

# Introduction

## Peer Review Overview

### Purpose of Peer Review

A peer review is a standard best practice for assessing highly technical, complex projects and programs and is widely used by industry, government, and academia. Peer reviews elicit objective reviews and advice from independent experts to provide DOE managers, staff, and researchers with a powerful and effective tool for informing the management, relevance, and productivity of government-funded projects. The 2020 EERE Peer Review Guidance defines a peer review as:

.....

**A rigorous, formal, and documented evaluation process using objective criteria and qualified and independent reviewers to make a judgement of the technical/scientific/business merit, the actual or anticipated results, and the productivity and management effectiveness of programs and/or projects.**

.....

This definition distinguishes in-progress peer review from other types of reviews, such as merit reviews, which are used to evaluate technical proposals for competitive solicitations; “stage gate” or “go/no-go” reviews, which determine whether a project is ready to move to the next phase of development; and other review activities such as quarterly milestone or budget reviews.

A peer review is based on the premise that enlisting third-party experts to objectively evaluate the progress and impact of a technical project and/or program adds a valuable layer to technical program and project management. Peer reviews are essential in providing robust, documented feedback to EERE leadership to inform program planning. They also provide management with independent validation of the effectiveness and impact of funded projects and program scopes. Knowledge about the quality and effectiveness of current projects and programs is essential in directing (or redirecting) new and existing efforts.

### WPTO 2022 Peer Review

The Water Power Technologies Office’s (WPTO) 2022 Peer Review was held on July 18–29, 2022. Due to the lasting COVID-19 pandemic, the office decided to hold the event virtually on WebEx, a web conferencing platform. A total of 31 external subject-matter experts from industry, academia, nonprofit organizations, and government agencies evaluated more than 100 projects active in WPTO’s fiscal years (FY) 2019–2021 research and development (R&D) portfolio. During the event, PIs presented on their projects, and WPTO staff presented on their program and activity area strategies and progress on stated goals and objectives.

The 2022 Peer Review was split between the programs—the Hydropower Program and projects were reviewed July 18–22, 2022, and the Marine Energy Program and its projects were reviewed July 25–29, 2022. These week-long reviews were split into tracks set by the Marine Energy and Hydropower programs’ activity areas (see Table 1).

Results of the 2022 Peer Review will be used to help inform programmatic decision making, modify existing projects, guide future funding opportunities, and support other planning objectives. WPTO released its first [Multi-Year Program Plan](#) (MYPP) in March 2022, so this was the first peer review that allowed external reviewers to compare funded projects and initiatives to the MYPP. Due to the time between peer reviews because of COVID-19, reviewers, in some cases, were asked to review projects that no longer matched WPTO’s overall strategy. However, it was still useful for the office to receive feedback that compared these sunsetting or completed projects to the

current strategy as outlined in the MYPP. For more information about the office’s structure, strategy, and R&D portfolio implementation, please refer to the MYPP or the corresponding office, program, or activity area [overview slide decks](#) presented during the review.

**Table 1. WPTO’s Programs and Activity Areas**

Hydropower Program	Marine Energy Program*
<ul style="list-style-type: none"> <li>• Innovations for Low-Impact Hydropower Growth</li> <li>• Grid Reliability, Resilience, and Integration (HydroWIRES)</li> <li>• Fleet Modernization, Maintenance, and Cybersecurity</li> <li>• Environmental and Hydrologic Systems Science</li> <li>• Data Access, Analytics, and Workforce Development</li> </ul>	<ul style="list-style-type: none"> <li>• Foundational R&amp;D</li> <li>• Technology-Specific System Design and Validation</li> <li>• Reducing Barriers to Testing</li> <li>• Data Access, Analytics, and Workforce Development</li> </ul>

\*Powering the Blue Economy was also reviewed as an initiative.

## Reviewer Roles and Responsibilities

Review panels consisted of four to six external experts who were selected based on their technical expertise and high-level qualifications in their designated technology area. WPTO made efforts to ensure a balance within each review panel by including a mix of reviewers from industry, academia, nongovernmental organizations, and federal agencies with a range of expertise. Reviewers were required to sign legal agreements stipulating an absence of a conflict of interest with the projects they reviewed. A program review chair, as well as a review panel lead, who in most cases had experience as a reviewer, guided each set of reviewers. Table 2 lists the members and affiliations of the program review chairs and review panel leads. Members of each review panel are listed within each individual program section.

