



**Department of Energy**  
Bonneville Power Administration  
PO Box 3621  
Portland, OR 97208

**FY17 TECHNOLOGY INNOVATION  
INTERNAL PROPOSALS  
FUNDING OPPORTUNITY ANNOUNCEMENT BPA-0002017**

Announcement Issue Date:	March 1, 2016
Registration Due for Pre-Application Conference:	March 8, 2016
Pre-Application Conference Call, Live Meeting, 10:30-11:30am PDT	March 10, 2016
Phase 1–Concept Paper and Statement of Qualifications, 4:00pm PDT	March 31, 2016
Notice to Applicants to Submit Phase 2 Applications:	April 8, 2016
Phase 2–Full Application Due Date, 4:00pm PDT	May 1, 2016
Intent to Award Notices	July 7, 2016

The following is a Bonneville Power Administration (BPA) competitive announcement for the Fiscal Year (FY) 2017 Technology Innovation Portfolio. BPA's Technology Innovation (TI) Office conducts an annual opportunity announcement for projects that advance technologies based on agency guidance and strategic needs identified in the agency's Technology Roadmaps and Focus Area. BPA uses a two-phase process to identify and select these potential research and development opportunities. In Phase 1, BPA will accept concept papers and detailed supporting information for consideration. In Phase 2, BPA will then invite those parties who met the qualifying criteria to submit full applications under this announcement. All documents shall be submitted electronically through the BPA Funding Opportunity Exchange (BPA Exchange) website: <https://bpa-exchange.energy.gov>

Please review the entire announcement prior to submitting any documents. BPA is under no obligation to consider submittals that do not include all the required information. Detailed requirements are noted from Part I through IV. Any amendments to this announcement will be posted on BPA Exchange. Applicants should periodically review the website for any updates as no other notices will be provided. Questions and answers will be posted on BPA Exchange using the link on the left side of the page.

If you have any questions not addressed on BPA Exchange or in this announcement, please contact Judith Estep Portfolio Manager, Technology Innovation Office at 503-230-5997 or e-mail [jaestep@bpa.gov](mailto:jaestep@bpa.gov).

Sincerely,

Terry Oliver  
Chief Technology Innovation Officer  
Technology Innovation Office

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## **PART I – FY17 TECHNOLOGY INNOVATION FUNDING OPPORTUNITY DESCRIPTION**

### **A. BACKGROUND**

The Bonneville Power Administration (BPA) is a federal power marketing agency that transmits and markets power from 31 federal dams and one nuclear power plant. BPA also purchases power from several wind farms. BPA's Technology Innovation Office conducts an annual opportunity announcement for projects that advance technologies based on agency guidance and strategic needs identified in the agency's Technology Roadmaps. Previous announcements resulted in projects that addressed the Technology Roadmaps in areas of Energy Efficiency and Demand Response, Hydro Power Operations, Renewable Energy, Physical Security, and Transmission Services.

In support of its research, operation, and maintenance goals, BPA has its own set of nationally recognized Laboratories. The Labs are located at BPA's Ross Complex in Vancouver. Laboratory capabilities for high voltage, high current, mechanical, chemical, environmental field testing services, and staged system fault services are specifically tailored for BPA system needs. The Labs provide services that are important to ensuring regional system reliability and provide a conduit for the development and demonstration of new technologies needed to modernize the electrical energy infrastructure and to ensure safe and efficient operation of the power system.

Since 2006, the BPA has actively invested in technology road-mapping. Technology road-mapping is a form of technology planning that is used to inform and guide the agency's research and development agenda. The main benefit of technology road-mapping is that it provides information to make better technology investment decisions by identifying technologies and technology gaps that are critical to improving BPA's power delivery system. The Roadmaps are then used to identify ways to leverage Agency investments to bridge these gaps.

### **B. OBJECTIVE**

This Technology Innovation (TI) Funding Opportunity Announcement is for projects beginning in BPA's Fiscal Year 2017, which runs from October 1, 2016 through September 30, 2017. Projects may be submitted for up to 36 months in length, but BPA will only fund on a fiscal year basis (October – September). Funding for future periods is subject to annual approval. Applicants should allow some flexibility in their startup planning to allow for kickoff meetings, contracting, and minor project adjustments. The goal is to select technology innovation projects that advance our ability to maximize the Federal Columbia River Power Systems (FCRPS) asset value and that do so by improving BPA's ability to monitor, control and use all of FCRPS assets in an integrated manner. This TI Funding Opportunity does not purchase power nor imply any commitment to purchase power from any resource(s) for BPA.

A requirement for an acceptable technology innovation application is that it fulfills BPA's objectives to be a leader in the application of technologies that provide benefits to BPA, its customers and the region. Project sponsors will need to demonstrate that submitted projects are meeting the challenges of BPA. Consequently, the proposed projects would need to benefit BPA (directly or indirectly); though supporting research can draw from a multitude of informational and technological resources worldwide.

### **C. TECHNOLOGY ROADMAPS**

Key components of the portfolio selection process are the Technology Roadmaps. The roadmaps clearly articulate the research that is needed in a given technology area. The roadmaps show how the R&D Programs in a given area relate to technology characteristics, capability gaps, and strategic business drivers. BPA is interested in receiving proposals that investigate the R&D Programs identified in the following roadmaps available at the BPA Technology Innovation Home Page, [www.bpa.gov/ti](http://www.bpa.gov/ti).

- Collaborative Transmission Technology Roadmap (including addendum and appendix) (March 2016)
- Demand Response Technology Roadmap (March 2015)
- Power Generation Asset Management Technology Roadmap v.2 (March 2016)

- Energy Efficiency Technology Roadmap Volumes 1, 2, 4, 5, 6, 7,8 and appendixes (March 2015) and Vol. 3: Lighting (March 2016)

For more guidance about the types of energy efficiency research that may benefit BPA and the Pacific Northwest refer to the [Northwest Power and Conservation Council's](#) website and the [Sixth Northwest Conservation and Electric Power Plan](#). The Council's resource strategy for the Sixth Power Plan provides guidance for BPA on choices that will help meet the region's growing electricity needs while also reducing the risk associated with uncertain future conditions.

#### **D. TECHNOLOGY FOCUS AREA**

The Technology Roadmaps identify business and operational challenges, technical needs, required capabilities, technology gaps and associated R&D programs that BPA could research to enhance its ability to maximize FCRPS asset value. Within each of the technology roadmaps, and across all of the roadmaps, BPA is calling out the importance of flexible operations as a focus area given the ongoing evolution of within hour energy markets and impacts of consumer demands for energy independence via distributed generation options.

BPA is interested in receiving proposals that address technologies and/or technology gaps that enhance BPA's ability to monitor, control and use the BPA's FCRPS (hydro, transmission, energy efficiency & demand response) assets in an integrated manner to operate the system flexibly to manage real-time operational requirements, fluctuations in load-resource balance and within-hour dispatch of energy.

For example, within the Federal Columbia River Power System, the ability to understand and anticipate the value potential of flexible operations is a key element for BPA to derive full value from new circumstances evolving within the Western Interconnected electric grid. Similarly, transmission faces challenges in moving to new operating paradigms arising from higher uncertainty in load patterns and changes in markets and product offerings that [require improved] demand real-time visibility (situational awareness), control equipment, and computational capability. As well, in demand side management, new combinations of responsive assets bring flexibility to the future BPA needs.

