



Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

PUBLIC AFFAIRS

April 5, 2011

In reply refer to: DK-7

Dan Seligman, Attorney at Law
Columbia Research Corporation
PO Box 99249
Seattle, WA 98139

RE: FOIA #BPA-2011-00622-F

Dear Mr. Seligman:

This is a final response to your request for information that you made to the Bonneville Power Administration (BPA) under the Freedom of Information Act (FOIA), 5 U.S.C. 552.

You have requested the following:

A copy of the contract(s) between BPA and EnerNOC and/or Ecofys-US relating to demand responses to manage intermittent wind power.

Response:

BPA has provided the responsive records in their entirety.

I appreciate the opportunity to assist you. Please contact Cheri Benson, FOIA/Privacy Act Specialist at 503-230-7305 with any questions about this letter.

Sincerely,

/s/Christina J. Munro

Christina J. Munro
Freedom of Information Act/Privacy Act Officer

Enclosure: Responsive documents

UNITED STATES
GOVERNMENT

COOPERATIVE AGREEMENT

BONNEVILLE
POWER ADMINISTRATION

Mail Invoice To:
See Page Two

Contract : 00049918
Release :
Page : 1

Vendor:
ECOFYS US INC
200 SW 4TH
SUITE 205
CORVALLIS OR 97333

Please Direct Inquiries to:

JASON C. WEINSTEIN
Title: CONTRACT SPECIALIST
Phone: 503-230-3892
Fax : 503-230-4508

Attn: DIANE BROAD

Contract Title: 220 SMART END-USE ENERGY STORAGE INTEGRATION OF RENEWABLE ENERGY

Total Value : \$299,592.00
Pricing Method: COST SHARE (NO FEE)
Performance Period: 09/01/10 - 09/30/11

**** NOT TO EXCEED ****
Payment Terms: % Days Net 15



Contractor Signature

Diane Broad, Director

Printed Name/Title

23-Sep-2010

Date Signed



BPA Contracting Officer

09-22-2010

Date Signed



Continuation Sheet

**COOPERATIVE AGREEMENT # 49918
 TECHNOLOGY INNOVATION PROJECT # 220
 SMART END-USE ENERGY STORAGE INTEGRATION OF RENEWABLE ENERGY**

BPA Financial Assistance Officer	Krista McCracken, NSSP-4	(503) 230-5383	klmccracken@bpa.gov
BPA Financial Assistance Officer's Representative	Jason Weinstein, NSSP-4	(503) 230-3892	jcweinstein@bpa.gov
BPA Project Technical Representative (Primary)	Frank Brown, KLS-SEATTLE	(206) 220-6774	febrown@bpa.gov
BPA Project Technical Representative (Alternate)	Roy Beaty, KLS-6	(503) 230-5213	rebeaty@bpa.gov
Ecofys US Representative	Diane Broad	(541) 766-8200	d.broad@ecofys-us.com

1. Cooperative Agreement Contents
 - A. Signature Page
 - B. Continuation Sheet
 - C. Unit 1 Terms and Conditions, Unit 2 Project Description, Unit 3 Stage Gate Budget
2. Recipient shall submit monthly reimbursement requests and supporting documentation to primary and alternate PTR by email.
3. This award document may contain both Financial Assistance clauses, as well as BPA purchasing clauses, as allowed by both the Bonneville Financial Assistance Instructions (BFAI) and the Bonneville Purchasing Instructions (BPI). It is BPA's intent that these clauses be used interchangeably and Contractors and/or Financial Assistance recipients abide by the clause's legal requirements regardless of the use of the specific words: "contract," "contractor," "subcontractor," "grant," "cooperative agreement," "recipient," or "sub-recipient."
4. Cost principles in 2 CFR 220, 2 CFR 225, 2 CFR 230, and BPI Part 13 will be used to determine allowable, allocable, and reasonable costs for reimbursement. The applicable cost principle is determined based on the recipient or subrecipient entity type.
5. Administrative requirements from 2 CFR 215 (A-110) apply to Higher Education, Hospitals, and Other Non Profit Organization recipients and subrecipients. 2 CFR 215 administrative requirements are adopted for commercial organizations. Administrative requirements from OMB Circular A-102 apply to State and Local Government recipients and subrecipients.

6. BPA Funding is provided from the following sources:

Funding Source	Amount	Work Performed	Expenses Reported	Invoice
BPA EE Demand Response	\$49,592	09/01/2010 to 09/30/2010	09/24/2010	No later than 10/08/2010
BPA Technology Innovation	\$250,000	10/01/2010 to 09/30/2011	Monthly	Monthly
TOTAL	\$299,592			

BPA EE Demand Response funding must be used for expenses incurred in FY2010 09/01/2010 – 09/30/2010. BPA EE Demand Response funding is not available in FY2011 10/01/2010 - 09/30/2011. BPA's total cost for the project will be reduced by the value of any BPA EE Demand Response funding that is not expended prior to the timeframe indicated above.

7. Allowable costs under the agreement incurred prior to the date of its award and execution are eligible for reimbursement effective to September 1, 2010.

(END OF CONTINUATION SHEET)

49918 COOPERATIVE AGREEMENT

SMART END-USE ENERGY STORAGE AND INTEGRATION OF RENEWABLE ENERGY

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UNIT 1 – TERMS AND CONDITIONS

CLAUSE 4-1 REGULATIONS APPLICABLE TO BPA FINANCIAL ASSISTANCE (BFAI 4.10) (SEP 04)

The Bonneville Power Administration's financial assistance function is managed and executed solely in accordance with the Bonneville Financial Assistance Instructions (BFAI). The BFAI is available without charge on the Internet at <http://www/bpa.gov>. Copies of the BFAI may be obtained for \$15.00 each. Requests and comments should be sent to Head of the Contracting Activity - GK, Bonneville Power Administration, P.O. Box 3621, Portland, OR 97208. Subscriptions are not available.

CLAUSE 4-2 NONDISCRIMINATION IN FEDERALLY ASSISTED PROGRAMS (BFAI 4.10) (SEP 04)

The recipient shall comply with 10 CFR Chapter II, Section 600.39 which provides that "...no person shall on the ground of race, color, national origin, sex, handicap, or age be excluded from participation in, be denied the benefits of, be subjected to discrimination under, or be denied employment, where the main purpose of the program or activity is to provide employment or when the delivery of program services is affected by the recipient's employment practices, in connection with any program or activity receiving Federal assistance from ..." BPA.

CLAUSE 4-3 EXAMINATION OF RECORDS (BFAI 4.10) (SEP 04)

- (a) The recipient shall maintain books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this award. The Financial Assistance Officer or a representative shall have the right of access to any books, documents, papers, or other records of recipients and subrecipients which are pertinent to the award, in order to make audits, examinations, excerpts and transcripts.
- (b) Such material shall be made available at the office of the recipient, at all reasonable times, for inspection, audit or reproduction, until the expiration of 3 years from the date of final payment under this award or for such longer period, if any, as is required by applicable statute. If any litigation, claim, negotiation, audit or other action involving the records has been started prior to the expiration of the 3 year period, the records must be retained until completion of the action and resolution of all issues which arise from it, or until the end of the regular 3 year period whichever is later.

CLAUSE 4-4 REPORTING PROGRAM PERFORMANCE (BFAI 4.10)(SEP 04)

- (a) Frequency. Unusual events having a negative impact on the project shall be reported by the Recipient to the Project Technical Representative (PTR) as soon as they are discovered. A progress report is due quarterly no later than the first Friday after the last day of the quarter. BPA quarters end on December 31, March 31, June 30, and September 30. A final report on the project must be submitted no later than 90 days after completion of the project.
- (b) Contents. The report shall contain a comparison of the actual accomplishments to those planned for the period, and the findings of the principal investigator. If the project is not on schedule, a brief explanation of the reason is required. Unusual situations encountered which impacted the costs or effectiveness of the project should be identified and explained. Include the following information:

- 1. Planned Project Deliverable(s) list format with status.
 - a. Track entire list from start to finish of project.

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- b. Track Status: status may include submitted, accepted, in progress, delayed, and rescheduled.
 2. Activities/Accomplishments: Work performed this reporting period tracked at task/deliverable level. Include status of stage gates this reporting period
 3. Challenges/Discoveries: Describe problems encountered and what discoveries made. Link to tasks and deliverables
 4. Actions Taken on Challenges/Discoveries: Describe your response or proposed response. Include actions taken, results achieved, people informed, etc
 5. Planned Activities: Describe activities planned for next quarter. If appropriate, include next stage gate, when is it and what expectations are to be met
 6. Schedule Status: Do you anticipate meeting, or missing, the planned completion date for upcoming tasks and deliverables? Explain any variance. Explain your basis for this determination.
 7. Financial Status: Describe the actual project expenditures at the stage gate level. BPA understands that final expenditure information may not be immediately available at the end of each quarter. Reasonably estimate the expenditures.
 8. Proposed Project Changes
 - a. Track list of proposed project changes from start to finish of project. Describe any changes to project scope, schedule, budget or work element.
 - b. Track status of project changes submitted. Status may include submitted, accepted, revised, declined, in progress, delayed.
- (c) Format: Deliver the report in electronic format to the PTR in Microsoft Word or Adobe Portable Document Format.

CLAUSE 4-6 REIMBURSEMENT PAYMENT AND FINANCIAL REPORTING REQUIREMENTS (BFAI 4.10M)(SEP 10)

- (a) Payment for services performed under this award will be reimbursed by Vendor Express payment after performance of the services. Recipient requests for reimbursements, and recipient financial reporting requirements shall be made as follows:
- (b) Reimbursements. Standard Form 270, Request for Advance and Reimbursement, shall be used when requesting reimbursement for costs incurred on the project. Requests shall not be made more frequently than monthly. Submit SF 270 and BPA SF 270 reimbursement worksheet to the PTR. An electronic copy of the SF 270 in Adobe Portable Document Format including the Recipients signature is acceptable
- (c) Final Cost Report. The final cost report shall be submitted to the PTR within 90 days after the end of the effective period. It shall be submitted in the same format as the budget as awarded. The final cost report shall compare the amounts allocated in the award budget to the amounts expended for each budget element.

CLAUSE 4-7 ENVIRONMENTAL PROTECTION (BFAI 4.10)(SEP 04)

The recipient shall insure that the facilities under its ownership, lease or supervision which will be utilized in the accomplishment of the project are not listed on the Environmental Protection Agency's (EPA) list of Violation Facilities and that it will notify BPA of the receipt of any communication from the Director of the EPA Office of Federal Activities indicating that a facility to be used in the project is under consideration for listing by the EPA.

**CLAUSE 4-8 INDEMNIFICATION
(BFAI 4.10)(SEP 10)**

The recipient agrees to hold BPA harmless against any direct or consequential damages claimed by the recipient or third parties arising from or related to Recipient's performance, during the period of this award.

**CLAUSE 4-9 ACKNOWLEDGMENT OF SUPPORT
(BFAI 4.10)(SEP 10)**

Publication of the results of this award is encouraged. The recipient shall include in any article or other announcement that is published an acknowledgment that the project was supported, in whole or in part, by BPA, but that such support does not constitute an endorsement by BPA of the views expressed therein.