Reviewers were responsible for utilizing their subject-matter expertise to evaluate WPTO-funded projects and evaluate WPTO’s program and activity area strategies and progress toward goals per panel assignment. They were also expected to provide feedback on the peer review process and to participate in facilitated, reviewer-only discussions during the review and the post-review debrief with WPTO staff and reviewers. Panel leads were responsible for facilitating the reviewer-only discussions on the portfolio of projects and assigned activity area(s) before final comments and scores were submitted, leading the post-review debrief between WPTO staff and the review panel, and drafting a short summary of the activity area reviews for the final peer review report. Program chairs were responsible for participating in reviewer-only activity area discussions, leading the post-review debrief with WPTO staff and all reviewers on the final day, drafting a short summary of the program reviews for the peer review report, and reviewing key parts of the final peer review report.

**Table 2. Program Review Chairs and Panel Leads**

	Name	Role	Review Panel	Affiliation
Hydropower Program	Shannon Ames	Review Chair and Panel Lead	Environmental and Hydrologic Systems Science	Low-Impact Hydropower Institute
	David Sinclair	Panel Lead	Innovations for Low-Impact Hydropower Growth	Advanced Hydro Solutions
	Tom Acker	Panel Lead	HydroWIRES	Northern Arizona University
	Cathy Campbell	Panel Lead	Fleet Modernization, Maintenance, and Cybersecurity	U.S. Army Corps of Engineers
Marine Energy Program	Henry Jeffrey	Review Chair and Panel Lead	Technology-Specific System Design and Validation	University of Edinburgh
	David Ingram	Panel Lead	Foundational R&D	University of Edinburgh
	Sue Barr	Panel Lead	Reducing Barriers to Testing	Cambrian Offshore
	Michael Atkinson	Panel Lead	Data Access, Analytics, and Workforce Development	North Carolina A&T State University

### Evaluation Criteria

Reviewers were asked to evaluate WPTO’s R&D programs, initiatives, and activity areas at a strategic level, both numerically and with specific, concise comments to support each evaluation. Reviewers evaluated each program and activity area based on strategy and implementation and progress. Reviewers provided scores on a scale of 1 (“unsatisfactory”) to 5 (“superior”) for each criterion, which are outlined in Appendix B. The weighting of the evaluation criteria is summarized in Table 3.

**Table 3. Program and Activity Area Criteria Weighting**

Evaluation Criteria	Program	Activity Area/Initiative
Objectives	50%	60%
End-User Engagement and Dissemination	50%	40%

Reviewers were also asked to evaluate a set of WPTO’s projects and prizes, both numerically and with specific, concise comments to support each evaluation. Reviewers evaluated each project on the following specific criteria: project/prize objectives, end-user engagement and dissemination, and performance. Reviewers provided scores on a scale of 1 (“unsatisfactory”) to 5 (“superior”) for each criterion, which are outlined in Appendix B. The weighting of the evaluation criteria is summarized in Table 4.

Table 4. Project and Prize Criteria Weighting

Evaluation Criteria	Project	Prize
Objectives	25%	35%
End-User Engagement and Dissemination	25%	35%
Performance	50%	30%

## Format of the Report

The quantitative and qualitative results are summarized at the program, activity area, and project levels. Information in this section has been compiled based on the following sources and is organized as follows, with the Hydropower Program first in each volume followed by the Marine Energy Program:

### Volume I (Section 1: Hydropower; Section 2: Marine Energy)

- **Program Overview:** A brief overview of the program and scope of the review.
- **Program Evaluation Summary:** A summary of all reviewers' comments that provides insight into the program's strengths and weaknesses or potential issues and specific recommendations. The program review chair was responsible for drafting the program summary in consultation with each review panel lead and all hydropower reviewers. Consensus among the reviewers was not required, and the review chair was asked to include differences of opinion and dissenting views within the report.
- **Program Response:** The WPTO program managers' official response to the recommendations provided in the review chair's program evaluation summary.
- **Program and Activity Area Results:** The results of the reviewers' quantitative scores on the programs and activity areas. This section also includes the activity area evaluation summaries and activity area responses.

### Volume II (Section 1: Hydropower; Section 2: Marine Energy)

- **Program and Activity Area Evaluations:** The complete results of the peer review, including the quantitative scores on the programs and activity areas and aggregated anonymous feedback.
- **Project and Prize Evaluations:** Individual project and prize reports that detail the quantitative scores on each project or prize and aggregated anonymous feedback.
- **Appendices:** Includes the agendas and evaluation criteria.