To that end, the BPA is interested to receive research proposals that address advancement in flexible operation technologies based on BPA's Technology Roadmaps. Research activities can range from advancing the science and engineering of a particular resource technology to demonstration projects that enhance the commercial viability and acceptance of the technology, to solving technical challenges associated with the advancement of flexible operations.

#### **E. FEDERAL INFORMATION SECURITY MANAGEMENT ACT OF 2002 (FISMA)**

Recipients who plan on collecting or receiving BPA information such as system data and models should review the applicable clauses in Part VII to ensure that Information Technology systems and security protocols meet the stated criteria.

If BPA approves the project to receive BPA furnished data or collect data on BPA's behalf, the recipient is required to satisfy FISMA, as a requirement of the terms and conditions. Data furnished by BPA to a recipient will be assigned a low or moderate security rating, depending on the sensitivity of the information provided.

Applications are not required to attest to these security controls at the time of submission, but awareness of the likely applicability of these security controls and initial coordination with information/security personnel may be appropriate. Whenever possible, BPA will alert applicants to the likely applicability of information security controls required prior to submission of Phase 2. If not known at that time, BPA will inform tentative awardees what level of information security controls may be applied, and discuss any time/cost impacts of meeting such requirements. Phase 2 applications are to provide a detailed description of the BPA data and information specified in the section addressing "Required BPA Furnished Property or Services" of the Vol II - Project Description.

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Data rated low under the FIPS 199 (Standards for Security Categorization of Federal Information and Information Systems) requires the recipient to protect all data and information systems under its management and control at all times commensurate with the risk and magnitude of harm that could result to Federal security interests and BPA's missions and programs resulting from a loss or unauthorized disclosure of confidentiality, availability, and integrity of these information or systems. The recipient shall maintain an information security and/or data security plan or program consistent with industry standards such as National Institute of Standards and Technology (NIST), as required by the E-Government Act (Public Law 107-347) of 2002, Title III Federal Information Security Management Act (FISMA). The BPA Chief Information Officer (CIO), or representatives, shall have the right to examine, audit, and reproduce any of the recipient's pertinent information security and/or data security plan or program. The recipient shall adhere to any additional information security requirements identified in the statement of work. The recipient, at its sole expense, shall address and correct any deficiencies and/or noncompliance with the terms of the award as identified by BPA.

Data rated moderate under the FIPS 199, requires the recipient to provide protection of BPA data using the security controls as outlined in NIST 800-53rev4 or the ISO27001:2005/2013 security controls commensurate with a moderate level. This protection must be verified through an independent 3rd party audit/assessment against NIST 800-53rev4 or the ISO27001:2005/2013 security controls. The 3rd party audit/assessment must be completed each year.

The federal government program Federal Risk and Authorization Management Program (FedRAMP) provides a list of auditing organizations that have been certified to conduct these audits/assessments. The list is mentioned as information only and does not limit the use of other auditors.

## **PART II – AWARD INFORMATION**

### **A. CONDITIONS OF AWARD**

Projects selected must assume substantial involvement between BPA Office of Technology Innovation in the performance of the work supported. The anticipated substantial BPA involvement for this project will be:

- Requiring the project to meet or adhere to specific procedural requirements before subsequent stages of a project may continue, e.g., Project Stage Gates.
- Completing 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 Stage Gates objectives have been achieved to warrant continued funding.
- Limiting project discretion with respect to changes in the Project Manager, Subject Matter Expert, Principle Investigator or other Key Personnel.

### **B. ESTIMATED FUNDING**

\$3.0 to \$3.5 million is available for new awards under this announcement; however, BPA is under no obligation to award the full amount available.

### **C. ANTICIPATED NUMBER OF AWARDS AND AWARD SIZE**

BPA anticipates multiple awards resulting from this announcement with award size ranging from \$50,000 to \$500,000 per project per fiscal year of BPA funds.

### **D. FUNDING PERFORMANCE PERIOD**

Projects are funded on a fiscal year basis. The estimated project period is one year beginning October 1, 2016 through September 30, 2017, although actual project start dates may be delayed. Multi-year projects may need to

compete for continuation funding in future periods and are subject to approved stage gates and the annual TI Summit Review.

### **E. STAGE GATES**

Project stage gates are a management tool to make decisions to about whether to continue or terminate a project during the duration of the project. Every project is to have at least one stage gate during each fiscal year. Stage gate reviews are conducted to determine if the project moves forward or stops.

In addition, a stage gate occurs during the annual Technology Innovation Summit Week, which occurs each January. The Summit is a review of the entire portfolio by the Technology Innovation/Confirmation Council to decide which projects move forward or stop. Prune considerations may include portfolio balancing, relative benefit to BPA, and/or a need to reduce fiscal year spending and may not necessarily imply poor project performance. For example, a project that is otherwise performing well may still be pruned as a result of the Summit evaluation. Pruned projects are to stop work and terminate the project shortly after the Summit.

Prior to submitting an application, Applicants are encouraged to assess the risk and implications of the possibility of having a project terminated during the course of the project.

## **PART III – ELIGIBLE APPLICATIONS**

### **A. ELIGIBLE APPLICANTS**

All interested BPA staff are eligible to apply under Phase 1 of this announcement. Applicants may submit multiple Phase 1 applications for different concepts. However, only those submissions determined by BPA to meet the qualifying criteria identified in Part V will be invited, and therefore eligible, to submit full applications under this announcement during Phase 2. BPA supports teaming arrangements if proposed.

### **B. COST SHARING**

BPA requires no cost share for projects submitted by BPA staff. BPA staff may not submit projects with a sole source contractor in mind for the purpose of assisting in the circumvention of cost share requirements imposed on all outside applicants. BPA staff engaging in such circumvention actions will be subject to disciplinary action including potential ethical and criminal sanctions. Please consult with BPA TI Portfolio Manager, Judith Estep to discuss any questions you may have, [jaestep@bpa.gov](mailto:jaestep@bpa.gov), 503.230.5997.

## **PART IV – APPLICATIONS AND SUBMISSION INFORMATION**

### **A. SUBMISSION REQUIREMENTS**

This announcement is composed of two phases with all relevant dates listed on the cover page. The requirements for both phases are addressed in this Part. It is critical potential applicants carefully review these requirements, as incomplete applications may be denied further consideration. Phase 1 submittals should clearly demonstrate how their project application is aligned with the BPA Focus Area and/or Technology Roadmap(s), e.g., technology characteristic, capability gap and/or drivers with page references. Applications will be evaluated based upon the criteria in Part V of this announcement. BPA will notify each Phase 1 applicant of the results of this evaluation. Those applicants determined to meet the identified criteria will be invited to submit a full application under Phase 2.

### **SUBMISSION DATES AND TIMES**

- **Phase 1** application is due by March 31, 2016 not later than 4 PM Pacific Time.
- **Phase 2** application is due by May 01, 2016, not later than 4 PM Pacific Time.

### **B. PHASE 1 CONTENT**

This section contains the instructions for Phase 1 of this announcement. If more than one Phase 1 application is submitted by the same applicant, each application shall contain all the information required by this opportunity announcement to be considered responsive. Phase 1 applications should provide all the requirements below included in two documents (Microsoft Word or Adobe Portable Document Format), one for sections B.1, and B.2. Also, one document for B.4 Qualifications and References. Applicants must fill out all requested information in BPA Exchange when submitting a project application regardless of duplication within their submission.

