *(if applicable)*

Subtask 1.8 Permits

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

Exhibit A
Scope of Work
Integral Consulting Inc.

The Recipient shall:

- Prepare a *Permit Status Letter* that documents the permits required to conduct this Agreement. If no permits are required at the start of this Agreement, then state this in the letter. If permits will be required during the course of the Agreement, provide in the letter:
    - A list of the permits that identifies: (1) the type of permit; and (2) the name, address, and telephone number of the permitting jurisdictions or lead agencies.
    - The schedule the Recipient will follow in applying for and obtaining the permits.

  The list of permits and the schedule for obtaining them will be discussed at the Kick-off meeting (subtask 1.2), and a timetable for submitting the updated list, schedule, and copies of the permits will be developed. The impact on the project if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the CAM with an *Updated List of Permits* (including the appropriate information on each permit) and an *Updated Schedule for Acquiring Permits*.
- Send the CAM a *Copy of Each Approved Permit*.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the CAM within 5 days. Either of these events may trigger a CPR meeting.

Products:

- Permit Status Letter
- Updated List of Permits *(if applicable)*
- Updated Schedule for Acquiring Permits *(if applicable)*
- Copy of Each Approved Permit *(if applicable)*

Subtask 1.9 Subcontracts

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

The Recipient shall:

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

Products:

- Subcontracts *(draft if required by the CAM)*

TECHNICAL ADVISORY COMMITTEE

Subtask 1.10 Technical Advisory Committee (TAC)

The goal of this subtask is to create an advisory committee for this Agreement. The TAC should be composed of diverse professionals. The composition will vary depending on interest, availability, and need. TAC members will serve at the CAM's discretion. The purpose of the TAC is to:

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

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

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

The Recipient shall:

- Prepare a *List of Potential TAC Members* that includes the names, companies, physical and electronic addresses, and phone numbers of potential members. The list will be

discussed at the Kick-off meeting, and a schedule for recruiting members and holding the first TAC meeting will be developed.
- Recruit TAC members. Ensure that each individual understands member obligations and the TAC meeting schedule developed in subtask 1.11.
- Prepare a *List of TAC Members* once all TAC members have committed to serving on the TAC.
- Submit *Documentation of TAC Member Commitment* (such as Letters of Acceptance) from each TAC member.

Products:
- List of Potential TAC Members
- List of TAC Members
- Documentation of TAC Member Commitment

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.
- Review and provide comments to proposed project performance metrics.
- Review and provide comments to proposed project Draft Technology Transfer Plan.

Products:
- TAC Meeting Schedule (draft and final)

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

Subtask 1.12 Project Performance Metrics
The goal of this subtask is to finalize key performance targets for the project based on feedback from the TAC and report on final results in achieving those targets. The performance targets should be a combination of scientific, engineering, techno-economic, and/or programmatic metrics that provide the most significant indicator of the research or technology's potential success.

The Recipient shall:

- Complete and submit the project performance metrics section of the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task, to the CAM.
- Present the draft project performance metrics at the first TAC meeting to solicit input and comments from the TAC members.
- Develop and submit a *TAC Performance Metrics Summary* that summarizes comments received from the TAC members on the proposed project performance metrics. The *TAC Performance Metrics Summary* will identify:
    - TAC comments the Recipient proposes to incorporate into the *Initial Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
    - TAC comments the Recipient does not propose to incorporate with and explanation why.
- Develop and submit a *Project Performance Metrics Results* document describing the extent to which the Recipient met each of the performance metrics in the *Final Project Benefits Questionnaire*, developed in the Evaluation of Project Benefits task.
- Discuss the *Project Performance Metrics Results* at the Final Meeting.

Products:

- TAC Performance Metrics Summary
- Project Performance Metrics Results

Exhibit A
Scope of Work
Integral Consulting Inc.

TECHNICAL TASKS

TASK 2 RADAR SYSTEM VALIDATION

The goals of this task are to validate radar capabilities for monitoring bird and bat interactions (e.g., avoidance) with FOSW technologies and develop optimal use modes and data output to support bird collision risk modeling and mitigation schemes.