**CLAUSE 4-10 DISPUTES
(BFAI 4.10) (SEP 04)**

- (a) Except as otherwise provided in this award, any unresolved dispute concerning a question of fact arising under this award shall be decided by the Financial Assistance Officer (FAO), who shall reduce that decision to writing and mail, or otherwise furnish a copy thereof to the Recipient. The decision of the Financial Assistance Officer shall be final and conclusive. The FAO's decision may be appealed to the BPA HCA. The decision of the BPA HCA shall be final and conclusive.
- (b) This clause does not preclude consideration of law questions in connection with decisions provided for in paragraph (a) above; provided, that nothing in this award shall be construed as making final the decision of any administrative official, representative, or board, based on a question of law.
- (c) The use of alternate disputes resolution processes are encouraged, and may be used as negotiated between the parties.

**CLAUSE 4-11 TRAVEL
(BFAI 4.10)(SEP 04)**

- (a) Domestic travel may be an appropriate charge to this award, and prior authorization for specific trips is not required. In accordance with the applicable cost principles, reasonable, necessary, and allowable travel costs may be charged on an actual basis or per diem basis in lieu of actual costs incurred, provided the method used results in charges consistent with those normally allowed by the organization in its regular operations and travel is at less than business class common carrier fare, unless otherwise approved in advance by the Financial Assistance Officer.
- (b) Foreign travel may be charged to this award without prior approval if detailed in the approved budget. If foreign travel is required, but not detailed in the approved budget, it must be approved in writing by the Financial Assistance Officer prior to beginning the travel. Foreign travel will be reimbursed on the same basis as domestic travel.

**CLAUSE 4-12 FINANCIAL ASSISTANCE OFFICER'S REPRESENTATIVE
(BFAI 4.10)(SEP 04)**

The Financial Assistance Officer's Representative (FAOR) shall have all the rights, powers, and privileges of the Financial Assistance Officer necessary to the administration of the award: provided, however, that the FAOR is not empowered to execute modifications to the award, to make a final decision of any matter which would be subject to appeal, or to suspend or terminate for any cause the recipient's right to proceed.

**CLAUSE 4-13 PROJECT TECHNICAL REPRESENTATIVE
(BFAI 4.10)(SEP 04)**

- (a) The Project Technical Representative (PTR) is the authorized representative of the Financial Assistance Officer (FAO) for technical actions performed in relation to the award. This includes the functions of (1) review of work performed; and (2) interpretation of technical program requirements.
- (b) The PTR is not authorized to act for the FAO in the following matters: (1) modifications that change the amount of award, technical requirements or time for performance; (2) suspension or termination of the recipient's right to proceed; and (3) final decisions on any matters subject to appeal.

**CLAUSE 4-14 FIELD REPRESENTATIVE
(BFAI 4.10)(SEP 04)**

- (a) The Field Representative (FR) will be appointed by Financial Assistance Officer (FAO) or the Project Technical Representative (PTR) and is authorized by the PTR for reviewing project accomplishments and recipient's technical reports, and interpretation of award requirements.
- (b) The Field Representative (FR) is not authorized to act in the following matters: (1) modifications that change the award amount or general direction of the project; (2) suspension or termination of the recipient's right to proceed; (3) approval of financial requests and reports, and (4) final decisions on any matters subject to appeal.

**CLAUSE 4-15 COST REIMBURSEMENT BASIS
(BFAI 4.10)(SEP 04)**

This award is funded on a cost reimbursement basis without fee or profit, not to exceed the amount awarded as indicated on the face page and is subject to a refund of unexpended funds to BPA.

**CLAUSE 4-16 BPA-FURNISHED EQUIPMENT OR MATERIAL
(BFAI 4.10)(SEP 04)**

- (a) The recipient hereby releases and agrees to hold BPA, or persons acting upon behalf of the BPA harmless for any and all liability of every kind and nature whatsoever resulting from the receipt, shipping, installation, operation, handling, condition, use and maintenance of the material furnished by BPA under this award.
- (b) Neither BPA nor persons acting on behalf of BPA make any warranty or other representation, express or implied, that the material provided under this award will accomplish the results for which it is requested or intended.

**CLAUSE 4-17 SUSPENSION OR TERMINATION
(BFAI 4.10)(SEP 04)**

- (a) Definitions.
 - (1) "Suspension" is an action by BPA that temporarily suspends BPA support under the award pending corrective action by the Recipient or pending a decision by BPA to terminate the award.
 - (2) "Termination" means the cancellation of BPA sponsorship, in whole or in part, at any time prior to the date of completion.
- (b) Suspension or Termination for cause.
 - (1) Notice of Suspension. Prior to issuing a suspension notice, efforts will be made by BPA and the recipient to informally resolve disagreements. If informal efforts fail, BPA may issue a notice of suspension that

specifies the date on which the suspension will take effect. During the suspension, BPA may withhold further payment and prohibit the recipient from incurring additional obligations of funds pending corrective action by the recipient or a decision by BPA to terminate. BPA shall allow all necessary and proper costs that the recipient could not reasonably avoid during the period of suspension provided that they would otherwise be allowable.

(2) Notice of Termination for Cause. Prior to issuing a termination notice, efforts will be made by BPA and the recipient to informally resolve disagreements. If informal efforts fail, BPA may issue a notice of termination that will take effect as stated in the letter. The Financial Assistance Officer shall determine the severity of the violation that caused the termination for cause, and determine what costs are appropriate for reimbursement.

(c) Termination for convenience. BPA or the recipient may request that the award be terminated in whole or in part when both parties agree that the continuation of the project would not produce beneficial results commensurate with the further expenditure of funds. The two parties shall agree upon the termination conditions, including the effective date and, in the case of partial terminations, the portion to be terminated. The recipient shall not incur new obligations for the terminated portion after the effective date, and shall cancel as many outstanding obligations as possible. BPA shall allow full credit to the recipient for the BPA share of the noncancellable costs, properly incurred by the recipient prior to termination.

(d) Authority to issue notices. The Financial Assistance Officer is the only person authorized to suspend or terminate the award.

**CLAUSE 4-18 CHANGE OR ABSENCE OF THE PRINCIPAL INVESTIGATOR OR DESIGNATED KEY PERSONNEL
(BFAI 4.10)(SEP 04)**

Since BPA funding of this project is based, to a significant extent, on the qualifications and level of participation of the Principal Investigator(s), or key personnel, a change of Principal Investigator(s), or key personnel, or their level of effort is considered a change in the approved project. The approval of BPA must be obtained prior to any change of the Principal Investigator or key personnel who have been identified as key personnel. In addition, any continuous absence of the Principal Investigator or key personnel in excess of 3 months, or plans for the Principal Investigator or key personnel to become substantially less involved in the project than was indicated in the approved application requires BPA prior approval. The recipient must contact the Financial Assistance Officer (FAO) immediately upon becoming aware that any of these changes are likely and must receive FAO approval before effecting any such change.

Principal Investigator: Diane Broad, P.E., Ecofys US

**CLAUSE 4-23 PERSONAL PROPERTY MANAGEMENT
(BFAI 4.10) (SEP 04)**

(a) This clause provides guidance for the utilization and disposition of personal property furnished by BPA or acquired in whole or in part with BPA funds, or whose cost was charged to a project supported by BPA funds.

(b) BPA-owned personal property.

(1) The following BPA property will be provided for use in this award:

NONE

(2) Title remains vested in BPA. The recipient shall submit an annual reconciled physical inventory listing by October 1 of each year of such property in its custody to the PTR.

(3) Upon completion of the award, or when the property is no longer needed, the recipient shall provide an inventory of the property to BPA and request disposition instructions.

(c) Recipient-acquired personal property.

(1) When the recipient acquires personal property using BPA funds, in whole or in part, title vests with the recipient.

(2) BPA will request the recipient to transfer title to the following property no later than at the end of the project:

AIR SOURCE HEAT PUMPS, QUANTITY 6, TRANSFER TITLE TO LOWER VALLEY ENERGY

(3) BPA reserves the right to transfer title to the property listed below to itself or a third party at the completion of the project.

NONE

(4) If BPA does not provide disposition instructions for property identified in (b)(3) within 120 days of the end of the project, BPA relinquishes the right to transfer title and the recipient may retain the property, or dispose of it as appropriate.

(5) BPA does not reserve the right to transfer title to the following personal property. The recipient may retain, use or dispose of this property.

NONE

(6) The recipient shall submit a reconciled physical inventory listing by October 1 every second year of the award of personal property in its control.

(d) Property Management Standards for property which BPA will, or reserves the right to, require the transfer of title at the conclusion of the award:

(1) Property records shall be maintained which include a description of the property, source of property, including award number, acquisition date, location, use and condition of the property and the date the information was reported, unit acquisition cost, ultimate disposition of property, and date of disposition.

(2) The recipient shall maintain a system to insure adequate safeguards to prevent loss, damage, or theft of the property.

(3) The recipient shall follow adequate maintenance procedures to keep the property in good condition.

**CLAUSE 4-26M BUDGET CHANGES AND LINE ITEM TRANSFERS
(BPI 4.10) (SEP 10)**

If unanticipated project needs arise, the recipient is authorized to make budget line item (presented in columns in Unit 3 – Stage Gate Budget) transfers not exceeding ten (10%) percent of the total project budget at the individual Stage Gate level. Recipient is prohibited from making budget line item transfers to or from Stage Gates that are not currently funded. Reallocation of funds exceeding this amount must have the prior written approval of the FAO. The recipient shall send a written request for such budget changes to the FAO through the PTR. The FAO will respond to the request within 30 days.

Recipients or subrecipients shall obtain prior approval whenever any of the following changes are anticipated:

(a) Changes in the scope or the objective of the project or program that will require a budget revision.

(b) The need for additional funding.

**CLAUSE 4-27M INCREMENTAL FUNDING
(BPI 4.10) (SEP 10)**

This project is not fully funded at the time of the award. It is anticipated that further BPA funding may be provided on an incremental basis. If funds are not available for any reason, BPA shall be under no obligation to provide funding for any additional portion of the project. If BPA does not fund the balance of the effective period, the award may be terminated when the funds committed by BPA have been expended.

This Project may be incrementally funded on an annual or other basis subject to BPA's favorable determination of the following:

- (1) Availability of adequate funds in the Technology Innovation Program.
- (2) Required reports were submitted and contained required data.
- (3) Results demonstrate progress towards project goals was equal to or greater than established by the Agreement.
- (4) The next phases work statement has been approved by BPA.
- (5) The annual formal presentation of the project status, if required, has been completed on a timely basis; and BPA desires to continue the project.

**CLAUSE 4-100 CERTIFICATION, DISCLOSURE, AND LIMITATION REGARDING PAYMENTS TO
INFLUENCE CERTAIN FEDERAL TRANSACTIONS
(SEP 98)(BPI 3.5.6)**

(a) As used in this clause:

"Covered Federal action" means

- (1) The awarding of any Federal Financial Assistance.
- (2) The extension, continuation, renewal, amendment, or modification of any Federal Financial Assistance.

"Indian tribe" and "tribal organization" have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B) and includes Alaskan Natives.

"Influencing or attempting to influence" means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government" means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, includes a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Person" means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation" means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

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"Reasonable payment" means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient" includes all contractors and subcontractors. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed" means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(b) The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that:

- (1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with the awarding of any Federal contract or the extension, continuation, renewal, amendment, or modification of any Federal contract.
- (2) If any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress on his or her behalf in connection with this solicitation, the offeror shall complete and submit, with its offer, Standard Form-LLL, Disclosure of Lobbying Activities, to the Contracting Officer.
- (3) He or she will include the language of this certification in all subcontract awards at any tier and that all sub-recipients of subcontract awards in excess of \$100,000 shall certify and disclose accordingly.

