DE-FOA-0001838: Notice of Opportunity for Technical Assistance for Techno-Economic Studies of Pumped-Storage Hydropower

Water Power Technologies Office
Hydropower Program

Key Dates	
Notice of Opportunity for Technical Assistance Issue Date	April 27, 2018
Informational Webinar (Optional)	May 24, 2018 at 1 p.m. ET
Submission Deadline for Letters of Intent (Optional)	Letters of Intent are due at 5 p.m. ET on June 12, 2018.
Submission Deadline for Applications	Applications are due at 5 p.m. ET on July 12, 2018.
Expected Date for EERE Selection Notifications	All selections are expected to be made by September 2018.
Summary Information	
Means of Submission	Applications must be submitted through EERE Exchange at https://eere-Exchange.energy.gov, EERE's online application portal. EERE will not review or consider applications submitted through other means.
Total Value of Technical Assistance to be Provided	Total Technical Assistance is valued at $3,000,000. DOE will provide the funding to the team that will provide the Technical Assistance for the selected projects. There is no direct financial assistance available under this NOTA.
Anticipated Number of Project Selections	2
Value of Technical Assistance Provided Per Project	EERE anticipates providing approximately $1,500,000 per selected project in the form of Technical Assistance.
Period of Performance	Period of Performance will be up to 18 months.
Eligible Entities	For-profit and non-profit companies or entities, and State, local, and tribal government are eligible to apply. Federal agencies and federally-funded research and development centers (FFRDCs) are not eligible.
Cost Share Requirement	Not required
Submission of Multiple Applications	Applicants may submit more than one application, provided that each application describes a unique site.
Questions	Questions may be directed to WPTONOTA@ee.doe.gov.

SECTION I: OVERVIEW AND DESCRIPTION OF TECHNICAL ASSISTANCE

A. SUMMARY

As an energy storage technology, pumped storage hydropower (PSH) plays a key role in supporting the ongoing evolution of the electric power system. In addition to enabling higher penetration of wind and solar generation, PSH also provides a large amount of flexible dispatchable capacity that helps provide for a safe, reliable, and economical operation of the power grid. Nevertheless, the challenge to accurately evaluate the different value streams that PSH projects provide to the grid has been and remains a major issue for the hydropower industry, generation planners, and system operators.

The purpose of this Notice of Opportunity for Technical Assistance (NOTA) is to perform techno-economic studies—including cost-benefit analyses, power market analyses, financial analyses, and a valuation analysis—to evaluate the long-term value of two selected PSH projects. These studies will provide PSH developers the capability to estimate the value of a proposed PSH project, including: value of bulk power/storage capacity; energy arbitrage; value of ancillary services; power system stability; and transmission benefits. The studies will also investigate and compare PSH financial revenue streams under current market structures relative to the economic value of PSH to the grid.

The techno-economic studies will be carried out by a Technical Assistance team comprising subject matter experts from the following DOE national laboratories: Argonne National Laboratory (ANL), Idaho National Laboratory (INL), National Renewable Energy Laboratory (NREL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest National Laboratory (PNNL). As part of the Technical Assistance, the Technical Assistance team has developed draft guidance for methodologies and approaches to PSH valuation. Through these studies, the team will test and refine the valuation guidance, after which the guidance and valuation tools will be transferred to the industry and made publicly available.

B. OBJECTIVES

In Fiscal Year (FY) 2017, Congress directed the Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy (EERE), Water Power Technologies Office (WPTO) to produce "a thorough techno-economic analysis of the value of PSH at two sites with high-levels of intermittent renewable energy generation in the United States."[1] In addition to serving as the mechanism for selecting both sites, WPTO is issuing this NOTA to achieve the following objectives:

- Assess services and contributions that PSH projects provide to the grid and estimate the value of those services, including revenue streams over time;
- Quantify the economic value provided by new PSH projects based on the market, location, and plant characteristics;
- Compare design configurations for new PSH projects based on cost and value;
- Test and refine a comprehensive, replicable, and transparent PSH valuation guidance to enable consistent assessments and comparisons of new PSH projects and design options; and
- Support a larger multi-year research strategy to define PSH capabilities and estimate the value that hydropower and PSH resources contribute to reliability, resiliency, and other benefits under a set of plausible future electric power system conditions.

[1] See Explanatory Statement for the Consolidated Appropriations Act, 2017, Congressional Record – House, 115th Cong., First Session, Vol. 163, No. 76-Book II, p. H3751 (May 3, 2017).

These objectives will assure that the NOTA outcomes benefit not only those directly receiving technical assistance but the broader hydropower industry and electricity stakeholders.