The Recipient shall:

- Collect data from published accounts and databases for data related to bird and bat species presence, relative abundance, ecologies, and behaviors in the California offshore WEAs.
- Determine optimal radar specifications to detect characteristics of birds and bats of interest (e.g., size, wingspan, for vulnerable, threatened, or endangered species) and procure a radar system that meets defined specifications.
- Prepare a *Radar System Test Plan* that describes, at a minimum, testing and validation objectives and criteria (e.g., target detection, identification, and behavior-pattern recording capability), procedures, location(s), conditions, and testing and validation equipment (e.g., radar system and drones to simulate birds in flight) including technical specifications.
- Consult with TAC on the *Radar System Test Plan* to verify technical feasibility in accordance with subtask 1.10 (Technical Advisory Committee). Incorporate TAC feedback into the *Radar System Test Plan* as appropriate.
- Perform data collection exercises in an onshore relevant “laboratory” environment over a variety of environmental conditions (e.g., weather, sun angle) expected for the California WEAs based on use-case support inputs optimized for bird collision risk modeling.
- Evaluate and validate radar field data collected in an onshore relevant “laboratory” environment (as per the bullet point above) to determine optimal use modes for the California offshore environment and specific bird and bat species of interest relevant to the California WEAs.
- Determine utility of field data as inputs to bird collision risk models as well as for FOSW technology operational and environmental monitoring.
- Prepare a draft *Radar System Report* that describes, at a minimum:
    - Field data collection activities (including location, date/time, environmental conditions, drone simulations, bird observations).
    - End-of-project optimal/target radar use modes determined from field data collection activities.
    - Accuracy of target detection.
    - Advantages and limitations of radar data as inputs to bird collision risk models as well as for FOSW technology operational and environmental monitoring.
    - Methodologies and testing to ensure operational durability in the California WEAs and long-term deployment.
- Submit the draft *Radar System Report* to the CAM for feedback and incorporate changes as requested in the final *Radar System Report*.

Products:

- Radar System Test Plan
- Radar System Report (draft and final)

TASK 3 THERMAL TRACKER THREE-DIMENSIONAL (TT3D) SYSTEM VALIDATION
The goals of this task are to validate TT3D capabilities for monitoring bird and bat interactions (e.g., avoidance behaviors) with FOSW technologies and bird and bat morphologies/flight styles to develop optimal use modes and data output to support bird collision risk modeling and mitigation schemes.

The Recipient shall:

- Prepare a *TT3D System Test Plan* that describes, at a minimum, testing and validation objectives, procedures, location(s), conditions, and testing and validation equipment (e.g., TT3D and drones to simulate birds in flight) including technical specifications.
- Consult with TAC on *TT3D System Test Plan* to verify technical feasibility in accordance with subtask 1.10 (Technical Advisory Committee). Incorporate TAC feedback into the *TT3D System Test Plan* as appropriate.
- Perform data collection exercises in an onshore, relevant "laboratory" environment over a variety of environmental conditions (e.g., weather, sun angle) expected in the California WEAs based on use-case support inputs optimized for bird collision risk modeling.
- Evaluate field data (collected per the bullet point above) to determine optimal use modes for the California offshore environment and specific bird and bat species of interest relevant to the California WEAs.
- Determine utility of field data as inputs to bird collision risk models as well as for FOSW technology operational monitoring.
- Prepare a draft *TT3D System Report* that describes, at a minimum:
    - Field data collection activities including location, date/time, environmental conditions, bird observations.
    - End-of-project optimal/target TT3D use modes determined from field data collection activities.
    - Accuracy of target detection and classification.
    - Advantages and limitations of TT3D data as inputs to bird collision risk models as well as for FOSW technology operational monitoring.
    - Methodologies and testing to ensure operational durability in California WEAs and long-term deployment.
- Submit the draft *TT3D System Report* to the CAM for feedback and incorporate changes as requested in the final *TT3D System Report*.

Products:

- TT3D System Test Plan
- TT3D System Report (draft and final)

TASK 4 RADAR AND TT3D SYSTEM INTEGRATION AND DATA FUSION
The goal of this task is to develop a system to integrate radar and TT3D operations and data and validate the integrated radar and TT3D system functionality and data output to advance capabilities of each sensor and leverage a combined data set collected over multiple spatial scales.