(c) Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by section 1352, title 31, U.S. Code. Any person who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure form to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10, 000 and not more than \$100,000 for each such failure.

(d) A contractor who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, OMB standard form LLL, Disclosure of Lobbying Activities, if such person has made or has agreed to make any payment using non appropriated funds (to include profits from any covered Federal action), which would be prohibited under this clause if paid for with appropriated funds.

(e) The contractor shall file a disclosure form at the end of each calendar quarter in which there occurs any event that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under paragraph (b) of this clause. An event that materially affects the accuracy of the information reported includes--

- (1) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- (2) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or

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- (3) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.
- (f) The contractor shall require the submittal of a certification, and if required, a disclosure form, by any person who requests or receives any subcontract exceeding \$100,000 under the Federal contract.
- (g) All subcontractor disclosure forms (but not certifications), shall be forwarded from tier to tier until received by the prime contractor. The prime contractor shall submit all disclosure forms to the Contracting Officer at the end of the calendar quarter in which the disclosure form is submitted by the subcontractor. Each subcontractor certification shall be retained in the subcontract file of the awarding contractor.
- (h) Any person who makes an expenditure prohibited under this clause or who fails to file or amend the disclosure form to be filed or amended by this clause shall be subject to a civil penalty as provided by 31 U. S. Code 1352. An imposition of a civil penalty does not prevent the Government from seeking any other remedy that may be applicable.

CLAUSE 4-101 DRUG-FREE WORKPLACE (SEP 98)(BPI 3.6.4)

- (a) The contractor agrees that with respect to all employees to be employed under this contract it will provide a drug-free workplace as described in this clause.
- (b) Definitions. As used in this clause "Controlled substance" means a controlled substance in schedules I through V of section 202 of the Controlled Substances Act (21 U.S.C. 812), as from time to time amended, and as further defined in regulation at 21 CFR 1308.11-1308.15, as amended.

"Conviction" means a finding of guilt (including a plea of nolo contendere) or imposition of sentence, or both, by any judicial body charged with the responsibility to determine violations of the Federal or State criminal drug statutes.

"Criminal drug statute" means a Federal or non-Federal criminal statute involving the manufacture, distribution, dispensing, possession or use of any controlled substance.

"Drug-free workplace" means the site(s) for the performance of work done by the contractor in connection with a specific contract at which employees of the contractor are prohibited from engaging in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance.

"Employee" means an employee of a contractor directly engaged in the performance of work under a Government contract. "Directly engaged" is defined to include all direct cost employees and any other contractor employees who have other than a minimal impact or involvement in contract performance.

"Individual" means an offeror/contractor that has no more than one employee including the offeror/contractor.

- (c) The Contractor, if other than an individual, shall -- within 30 calendar days after award (unless a longer period is agreed to in writing for contracts of 30 calendar days or more performance duration); or as soon as possible for contracts of less than 30 calendar days performance duration--
 - (1) Publish a statement notifying its employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition;
 - (2) Establish an on-going drug-free awareness program to inform such employees about--
 - (A) The dangers of drug abuse in the workplace;
 - (B) The contractor's policy of maintaining a drug-free workplace;

- (C) Any available drug counseling, rehabilitation, and employee assistance programs; and
 - (D) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
 - (3) Provide all employees engaged in performance of the contract with a copy of the statement required by subparagraph (c)(1) of this clause;
 - (4) Notify such employees in writing in the statement required by subparagraph (c)(1) of this clause that, as a condition of continued employment on this contract, the employee will--
 - (A) Abide by the terms of the statement; and
 - (B) Notify the employer in writing of the employee's conviction under a criminal drug statute for a violation occurring in the workplace no later than five (5) days after such conviction.
 - (5) Notify the Contracting Officer in writing within ten (10) days after receiving notice under subdivision (c)(4)(B) of this clause, from an employee, or otherwise receiving actual notice of such conviction. The notice shall include the position title of the employee;
 - (6) Within 30 days after receiving notice under subparagraph (c)(4)(B) of this clause of a conviction, take one of the following actions with respect to any employee who is convicted of a drug abuse violation occurring in the workplace:
 - (A) Taking appropriate personnel action against such employee, up to and including termination; and/or
 - (B) Require such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency.
 - (7) Make a good faith effort to maintain a drug-free workplace through implementation of subparagraphs (c)(1) through (c)(6) of this clause.
- (d) In addition to other remedies available to the Government, the Contractor's failure to comply with the requirements of paragraph (c) of this clause may, pursuant to BPI 3.6.3 render the contractor subject to suspension of contract payments, termination of the contract for default, and suspension or debarment.

**CLAUSE 4-103 PATENT RIGHTS
(SEP 98)(BPI 17.3.5.1)**

- (a) Definitions.
- (1) "Invention" means any invention or discovery which is or may be patentable or otherwise protectable under title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. 2321, et seq.).
 - (2) "Made," when used in relation to any invention, means the conception or first actual reduction to practice of such invention.
 - (3) "Nonprofit organization" means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c)) and exempt from taxation under section 501(a) of the Internal Revenue Code (26 U.S.C. 501(a)) or any nonprofit scientific or educational organization qualified under a state nonprofit organization statute.
 - (4) "Practical application" means to manufacture, in the case of a composition of product; to practice, in the case of a process or method, or to operate, in the case of a machine or system; and, in each case under

such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or Government regulations, available to the public on reasonable terms.

- (5) "Small business firm" means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in Government procurement and subcontracting at 13 CFR 121.3-8 and 12 CFR 121.3-12, respectively, will be used.
 - (6) "Subject invention" means any invention of the contractor conceived or first actually reduced to practice in the performance of work under this contract.
- (b) Allocation of principal rights. The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal Government shall have a non-exclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.
- (c) Invention disclosure, election of title, and filing of patent application by contractor.
- (1) The Contractor will disclose each subject invention to BPA within 2 months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. The disclosure to the agency shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after disclosure to the agency, the contractor will promptly notify BPA of the acceptance of any manuscript describing the invention for publication or of any sale or public use planned by the Contractor.
 - (2) The Contractor will elect in writing whether or not to retain title to any such invention by notifying BPA within 2 years of disclosure to the agency. However, in any case where publication, or sale or public use has initiated the 1 year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by BPA to a date that is no more than 60 days prior to the end of the statutory period.
 - (3) The contractor will file its initial patent application on a subject invention to which it elects to retain title within 1 year after election of title, or, if earlier, prior to the end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, sale, or public use. The Contractor will file patent applications in additional countries or international patent offices within either 10 months of the corresponding initial patent application or 6 months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.
 - (4) Requests for extension of the time for disclosure election, and filing under subparagraphs (c) (1), (2), and (3) of this clause may, at the discretion of BPA, be granted.
- (d) Conditions when the government may obtain title. The Contractor will convey to BPA, upon written request, title to any subject invention-
- (1) If the Contractor fails to disclose or elect title to the subject invention within the times specified in paragraph (c) of this clause, or elects not to retain title; provided, that BPA may only request title within 60 days after learning of the failure of the Contractor to disclose or elect within the specified times.
 - (2) In those countries in which the Contractor fails to file patent applications within the times specified in paragraph (c) of this clause; provided, however, that if the Contractor has filed a patent application in a

country after the times specified in paragraph (c) of this clause, but prior to its receipt of the written request of BPA, the Contractor shall continue to retain title in that country.

- (3) In any country in which the Contractor decided not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

(e) Minimum rights to contractor and protection of the Contractor right to file.

- (1) The Contractor will retain a non-exclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the contractor fails to disclose the invention within the times specified in paragraph (c) of this clause. The Contractor's license extends to its domestic subsidiary and affiliates, if any, within the corporate structure of which the Contractor is a party and includes the right to grant sub licenses of the same scope to the extent the Contractor was legally obligated to do so at the time the contract was awarded. The license is transferable only with the approval of BPA, except when transferred to the successor of that part of the Contractor's business to which the invention pertains.
- (2) The Contractor's domestic license may be revoked or modified by BPA to the extent necessary to achieve expeditious practical application of subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR Part 404 and agency licensing regulations (if any). This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of BPA to the extent the Contractor, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.
- (3) Before revocation or modification of the license, BPA will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed 30 days (or such other time as may be authorized by BPA for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal, in accordance with applicable regulations in 37 CFR Part 404 and BPA regulations, if any, concerning the licensing revocation or modification of the license.

(f) Contractor action to protect the government's interest.

- (1) The Contractor agrees to execute or to have executed and promptly deliver to BPA all instruments necessary to-
 - (A) Establish or confirm the rights the government has throughout the world in those subject inventions to which the Contractor elects to retain title, and
 - (B) Convey title to BPA when requested under paragraph (d) of this clause and to enable the Government to obtain patent protection throughout the world in that subject invention.
- (2) The Contractor agrees to require, by written agreement, its employees, other than clerical and non-technical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters, and in a format suggested by the Contractor, each subject invention made under contract in order that the Contractor can comply with the disclosure provisions of paragraph (c) of this clause, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by subparagraph (c)(1) of this clause. The Contractor shall instruct such employees, through employee agreements or other suitable educational programs, on the importance of reporting inventions in sufficient time to permit the filing of patent application prior to U.S. or foreign statutory bars.

- (3) The contractor will notify BPA of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than 30 days before the expiration of the response period required by the relevant patent office.
- (4) The Contractor agrees to include, within the specification of any United States patent application and any patent issuing thereon covering a subject invention, the following statement: "The invention was made with Government support under (identify the contract) awarded by U.S. Dept. of Energy, Bonneville Power Administration. The Government has certain rights in the invention."

(g) Subcontracts.

- (1) The Contractor will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental, or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the Contractor in this clause, and the Contractor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.
- (2) The Contractor will include in all other subcontracts, regardless of tier, for experimental, developmental, or research work, a patent rights clause.
- (3) In the case of subcontractors, at any tier, BPA, the subcontractor, and the Contractor agree that the mutual obligations of the parties created by this clause constitute a contract between the subcontractor and the Federal agency with respect to the matters covered by the clause; provided, however, that nothing in this paragraph is intended to confer any jurisdiction under the Contract Disputes Act in connection with proceedings under paragraph (j) of this clause.

(h) Reporting on utilization of subject inventions. The Contractor agrees to submit, on request, periodic reports (no more frequently than annually) on the utilization of subject inventions or on efforts to obtain such utilization instigated by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and such other data and information as BPA may reasonably specify. The Contractor also agrees to provide such additional reports as may be requested by BPA in connection with any march-in proceeding undertaken by BPA in accordance with paragraph (j) of this clause. As required by 35 U.S.C. 202(c)(5), BPA agrees it will not disclose such information to persons outside the Government without the permission of the Contractor.

(i) Preference for United States industry. Notwithstanding any other provision of this clause, the Contractor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject invention in the United States unless such person agrees that any product embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by BPA upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States, or that under the circumstances domestic manufacture is not commercially feasible.