C. BACKGROUND

PSH is a type of hydropower facility where energy can be stored and generated by moving water between two reservoirs of differing elevations. As an energy storage technology, PSH supports many aspects of power grid operations and spans all major power grid components, including electricity generation, delivery, and demand sub-systems. Historically, most PSH plants in the United States were built to complement and provide backup capacity to large baseload coal and nuclear plants, which operate at a steady rate. PSH plants would generate power during the daily peak electrical demand, and pump water to the upper reservoir late at night during periods when energy demand was low. This practice is known as energy arbitrage. The penetration of variable renewable generation from wind and solar resources is now one of the key factors for the renewed interest in PSH as there is an increasing need for flexibility in power system operations. In addition to providing 97% of the total utility-scale storage in the United States, PSH plants can respond quickly and flexibly to both grid generation and load needs to accommodate variable generation. This dual mode of operation contributes toward greater resiliency and reliability of the power grid.

While the services provided by PSH are increasingly valuable, almost no new facilities have been built in the United States in the last several decades. PSH plants require high initial capital costs and long lead times to complete the construction process. Further, it is difficult to assess and quantify the full value of PSH contributions to the grid. The value of flexibility, for example, is less predictable than day-night energy arbitrage. The inability to estimate the full value of PSH, especially system-wide contributions, makes it difficult to assess the total benefits of a PSH project to the system.

In FY17, WPTO established a multi-laboratory research effort to develop an advanced valuation guidance for PSH. The valuation guidance is a step-by-step methodology that can be used by PSH developers, plant owners and operators, and other stakeholders to assess the economic value of existing or planned PSH projects. The valuation guidance is general in nature such that it can be applied to different types and sizes of PSH plants operating in different market environments, while also being detailed enough to account for the various services that specific plants provide to the grid. The methodology will be applied at the two sites selected through this NOTA, allowing recipients to evaluate and demonstrate the potential economic and financial value of the proposed projects. Utilizing the valuation guidance at the two selected sites will help validate and refine the guidance itself, which will be made publicly available after the studies are complete.

D. SCOPE OF ACTIVITIES

DOE anticipates providing tailored Technical Assistance to two (2) entities selected under this NOTA through the use of a specifically-assembled Technical Assistance team comprised of subject matter experts from DOE national laboratories. Cost-benefit analyses, power market analyses, financial analyses, and a valuation analysis will be conducted to help recipients assess and estimate the value of the various services and contributions that each selected PSH project provides to the grid based on the project's design, equipment, operational characteristics, location, market landscape, and other project-specific characteristics. The techno-economic studies will compare project investment costs to assessed grid benefits and revenue streams.

During the period of duration of this NOTA, the Technical Assistance team will perform the following tasks:

Task 1. Cost-Benefit Analyses

The Technical Assistance team will perform a number of analyses to estimate the benefits and costs of each selected PSH project, including:

- Bulk power capacity and energy value over PSH lifetime (value of energy arbitrage and PSH capacity);
- Value of PSH ancillary services: regulation service (secondary frequency control), contingency reserves (tertiary frequency control), flexibility reserves, and black start service;
- Power system stability services: inertial response, governor response (primary frequency control), transients and small signal stability, and voltage support;
- PSH impacts on reducing system cycling and ramping costs (value of reducing cycling and ramping of other units in the system);
- Other system-wide (portfolio) effects of PSH operations (e.g., PSH impacts on decreasing overall power system production costs, benefits for integration of variable energy resources, and impacts on power system emissions);
- Transmission benefits of PSH (transmission congestion relief, transmission investments deferral); and
- Non-energy services of PSH (e.g., water management services, socioeconomic benefits, and environmental impacts).

Given that PSH projects typically have long lifetimes, the studies will be performed in the context of plausible future scenarios of the power system where the projects are located (e.g., generation mix, demand growth and load projects, potential impacts of the transportation and other sectors on electricity demand) to estimate and project their costs and benefits over time. Sensitivity analyses on key factors that may influence the costs and benefits of the selected projects will also be performed.

The cost-benefit analyses will provide NOTA recipients with detailed information and estimates of potential values of various services and contributions that their projects could provide to the grid. This information will help NOTA recipients better understand the potential role and value of their projects in the power system and help them identify relative values of different PSH services and contributions. As these studies progress and evolve, other PSH benefits may also be incorporated into the analyses.

Task 2. Power Market Analysis

The Technical Assistance team will perform an analysis of the market rules and potential revenues for the electricity market in which each selected PSH project will be located. The analysis will include historical energy prices, capacity prices, and ancillary services prices. An analysis of new market trends and potential new market products will also be conducted.

The results of the market analysis will provide NOTA recipients with the estimated value and potential revenue streams that can be achieved in the electricity markets in which their projects will be located. The market analysis results will also provide NOTA recipients with necessary inputs for the financial analysis to determine financial feasibility of their projects.