#### **B.1 CONCEPT PAPER**

The Concept Paper must address the following items:

- Project description and list of major objectives (one page maximum).
- Describe how your project is tied to the BPA Focus area and/or Technology Roadmaps (including addendum and appendixes) as identified by specified R&D Program(s) : [www.bpa.gov/ti](http://www.bpa.gov/ti). Identify the specific R&D Program(s) that your proposal addresses; include the individual roadmap titles and page numbers, and describe how the project will result in needed technology characteristics and fill capability gaps identified in the roadmap(s) (three pages maximum).
- The Technology Readiness Level (TRL) at project start and project finish should be provided, with brief explanation. Refer to Appendix IV for TRL guidance.

#### **B.2 SUMMARY OF THE WORK PLAN**

Explain how the work will be performed (three pages maximum).

#### **B.3 STATEMENT OF QUALIFICATIONS & REFERENCES – Separate Document**

##### **1. Qualifications & Experience**

List the principal investigator(s), organization project leaders, partners, and participants. Describe what they bring to the project and their knowledge, skills and experience as related to the project. Applicants should include a resume for each Principal Investigator and major project participant. Resume should include abilities, skills, qualifications, and specialized experience relevant to the type of work proposed (include credentials, educational background and years of experience).

Principal Investigator(s)

- Identify the Principal Investigator(s) and other key personnel necessary to complete this project (projects will not be allowed to replace a Principal Investigator without written authorization). Include email and phone number for all proposed project team members.
- Describe the time commitment for the Principal Investigator(s) and other key project personnel and/or positions as a percentage of a full time employee (FTE)
- Identify contacts and references (name, title, address, telephone, and fax numbers) knowledgeable of the Principal Investigator(s) and other key personnel's previous technology experience related to the project.
- Include a brief description of the direct technology and other relevant experience of the Principal Investigator(s) and other key personnel for their responsibility areas.

Organization(s)

- Identify the organizations and personnel responsible for implementing the project. Identify the project manager, his/her tenure, and scope of responsibility. If multiple parties will perform the work describe the relationship between the parties (contractual, partnership, consortium, etc.).
- Letters of commitment should be including if a teaming arrangement is anticipated.
- Identify the credentials of organization/staff to support the application
- Identify the management structure and key managers who will be responsible for the technical work areas.
- Describe the adequacy of the proposed facilities to conduct and support development of any necessary field-testing activities.
- Provide pertinent examples of experience working with utility companies or federal agencies related to the technology area being studied within the last five years.

Partner(s)/Participants/Vendors

- Identify the consultants and contractors you expect to use on the project.
- Discuss any known and planned relationships with other utilities, developers, vendors, subsidiaries and others that will participate in the planning, development or operational phases of the project. This does not include ad-hoc project consultants or contractors.

2. References

List three references for projects of similar scope and complexity that were completed by the Applicant. Include a brief summary of the project along with the names, telephone numbers, and email addresses of contact persons from the agencies or organizations that sponsored the project.

**NOTE:** The Statement of Qualifications and References must be re-submitted with any updates for Phase 2. This ensures that BPA has the most up to date information in one place for evaluators to use.

**B.4 MULTIPLE CONCEPT SUBMISSIONS**

Each response to Phase 1 submitted shall address only one project. Applicants with multiple projects should submit a separate application for each.

**C. PHASE 2 CONTENT**

If invited, Phase 2 applications shall include all the required documentation below.

**C.1 INTRODUCTION**

This section contains the instructions for preparing the Full Application. If more than one application is submitted by the same applicant, each application shall be submitted and contain all the information required by this opportunity announcement in order to be responsive. This opportunity announcement prescribes a specific format for the Application to facilitate preparation and evaluation. Applicants may include additional material in the application only if it is necessary for clarification. Elaborate applications, lengthy discussions, and non-critical attachments are discouraged.

**C.2 APPLICATION DETAILS AND FORMAT**

The application shall present the applicant's plans for the project based on the concepts provided in Phase 1 format above, the details requested below, and how the applicant expects the project to proceed.

The application must be organized and provide the information in the sequence presented below. Sections must be numbered and identified as provided in this part. Additional subsections may be used if such usage enhances the applicant's ability to describe the work. If a required item is not known or is not applicable, applicants shall state this in the applicable section of the application. Relevant documents may be cited by reference. Copies of references cited are not expected to be included as part of the application.

**C.3 FULL APPLICATIONS SHALL INCLUDE THE FOLLOWING:**

Applicants must fill out all requested information in the website application process regardless of duplication with their submission.

Applications are required to submit a separate document for each of the following volumes in Word, Adobe Portable Document Format, or Excel as appropriate. Please be advised that if selected, the applicant must provide Volume II – Project Description, in Word format, as BPA intends to incorporate the Project Description into the resulting award document.

Each Project Application shall include the following outlined sections. Each section is described in more detail following this outline.

1. Volume I: Technical Proposal
  - a. Cover page
  - b. Describe the following:
    - i. Summary description of the proposed project
    - ii. How the project is aligned with the BPA Focus Area and Technology Roadmap(s) as identified by the specified R&D program(s).
    - iii. The risk to BPA of not doing the project
    - iv. The work already being done in the R&D community that is related to the project
    - v. How the project's results can be applied
    - vi. How the project will benefit BPA and the costs of doing the project
    - vii. The potential environmental impacts (of the project itself)
    - viii. Describe any required BPA furnished property or services to include level of effort BPA is required to provide to the project (regarding requests for BPA system data or models, provide as much detail as possible so that BPA can determine the sensitivity rating of the data)

- ix. Technology Readiness Level (refer to Appendix IV)
  - x. Any additional information,
2. Volume II: Project Description (Statement of Work)
- a. Cover and title page
  - b. Provide a detailed Project Description (Refer to Appendix III for template and instructions)
3. Volume III: Budget
- a. Cover and title page
  - b. Stage Gate Budget and supporting timeline (Refer to Appendix II for detailed instructions)
  - c. Budget Justification Narrative (Appendix I)
4. Volume IV: Statement of Qualifications & References
5. Volume V: Project Benefit Form

**C.3.1 DETAIL**

1. Volume I – Technical Proposal

The Technical Proposal will be used to assess both the scientific merit of the proposed work and its relevance to BPA’s Focus Area and/or Roadmaps (including addendum and appendixes). The technical proposal must be self-contained and written in a clear and concise manner. The proposal shall be definitive with respect to the research and development which the applicant actually proposes to conduct.

1.a Cover Page

Show the name of the project, organization name, date of the application, the person responsible for the application preparation, and all key technical partners to the project. The cover shall include the legend “Technical Proposal for Evaluation Purposes by or on behalf of the Bonneville Power Administration.”

Clearly show that this is Volume I: Technical Proposal on the cover page and in the saved document title (e.g. Company\_Vol\_I\_TechProposal.doc). The header/footer should include the control # and page #.

1.b Technical Proposal: As listed above the Technical Proposal shall provide the following:

- i. Summarize the proposed project. This should be a short paragraph of approximately three or four sentences.
- ii. Describe how your proposal is tied to the BPA Focus area and/or Technology Roadmaps (including addendum and appendixes) as identified by specified key roadmap components. The technology roadmaps can be found on at [www.bpa.gov/ti](http://www.bpa.gov/ti). Identify the specified key roadmap components that your proposal addresses, include the individual roadmap titles and page numbers, and describe how the project will result in needed technology characteristics and fill capability gaps identified in the roadmap(s).
- iii. The impact or unmitigated risk to BPA of not doing this project, the probability of success and technical risks of the project.
- iv. Any related work already being done in the R&D community that is related to this project. How this project improves, advances, changes, or is somehow different than what is being or has already been done.
- v. Where and how this project’s results can be applied. Is there something being used today that will benefit from this project? Is there a past use that can be put to better use because of this project? Is there an indirect benefit that should be noted? Does the project have near or future term application? If it is not applicable to BPA’s system, explain why and why it would be important for BPA to fund it.