(j) March-in rights. The Contractor agrees that, with respect to any subject invention in which it has acquired title, BPA has the right in accordance with the procedures in 37 CFR 401.6 and any supplemental regulations of BPA to require the Contractor, an assignee or exclusive licensee of a subject invention to grant a non-exclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request, that BPA has the right to grant such a license itself if BPA determines that-

- (1) Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use;

- (2) Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee, or their licensees;
 - (3) Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee, or licensees; or
 - (4) Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.
- (k) Special provisions for contracts with nonprofit organizations. If the Contractor is a nonprofit organization, it agrees that-
- (1) Rights to a subject invention in the United States may not be assigned without the approval of BPA, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the contractor;
 - (2) The Contractor will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when the agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. 202(e) and 37 CFR 401.10;
 - (3) The balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions will be utilized for the support of scientific research or education; and
 - (4) It will make efforts that are reasonable under the circumstances to attract licensees of subject inventions that are small business firms, and that it will give a preference to a small business firm when licensing a subject invention if the Contractor determines that the small business firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not small business firms; provided, that the Contractor is also satisfied that the small business firm has the capability and resources to carry out its plan or proposal. The decision of whether or not to give a preference in any specific case will be at the discretion of the Contractor. However, the Contractor agrees that the Secretary of Commerce may review the Contractor's licensing program and decisions regarding small business applicants. The Contractor will negotiate changes to its licensing policies, procedures, or practices with the Secretary of Commerce when the Secretary's review discloses that the Contractor could take reasonable steps to more effectively implement the requirements of this subparagraph (k)(4).

**CLAUSE 4-104 RIGHTS IN DATA
(OCT 05)(BPI 17.4.2.1; 17.4.3.1)**

- (a) Allocation of rights. Except as otherwise provided in this clause, BPA shall have the right to use, disclose, reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, in any manner and for any purpose, and to have or permit others to do so, in--
- (1) All data first produced in the performance of this contract; and
 - (2) Data delivered under this contract (except for proprietary computer software) that constitute manuals or instructional and training material for installation, operation or routine maintenance and repair of items, components, or processes delivered or furnished for use under this contract.
- (b) Copyright.
- (1) Data First Produced in the Performance of the Contract. The Contractor may establish claim to copyright subsisting in any data first produced in the performance of this contract. The Contractor grants to the Government, and others acting on its behalf, a paid-up non-exclusive, irrevocable, worldwide license for

all such data to reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, by or on behalf of the Government.

- (2) Data Not First Produced in the Performance of this Contract. The contractor should not, without prior written permission of the Contracting Officer, incorporate in data delivered under this contract any data not first produced in the performance of this contract and which contains a copyright notice, unless the Contractor identifies such data and grants to the Government, or acquires on its behalf, a license of the same scope as set forth in subparagraph (b)(1) of this clause;
- (c) Release, publication and use of data.
 - (1) The Contractor shall have the right to use, release to others, reproduce, distribute, or publish any data first produced or specifically used by the Contractor in the performance of this contract, unless otherwise expressly set forth in this contract.
 - (2) The Contractor agrees that to the extent it receives or is given access to data necessary for the performance of this contract which contain restrictive markings, the Contractor shall treat the data in accordance with such markings unless otherwise specifically authorized in writing by the Contracting Officer.
 - (3) The Contractor shall provide data from Steffes Data Collection units installed under the project to Steffes Corporation and the Electric Utility partner
- (d) Omitted or incorrect markings. Data delivered to BPA without a limited rights notice or a copyright notice shall be deemed to have been furnished with unlimited rights, and BPA assumes no liability for the disclosure, use, or reproduction of such data.
- (e) Protection of limited rights data and proprietary computer software. If the Offeror/Contractor desires to protect data and computer software that embody trade secrets or are commercial or financial and confidential or privileged, that are specified to be delivered under this contract, the Offeror/Contractor shall identify such data and computer software to the Contracting Officer as limited rights data. Limited rights data that are formatted as a computer data base for delivery to BPA are to be treated as limited rights data and not proprietary computer software. All markings to proprietary computer software must be in human-readable form that can be readily and visually perceived and in addition may be in machine-readable form as appropriate and feasible under the circumstances. These markings must be affixed by the contractor to the proprietary computer software before its delivery to BPA. The Contracting Officer may require the delivery of such limited rights data and computer software. If delivery of such data and computer software is so required, the Contractor may affix the following "Limited Rights Notice" to the data, and BPA will thereafter treat the data and computer software in accordance with such Notice:

LIMITED RIGHTS NOTICE

- (a) These data are submitted with limited rights under BPA Contract No. _____ (and subcontract _____, if appropriate). These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that BPA may disclose these data outside the Government for the following purposes, if any, provided that BPA makes such disclosure subject to prohibition against further use and disclosure: (COs may list additional purposes or if none, so state).
- (b) This Notice shall be marked on any reproduction of these data, in whole or in part.

(End of Notice)

- (f) Subcontracting. The Contractor has the responsibility to obtain from its subcontractors all data and rights therein necessary to fulfill the Contractors obligations to BPA under this contract. If a subcontractor refuses to accept terms affording BPA such rights, the Contractor shall promptly bring such refusal to the attention of the Contracting Officer, and shall not proceed with subcontract award without further authorization.
- (g) Relationship to patents. Nothing contained in this clause shall imply a license to the Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Government.

**CLAUSE 4-105 STAGE GATES
(BFAI 4.10)(SEP 10)**

- (1) Stage gates are decision points for deciding whether the project should go ahead, be delayed, stopped or re-scoped. Stage gates occur at least once before the end of a project. Stage gates are based upon the essential performance elements (breakthroughs) that have to happen for the rest of the project to be worth doing and before the project can go any further.
- (2) BPA will authorize performance of subsequent stage gates identified in the Project Description. In the event a determination is made to exercise a subsequent stage gate, the Project Technical Representative (PTR) will issue a written authorization to proceed with work included in the subsequent stage gate. The PTR's stage gate authority is limited to stage gates that have been funded by the Cooperative Agreement or Modifications to the Cooperative Agreement.
- (3) BPA's cost share contribution for a stage gate shall be for a pre-determined not to exceed amount.
- (4) The decision to exercise a stage gate is a unilateral option reserved for BPA.

**CLAUSE 4-106 COST SHARE
(BFAI 1.3.3)(SEP 10)**

- (a) BPA shall not pay any fee or profit to the Recipient for performing this project.
- (b) The Recipient's cost share and any third party cost share contribution shall be verified by BPA before the BPA Agreement is executed.
- (c) BPA may fund up to 50 percent of a project's total cost to the Recipient using Technology Innovation Program Funds. The maximum BPA cost share contribution using Technology Innovation Program funds is \$500,000 per project proposal on an annual basis. BPA will not fund any project with a total cost that is less than \$25,000.
- (d) Recipient shall notify the FAO in writing immediately in the event of a change to the cost share type, amount, or source.
- (e) In the event of a reduction in the cost share, Recipient shall immediately notify FAO in writing and provide an action plan to secure replacement cost sharing. The notification shall indicate if the Recipient plans to either continue the project with a reduction in scope or end the project in the absence of cost sharing.
- (f) Failure to obtain and maintain the required level of cost share during the project period of performance is grounds for Termination with Cause. BPA may Terminate this Agreement for Cause per Clause 4-17 without notice if the Recipient is unable to obtain and/or maintain the required level of cost share during the project period of performance

UNIT 2 – PROJECT DESCRIPTION

A. GOAL AND SCOPE

The purpose of this project is to facilitate the rapid development and deployment of end-use controllable loads to provide both balancing services in the BPA balancing area and localized benefits to BPA's slice and load-following utilities. The project will support the procurement and implementation of 1MW to 3MW of demand response with energy storage in the service territories of at least three consumer-owned utilities: Lower Valley Energy, Eugene Water & Electric Board, and Cowlitz County PUD. Further, the project will fund services to utilities who are enthusiastic about participating, but may need assistance developing a business case and marketing programs. A summary of the business case development and marketing options, along with a technology overview of demand response and its applications, will be combined into a Guidebook that will be distributed to other slice and load-following utilities in the Northwest who may be interested in proceeding with independent, parallel demonstration projects. The project will provide analytical capability for optimizing the dispatch and operation of end-use storage, and evaluation of the efficacy and economics of wide-scale adoption of dispatchable end-use loads for providing load following reserves. The proposal seeks to enable the rapid deployment of controllable loads to complement the work of the Smart Grid Demonstration Project by positioning more load serving utilities to take advantage of the communication protocols developed as part of that effort. The widespread installation of grid-responsive loads is expected to produce jobs at a time when new economic activity is sorely needed and to reduce the share of reserves now provided by the hydro system.

B. BACKGROUND

BPA currently has more than 3000 MW of wind in its Balancing Authority. In the coming years, an additional 2000 to 6000 MW are expected to come online. Concerns have been raised over relying exclusively on the hydro system to provide balancing services. Consequently BPA is focusing R&D efforts administered through BPA's Office of Technology Innovation on energy storage and wind integration proposals. This project would support BPA in finding new, cost-effective sources for system balancing, especially those that reduce the need for BPA to hold high night-time decremental reserves. The widespread use of controllable loads would also allow BPA to better utilize excess wind produced in low-load hours. These together would result in more efficient operation of the hydro system, and improved T&D efficiency.

C. PROJECT OBJECTIVES

TASK 1- ORGANIZE TECHNICAL ADVISORY PANEL (TAP): The project team will recruit subject matter experts tasked with providing guidance and wider perspective to the Project Team.

TASK 2- DEVELOP BUSINESS CASE: The Technical Advisory Panel will work with the participating utilities to develop a business case, i.e. a financial model that details investments, revenues, resources needed (people and equipment), expected pay-back period, and possible breakpoints at increasing levels of implementation of controllable loads.

TASK 3- CREATE TECHNOLOGY SURVEY: The project team will work together to summarize current demand response technologies with optional energy storage; communication methods, standards and protocols; goals of other demand response demos in the Pacific Northwest; and lessons learned and accomplishments of demand response demonstrations in the U.S. and Europe.

TASK 4- PRODUCE GUIDEBOOK FOR CONSUMER-OWNED UTILITIES: Create a guidebook for the consumer-owned utilities, with the Business Case and Technology Survey integrated. The guidebook will place all the technical and economic analyses, conclusions, and tools in one place, so utilities currently outside of the project can easily determine whether undertaking a pilot project is in line with their business goals and if so, move forward quickly and confidently.

TASK 5- DEVELOP UTILITY MARKETING MATERIALS: The TAP will utilize its members with experience in marketing innovative, energy-saving programs to work with utilities to develop effective marketing programs and materials. One of the objectives in the project is to involve at least 1 commercial entity and at least 30 consumers in the pilot projects. These end-users need to actively participate within the project by installing "grid-responsive

devices" in their buildings/houses, carry the risk of malfunctioning "new techniques", adjust their energy usage and, very important, give extensive feedback during and after the pilots about their experiences.

TASK 6- SITE SELECTION: The participating utilities will carefully select the sites within their service areas to install the equipment and participate in the demonstration.

TASK 7- DISPATCH OPTIMIZATION SUPPORT: Provide technologies and support to vendors and utilities where needed to implement algorithms or analysis to support the efficient dispatch of available storage and validation/verification techniques. For dispatch optimization, models of the candidate devices are needed. The development of these models and testing of them is expected to start once the candidate devices are determined. Then testing the models can proceed along with development of dispatch algorithms. Finally, the project team will assist utilities with integration of the algorithms to the actual dispatch software.

TASK 8- TECHNOLOGY INSTALLATIONS: Once the program marketing proceeds, installations of control and communication equipment can begin. Installations are expected to continue over an extended length of time during the performance period.

TASK 9- DISPATCH REVIEW PERIOD: A minimum 12 months of operation is planned for all installations, with up to 18 months for at least some of the installations. This is necessary to give a better view of the seasonality of the various storage capabilities and how these align with the balancing reserve requirements of BPA. This window of operational experience will be used as the basis for the evaluation.