Task 3. Financial Analysis (Optional)

At the recipient's discretion, pro forma financial analyses can also be performed for the two selected PSH projects to calculate appropriate financial ratios and parameters using the relevant financial value streams. Sensitivity studies will be performed to identify key cost factors and value streams that influence PSH feasibility.

The results of the financial analysis will help NOTA recipients determine the financial feasibility of their project.

Task 4. Valuation Analysis
An advanced valuation guidance developed by the Technical Assistance team will be used to perform a valuation analysis of each selected PSH project. Results of Tasks 1 and 2 will serve as inputs to provide specific values of various services and contributions provided by each selected PSH project. The valuation analysis will account for the types of products and associated revenue streams that each project may expect within their market landscape and participation levels. In addition to established revenue streams, the economic valuation analysis will account for the assessed value of other grid services provided by the project, including those that are not monetized. A co-optimization analysis will be performed to determine which PSH services and contributions can be performed at the same time or in parallel, and which are mutually exclusive.

The results of the valuation analysis will provide NOTA recipients with an objective assessment of the economic value of their projects. A detailed cost-benefit analysis will be performed by the Technical Assistance team to calculate the net present value (NPV), benefit-cost ratio, and other economic indicators of the value of their project. NOTA recipients will benefit from this information, which, together with the financial analysis, is crucial for sound decision-making in regard to project development and investments.

Task 5. Reporting
At the end of the period of performance, each recipient will receive a detailed final report documenting the results of the techno-economic studies. A report summarizing the results will be published by WPTO.

The Technical Assistance team will utilize the results and lessons learned during this study to refine the PSH valuation guidance. A revised version of the guidance will be made publicly available for use by PSH developers, plant owners and operators, policy makers, and other stakeholders.

SECTION II: TECHNICAL ASSISTANCE INFORMATION AND ELIGIBILITY

A. TECHNICAL ASSISTANCE

WPTO will provide tailored Technical Assistance to organization(s) selected under this NOTA through the use of a specifically-assembled Technical Assistance team comprised of subject matter experts from the following DOE national laboratories: Argonne National Laboratory (ANL), Idaho National Laboratory (INL), National Renewable Energy Laboratory (NREL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest National Laboratory (PNNL).

An Agreement will be set in place between (1) the team providing the Technical Assistance and (2) the Technical Assistance recipient. WPTO will provide the funding for the selected Technical Assistance projects directly to the Technical Assistance team.

Technical Assistance provided under this NOTA is designed to help entities better understand the economic value of a planned PSH project and make informed decisions. WPTO and the Technical Assistance team will not direct behavior, make decisions, or require entities to take any particular course of action.

B. ESTIMATED VALUE OF TECHNICAL ASSISTANCE

WPTO anticipates providing Technical Assistance to two (2) recipients. Each recipient will receive assistance valued at up to $1,500,000. DOE will provide the funding to the Technical Assistance team that will provide the Technical Assistance for the selected projects. **There is no financial assistance available under this NOTA; only Technical Assistance will be provided.** DOE will not purchase hardware, software, or provide any direct funding to selected organizations through this NOTA.

DOE is under no obligation to pay for any costs associated with preparation or submission of applications. DOE reserves the right to provide Technical Assistance in whole or in part, to any, all, or none of the applications submitted in response to this NOTA.

C. COST SHARING

Cost sharing is not required.

D. PERIOD OF PERFORMANCE

The period of performance of this Technical Assistance will not exceed 18 months.

E. ELIGIBILITY CRITERIA

The following eligibility criteria will be used in the selection process:

1. **Organization:**
    a. **Domestic Entities:** For-profit and non-profit companies or entities that are incorporated (or otherwise formed) under the laws of a particular State or territory of the United States are eligible to apply. State, local, and tribal government entities are eligible to apply. Federal agencies and federally-funded research and development centers (FFRDCs) are not eligible to apply.
    b. **Foreign Entities:** Foreign entities, whether for-profit or otherwise, are eligible to apply. If a foreign entity applies, it must designate in the application a subsidiary or affiliate

incorporated (or otherwise formed) under the laws of a State or territory of the United States that will provide requested data and enter into the Agreement. The Application must state the nature of the corporate relationship between the foreign entity and domestic subsidiary or affiliate.

2. **Project type:** Pumped-storage hydropower plant using water as storage medium.
3. **Design:** Open-loop or closed-loop.
4. **Technology:** Fixed-speed, adjustable-speed, or ternary technology.
5. **Project status:** Planned PSH project development. Existing, operational PSH projects are not eligible, even if modifications are proposed.
6. **Ownership:** No restrictions (e.g., utility, independent power producer). See Eligibility Criteria 1.
7. **Project size:** Total capacity of the plant (all units): minimum 20 MW.
8. **Location:** Project must be located in the United States.
9. **Market environment:** No restrictions (e.g., traditional regulated or restructured/competitive market).