- vi. How this project will benefit BPA. Describe the qualitative benefits to BPA. Quantify the benefit and estimate the cost of doing the project. Describe the assumptions and any calculations for these estimates. Describe whether the costs and benefits are quantifiable or not. If they cannot be quantified, describe why not.
- vii. Describe the potential environmental impacts from the construction, operation, and implementation of the proposed project, including project-specific impacts (rather than general impacts) that may result from facilities footprints, demonstration or implementation phases, and construction activities, e.g., ground disturbance, wetlands impacts, water usage. List any permits that may be required from state, local, and federal permitting authorities. Please note that construction, operation, and implementation is contingent upon BPA's completion of environmental review as required by the National Environmental Policy Act (NEPA) and applicable environmental statutes.
- viii. Describe the level of effort the applicant is requesting from BPA in support of the project. Specifically identify any BPA furnished data, services, or materials that are essential to the performance of the project. Regarding requests for BPA system data or models, provide as much detail as possible so that BPA can determine the sensitivity rating of the data. Identify the key tasks or phases in the project where the applicant believes BPA participation is essential. Applicants are advised that BPA's labor contribution to the project may be limited. BPA does not make any guarantees that BPA will contribute labor to the project.
- ix. Technology Readiness Level (TRL) – Explain what the TRL is at the start of the project and the anticipated TRL at completion. Include sufficient evidence to justify the TRLs. Evidence could include documents, research papers, current or previous research projects, and an example of pilot, demonstration or full application in other organizations. Provide Refer to Appendix IV for a description of each of the levels. The TRL numbers are also required to be entered into the announcement website.
- x. Provide any additional information, with appropriate headings, that will help describe the project and plans.

2. Volume II – Project Description (Statement of Work)

Note: Please be advised that if selected the applicant must provide Volume II in Word Format as BPA intends to incorporate the Project Description into the resulting award document.

2.a Cover Page

Show the name of the project, organization name, date of the application, the person responsible for the application preparation, and all co-sponsors currently in the project. The cover shall include the legend "Technical Proposal for Evaluation Purposes by or on behalf of the Bonneville Power Administration."

Clearly show that this is Volume II: Project Description on cover page and in the saved document title (e.g. Company\_Vol\_II\_ProjDescription.doc). The header/footer should include the control # and page #.

2.b Project Description

Follow BPA guidelines for proposed Project Description (see Appendix III for template and instructions). All applications must contain a detailed Project Description that describes the project's objectives, addresses how the project work will be conducted, and how the objectives will be achieved. This is similar to a Statement of Work and should be written as a standalone document that can serve as the applicant's work proposal for the project. BPA intends to incorporate the applicant's proposed Project Description into the resulting Cooperative Agreement or other award instrument.

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3. Volume III –Budget

3.a. Cover and Title Page

Show the name of the project, organization name, date of the application, the person responsible for the application preparation, and all project co-sponsors when applicable.

3.b. Budget for Proposed Project Description

The budget proposal consists of the Applicant’s estimated costs to perform the work described in the proposed Project Description.

FY	Travel	Contract	Materials	TOTAL	FTE
2017					
2018					
2019					
TOTAL					

Example Proposal Budget

FY	Travel	Contract	Materials	TOTAL	FTE
2017	15,000	60,000	100,000	175,000	0.7
2018	15,000	100,000	60,000	175,000	0.7
2019	15,000	100,000	60,000	175,000	0.7
TOTAL	45,000	260,000	220,000	525,000	

3.c. Stage Gate Budget

Complete Table 2 for the first year of the project only. Applicants should budget for participation in Technology Innovation Summit Week. The TI Summit Week occurs during the second FY quarter and travel costs for the project presenter should be included.

Table 2 – Stage Gate Budget

STAGE	LABOR	TRAVEL	CONTRACTS	EQUIPMENT/SUPPLIES	OTHER DIRECT COSTS	PROJECT TOTAL
Stage 1						
Stage n						
TOTAL						

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Example (Stage Gates are November 15<sup>th</sup> and March 10<sup>th</sup> in this example):

STAGE	TRAVEL	CONTRACTS	EQUIPMENT/ SUPPLIES	OTHER DIRECT COSTS	PROJECT TOTAL
1. Start 10/01/2016 Finish: 11/15/2016 – Stage Gate 1	\$0	\$13,440	\$25,000	\$0	\$38,440
2. 11/16/2016 Finish: 03/10/2017 Stage Gate 2	\$1,000	\$13,440	\$0	\$0	\$14,440
3. 03/11/2017 Finish: 09/30/2017	\$0	\$13,440	\$0	\$0	\$13,440
<b>TOTAL:</b>	\$1,000	\$40,320	\$25,000	\$0	\$66,320

3.d. Project Staff Hours

Complete Table 3 for the first year of the project only.

Table 3 – Project Staff Hours

Project Team	NAME	BPA POSITION	GRADE	HOURS
Project Manager				
Principal Investigator				
COTR (as needed)				
Project Staff				
<b>TOTAL</b>				

Example Project Staff Hours

Project Team	NAME	BPA POSITION	GRADE	HOURS
Project Manager	John Doe	Electrical Engineer	GS-15	1000
Principal Investigator	Mary Brown	Mechanical Engineer	GS-14	1000
COTR (as needed)	Sue Blue	Public Utility Specialist	GS-9	500
Project Staff	Mike Hallow	Mechanical Engineer	GS-12	1000
<b>TOTAL</b>				3500

3.e. Budget Justification Narrative

A Budget Justification Narrative should be provided which itemizes details for each cost category. Appendix I provides the template for this itemized listing of costs to support your Stage Gate Budget.

4. Volume IV: Statement of Qualifications & References

The information submitted during Phase 1 (Part III-B.4) must be re-submitted as Volume IV. This can be updated between Phase 1 and 2. The attachment should be titled similar to: Company\_Vol\_IV\_Qualifications.doc.

5. Volume V: Project Benefit Form

Applicants are required to submit a completed project benefit form, included with the announcement on BPA Exchange as attachment V. The volume should be attached with the application titled: Company\_Vol\_V\_ProjectBenefit.doc. As reference, an example of a completed project benefit form is included in the announcement on BPA Exchange as attachment EXAMPLE Project Benefit Form.

## **PART V – EVALUATION INFORMATION**

### **A. CRITERIA FOR PHASE 1**

The Phase 1 application will be evaluated individually based on the response to BPA's requirements and the evaluation criteria. Phase 1 submittals will not be evaluated against each other. BPA reserves the right to utilize third party consultants in the review of Phase 1. BPA is solely responsible for any decisions made pursuant to this phase, including the determination of the applicant's capability to bring the proposed idea to a successful conclusion and the relative technical and schedule risks for the project. Applicants will be notified of the decision by BPA of whether they can proceed to Phase 2. Phase 1 submittals will be evaluated using the following criteria, listed in descending order of importance:

- a. Relevance of the proposed project to the identified BPA Focus Area and/or Technology Roadmaps (including addendum and appendixes);
- b. Principal investigator and project team qualifications including technical expertise, capabilities, related experience, and previous project successes, as well as the resources, facilities, techniques and/or unique combinations of these which are integral factors for achieving the application objectives;
- c. Clarity, quality, and organization of the Phase 1 application.