TASK 10- INTERIM REPORT: This Interim Report will detail and document experience to date, success of marketing programs, anecdotal assessments of success, and challenges. Any needed course-corrections will be recommended in the Interim Report, which will also function as a vehicle for cross-utility information sharing.

TASK 11- BALANCING SERVICES CONTRACT TEMPLATE: Participating utilities will work with the project team and BPA to define the services they are capable of providing by operating the dispatchable loads and the general terms under which BPA would purchase these services. This template will be a model for other entities, such as wind project operators, to procure balancing services from the utilities after the conclusion of the project.

TASK 12- CUSTOMER SATISFACTION SURVEY: The project team will assist the utilities to assess customer acceptance and satisfaction with programs. Key to the success of end-use programs is the acceptance and satisfaction of customers who have participated in the program, and an assessment of reasons non-participating customers chose not to participate.

TASK 13- PROJECT EVALUATION: The overall evaluation report will compare and contrast business models and utility successes in providing balancing services from controllable end-use loads. The evaluation will assess the verification and validation of end-use response, projected scalability and economic benefits, and assess customer acceptance to the range of marketing and technologies employed.

D. PROJECT TEAM

Ecofys US has assembled a team of industry experts to execute this project. Ecofys US will serve as project manager.

- a) Ecofys US (Project Lead)
- b) Spirae
- c) Steffes
- d) EnerNOC
- e) Lower Valley Energy
- f) Eugene Water & Electric Board
- g) Cowlitz Co. PUD
- h) Dr. Shuai Lu, PNNL
- i) Dr. Hashem Nehrir, Montana State University
- j) Renewable Northwest Project
- k) Horizon Wind Energy

Ecofys and BPA may agree to add additional utilities and professional consultants to the project. Project team changes shall be reviewed and accepted by BPA before any costs are incurred by Ecofys and project partners for reimbursement under this agreement.

E. GENERAL REQUIREMENTS

The project will support the deployment of pilot projects by at least three consumer-owned Northwest utilities to develop and demonstrate the ability of controllable end-use devices with energy storage to provide balancing services to BPA. The project team will work with consumer-owned utilities in BPA's balancing authority to develop a business case for implementing the controllable end-use devices and associated communications, and to assess end-use electric storage technologies that are ready for implementation. The project will assist utilities in developing marketing materials to achieve the desired level of consumer participation. Prior to start-up and continuing during operation of the pilot, the project team will bring its considerable technical expertise to aid the utilities in setting up communications, modeling various control scenarios, and optimization of dispatch and control of the devices. After the operational segment of the pilot is complete, expected to be 12 to 18 months, the project will conduct satisfaction surveys, including consumers, the participating utilities, and BPA staff. The project will conclude with an overall project evaluation that will analyze the lessons learned and the degree of success of the pilot projects in using controllable loads with an energy storage component to provide balancing services and support the integration of renewable energy resources. Further, the evaluation will include the potential in the Pacific Northwest for widespread implementation, and the economic value this could represent to BPA, the consumer-owned utilities, their communities, and the renewable energy industry.

Steffes will supply Electric Thermal Storage (ETS) devices in the form of interactive water heaters, whole house furnace systems, and data collection and control hardware. The demonstrations will include 50 newly-installed interactive water heaters with 105 gallon capacity, and 10 interactive water heaters with the controls retrofitted on existing 50 gallon units. The whole house furnace systems, combined with an air-source heat pump for increased efficiency, will be deployed at six sites.

EnerNOC will enable and dispatch a 1 to 5 site load-following resource (representing a total of up to 1 MW of demand response) made up of commercial and industrial customer loads, capable of responding to dispatch

signals upon 10 minutes notice, in response to system imbalances resulting from wind intermittency. The resource will be available continuously (24x7), for up to 30 minutes per event, a maximum of two events per day, and a minimum of three hours between events. (These limitations are subject to further discussions with BPA and participating utilities.)

F. METHODS TO BE USED

STEFFES APPROACH

There are multiple options for demonstrating the value of Interactive Space and Water heating with ETS. Steffes has coordinated with the participating utilities to define a combination of the following options be installed in the project:

Interactive Water Heater Control:

This option involves the installation of a Steffes Interactive Water Heater Control (iWHC) device on a domestic water heater. The iWHC has the ability to accept a signal from a variety of sources: a utility control switch, the internet, a timer, etc. This control enables the water heater to become a powerful year-round storage device by providing variable, up or down regulation in response to the needs of the grid. The iWHC regulates heat storage, dependent upon power availability, while insuring comfort for the consumer at all times. Most standard electric water heaters can have a iWHC installed on them; however, it is preferred the water heater be a 85 or 105 gallon, high quality model (such as a Marathon).

Cowlitz County PUD will have 40 demonstration sites. Each site will have a 105 gallon Marathon hot water tank with iWHC installed. The sites will consist of both residential and commercial customers. Eugene Water and Electric Board will have 20 demonstration sites. Ten sites will have a 105 gallon hot water tank installed with iWHC, and 10 sites will have iWHC retrofitted on the existing 50 gallons hot water tanks.

ETS Furnace (Forced air or hydronic):

This option is for the installation of an Electric Thermal Storage furnace. These furnaces are available in either forced air or hydronic (hot water) models. These are 240V heaters with model sizes ranging from 19kW to 45.6kW and storage capacities from 120kWh to 240kWh. Commercial size models with larger capacities are also available. Like the ETS room units, these central systems have the ability to respond to smart control signals for doing Up and Down regulation while providing great comfort to the consumer. They also interface nicely with air source heat pumps (ASHP's) to provide comfort modulation, supplemental backup heat and improved efficiency. A new home would be a perfect candidate for this type of installation as an adequate electric service size needs to be planned for. Existing homes may also be considered on a case by case basis. The ASHP would be optional; however, demonstrating the improved efficiency and energy conservation in addition to arbitrage, frequency control and demand management would be beneficial.

Lower Valley Energy will have 6 demonstration sites. These 6 sites will have Comfort Plus Whole House furnaces installed with Air Source Heat Pumps (ASHP's). Five sites will be forced air units and 1 site will be hydronic output to supply in-floor heating.

Data Collection:

Steffes will provide data collection and communication services for each site. The information will be available through a web portal. The data collection system will have 8 inputs capable of recording 7 temperatures with 5 minute (or other) interval and one current reading with 1 minute (or other) interval, plus other data from the Steffes iWHC or furnace. The data collection unit has web look up functions and will also be able to do fast direct load control if desired in response to renewable power availability, LMP, ACE, or AGC signals.

Each site will need to have high speed internet service that can be accessed at any time for control and collection of data, along with a standard 120 volt receptacle to power the system. Wi-fi is preferred but not required (depends on proximity of router to utility room). The control and collection system will have an electrical consumption rate of less than 100 watts. Installation of the system would be the responsibility of a local individual, with full assistance of Steffes Corporation.

Steffes will provide one trip to the field (1-week) to provide installation training and assist with initial installation at no charge. Telephone support will be provided from the factory for the demonstration(s) at no charge for 2-years.

ENERNOC APPROACH

This project is intended to determine whether the aggregation of C&I end-use loads, such as those of a cold-storage facilities, are capable of providing a load following resource (up and down) to mitigate the intermittency of wind power. Over the course of the project period, EnerNOC will build and operate such a load following resource, available for dispatch in response to BPA or utility signals, to determine whether such an approach represents a reliable, cost-effective alternative to meeting BPA's wind balancing needs.

EnerNOC will enable and dispatch a load-following resource up to 1 MW in size made up of commercial and industrial customer loads, capable of responding to dispatch signals upon 10 minutes notice, in response to system imbalances (at times resulting from the variability of wind generation). The resource will be available continuously (24x7), for up to 30 minutes per event, a maximum of two events per day, and a minimum of three hours between events. These limitations are subject to further discussions with BPA.

EnerNOC will handle the following aspects of resource development and management:

Customer Enablement: After customers are identified by the serving utility, and agree to participate, EnerNOC's field operations staff will work with each utility customer to identify the appropriate load curtailment plan specific to the individual customer's business and needs. EnerNOC installs a hardware device, or ESS, at each end-use customer site at no cost to the customer. The ESS is a two way communications solution that (1) captures near real-time electricity consumption data on 5-minute intervals and (2) enables remote control of on-site customer equipment.

Resource Dispatch and Management: EnerNOC's Network Operations Center or NOC (located at EnerNOC headquarters in Boston and replicated in the San Francisco office) combines advanced software, Internet communications, and highly-skilled professionals to collect and present end-user energy consumption data, initiate and conclude demand response events, and manage and monitor event performance. The NOC connects to each site through the ESS, enabling continuous monitoring of enduser energy consumption and the continual adjustment of each user's load reduction forecast through EnerNOC's DemandSMART energy management software application.

Settlement and M & V: EnerNOC will report load reduction performance both during and after each load-following event. Within 48 hours of the event EnerNOC will provide a detailed post-event report outlining individual customer and aggregated performance, based on agreed upon M&V methods.

Control Signals

As the objective of the project is to demonstrate the provision of balancing reserves from controllable loads, it is expected that the loads will respond to the Balancing Reserve Deployment signal from BPA's Dittmer control center. Other control signals may be tested, such as AGC, ACE, system voltage and system frequency, system load level, and time of day, to assess the trade-offs and relative effectiveness of a variety of control approaches.

The method for communicating the control signals to the dispatchable loads will proceed in two phases.

In Phase I, direct communications will be used through the capabilities of the technology vendors, Steffes and EnerNOC. The chosen external control signal, e.g. ACE, will be made available via the Internet and captured by the vendors. The signal will be then sent directly to the individual devices.

In Phase II, a multi-layered approach will be used. The external control signal will be routed to the Distributed Energy Management platform of Spirae, where dispatch optimization algorithms will process the signal and send out the resulting individualized control signals particular to each device.

Depending on the utility and the load being controlled, the signal could pass through another layer such as the utility's Energy Management System or the NOC of EnerNOC for the C&I loads. An effort will be made in Phase II

to integrate utility distribution system data into the optimization, and to assist utilities in designing a cost-effective method of communicating with the devices after the conclusion of the demonstration program.

G. TASKS TO BE PERFORMED

TASK 1. ORGANIZE TECHNICAL ADVISORY PANEL (TAP)—30 days (Ecofys US)

Goals

Organize the TAP to support and inform the ongoing activities of the project.

Approach

The Project Team will initially focus on recruiting subject matter experts tasked with providing input to business case development, marketing approaches, and the technology survey. In Year 2, additional TAP members may be recruited to support developing a balancing services contract template. Renewable Northwest Project and the Public Power Council have agreed to assist the project in reaching out to individuals in the renewable energy industry and other consumer-owned utilities.

Project Team

Ecofys US will provide project management and key support for the work of the TAP..

TASK 2. DEVELOP BUSINESS CASE – 90 days (Ecofys US)

Goals

Project team members will utilize the resources of the Technical Advisory Panel which will work with interested utilities to develop a business case, i.e a financial model that details investments, revenues, resources needed (people and equipment), expected pay-back period, and any possible break-points at increasing levels of implementation of controllable loads. A more simplified business case will be produced for the consumers, providing answers to the critical question, “What’s in it for me?” The consumer business case will also present options for incentive programs that will be economically viable for the utilities and result in a high interest level for the consumers to participate.