Applicants are also encouraged to consider the review criteria in Section IV.B.2 and the extent to which the proposed site is responsive to those criteria.

F. DATA REQUIREMENTS

The techno-economic studies that will be conducted as part of this Technical Assistance are data-intensive in nature. The types of data that will be requested of NOTA recipients include general project data, techno-economic project characteristics, site characteristics, and financial data. The list of data types that will be requested from NOTA recipients is provided in Appendix A as a checklist. Applicants must indicate whether they have or can acquire the data listed in Appendix A and must attach the completed checklist or a document with the equivalent information to the application, per Section III.B.

Applicants are not expected to provide the respective data as part of the application. A more detailed data request will be sent to recipients after selections are made. The Agreement will address appropriate data protection for any proprietary data submitted to the Technical Assistance team and provide unlimited rights in data generated under the project.

The success of the studies and value to NOTA recipients will be dependent on data quality and availability. Careful consideration will be given to data as part of the evaluation and selection process (see Section IV.B.2).

SECTION III: APPLICATION AND SUBMISSION INFORMATION

A. LETTER OF INTENT

Applicants are encouraged to submit a Letter of Intent by **5 p.m. ET on June 12, 2018**. This letter should include the name and general information of the applicant and a brief description of the proposed PSH project. DOE will use the Letters of Intent to organize and expedite the merit review process. Letters should not contain proprietary or sensitive business information. Failure to submit such letters will not affect a responsive application submitted in a timely fashion. The Letter of Intent should be sent by e-mail to WPTONOTA@ee.doe.gov.

B. FULL APPLICATION

Applicants must provide a completed, signed Application for Federal Assistance (Form SF-424) in Portable Document Format (PDF). The form is available in EERE Exchange under the NOTA "Full Application Attachments" section. Complete all required fields in accordance with the instructions on the form. The list of certifications and assurances in Field 21 can be found at http://energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms, under Certifications and Assurances. Save Form SF-424 in a single PDF file using the following convention for the title, "ControlNumber_LeadOrganization_App424".

In addition to the SF-424 Application form, Applicants must include the information requested below in a Project Summary file not to exceed 15 pages. Appendices may be used to provide supporting information, such as résumés of key personnel, letters of support, and additional site documentation. Appendices will not count toward the page limit. The Project Summary file must include the following information:

1. **Applicant Information**
   - Business Point(s) of Contact:
     - Name
     - Phone number
     - Email address
   - Technical Point(s) of Contact:
     - Name
     - Phone number
     - Email address

2. **Project Information**
   - Name of project
   - Project owner/developer
   - Project location:
     - State or territory
     - County
     - Township or nearby town
     - Stream or other body of water
   - Planned in service date
   - Detailed technical description, including:
     - Total plant capacity:

        - Generating capacity (MW)
        - Pumping capacity (MW)
    - Number of units
        - Pumps
        - Turbines
    - Number of penstocks (e.g. one per unit)
    - Generating capacity by unit
    - Pumping capacity by unit
    - Project works (e.g., Does the project use an existing dam? Will a new primary transmission be built?)
- Primary purpose of the project
- Primary anticipated value or benefits of the project
- Primary anticipated revenue streams
- Anticipated off-taker(s) and/or accessible electricity markets
- Supporting evidence that the project is located at a site with high levels of intermittent renewable energy generation

3. Development Status

- Has a preliminary permit or license application been filed?
- Has a preliminary permit or license been issued?
- List any studies, investigations, tests, or surveys that have taken place for the purpose of determining the technical, economic, and/or financial feasibility of the proposed project.
- List any obstacles to the development of the project, and how the organization plans to address these obstacles.
- List any known significant environmental or social impacts of the project.

4. Rationale for Applying

- How would a techno-economic study and value analysis make a difference in the project plan?
- How will the results of the Technical Assistance be used?

Applicants must also provide the completed Data Request Checklist in Appendix A indicating which data are available or can be acquired. A template has been provided in Appendix A. Though not a required format, applicants are encouraged to submit the information using this template. Applicants are not expected to provide the respective data as part of the application. A more detailed data request will be sent to recipients after selections are made.

Summary of Required Forms/Files

The full application for Technical Assistance must include the following documents:

Submission	Components	File Name
Full Application (PDF, unless stated otherwise)	SF-424	ControlNumber_LeadOrganization_App424
	Project Summary	ControlNumber_LeadOrganization_Summary
	Data Request Checklist	ControlNumber_LeadOrganization_Checklist

C. SUBMISSION INSTRUCTIONS

Applications must be submitted electronically via EERE Exchange at https://eere-exchange.energy.gov/ by **5 p.m. ET on July 12, 2018**. Applicants may monitor submission status through EERE-Exchange. See Section V for additional information regarding Exchange.