Based on the above evaluation criteria, the Phase 1 application will either be determined to be:

**Non-compliant** – Phase 1 application does not meet one or more of the minimum evaluation criteria. The respondent is not invited to submit a Phase 2 application.

**Encouraged** – Phase 1 application satisfies the requirements. The respondent is encouraged to submit a Phase 2 application.

**Discouraged** – Phase 1 application meets the minimum requirements, however it lacks sufficient detail to successfully compete in Phase 2. The respondent is discouraged to submit a Phase 2 application without addressing the concern(s) identified from the phase 1 evaluation.

### **B. CRITERIA FOR PHASE 2**

Responsive applications will then be reviewed and evaluated by an evaluation panel composed of BPA staff and third party subject matter experts. Qualified subject matter experts are used at BPA's sole discretion and are required to sign non-disclosure agreements and certify that they do not have a conflict of interest in participating in the evaluation of each application along with internal evaluators.

The application will be evaluated across several criteria. BPA applies a portfolio model to manage its technology innovation projects. Under this portfolio model, BPA's goal is to have a balance of projects in its Technology Innovation Portfolio across various technologies, time horizons, risk/reward profiles, cost concerns, and other needs. Highly ranked applications will be considered for inclusion in the BPA Technology Innovation Portfolio. Portfolio decisions are more complex than a technical review of a project taken in isolation. The decision to include a project in the Technology Innovation Portfolio includes consideration of the project risk/benefit profiles, the need to address the Roadmap, a balance of projects, ability to commit resources, a balance of time horizons and other factors.

Applicants are advised that an application for a project on a subject matter that is not currently included in BPA's TI portfolio may stand a better chance of selection for award compared to another application on a subject matter that is already well represented in the portfolio. Portfolio funding decisions are based in part on the information provided in the application. BPA reserves the right to consider other information from any source, including past performance information, for all project participants. BPA may request an oral project presentation after Phase 2. Applicants will be contacted if this is required.

Proposal evaluation criteria are provided below:

No.	Criteria	Description	BPA Objective
1	Project strength within BPA's existing portfolio	The degree to which the project strengthens BPA's existing portfolio of projects	The right portfolio
2	Technology Roadmap	The degree to which project scope addresses the R&D Program(s) identified in the Technology Roadmap(s)	The right research
3	Flexible Operation Focus Area	The degree to which the project scope addresses the Flexible Operation focus area	The right focus
4	Project Resources	The degree to which the team members have sufficient experience and are qualified to carry out the project	The right mix of talent
5	Technical Success	The probability of the project being a technical success	Achieving successful project results
6	Successful Application to BPA	The probability of near or long term successful application to BPA	Successful application to BPA business challenges
7	Magnitude of Expected Benefit	The quantitative or qualitative expected benefits as applied system wide, assuming this project is a technical success	Magnitude of benefits to BPA and Pacific Northwest commensurate with risks
8	Stage Gates	The degree to which proposed Stage Gates (go/stop decision points) reflect real options/choices for project decisions, <u>and</u> relate to real discovery/science/achievement thresholds	The right decision points

**PART VI – QUESTIONS**

**A. QUESTIONS**

Applicants may submit questions regarding the announcement in writing to Judith Estep, TI Portfolio Manager at any time. Answers that are not readily apparent by reading this announcement will be posted to the BPA Exchange weekly in the Question and Answer section. Any required changes to the announcement will be posted as an amendment.

**B. CONTACT**

Name: Judith Estep  
Email: [jaestep@bpa.gov](mailto:jaestep@bpa.gov)  
Telephone: 503-230-5997

**C. PRE-APPLICATION CONFERENCE CALL**

BPA will hold a conference call for internal applicants to review Phase 1 and Phase 2 content, instructions, and the evaluation process as stated in this announcement. Attendance is not required and any topics discussed will be posted to the BPA Funding Opportunity Exchange website for review by all interested applicants.

The conference will be held via telephone bridge on March 10, 2016 from 10:30AM – 11:30AM. A call-in phone number for the conference will be provided upon request. Please provide an email notice of your intent to participate to Sheila Adel, Technology Innovation Portfolio manager, no later than 4:00 PM Pacific time, March 8, 2016 via email to [saadel@bpa.gov](mailto:saadel@bpa.gov).

**PART VII – DEFINITIONS/ACRONYMS**

"Applicant" means an entity that files a written application for financial assistance with BPA or with a recipient, i.e., for a subaward.

"Application" means a written document from an applicant that contains details of the project or program for which they are seeking BPA's financial assistance and support.

"Award" means the written instrument executed by a BPA Financial Assistance Officer (FAO) after an application is approved, which contains the terms and conditions for providing financial assistance to the recipient. "Award" can refer to any of the specific instruments referred to in the BFAI. An award authorizes funds for a specific project.

"BFAI" means Bonneville Financial Assistance Instructions.

"BPA" means Bonneville Power Administration

"BPI" means the Bonneville Purchasing Instructions.

"Contract" means a legal instrument reflecting an agreement between BPA and a contractor whenever the principal purpose of the instrument is the acquisition by purchase or lease of goods or services for the direct use or benefit of BPA.

"Cooperative agreement" means a legal instrument reflecting a relationship between BPA and a State or local government or other recipient whenever:

- (1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State, local government, tribe or other recipient to accomplish a public purpose of support or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of BPA; and,
- (2) substantial involvement is anticipated between BPA and the State, local government, tribe or other recipient during performance of the activity. (31 U.S.C. 6305)

"Cooperative Research and Development Agreements" (CRADA) is when a partner and BPA intend to collaborate on a project. It protects a company's and BPA's existing intellectual property, and allows the company to negotiate for an exclusive field-of-use license to subject inventions that arise during the CRADA's execution, and BPA to maintain license rights to those inventions. The primary type is that of Shared Resources: A joint research project between BPA and a partner to develop, advance, or commercialize BPA-developed or BPU utilized technology without funds changing hands.

"Federal Information Security Management Act of 2002 (FISMA)" is a United States federal law enacted in 2002 as Title III of the E-Government Act of 2002 (Pub.L. 107–347, 116 Stat. 2899). The act requires each federal agency to develop, document, and implement an agency-wide program to provide information security for the information and information systems that support the operations and assets of the agency, including those provided or managed by another agency, contractor, or other source.

"FCRPS" means the Federal Columbia River Power System.

"Field Representative" or "FR" means the individual who has been delegated responsibility by the Financial Assistance Official (FAO) for inspecting the project for compliance with plans and specifications. The field representative is not authorized to make changes to the award, direct the recipient to take specific actions, issue stop or resume work orders. Field representatives work under the direct supervision of the FAO and Project Technical Representative (PTR).

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"Financial assistance" means any form of assistance instrument where the principal purpose of the relationship is the transfer of money, property, services or anything of value to a recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute rather than of acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of BPA. Specific types of financial assistance instruments include, but are not limited to, grants, cooperative agreements, and loans.

"Financial Assistance Officer" (FAO) means a BPA employee who possesses the delegated authority to obligate BPA funds through the use of financial assistance instruments.