Approach

A key indicator of project success is identifying and measuring the benefits derived by BPA, the locally owned utilities, and the end user. Therefore, a profitable business case has to be developed with regard to the potential costs and benefits of providing balancing services. There will be benefits like cost-savings from peak shifting, an efficient integration of renewable energy sources, etc. But on the other hand, costs will be made such as investment in equipment and in communication/marketing to the end-user, etc.

Ecofys will coordinate with the BPA Demand Response Team in performing Tasks 2., 2.1, and 2.3, to make optimum use of the DR Team’s work products in Ecofys project.

The business case will elaborate on the following main elements:

1. Specific description of the balancing services, devices and objectives.
2. Describe the benefits and disadvantages for utilities.
3. Describe the benefits and disadvantages for the end-users.
4. Potential target groups (end-users) and interconnectivity within these groups.
5. (Potential) competing services (existing DSM programs)
6. Human, physical resources required

7. Financial projection:

- a) (Investment) cost/benefit analyses per device, per house, per local unit and on a system level (including financial benefits for end-user).
- b) Costs for communication/marketing to the end-user.
- c) Potential income from sales of balancing services, cost-savings from peak shaving (less peak- supply capacity necessary), etc.
- d) Payback time for storage devices from the utility perspective.

8. Synergy effects like:

- a) Impact on job creation of widespread installation of storage devices.
- b) Better integration of renewable energy.
- c) Closer customer relations / Higher customer satisfaction.

9. Risk analyses

The outcome of the business case can be used in the negotiation between BPA and utilities concerning possible future contracts for supply of balancing services (To be elaborated in Task 11, Balancing Services Contract Template). Furthermore the outcome of the business case will be integrated in a guidebook for the consumer-owned utilities.

Task 2.1

Provide insight regarding the current energy system in the region, including:

- 1. Type and size of end-users.
- 2. The shape of the energy demand: average energy-use per type of end-user, peak/base load, daily fluctuations, seasonal influence, etc.
- 3. Description of the current energy sources (type of power plants), current energy prices per type of power plant and expected price development.
- 4. Description of upcoming changes in BPA demand charges and demand rate structure.
- 5. Review of balancing authorities in the region

Task 2.2

Based on the gathered information the business case will be worked out.

Task 2.3

If necessary, contacts need to be made with other stakeholders to:

- 1. Request extra information.
- 2. Ask for feedback on assumptions/ideas.
- 3. Get feedback on the overall business case.

Project Team

Ecofys US will be responsible for Task 2, with assistance from Ecofys resources in the Netherlands.

Deliverables

Business case for providing balancing services

TASK 3. CREATE TECHNOLOGY SURVEY—105 days (Ecofys US)

Goals

The project team will work together to summarize current demand response technologies with optional energy storage; communication methods, standards and protocols; goals of other demand response demos in the Pacific Northwest; and lessons learned and accomplishments of demand response demonstrations in the U.S. And Europe.

Approach

The project team members and the TAP will produce a summary document by doing literature searches, interviews with utilities currently engaged in demonstration projects with DR, and reporting on projects that the team members themselves have completed or are currently active.

Identify devices with storage capacity:

1. Provide a list of devices which qualify for load management plus e- storage functionalities (e.g. water/space heaters, cold storage, in future: electric vehicles, laptops and mobile phones?)
2. Identify the potential per device and combination of devices. Provide a list of devices which qualify for load management without storage capacity (e.g. AC's, residential refrigeration, lighting)
3. Identify the potential per device and combination of devices
4. Provide insight in the possible techniques available for load-balancing:
5. Provide a list of devices which qualify for load management plus possibly e- storage functionalities (e.g. water and space heaters, air conditioners, chillers, lighting, water pumps, fridge, TV, electric vehicles, laptops and mobile phones, freezer).
6. Estimate the potential per device and combination of devices.
7. Estimate the investment costs per device.

Identify communications options with devices and whether certain technologies or protocols are easily integrated with the utility's operations or require more integration effort. Identify smart end-use storage solutions that are more passive, and those that require more interaction with the technology and therefore more involvement of utility personnel.

Ecofys will coordinate with the BPA Demand Response Team and BPA contractors to optimize the use of the Technology Surveys being completed by those contractors in the Ecofys project.

Project Team

Ecofys US will develop the Technology Survey, with assistance from MSU, PNNL, RNP, and Ecofys Netherlands.

Deliverables

Technology Survey Document for use by participating utilities and for inclusion in the Guidebook (see

Task 4).

TASK 4. PRODUCE GUIDEBOOK FOR CONSUMER-OWNED UTILITIES – 60 days (Ecofys US)

Goals

Create a guidebook for the consumer-owned utilities, focusing on the unique value to the utilities of implementing within their service territories controllable loads whose energy usage can be increased or decreased via utility control. The outputs of Task 2 and Task 3, the Business Case and Technology Survey, will be integrated into this guidebook along with an introduction and background to explain why these resources are a critical need in the Pacific Northwest region. The guidebook will place all the technical and economic analyses, conclusions, and tools in one place, so that utilities currently outside of the project can easily determine whether undertaking a pilot project is in line with their business goals and if so, move forward quickly and confidently.

Approach

The outcome of the previous subtasks, Formation of a TAP, Developing the Business Case and Technology Survey, will be integrated into a guidebook for the consumer-owned utilities. The guidebook content will be reviewed by staff at the Northwest Power and Conservation Council, which has provided funding specifically for this task. The guidebook will be produced in electronic form and linked from the Council website and possibly from websites of other public power interest organizations.

The guidebook will be widely distributed so that consumer-owned utilities who are not able to directly participate in this R&D project from the beginning can still be informed about the potential benefits of installing controllable loads and providing balancing services for renewables integration. Based on interest level and funding support, it is expected that other Northwest utilities will choose to implement demonstration pilot projects in alignment with this project.

Ecofys will coordinate with the BPA Demand Response Team and BPA contractors to optimize use of PNW Consumer-Owned Utilities Demand Response Guidebook being prepared by those contractors in the Ecofys project.

Project Team

Ecofys US will be responsible for task 4, production of the guidebook.

Deliverables

Guidebook for utilities on installing “Smart End-Use Energy Storage”

TASK 5. DEVELOP UTILITY MARKETING MATERIALS—150 days (Ecofys US)

Goals

Assist the participating utilities to identify and implement effective marketing to enable full deployment of the Steffes hardware and participation of 1 to 5 industrial cold-storage facilities.

Approach

Success of end-use programs will depend on satisfied end-users. Members of the TAP with skills in marketing will work with utilities to develop effective marketing programs and materials. Depending on the experience and preferences of the utilities, methods of collecting information that may be on the activities list are:

Interviews: with key figures about relevant Business Drivers, SWOT analysis, important operational matters and the location of the subject in the core process.

Feedback session after interview: discuss the results of an interview again with the interviewee after an initial analysis

Reading: existing policy or business plans, strategic reports, studies and other literature, for example Calling up and studying drawings and maps

Questionnaires: to identify core problems or assess willingness to change, for example

Workshops: when creativity has to be encouraged and when direct action is required

Brainstorming: when generating ideas is the primary goal

Mind Mapping: when the associations of the parties concerned have to be established

Post-it Session: a technique with which ideas are easy to group and score

Nominal Grouping Technique: suitable for gauging ideas or performing a zero measurement. A scoring technique in which possible solutions are scored by the participants

One of the objectives in the project is to involve at least 1 commercial entity and at least 30 consumers in the pilot projects. These end-users need to actively participate within the project by installing "grid responsive devices" in their buildings/houses, carry the risk of malfunctioning "new techniques", adjust their energy usage and, very important, give extensive feedback during and after the pilots about their experiences. Therefore, the success of these pilots depends highly on the cooperation and satisfaction of the end-users.

As participation is certainly not hassle and risk free a good/interesting "proposition" has to be created towards the end-users to "seduce" them to participate: "What's in it for them". Within the business case the "financial" proposition to the end-user is already formulated. The main challenge within this work package is however to get this proposition/message across to the end-user in an attractive way in the beginning, and to keep the participants interested and cooperative during the pilot of at least one year.

To reach this goal effective marketing programs and materials have to be developed together with the utilities, describing the project, highlighting the advantages and keeping the participants active along the way.

Subtasks for this effort include:

Task 5.1

Make an inventory of the potential target groups and the relation with the publicly-owned utilities. Also analyze the communication possibilities of the publicly-owned utility and discuss with them which marketing programs fits well (in relation to costs and human resources)

Task 5.2

Develop effective marketing programs and incentives for consumers, and how those incentives would be similar or different from those used in existing DSM programs. Discuss the outline and draft version of the marketing programs with the publicly-owned utilities.

Task 5.3

Develop marketing materials (fliers, brochures, articles etc.) targeted to the end users. The draft version of the content of these materials will be discussed with the publicly-owned utilities before finalizing them.

Ecofys will coordinate with the BPA Demand Response Team and BPA residential demand response pilot utilities to consider the marketing materials used by the six residential pilot utilities, to market Steffes equipment installations and load management actions, and also with the utilities participating in the BPA Commercial and Industrial demand response pilots.

Project Team

Ecofys US will be responsible for Task 8, with assistance from Ecofys Netherlands.

Deliverables:

A set of marketing materials for the residential sector to encourage installation of ETS technology A marketing program for the selected target groups Communication materials for the selected target groups.

TASK 6. SITE SELECTION – 330 days (Ecofys US)

Goals

To select optimal sites within each utilities' service area for equipment installation and participation in the demonstration.

Approach

The participating utilities have the following deadlines for identifying sites for deployment of Steffes ETS equipment: December 31st 2010 for installation of retrofit interactive water heater controls on existing water heaters, March 31st 2011 for new installations of 105g interactive water heater controls, August 31st 2011 for the comfort plus furnace units. Site selection for C&I loads will proceed at the project start. EnerNOC will work with Cowlitz County PUD and EWEB to identify prospects and communicate with the customers. Although not a hard dead-line, the goal is to identify at least one cold storage facility for participation by March 31st, 2011.

Project Team

Each utility will be responsible for Task 6, site selection. Ecofys will track progress and report this information to BPA.

STAGE GATE 1 - MARCH 31, 2011

Stage Gate 1 is a go/no-go decision point in the project. Based on the results of Tasks 1 to 6, either there will be sufficient interest from consumers at the participating consumer-owned utilities to implement demonstration pilot projects, or not. Another important evaluation at Stage Gate 1 is the success of efforts to model and simulate the response of the controllable loads in a Distributed Energy management software platform. Factors that will influence the project's success at

Stage Gate 1 include:

1. Business Case: Did the utilities utilize the results of the business case to develop an approach to implementation that was affordable to the utility and sufficient to entice consumer participation?
2. Site Selection (ETS): Were sties identified for the retrofitted iWHC on existing water heaters? Were sites identified for the new water heaters with iWHC? Has progress been made in identifying at least half of the sites for the whole-house furnaces? Are installations proceeding for all the sites with retrofitted iWHC? Has installation begun for at least half of the sites with new water heaters with iWHC?
2. Resource Availability (C&I): Were C&I customers identified and informed well enough to result in commitment of at least one C&I facility?
3. Technology Survey: Did the technology summary, provided to the participating utilities, contribute to a clear understanding of project methods and goals, as well as the relationship of this project to other regional DR and Smart Grid efforts? Was this information helpful in creating enthusiasm within the utility staff and management, leading to a clear plan for implementation during Phase I and Phase II of the Dispatch Optimization (Task 7)?
4. Dispatch Optimization Support, Initial Modeling: Was the project team able to utilized existing models for the end-use loads, or create new working models? Were these models able to be be incorporated into the Spirae

Distributed Energy Management platform to create a working model of at least one utility's system? Did the project team succeed in modeling and simulating the effects of at least one dispatch optimization algorithm?