If an organization has more than one planned PSH project they would like to submit for consideration, the organization must submit one application per project. There is no limit for how many applications an organization may submit, provided that each application is for a distinct PSH site. An applicant may not submit more than one application for different variations of the same PSH site (e.g., one application using fixed-speed and one using adjustable-speed technology).

SECTION IV: APPLICATION REVIEW INFORMATION

A. EVALUATION PROCESS

WPTO will evaluate the applications in accordance with the evaluation process defined below. The evaluation process consists of multiple phases; each includes an initial eligibility review and a thorough technical review. Rigorous technical reviews of eligible submissions are conducted by an evaluation team of technical and professional experts in the subject matter of the NOTA. The evaluation team will be responsible for reviewing, evaluating, and rating the applications as well as making recommendations to the Selection Official. Ultimately, the Selection Official considers the recommendations of the reviewers along with other considerations, such as program policy factors, in determining which applications to select.

After reviewing an application, WPTO may contact the applicant to clarify information presented in the application and confirm understanding of the requirements for participation.

B. CRITERIA

1. Initial Eligibility Review

Prior to a full evaluation, WPTO will perform an initial eligibility review to determine that (1) the applicant is an eligible entity under this NOTA per Section II.E; (2) the information requested has been submitted; and (3) the application is responsive to the objectives of the NOTA. Applications that fail to pass the initial eligibility review will not be forwarded for further review and will be eliminated from further consideration.

2. Review Criteria

Applications will be evaluated against the following criteria:

Criterion 1: Project Information and Impact **Weight: 70%**

- Clarity and completeness of the Project Summary file, including:
  - Concise overview of the proposed PSH project
  - Description of the entity applying for Technical Assistance
  - Thoroughness in providing the project information requested
  - Availability of data requested, as demonstrated by completing the Data Request Checklist provided in Appendix A
- Proximity of project to high levels of intermittent renewable energy generation[2]
- Operational flexibility and versatility with regard to different grid services the proposed project can provide
- Adequacy in the identification of obstacles to the completion of the installation, such as significant environmental or social impacts of the project, and how the organization plans to address these obstacles

[2] Proximity may be demonstrated, for example, by a project that is located in a balancing area that currently has or is shortly projected to have a substantial penetration of generation from intermittent renewable resources or within which generation from intermittent renewable resources can exceed demand. WPTO will consider other demonstrations that a project meets this criterion.

- Justification for how the organization intends to utilize the Technical Assistance and how it will result in overcoming specific challenges related to the development of the proposed PSH project

Criterion 2: Capabilities and Commitment **Weight: 30%**

- Level of documentation available for the purpose of determining the technical, economic, and/or financial feasibility of the proposed project (e.g., studies completed)
- Likelihood for project development in the near-term
- Degree of relevant experience and capability of the organization, with weight given to any past experience in the hydropower sector with an emphasis on PSH and/or leading a project of similar size or scope
- Demonstrated level of commitment of all project partners as evidenced by letters of support

C. PROGRAM POLICY FACTORS

In addition to the above criteria, the Selection Official may consider the following program policy factors in determining which applications to select for negotiations leading to Technical Assistance:

1. **Technological diversity:** Preference to select two projects with different technical characteristics, such as size, number of units, and technology type (e.g., fixed speed, adjustable speed, ternary).
2. **Project size:** Preference given to projects with greater influence on system operations (e.g., effect on market prices).
3. **Market structure diversity:** Preference to select two projects located in different market environments (i.e. traditional/regulated and restructured/competitive markets).
4. **Geographical diversity:** Preference to select two projects in different geographical regions of the United States.
5. **Proximity to intermittent renewable resources**: Preference to select projects located in proximity to high levels of intermittent renewable energy generation.
6. **Ownership diversity:** Preference to select two projects of different ownership types (e.g., utility, independent power producer).
7. **Project complexity:** Preference given to project layouts whose complexities are commensurate with available computational and analytical capabilities.
8. **Project originality:** Presence of unique use cases, services, or system benefits that would be difficult to evaluate without Technical Assistance from DOE.

SECTION V: ADDITIONAL INFORMATION REGARDING EXCHANGE

Register and create an account on EERE Exchange at https://eere-Exchange.energy.gov.