"Financial Assistance Officer's Representative" or "FAOR" means the individual designated by the FAO to perform administrative work connected with the award.

"Financial Status Report" (FSR) means a periodic report regularly provided to the FAO or PTR to enable supervision of the recipient's project implementation and success.

FISMA means Federal Information Security Management Act of 2002 "FY" means Fiscal Year. BPA's fiscal years begins October 1<sup>st</sup> and continues until September 30<sup>th</sup> of the following year.

"Gap" means a utility need that is not met today or will not be met in the future with the technology currently in service.

"Government" means a State or local government or a federally-recognized Indian Tribal Government.

"Grant" means a legal instrument reflecting a relationship between BPA and a State or local government or other recipient whenever:

(1) the principal purpose of the relationship is the transfer of money, property, services, or anything of value to the State, local government, tribe or other recipient in order to accomplish a public purpose of support or stimulation authorized by Federal statute, rather than acquisition, by purchase, lease, or barter, of property or services for the direct benefit or use of BPA; and,

(2) no substantial involvement is anticipated between BPA and the State, local government, tribe or other recipient during performance of the contemplated activity (31 U.S.C. 6304).

"Grantee." See Recipient.

"Local government" means a county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of government (whether or not incorporated as a nonprofit corporation under state law), any other regional or interstate government entity, or any agency or instrumentality of a local government.

"Negotiation" means the process through which BPA and the applicant establish mutual agreement as to project purpose, definition, timing, BPA's role in the project, and the resources appropriate to support and carry out the project.

"PNW" means the "Pacific Northwest" (as defined by the Northwest Power Act, 16 U.S.C. § 839a(14)) section 3(14), "the area consisting of the states of Oregon, Washington, and Idaho, the portion of the State of Montana west of the Continental Divide, and such portions of the States of Nevada, Utah, and Wyoming as are within the Columbia River drainage basin and any contiguous areas, not in excess of seventy-five air miles from the area referred to in (the Act), which are a part of the service area of a rural electric cooperative customer served by the (BPA) Administrator."

"Participant" means a non-Federal party which receives financial assistance by means of a cooperative agreement. At BPA the term "recipient" is used in lieu of "participant."

"Principal Investigator" means a person designated by the recipient in the award document as necessary to understand the goals of the project, direct and manage the project, and whose participation is required for successful completion of the project.

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"Program Office" means the office that determines major program goals and policies, and allocates funds, personnel, and other resources among the programs for which it is responsible, and determines other major facets of the financial assistance effort.

"Project Technical Representative" or "PTR" means the individual designated by the FAO to perform technical award administration activities on behalf of the FAO within limits specified by the FAO.

"R&D" means Research and Development investigations in the following areas:

- Basic Research - research directed toward increasing knowledge in science. The primary aim of basic research is to develop a more complete understanding of the subject under study.
- Applied Research – is the effort that normally follows basic research. It attempts to determine and exploit the potential of scientific discoveries or improvements in technology, materials, processes, methods, devices or techniques. It attempts to advance the state of the art.
- Advanced Development - all effort directed toward projects that have moved into development of hardware for test. The prime result of this type of effort is proof of design concept rather than the development of hardware for service use.
- Demonstration – field tests

"Recipient" means the organization that receives a financial assistance award from BPA and is financially accountable for the use of any BPA funds or property provided for the performance of the project, and is legally responsible for carrying out the terms and conditions of the award.

"Stage Gate" means a critical GO/STOP decision point. It occurs at least once within a fiscal year. Its occurrence is based upon the essential performance elements that have to happen for the rest of the project to be worth doing and before the project can go any further (see Appendix II for further details).

"State" means any of the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, any territory or possession of the United States, or any agency or instrumentality of a State exclusive of local governments.

**APPENDIX I – BUDGET JUSTIFICATION NARRATIVE TEMPLATE**

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*Provide information that supports the high level budget numbers by cost category, e.g., key line items in each cost category. For example, under “Equipment,” identify types of equipment, number of units, and cost per unit. Under subcontracts, identify type of service and vendor if known. This section will be used to support Stage Gate Budgets and should be prepared accordingly. The narrative should address any relevant information and assumptions used in developing the proposed budget.*

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**A. Staff Assigned to Project**

List all staff by name, position, GS level and hours of time assigned to the project.

**B. Travel**

Specify the mileage, per diem (lodging and M&IE), estimated number of trips in-State and out-of-State, number of travelers, and other costs for each type of travel. Travel may be integral to the purpose of the proposed project (e.g. inspections) or related to proposed project activities (e.g. attendance at meetings).

**C. Contracts**

Identify each proposed contract and specify its purpose and estimated cost. This information will help us understand contracting work expected to be needed to support the project. Leased or rented goods (equipment or supplies) should be included in the “Other” category. The applicant should list the proposed contract activities along with a brief description of the scope of work or services to be provided, proposed duration, and proposed procurement method (competitive or non-competitive), if known.

**D. Equipment/Supplies**

The budget detail must include an itemized listing of all equipment proposed under the project. Explain need for each item to be purchased. Identify categories of supplies to be procured (e.g., laboratory supplies or office supplies).

**E. Other Direct Costs**

List each item in sufficient detail for BPA to determine the reasonableness and allowability of its cost. This category should include only those types of direct costs that do not fit in any of the other budget categories. Examples of costs that may be in this category are: insurance, rental/lease of equipment or supplies, equipment service or maintenance contracts.

## **APPENDIX II – STAGE GATE GUIDANCE**

### **Definition**

Stage Gates are decision points for deciding whether the project should go ahead or be stopped. Stage gates occur at least once before the end of a project. Its occurrence is based upon the essential performance elements that have to happen for the rest of the project to be worth doing and before the project can go any further. Ideally, a stage gate does not happen concurrent with the Summit Event.

### **Guidance**

1. Every project has to have at least one stage gate during each fiscal year. This is in addition to the requirement of presenting project status during the Technology Innovation Summit Week (described below).
2. Have the riskiest sorts of project elements done early in the project life.
3. The project proposer should view the whole project and determine if there are critical elements that can be done early. It's important to know early in the project life whether or not there are any "show stoppers." Fail early – fail cheap.
4. The stage gate review process is performed by members of the project team including the Financial Assistance Officer/Project Technical Representative (Contracting Officer/Contracting Officer's Technical Representative for contracts), project manager, subject matter expert, and Technology Innovation Project Management Officer. At a minimum the Project Technical Representative (or Contracting Officer's Technical Representative), Project Manager, and Project Management Officer should be involved in the stage gate review and decision. Criteria should be designed to answer salient questions such as:
  - Have critical technical milestones been met?
  - Is project on time and within budget?
  - Does the concept still have potential to provide the anticipated benefits?
5. Each gate requires quantitative and/or qualitative criteria. For example:
  - If project Task 1 does not meet a specific testing specifications then the probability of not being able to design product feature "A" quadruples. This puts the project at an unacceptable risk; therefore the best business decision is to stop the project.
  - During Phase 1 an environmental assessment proved to be in conflict with the BPA need to provide value to the region, therefore the project was stopped.
  - Before performing a detailed design of the demonstration project, a feasibility study was conducted to determine the material costs. The study learned that certain materials were in extreme short supply causing the preliminary estimates of the material costs to be severely conservative. The newly revised costs resulted in a negative cost/benefit. The project was stopped.