A presentation will be made to BPA personnel at Stage Gate 1 to inform all interested parties whether the project has met the criteria to proceed to the next Stage Gate.

TASK 7. DISPATCH OPTIMIZATION SUPPORT—660 days (Spirae)

Goals

Provide technologies and support to vendors and utilities where needed to implement algorithms or analysis to support the efficient dispatch of available storage and validation/verification techniques. For dispatch optimization, models of the candidate devices are needed. The development of these models and testing of them is expected to start once the candidate devices are determined. Then testing the models can proceed along with development of dispatch algorithms. Finally, the project team will assist utilities with integration of the algorithms to the actual dispatch software.

Approach

Scientists at Montana State University, PNNL and Spirae will provide technologies and support to vendors and utilities where needed to implement algorithms or analysis to support the efficient dispatch of available storage and validation/verification techniques. For dispatch optimization, models of the candidate devices are needed. The development of these models and testing of them is expected to start once the candidate devices are determined. Then testing the models can proceed along with development of dispatch algorithms. Finally, the project team will assist utilities with integration of the algorithms to the actual dispatch software.

Problem Description and the Proposed Approach:

Wind energy is intermittent by nature. When there is excess wind power available, electric thermal storage (ETS) devices such as electric water heaters (EWH's) can be turned on to absorb the available power by raising water temperature in the EWH tank to a safe maximum value. This can be achieved by turning EWH's on, either by a simple on/off control scheme (i.e., turning EWH's on, for existing EWH's) or by raising the EWHs' thermostat setpoint (for EWH's designed to provide thermal storage). Control can be achieved through a communication signal sent to each EWH by the utility.

Assuming the thermostat setpoint of EWHs can be adjusted by the utility through communication, the utility can communicate a unique command signal to each EWH to control its thermostat setpoint. The command signals can be randomized to avoid loss of diversity in the operation of the EWHs, which can otherwise result in instability in demand. When there is excess wind power available, the thermostat setpoint of the EWHs involved will be raised randomly by the utility to absorb the excess available power. Similarly, when there is shortage of renewable power, the EWHs' thermostat setpoint may be lowered to a certain point when allowed by the customers involved. The result of this strategy is balancing generation and demand at the grid level.

The above procedure can also be used for leveling utility demand profile. That is, the EWH thermostat set-points can be randomly lowered during peak demand hours to reduce power demand and randomly raised during low demand hours to increase demand; hence, increasing the utility load factor. In the commercial and industrial sector, members of the project team will recruit, enable and dispatch a load-following resource up to 1 MW in size made up of customer loads capable of responding to dispatch signals upon 10 minutes notice, in response to system imbalances resulting from wind variability. The resource will be available continuously (24x7), for up to 30 minutes per event, a maximum of two events per day, and a minimum of three hours between events. These limitations are subject to further discussions with BPA.

Spirae's role will be supporting design and development for integration of the end-use storage into the participating distribution utilities via software. This will proceed with a phased approach. The method for communicating the control signals to the dispatchable loads will proceed in two phases.

In Phase I, direct communications will be used through the capabilities of the technology vendors, Steffes and EnerNOC. The chosen external control signal, e.g. ACE, will be made available via the Internet and captured by

the vendors. The signal will be then sent directly to the individual devices. In Phase II, a multi-layered approach will be used. The external control signal will be routed to the Distributed Energy Management platform of Spirae, where dispatch optimization algorithms will process the signal and send out the resulting individualized control signals particular to each device. Depending on the utility and the load being controlled, the signal could pass through another layer such as the utility's Energy Management System or the NOC of EnerNOC for the C&I loads. An effort will be made in Phase II to integrated utility distribution system data into the optimization, and to assist utilities in designing a cost-effective method of communicating with the devices after the conclusion of the demonstration program.

Spirae will engineer the dispatch algorithm side of things with assistance and consulting provided by the other team stakeholders with respect to objectives and methods. Given that the algorithm will be accepting external signals such as AGC, ACE, or renewables generation error margin, etc.. this algorithm would then translate the signal input to a dispatch strategy for the portfolio of water heaters for each utility. Key components of the algorithm would be to investigate long term versus short term (e.g. transients) balancing strategies, ramp rates, and cascading dispatch to minimize impacts to the system, etc. Also, Spirae will provide development of use models of each of the participating utilities to feed the algorithm implementation. Spirae would provide simulation of various use cases prior to the demonstration phase.

Spirae will deploy the dispatch algorithms on their hosted BlueFin DER Management platform which will reside at the Spirae control center in Fort Collins, Colorado. This SW platform would provide the framework for both the algorithm as well as HMI's and other data collection/historian and analysis capabilities to gather experiment data. Spirae will also provide a SW/HW gateway to each of the participating utilities for data exchange and integration with the local DER control and communication system. The communication with and dispatch of the water heaters would be conducted via integration with the Steffes or Utility database at the utility back end.

Therefore, the anticipated architecture would be a layered strategy, with the applications/algorithm layer at the project level operating on the Spirae BlueFin platform, then distributed to "gateways" or interfaces with each of the utility projects, and then integration with the local DER control and communications.

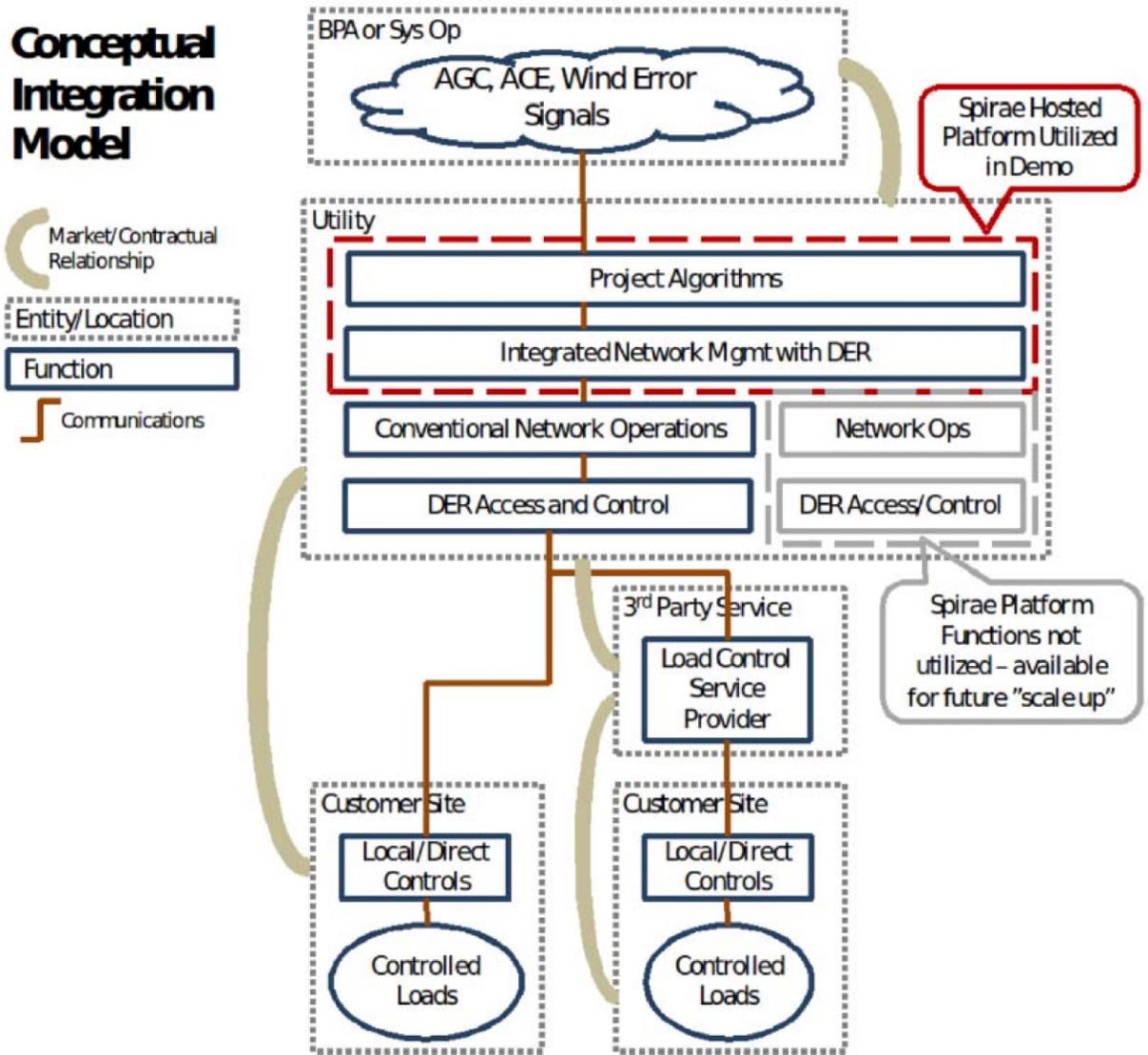


Figure 1: The conceptual system architecture

Project Team

Spirae will be responsible for Task 7 and management of other parties involved.

Deliverables:

1. Models of ETS devices
2. Algorithms for control and effective dispatch of ETS devices
3. Configured software to manage the control signal(s) and monitor the response of the resource

TASK 8. TECHNOLOGY INSTALLATIONS—270 days (Steffes, EnerNOC)

Goals

Once program marketing proceeds, installations of control and communication equipment can begin. Installations are expected to continue over an extended length of time during the performance period. Installations of controls for C&I facilities and for interactive water heaters are targeted for completion by the end of June 2011, and installation of whole house furnaces by the end of October 2011.

Approach

Steffes will work with each participating utility to facilitate installations. Steffes will provide one trip to the field (1-week) at each utility to provide installation training and assist with initial installation at no charge. Telephone support will be provided from the factory for the demonstration(s) at no charge for 2-years.

EnerNOC will work with each participating utility and the C&I customer(s) directly to accomplish installation of the necessary metering and control equipment. To the extent that capable and interested C&I customer sites are identified, EnerNOC will make a load following resource (1 to 5 customer sites) available to BPA for dispatch beginning May 1, 2011 or within 60 days of C&I customer commitment, whichever occurs later.

Spirae's role will be assisting with utility integration to the dispatch optimization system (Spirae hosted platform), and will be supported with custom interface development and/or applications engineering.

During this phase, additional refinement of the utility participation model will be conducted, and testing to ensure interoperability.

Project Team

Steffes will be responsible for residential installations; EnerNOC will be responsible for commercial & industrial metering and controls installation; Spirae will assist with installation of communications necessary for implementing the optimized dispatch control.

TASK 9. DISPATCH REVIEW PERIOD—540 days (Ecofys US)

Goals

A minimum 12 months of operation is planned for all installations, with up to 18 months for at least some of the installations. This is necessary to give a better view of the seasonality of the various storage capabilities and how these align with the balancing reserve requirements of BPA. This window of operational experience will be used as the basis for the evaluation.

Approach

This is not so much a task, but a window of operational experience that will be used as the basis of the evaluation. Steffes and EnerNOC will be providing the technology for data collection. Steffes will provide data collection and communication services for each site. The information will be available through a web portal. The data collection system will have 8 inputs capable of recording 7 temperatures with 5 minute (or other) interval and one current reading with 1 minute (or other) interval, plus other data from the Steffes iWHC or furnace. Typically, data is uploaded from each site to a central database every 4 days.