This account will then allow the user to register for any open EERE Opportunity Announcements that are currently in EERE Exchange. It is recommended that each organization or business unit, whether acting as a team or a single entity, use only one account as the contact point for each submission. Applicants should also designate backup points of contact so Applicants may be easily contacted if deemed necessary. **This step is required to apply to this Notice of Opportunity for Technical Assistance (NOTA).**

All submissions must conform to the following form and content requirements, including maximum page lengths, described in Section III above, must be submitted via EERE Exchange at https://eere-exchange.energy.gov/, unless specifically stated otherwise. **EERE will not review or consider submissions submitted through means other than EERE Exchange, submissions submitted after the applicable deadline, and incomplete submissions**. EERE will not extend deadlines for Applicants who fail to submit required information and documents due to server/connection congestion.

A control number will be issued when an Applicant begins the Exchange application process. This control number must be included with all Application documents, as described below.

To be considered eligible for review, the Application must be:

- Comprehensive in providing the information requested in Section III
- Submitted in Adobe PDF format
- Written in English
- Formatted to fit on 8.5 x 11 inch paper with margins not less than one inch on every side. Use Times New Roman typeface, a black font color, and a font size of 12 point or larger (except in figures or tables, which may be 10 point font). A symbol font may be used to insert Greek letters or special characters, but the font size requirement still applies. References must be included as footnotes or endnotes in a font size of 10 or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- Formatted with the Control Number prominently displayed on the upper right corner of the header of every page. Page numbers must be included in the footer of every page.
- Within the specified maximum page limit, including cover page, charts, graphs, maps, and photographs when printed using the formatting requirements set forth above and single spaced. If Applicants exceed the maximum page lengths indicated below, EERE will review only the authorized number of pages and disregard any additional pages.

Applicants are responsible for meeting the submission deadline. **Applicants are strongly encouraged to submit their Application at least 48 hours in advance of the submission deadline**. Under normal conditions (i.e., at least 48 hours in advance of the submission deadline), Applicants should allow at least one hour to submit the application. Once the Application is submitted in EERE Exchange, Applicants may revise or update their application until the expiration of the applicable deadline.

EERE Exchange is designed to enforce the deadlines specified in this NOTA. The “Apply” and “Submit” buttons will automatically disable at the defined submission deadlines. Should Applicants experience problems with Exchange, the following information may be helpful:

Applicants that experience issues with submission PRIOR to the NOTA deadline: In the event that an Applicant experiences technical difficulties with a submission, the Application should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist Applicants in resolving issues.

Applicants that experience issue with submissions that result in late submissions: In the event that an Applicant experiences technical difficulties so severe that they are unable to submit their application by the deadline, the Applicant should contact the Exchange helpdesk for assistance (EERE-ExchangeSupport@hq.doe.gov). The Exchange helpdesk and/or the EERE Exchange system administrators will assist the Applicant in resolving all issues (including finalizing submission on behalf of and with the Applicant's concurrence). PLEASE NOTE, however, those Applicants who are unable to timely submit their application due to their waiting until the last minute when network traffic is at its heaviest to submit their materials will not be able to use this process.

SECTION VI: ADMINISTRATIVE INFORMATION

A. QUESTIONS/AGENCY CONTACTS

Upon the issuance of this Notice of Opportunity for Technical Assistance (NOTA), WPTO personnel are prohibited from communicating (in writing or otherwise) with Applicants regarding the NOTA except through the established question and answer process as described below. Specifically, questions regarding the content of this NOTA must be submitted to WPTONOTA@ee.doe.gov not later than 3 business days prior to the application due date. WPTO will attempt to respond to a question within three business days.

Questions related to the use of the EERE Exchange website should be submitted to: EERE-ExchangeSupport@hq.doe.gov.

B. TREATMENT OF APPLICATION INFORMATION

In general, EERE will use data and other information contained in applications for evaluation purposes only unless such information is generally available to the public or is already the property of the Government.

Applicants should not include trade secrets or commercial or financial information that is privileged or confidential in their application unless such information is necessary to convey an understanding of the application or to comply with a requirement in the NOTA. Applications containing trade secrets or commercial or financial information that is privileged or confidential, which the Applicant does not want disclosed to the public or used by the Government for any purpose other than application evaluation, must be marked as described in this section.

The cover sheet of the application must be marked as follows and identify the specific pages containing trade secrets or commercial or financial information that is privileged or confidential:

> Notice of Restriction on Disclosure and Use of Data:
> Pages [list applicable pages] of this document may contain trade secrets or commercial or financial information that is privileged or confidential, and is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with an assistance agreement or Memorandum of Agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source. [End of Notice]

The header and footer of every page that contains trade secrets or commercial or financial information that is privileged or must be marked as follows: “May contain trade secrets or commercial or financial information that is privileged or confidential and exempt from public disclosure.”

In addition, each line or paragraph containing trade secrets or commercial or financial information that is privileged or confidential must be enclosed in brackets.