### **Technology Innovation Summit Week**

In addition to the stage gate decision points, project progress is evaluated during the Technology Innovation Summit Week. Like a stage gate, decisions about whether the project should move forward or be stopped are also made at this time. The TI Summit Week occurs during the second FY quarter (late Jan. or early Feb.). This allows the project sufficient time to gain traction, meet deliverables, and provide a project progress report. During the week, project presentations are provided by the principal investigators and should include project status, issues, next steps, financial status, etc. The recipient should figure any associate travel costs into the project budget. Presentation templates and instructions will be provided after award but applicants should build in adequate time to prepare a thorough presentation, provide drafts, and collaborate with BPA prior to presenting. Presentations will be made to the Technology Confirmation/Innovation Council who performs this annual review of funded projects and makes decisions about continued funding and project support. Projects may be stopped at this time if they are determined to not be performing adequately, no longer meet current needs, or need pruned based on the overall portfolio balance.

## **APPENDIX III – PROJECT DESCRIPTION CONTENTS**

The Applicant’s Project Description shall address each of the following topics generally in the sequence presented below. All tasks and deliverables anticipated to be accomplished in future fiscal years should be clearly marked as such. Budgets and work will be approved per fiscal year.

### **1. Goal and Scope of this Agreement**

The general objective and goal of the agreement should be outlined in a few brief sentences. This section includes the technology area to be investigated, objectives/goals, and major milestones for the effort. Provide a brief overview of the technology development effort and describe why it is being pursued, what is intended to be accomplished, and what aspect of the BPA Focus Area and/or Technology Roadmap(s) (e.g. which product/service area, individual roadmap title(s)) is being addressed.

### **2. Background**

This section includes any information, explanations, or constraints that are necessary in order to understand the technical requirements presented in the Project Description. It may include techniques previously tried and found ineffective.

### **3. Location of Project (required only if work is site-specific)**

The location of the project should be described. For example, "This project will be performed in the BPA service area of the Pacific Northwest," "This project will be performed at BPA Headquarters in Portland, Oregon," or a similar statement. If available, maps depicting possible site-specific project locations should be included with the application.

### **4. BPA-Furnished Property, Information or Services (As proposed by the Applicant and to be approved by BPA)**

Indicates the nature and extent of property, system data, models or services to be provided to an external contractor in support of this agreement. Describe the format in which any data is proposed to be furnished by BPA. Provide as much detail as possible so that BPA can determine the level of effort required to assist the project and determine the sensitivity rating of the data.

Also provide the location at which the property, data, or services will be delivered to the contractor and the date and time it will be provided, in the format below:

<u>Description</u>	<u>Point of Delivery</u>	<u>Date</u>
--------------------	--------------------------	-------------

### **5. Recipient-Furnished Property or Service**

The recipient is required to provide all property and services in support of this agreement, except those mentioned under Section 4 above. In addition to physical property, include a listing of any proprietary data and software to be used on the project, as well as any patent applications related to the subject of the project. The main purpose of this section is to point out major property or services which may be unique in nature.

### **6. Definitions and Acronyms**

New terms or acronyms within the project description, particularly those of a specialized or technical nature, should be defined in this section. It is not necessary to define such common terms as BPA, Regional Act, etc.

### **7. Documentation**

Specifications and standards (either Federal or industry-wide) which are to be used in the performance of the project are listed here, for incorporation by reference into the agreement.

**8. Technical Exhibits**

Voluminous and detailed data required to provide BPA with sufficient information to evaluate the Project Description should be appended as exhibits.

**9. General Requirements**

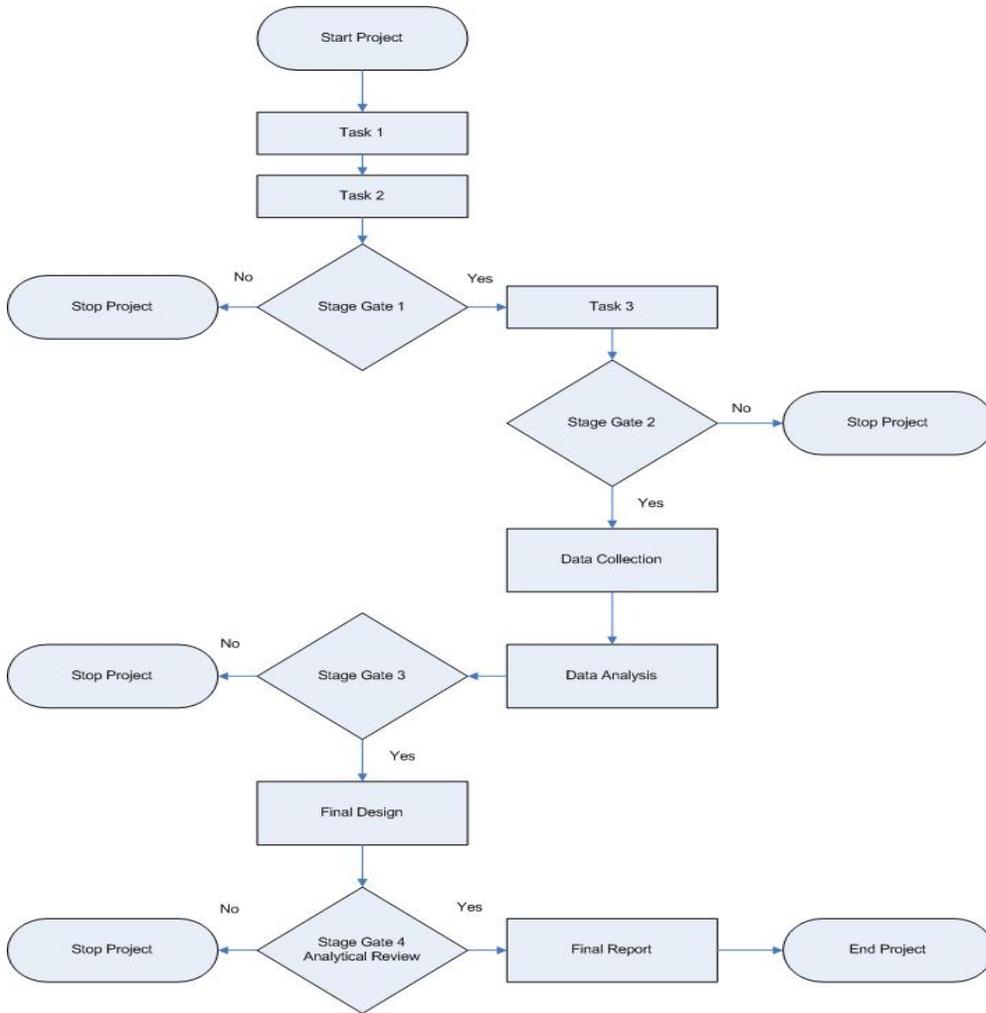
A one paragraph description of the general requirements to be accomplished in this agreement should be provided here, expanding on the description in Section 1 above. A clear statement of the tasks to be performed in reaching these objectives.

**10. Specific Requirements**

Describe the area of investigation or research required in performing the identified tasks.