Within 48 hours of each load following event, EnerNOC will provide BPA with a post-event report detailing the performance of each individual customer site, and the portfolio as a whole. At the conclusion of the summer 2011 season, EnerNOC will provide BPA with an overall post-season program review report.

Analysis of the data will be performed by Ecofys US and Spirae, with support from PNNL, MSU and RNP.

Project Team

Ecofys US will be responsible for task 9, supported primarily by Steffes, EnerNOC and Spirae.

TASK 10. INTERIM REPORT—60 days (Ecofys US)

Goals

This Interim Report will detail and document experience to date, success of marketing materials, anecdotal assessments of success, and challenges. Any needed course-corrections will be recommended in the Interim Report, which will also function as a vehicle for cross-utility information sharing.

Approach

The Interim Report will include a summary from each participating utility of the challenges and success of the project to date. Preliminary analysis of data collected from operational demonstration sites will be included in the report. Expert review and coordination with the ongoing PNW Smart Grid Demonstration will be provided by PNNL.

Project Team

Ecofys US will be responsible for task 10, with support from PNNL, MSU, and other experts.

Deliverables:

Interim Report

Presentation to BPA staff and other stakeholders (part of Stage Gate 2)

STAGE GATE 2 – DECEMBER 31, 2011

Stage Gate 2 is a go/no-go decision point in the project. Based on the results of Tasks 7 to 10, the Interim Report will summarize the effectiveness of the demonstration pilot projects to date. Based on the results and initial results factors that will influence the project's success at Stage Gate 2 include:

1. Technology Installations: Did the utilities develop an effective communications platform and protocols that are acceptable to BPA for receiving signals such as the BPA Reserve Deployment signal, AGC and ACE?
2. Dispatch Optimization: Are the utilities able to control the loads through the use of one or more control signals? Is the changing load level able to be verified?

A presentation will be made to BPA personnel at Stage Gate 2 to inform all interested parties whether the project has met the criteria.

TASK 11. BALANCING SERVICES CONTRACT TEMPLATE—90 days (RNP)

Goals

To create a model contract for the participating utilities (and possibly other utilities) to use as a template in negotiating the sale of balancing services from dispatchable loads.

Approach

The project team together with the TAP will define the services provided by the utilities operating the dispatchable loads and the general terms under which BPA would purchase these services. This template will be a model for other entities, such as wind project operators, to procure balancing services from the utilities after the conclusion of the project.

Project Team

Renewable Northwest Project will be responsible for management of the task 11.

Deliverable:

Final Draft Report defining the services provided by the utilities and recommended terms under which BPA would purchase these services. The team expects that BPA's Demand Response team will develop this report further in Spring 2011.

TASK 12. CUST OMER SATISFACTION SURVEY—90 days (Ecofys US)

Goals

Assess customer acceptance and satisfaction with programs.

Approach

Key to the success of end-use programs is the acceptance and satisfaction of customers who have participated in the program, and an assessment of reasons non-participating customers chose not to participate.

- Assess customer and utility acceptance and satisfaction with programs.
- Survey pilot project participants and BPA staff for suggested program improvements.

Project Team

Ecofys US will be responsible for management of the task 12, in cooperation with the participating utilities.

Deliverable:

Report summarizing the experience and attitudes of the participants in the pilot project

TASK 13. PROJECT EVALUATION—120 days (Ecofys US)

Goals

The Project Evaluation will document the success of the project in development and deployment of end-use controllable loads to provide both balancing services in the BPA balancing area and localized benefits to BPA's slice and load-following utilities. The evaluation will show techniques used for optimizing the dispatch and operation of end-use storage, and for efficient and cost-effective integration of the controllable loads into the utility's existing operations. Another focus is the efficacy and economics of wide-scale adoption of dispatchable end-use loads for providing load following reserves.

Approach

Ecofys US will lead in the production of an evaluation report that will compare and contrast business models, technologies and utility successes in providing balancing services from controllable end-use loads. The evaluation will assess the verification and validation of end-use response, projected scalability and economic benefits, and assess customer acceptance to the range of marketing and technologies employed. The Project Evaluation will analyze the success or failure in meeting the Major Project Objectives:

- Develop technical and economic tools and guidelines to encourage the deployment of demonstration pilot projects in the territories of at least three publicly-owned, load-serving utilities; multiple technologies for controllable loads/electric storage devices will be utilized, in both the residential and commercial & industrial (C&I) sectors.
- Identify robust protocols for controlling storage devices: optimal charge and discharge rates, charge levels for the devices, communications options.

BONNEVILLE POWER ADMINISTRATION

- Evaluate whether the load response can be accurately measured and verified, both with and without the services of a power aggregator.
- Demonstrate the use of residential and C&I controllable loads to provide up-regulation service (equivalent to decreased load demand) and down-regulation service (equivalent to increased load demand), with a goal of providing load-following balancing reserves.
- Demonstrate the use of several independent control signals and communication methods
- Quantify the balancing services provided by a given level of storage device capacity.
- Evaluate the possibilities of providing load following, regulation, and contingency reserves through widespread deployment of controllable end-use devices with energy storage.
- Determine payback time for storage devices from the utility perspective; evaluate potential income from sales of balancing services, cost-savings from peak shaving and improved T&D efficiency.
- Quantify the impact on job creation of widespread installation of storage devices.
- Assess customer and utility acceptance and satisfaction with programs.
- Survey pilot project participants and BPA staff for suggested program improvements.
- Identify effective marketing programs and incentives for consumers, and how those incentives would be similar or different from those used in existing DSM programs.
- Identify smart end-use storage solutions that are market-ready, and those that require more technology development or field testing.

Project Team

Ecofys US will be responsible for Task 13.

Deliverable

Evaluation report with recommendation

Presentation to BPA staff and other stakeholders

H. PROJECT SCHEDULE

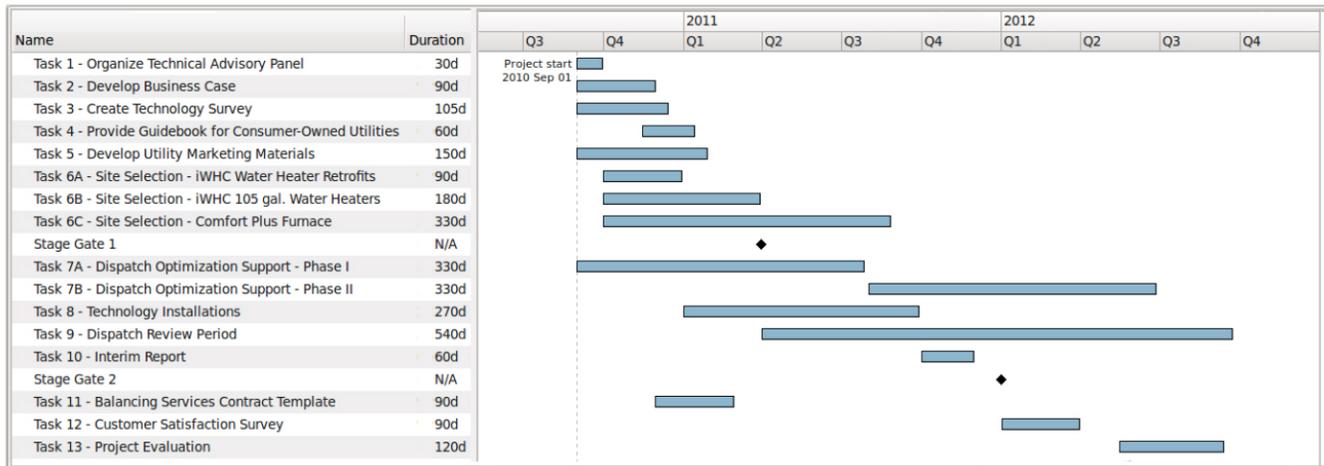


Figure 2: The Project Gantt Chart.

NOTE: Quarters are on calendar basis, not BPA fiscal year.

Agreement Signed	Duration	FIXED	START	FINISH
Reference Date				
Task 1	30		9/1/2010	10/1/2010
Task 2	90		9/1/2010	11/30/2010
Task 3	105		9/1/2010	12/15/2010
Task 4	60		11/15/2010	1/14/2011
Task 5	150		9/1/2010	1/29/2011
Task 6A	90		10/1/2010	12/30/2010
Task 6B	180		10/1/2010	3/30/2011
Task 6C	330		10/1/2010	8/27/2011
Stage Gate 1	0	3/31/2011	3/31/2011	3/31/2011
Task 7A	330		9/1/2010	7/28/2011
Task 7B	330		8/1/2011	6/26/2012
Task 8	270		1/1/2011	9/28/2011
Task 9	540		4/1/2011	9/22/2012
Task 10	60		10/1/2011	11/30/2011
Stage Gate 2	0	12/31/11	12/31/11	12/31/11
Task 11	90		11/30/2010	2/28/2011
Task 12	90		1/1/2012	3/31/2012
Task 13	120		5/15/2012	9/12/2012

Table 1: Project Timeline by Task.

I. SUBSTANTIAL INVOLVEMENT

1. BPA will provide substantial involvement to the project as described below:
 - A. Reviewing in a timely manner progress reports and proposed changes, recommending alternate approaches, if the plans do not address critical programmatic issues or accomplish objectives, and determining whether benchmarks have been achieved to warrant continued funding
 - B. Participating in project management planning activities to ensure BPA's program requirements and/or limitations are considered in performance of the work elements.
 - C. BPA will enter into separate agreements with utility partners to acquire the equipment and hardware for the demonstration sites.
 - D. BPA may make details regarding communication strategies developed in other on-going BPA-funded demand response pilot projects available to the Ecofys project team.
 - E. BPA will participate in establishing the communication and event parameters for Task 7.
 - F. BPA may provide data from other Demand Response program activities to Ecofys for use in planning and development of communications strategies in support of Task 7.

2. Recipient Responsibilities
 - A. Performing the project activities supported by the award in accordance with the Project Description, including providing the required personnel, facilities, equipment, supplies and services;
 - B. Managing and controlling project activities in accordance with its own established processes and procedures to ensure tasks and subtasks are completed within schedule and budget constraints defined by the Project Description;
 - C. Notifying PTR of all critical decision points and major meetings in sufficient time to allow the PTR to participate in person or via phone;
 - D. Implementing an approach to identify, analyze, and respond to project risks that is commensurate with the complexity of the project;
 - E. Defining and revising approaches and implementation plans, submitting the plans to PTR for review, and incorporating PTR comments;
 - F. Coordinating related project activities with team members and external stakeholders to ensure effective integration of all work elements;
 - G. Attending periodic program review meetings and reporting project status;
 - H. Submitting progress reports and addressing BPA concerns/comments.

UNIT 3 – STAGE GATE BUDGET

STAGE GATE	LABOR	TRAVEL	SUB CONTRACTS	EQUIPMENT & OTHER DIRECT COSTS	PROJECT TOTAL COST	BPA COST 49.15%	RECIPIENT & 3RD PARTY COST 50.85%
Stage Gate 1 Start 09/01/2010 Finish 03/31/2011	\$ 67,784	\$ 950	\$ 167,057	\$ -	\$235,791	\$115,893	\$119,898
Completion Year 1 Start 04/01/2011 Finish 9/30/2011	\$ 33,695	\$ 1,950	\$ 317,099	\$ 21,000	\$373,744	\$183,699	\$190,045
TOTAL	\$101,479	\$ 2,900	\$ 484,156	\$ 21,000	\$609,535	\$299,592	\$309,943