The above markings enable EERE to follow the provisions of 10 CFR 1004.11(d) in the event a Freedom of Information Act (FOIA) request is received for information submitted with an application. Failure to

comply with these marking requirements may result in the disclosure of the unmarked information under a FOIA request or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information, and may use or disclose such information for any purpose.

Subject to the specific FOIA exemptions identified in 5 U.S.C. 552(b), all information submitted to EERE by an Applicant is subject to public release under the Freedom of Information Act, 5 U.S.C. §552, as amended by the OPEN Government Act of 2007, Pub. L. No. 110-175. It is the Applicant's responsibility to review FOIA and its exemptions to understand (1) what information may be subject to public disclosure and (2) what information Applicants submit to the Government that are protected by law. In some cases, DOE may be unable to make an independent determination regarding which information submitted by an Applicant is releasable and which is protected by an exemption. In such cases, DOE will consult with the Applicant, in accordance with 10 C.F.R. §1004.11, to solicit the Applicant's views on how the information should be treated.

C. EVALUATION AND ADMINISTRATION BY NON-FEDERAL PERSONNEL

In conducting the merit review evaluation, the Government may seek the advice of qualified non-Federal personnel as reviewers. The Government may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities. The Applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure agreements prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign a non-disclosure agreement.

D. ENVIRONMENTAL REVIEW IN ACCORDANCE WITH NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

DOE will conduct appropriate analysis under the National Environmental Policy Act (42 USC 4321, et seq.). NEPA requires Federal agencies to integrate environmental values into their decision-making processes by considering the potential environmental impacts of their proposed actions. For additional background on NEPA, please see DOE's NEPA website at http://nepa.energy.gov/.

While NEPA compliance is a Federal agency responsibility and the ultimate decisions remain with the Federal agency, all entities selected to receive technical assistance may be required to assist in the timely and effective completion of the NEPA process.

E. SELECTION NOTICES

Selected Applicants Notification: WPTO will notify applicants selected under this NOTA. Notice of selection is not an authorization to begin performance.
Non-selected Notification: Organizations whose applications have not been selected will be advised as promptly as possible.

F. PROTECTED PERSONALLY IDENTIFIABLE INFORMATION

In responding to this NOTA, Applicants must ensure that Protected Personally Identifiable Information (PII) is not included. PII is defined by the Office of Management and Budget (OMB) and EERE as:
Any information about an individual maintained by an agency, including but not limited to, education, financial transactions, medical history, and criminal or employment history and information that can be used to distinguish or trace an individual's identity, such as their name, social security number, date and place of birth, mother's maiden name, biometric records, etc., including any other personal information that is linked or linkable to an individual.

This definition of PII can be further defined as: (1) Public PII and (2) Protected PII.
Public PII: PII found in public sources such as telephone books, public websites, business cards, university listing, etc. Public PII includes first and last name, address, work telephone number, email address, home telephone number, and general education credentials.
Protected PII: PII that requires enhanced protection. This information includes data that if compromised could cause harm to an individual such as identity theft.

Listed below are examples of Protected PII that Applicants must not include in the files listed above to be evaluated by the Merit Review Committee.

- Social Security Numbers in any form
- Place of Birth associated with an individual
- Date of Birth associated with an individual
- Mother's maiden name associated with an individual
- Biometric record associated with an individual
- Fingerprint
- Iris scan
- DNA
- Medical history information associated with an individual
- Medical conditions, including history of disease
- Metric information, e.g. weight, height, blood pressure
- Criminal history associated with an individual
- Employment history and other employment information associated with an individual
- Ratings
- Disciplinary actions
- Performance elements and standards (or work expectations) are PII when they are so intertwined with performance appraisals that their disclosure would reveal an individual's performance appraisal
- Financial information associated with an individual
- Credit card numbers
- Bank account numbers
- Security clearance history or related information (not including actual clearances held)

Listed below are examples of Public PII that Applicants may include in the files listed above to be evaluated by the Merit Review Committee:

- Phone numbers (work, home, cell)
- Street addresses (work and personal)
- Email addresses (work and personal)
- Digital pictures
- Medical information included in a health or safety report
- Employment information that is not PII even when associated with a name
- Resumes, unless they include a Social Security Number
- Present and past position titles and occupational series
- Present and past grades
- Present and past annual salary rates (including performance awards or bonuses, incentive awards, merit pay amount, Meritorious or Distinguished Executive Ranks, and allowances and differentials)

- Present and past duty stations and organization of assignment (includes room and phone numbers, organization designations, work email address, or other identifying information regarding buildings, room numbers, or places of employment)
- Position descriptions, identification of job elements, and those performance standards (but not actual performance appraisals) that the release of which would not interfere with law enforcement programs or severely inhibit agency effectiveness
- Security clearances held
- Written biographies (e.g. to be used in a Technology Office describing a speaker)
- Academic credentials
- Schools attended
- Major or area of study
- Personal information stored by individuals about themselves on their assigned workstation or laptop unless it contains a Social Security Number

APPENDIX A. DATA REQUEST CHECKLIST

Instructions: Below is a list of data types that will be requested from NOTA recipients after selections are made. Check the box to indicate whether the data requested is available or can be acquired, and attach the completed checklist or a document with the equivalent information to the full application, per Section III.B. Applicants are not expected to provide the respective data as part of the application. A more detailed data request will be sent to recipients after selections are made.