The Recipient shall:

- Develop methodology for collection and synchronization of multiple real-time sensor data sources to address data needs, including:
    - Wide area patterns of bird and bat distribution, use patterns (seasonal as well as diurnal/nocturnal), habitat requirements, and ecology.
    - Patterns of macro-avoidance exhibited by various species and species groups.
    - Patterns of meso-avoidance and the capacities and tendencies of species and species groups to detect and respond on a near-field basis to WEA infrastructure.
- Develop methodology for TT3D adaptive sampling (e.g., automated movement of TT3D sensors to track objects of interest), if determined necessary from Task 2 and Task 3 testing and validation activities.
- Evaluate and validate feasibility of cloud-based computing infrastructure based on data collection results from Tasks 2 and 3.
- Investigate seabird and bat flight behavior, size, and other characteristics to inform automated identification and classification capabilities using artificial intelligence methods applied to integrated radar and TT3D data sets collected as part of Tasks 2 and 3. Develop a plan for managing false positives or negatives for bird and bat strike detection.
- Prepare a draft *Radar and TT3D System Integration and Data Fusion Report* that describes technical specifications for collection and synchronization of multiple real-time sensor data sources in support of understanding and monitoring bird and bat interactions with FOSW technologies, including but not limited to:
    - Optimal use modes of each sensor (radar and TT3D) as an integrated system.
    - Dataflow (e.g., cloud-based or on-board processing and interpretation or combination of both).
    - Data processing and analysis methods for automated bird identification and classification, including any limitations.
    - How the data will be delivered to shore and used.
    - Advantages and limitations of integrated radar and TT3D data as inputs to bird collision risk models as well as for FOSW technology environmental and operational monitoring.
- Submit the draft *Radar and TT3D System Integration and Data Fusion Report* to the CAM for feedback and incorporate changes as requested in the final *Radar and TT3D Data Fusion Report*.

Products:

- Radar and TT3D System Integration and Data Fusion Report (draft and final)

TASK 5 BLADE STRIKE SIMULATIONS, VALIDATION, AND INTEGRATION

The goals of this task are to simulate impact strikes on representative onshore and offshore wind turbine blades, develop an optimized blade strike test matrix, perform static ground tests of simulated bird and bat strikes on wind turbine blades, verify blade mounted detection capabilities, and test feasibility of integration with radar and thermal imaging monitoring technologies.

The Recipient shall:

- Collect data from published accounts and databases to inform the bird and bat strike detection team as to the size, weight, and flight speed characteristics of the birds and

bats that are likely to occur within the California WEAs. Establish representative categories of potential collision types that are based upon the inherent energy transfer resulting from a bird or bat strike.

- Perform structural (finite element analysis and/or computational fluid dynamics) modeling of bird and bat impact strikes on stationary and operational offshore and onshore turbine blades to cover conditions ranging from static ground tests to fully operational offshore environments.
- Develop a sensor configuration and bird and bat strike test matrix based on modeling results, including determining relevant bird and bat parameters/characteristics (e.g., strike force, size), vibration sensor requirements, and optimal sensor placement on blades.
- Prepare a *Blade Strike Test Plan* that describes, at a minimum:
    - Technical specifications for the optimal sensor and instrumentation configuration given a set of particular bird characteristics.
    - Selected impact cases including collision velocity, angle, blade span and chord locations, sensor placement; and test blade characteristics.
- Consult with TAC on the *Blade Strike Test Plan* to verify technical feasibility and discuss industry acceptance in accordance with subtask 1.10 (Technical Advisory Committee). Incorporate TAC feedback into the *Blade Strike Test Plan* as appropriate.
- Perform static blade strike tests in a controlled environment at an existing wind turbine testing facility to validate the blade structural response from the structural models, and the ability of blade-mounted sensors to detect and identify possible bird or bat strikes.
- Develop and implement methodology for integrating strike data with fused data from the radar and TT3D system from Task 4, including dataflow and automated identification and characterization techniques.
- Prepare a draft *Blade Strike Ground Test Report* that describes, at a minimum:
    - Results from the static blade strike tests.
    - Analysis, including relevance to bird and bat species of interest and ecology.
    - What data gaps were filled with respect to bird collision risk models and mitigation schemes.
    - Remaining data gaps.
    - Methodology and feasibility of the integrated monitoring system and implementing blade strike sensors on wind turbines.
    - Advantages and limitations of integrated radar, TT3D, and strike sensor data as inputs to bird collision risk models as well as for FOSW technology environmental and operational monitoring.
    - Benefits to FOSW developers and stakeholders of incorporating an integrated bird and bat collision detection system in offshore wind farm designs and environmental monitoring requirements.
- Submit the draft *Blade Strike Ground Test Report* to the CAM for feedback and incorporate changes as requested in the final *Blade Strike Ground Test Report.*
- Prepare a *CPR Report #1* in accordance with subtask 1.3 (CPR Meetings).
- Participate in a CPR meeting.