The specific steps or activities to be accomplished by the recipient which will address the TI Funding Opportunity announcement objectives should be described in sufficient detail. If BPA approval or review is required at specific points, they should be defined in this section. In general, this section should include the following:

- A. A clear identification of the objectives or technical problem toward which the recipient's efforts are to be directed.
- B. A detailed description of tasks that represent the work to be performed. This portion of the Project Description shall be developed in an orderly progression and in enough detail to establish the feasibility of accomplishing the overall project goals. The work effort should be segregated into major tasks and identified separately in numbered paragraphs. Each numbered major task shall delineate, by subtask, the work to be performed, and any deliverable items. If the application includes a phased approach, specify such and present specific tasks with each phase. If there is parallel performance of several broad but definable tasks, describe them and develop specific task statements for each. The Project Description shall contain every task and must be definitive, realistic and clearly stated.
- C. Project Management Protocols: Include items that help to clarify and structure the project. These would include the following:
  - i) Communications plan: Identify the project communication protocols. Explain how the project team members, sponsors, and stakeholders will be informed. Describe the stakeholder's reporting requirements.
  - ii) Contingency plan: Thinking ahead, what could happen that may change the original project plan? If that happens, how could the project plan be changed to still achieve the project objectives? This may be a logical place to insert a stage gate decision point (refer to Appendix II for a guidance about stage gates).
  - iii) Identify Stage Gates: These are STOP/GO decision points. Criteria for determining success at each stage gate is required.(refer to Appendix II for a detailed description of stage gates)
  - iv) A Gantt or PERT chart of all the stage gates, tasks, subtasks, and activities. Task interdependencies should be clearly identified.
  - v) Project Closure – A formal project close – out meeting is required as part of the project plan. The objective of the meeting is to discuss and document lessons learned and document next steps. The close-out meeting could be tied with the presentation of the final deliverables but needs to be specifically referenced in the project plan. At a minimum the Project Technical Representative (or Contracting Officer's Technical Representative), Project Managers, and TI Project Management Officer should be involved in the formal close-out meeting.
  - vi) Include a Process Flow Chart that depicts the overall flow of the work and the major decisions that will be made at the stage gates. The following is an example of a process flow chart.



**D. Technology Transfer**

BPA understands that the outcome expected for an R&D project is not certain. However, in the event of a successful outcome, consider the potential for the proposed result to address the key roadmap component cited in the BPA Roadmap and provide a preliminary technology transfer plan for BPA application. Identify any intellectual property, data, software, or hardware that may be included in this transfer. Describe the necessary actions to move the project results towards business application.

**E. Deliverables**

General deliverable requirements include but are not limited to:

- All supporting data in an electronic format acceptable to BPA;
- Expected functionality and support of any hardware and/or software as applicable along with full documentation of its use and repair, as acceptable to BPA;
- Expected performance standards;
- How the proposed project will be integrated into BPA’s Power Delivery System;
- How established utility processes and procedures will be impacted;
- The appropriate testing and/or evaluation methodology if applicable; and,

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- A final report including next steps for the project or potential follow-on projects.

Specific material items which are to be delivered to BPA should be listed in this section. Deliverables could be specific products such as working prototypes, models, computer disks or printouts, copies of a publication or a report, presentation of workshops or briefings, test plans, specifications, drawings, test data, or other types of measurable results. Clearly identify deadlines for approval by BPA (determined by recipient's capabilities and nature of work; usually about 4 weeks) in the schedule. All data items shall be traceable to specific tasks defined in the Project Descriptions.

Identify any and all hardware/software to be delivered to BPA as a result of the effort. Specify BPA acceptance criteria for each deliverable, product or tangible result that you expect from each task, phase or area of work at agreement completion. Define criteria for establishing or indicating that a specific stage gate or phase has been completed. List the deliverables that result from the stage gate or phase tied to the execution schedule. Identify all reviews and when/where they will be conducted.

When project needs are divisible into logical and identifiable stages of accomplishment, BPA will require completion and approval of each successive stage before proceeding to the next.

F. Time Schedule (Please note that schedules should assume an October 1st start, but the table is presented without dates to allow for flexibility).

In addition to the Gantt or PERT chart specified in section "iv" above, a specific time schedule shall be provided in the Project Description. Time schedules shall include chronological listings of the specific tasks detailed under B above. If BPA's approval is needed for a particular action, that activity shall be identified in the schedule. Schedules shall be expressed in days per task and elapsed days after award, not in specific calendar dates. A typical schedule may be formatted as follows:

Tasks	# of Work Days	Elapsed Calendar Days After Project Start
<b>Project Start - Pre-Award/Contract Execution</b>		
Task 1 – Short Description	20	28
Task 2 – Short Description	20	48
Task 3 – Short Description	20	60
Task 4 – Short Description	10	70
Task 5 – Short Description	55	133
<b>State Gate 1 – approval required</b>	10	147
Task 6 – Short Description	20	175
Task 7 – Short Description	50	217
Task 8 – Short Description	30	259
<b>Stage Gate 2 – approval required</b>	50	273
Task 9 – Short Description	100	322
Task 10 – Short Description	50	350
Task 11 – Short Description	60	400
<b>Stage Gate 3 – approval required</b>	10	405
Task 12 – Short Description	60	465
Task 13 – Tech Transfer Plan	40	505
Task 14 – Final Report	45	550
Task 15 – Project Closeout	10	555
<b>Project Completion</b>	-	555

EXAMPLE

## **APPENDIX IV – TECHNOLOGY READINESS LEVELS (TRL)**

TRL 1 – Basic principles observed and reported: Transition from scientific research to applied research. Essential characteristics and behaviors of systems and architectures. Descriptive tools are mathematical formulations or algorithms.

TRL 2 – Technology concept and/or application formulated: Applied research. Theory and scientific principles are focused on specific application area to define the concept. Characteristics of the application are described. Analytical tools are developed for simulation or analysis of the application.

TRL 3 – Analytical and experimental critical function and/or characteristic proof-of-concept: Proof of concept validation. Active Research and Development (R&D) is initiated with analytical and laboratory studies. Demonstration of technical feasibility using breadboard or brassboard implementations that are exercised with representative data.

TRL 4 – Component/subsystem validation in laboratory environment: Standalone prototyping implementation and test. Integration of technology elements. Experiments with full-scale problems or data sets.

TRL 5 – System/subsystem/component validation in relevant environment: Thorough testing of prototyping in representative environment. Basic technology elements integrated with reasonably realistic supporting elements. Prototyping implementations conform to target environment and interfaces.

TRL 6 – System/subsystem model or prototyping demonstration in a relevant end-to-end environment (ground or space): Prototyping implementations on full-scale realistic problems. Partially integrated with existing systems. Limited documentation available. Engineering feasibility fully demonstrated in actual system application.

TRL 7 – System prototyping demonstration in an operational environment (ground or space): System prototyping demonstration in operational environment. System is at or near scale of the operational system, with most functions available for demonstration and test. Well integrated with collateral and ancillary systems. Limited documentation available.

TRL 8 – Actual system completed and "mission qualified" through test and demonstration in an operational environment (ground or space): End of system development. Fully integrated with operational hardware and software systems. Most user documentation, training documentation, and maintenance documentation completed. All functionality tested in simulated and operational scenarios. Verification and Validation (V&V) completed.

TRL 9 – Actual system "mission proven" through successful mission operations (ground or space): Fully integrated with operational hardware/software systems. Actual system has been thoroughly demonstrated and tested in its operational environment. All documentation completed. Successful operational experience. Sustaining engineering support in place.

**APPENDIX V – PROJECT BENEFIT FORM**

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*The Project Benefit Form for Volume V is attached with the FOA BPA-0002017 on BPA Exchange: <https://bpa-exchange.energy.gov/>. Each application should include a completed project benefit form, which will assist evaluators in determine the benefits of the project to BPA and the region.*