1. General Data

- ❒ Plant name
- ❒ Plant status
- ❒ Location
- ❒ Owner/developer
- ❒ Planned in-service date
- ❒ Timeline of project activities (e.g., licensing/permitting, preliminary design, construction, operation)
- ❒ Project layout

2. Techno-economic Data

- ❒ Plant generating and pumping capacity (MW)
- ❒ Plant overall round trip efficiency (%)
- ❒ Number of units
- ❒ Rated generating capacity of each unit (MW)
- ❒ Rated pumping capacity of each unit (MW)
- ❒ Minimum and maximum generating capacity by unit (MW)
- ❒ Generator rough zone levels by unit (MW)
- ❒ Minimum and maximum pumping capacity by unit (MW)
- ❒ Ramp rates in generating and pumping modes (MW/min)
- ❒ Mode change times (seconds)
- ❒ Energy storage of upper reservoir (MWh)
- ❒ Minimum and maximum water storage volume of upper reservoir (AF)
- ❒ Minimum and maximum water volume storage of the lower reservoir (AF)
- ❒ Nominal (design) head (ft)
- ❒ Nominal (design) flow (cfs)
- ❒ Gross and net maximum head (ft)

- ❒ Gross and net minimum head (ft)
- ❒ Surge tank details, if available
- ❒ Volume (AF)/level (ft) function for upper reservoir
- ❒ Upper reservoir surface area (acres) at maximum and minimum head (ft)
- ❒ Penstock/generator configuration(s)
- ❒ Turbine type
- ❒ Turbine generation efficiency (%)
- ❒ Turbine pumping efficiency (%)
- ❒ Motor/generator data:
    - ❍ Type
    - ❍ Nominal (rated) power in generating and pumping mode (MW)
    - ❍ Average expected efficiency in generating and pumping mode (%)
    - ❍ Expected/planned efficiency curves/hill diagrams in generating and pumping mode (if available)
- ❒ Tailrace elevation (ft) as a function of water releases (cfs)
- ❒ Anticipated interconnection point(s)
- ❒ Excitation systems and power electronics data
- ❒ Plant operating costs:
    - ❍ Fixed operation and maintenance (O&M) costs ($/kW-yr)
    - ❍ Variable O&M costs ($/MWh)
- ❒ Plant maintenance requirements:
    - ❍ Maintenance period duration (days)
    - ❍ Maintenance frequency/schedule
- ❒ Outages:
    - ❍ Projected average forced outage rate (fraction)
    - ❍ Frequency and length by outage cause

3. Site Characteristics

- ❒ Open-loop or closed-loop project?
- ❒ Is this a greenfield project or does it make use of an existing site?
- ❒ Dam type and characteristics
- ❒ Plant footprint (area)

- ❒ Size of upper reservoir [dead pool and active storage (AF) and surface area (acres)]
- ❒ Size of lower reservoir [dead pool and active storage (AF) and surface area (acres)]
- ❒ Minimum and maximum elevations of water level in upper reservoir (ft)
- ❒ Minimum and maximum elevations of water level in lower reservoir (ft)
- ❒ Evaporation rate (average AF/month)
- ❒ Water conveyance location and routing (including surge tank, if applicable)

4. Financial Data

- ❒ Capital investment costs ($/kW as of January 1, 2018)
- ❒ Itemized capital investment costs ($) for major project components, such as reservoirs, conveyance systems, electro-mechanical equipment, interconnection costs (including transmission lines and substations), licensing and permitting, project management costs, and contingencies.
- ❒ Plant economic lifetime (years)
- ❒ Plant depreciable life or book life (years)
- ❒ Tax and insurance costs
- ❒ Escalation rates for capital costs
- ❒ Escalation rates for O&M costs
- ❒ Project financing strategy:
    - ❍ Anticipated business model [e.g., contracted power purchase agreement (PPA), merchant plant, etc.]
    - ❍ Allowance for funds used during construction (AFUDC) or interest during construction (IDC) (%)
    - ❍ Debt/equity ratio (%)
    - ❍ WACC – weighted average cost of capital (%)
- ❒ Market participation and expected future market involvement