Products:

- Blade Strike Test Plan
- Blade Strike Ground Test Report (draft and final)
- CPR Report #1

TASK 6 EVALUATION OF PROJECT BENEFITS

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

The Recipient shall:

- Complete *the Initial Project Benefits Questionnaire*. The Initial Project Benefits Questionnaire shall be initially completed by the Recipient with 'Kick-off' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Complete the *Annual Survey* by January 31st of each year. The Annual Survey includes but is not limited to the following information:
  - Technology commercialization progress
  - New media and publications
  - Company growth
  - Follow-on funding and awards received
- Complete the *Final Project Benefits Questionnaire*. The Final Project Benefits Questionnaire shall be completed by the Recipient with 'Final' selected for the 'Relevant data collection period' and submitted to the CAM for review and approval.
- Respond to CAM questions regarding the questionnaire drafts.
- Complete and update the project profile on the CEC's public online project and recipient directory on the Energize Innovation website at www.energizeinnovation.fund, and provide *Documentation of Project Profile on EnergizeInnovation.fund*, including the profile link.
- If the Prime Recipient is an Innovation Partner on the project, complete and update the organizational profile on the CEC's public online project and recipient directory on the Energize Innovation website www.energizeinnovation.fund, and provide *Documentation of Organization Profile on EnergizeInnovation.fund*, including the profile link.

Products:

- Initial Project Benefits Questionnaire
- Annual Survey(s)
- Final Project Benefits Questionnaire
- Documentation of Project Profile on EnergizeInnovation.fund
- Documentation of Organization Profile on EnergizeInnovation.fund

TASK 7 TECHNOLOGY/KNOWLEDGE TRANSFER ACTIVITIES

The goal of this task is to conduct activities that will accelerate the commercial adoption of the technology being supported under this agreement. Eligible activities include, but are not limited to, the following:

- Scale-up analysis including manufacturing analysis, independent design verification, and process improvement efforts.
- Technology verification testing, or application to a test bed program located in California.
- Legal services or licensing to secure necessary intellectual property to further develop the technology.
- Market research, business plan development, and cost-performance modeling.
- Entry into an incubator or accelerator program located in California.

Exhibit A
Scope of Work
Integral Consulting Inc.

The Recipient Shall:

- Develop and submit a *Technology Transfer Plan* that identifies the proposed activities the recipient will conduct to accelerate the successful commercial adoption of the technology.
- Present the draft *Technology Transfer Plan* to the TAC for feedback and comments.
- Develop and submit a *Summary of TAC Comments* that summarizes comments received from the TAC members on the Draft Technology Transfer Plan. This document will identify:
    - TAC comments the recipient proposes to incorporate into the final *Technology Transfer Plan*.
    - TAC comments the recipient does not propose to incorporate with and explanation why.
- Submit the final *Technology Transfer Plan* to the CAM for approval.
- Implement activities identified in final *Technology Transfer Plan*.
- Develop and submit a *Technology Transfer Summary Report* that includes high level summaries of the activities, results, and lessons learned of tasks performed relating to implementing the Final Technology Transfer Plan. This report should not include any proprietary information.
- When directed by the CAM, develop presentation materials for an CEC- sponsored conference/workshop(s) on the project.
- When directed by the CAM, participate in annual EPIC symposium(s) sponsored by the CEC.
- 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.

Products:

- Technology Transfer Plan (draft and final)
- Summary of TAC Comments
- Technology Transfer Summary Report (draft and final)
- High Quality Digital Photographs

IV. PROJECT SCHEDULE

Please see the attached Excel spreadsheet.