ARPA-E GO COMPETITION CHALLENGE 2: TIMELINE
UPDATED 2021-04-16

A. Challenge 2: August 17th, 2020 – October 2021

Challenge 2 will focus on the SCOPF problem and utilize multiple unique datasets. Each dataset will consist of a collection of power system network models of different sizes with associated operating scenarios (for more details on the distinction between power system network models and operating scenarios, see details on scoring: https://gocompetition.energy.gov/challenges/challenge-2/scoring).

Challenge 2 will extend the transmission network problem presented in Challenge 1 by adding the following new features: topology optimization, price-responsive demand, ramp rate constraints for generators and load, fast-start unit commitment, adjustable transformer tap ratios, phase shifting transformers, and switchable shunts. It is expected that many datasets will be open source and include models generated by the ARPA-E GRID DATA program. Datasets will be released on the GO Competition website throughout the fifteen-month period of Challenge 2. System models and datasets made publicly available in the GO Competition will not contain or constitute Critical Energy Infrastructure Information (CEII).[1] Any datasets or system models used in the GO Competition that do contain CEII will be maintained according to all applicable requirements and established industry best practices.

The datasets used for the Trials and Final Event will not be released in advance of the judging process, but all open access datasets will be released after all judging is completed and the winners are determined. Note that Trial 1, Trial 2, Trial 3, and the Final Event may include datasets that are not from the ARPA-E GRID DATA program and that will not be publicly

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[1] See 18 C.F.R. § 388.113(c)(1). The term "CEII" means "specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that: (i) relates details about the production, generation, transportation, transmission, or distribution of energy; (ii) could be useful to a person in planning an attack on critical infrastructure; (iii) is exempt from mandatory disclosure under the Freedom of Information Act,5 U.S.C. Part 552; and (iv) Does not simply give the general location of the critical infrastructure." [2] The Pacific Northwest National Laboratory (PNNL) is the GO Competition Administrator, the host team of the competition. Additionally, there are contractors and sub-contractors that are supporting PNNL and ARPA-E in regard to the GO Competition Challenge 2. These include Georgia Institute of Technology, Los Alamos National Laboratory, Texas A&M University, and the University of Wisconsin-Madison. [3] Entrants are only allowed one submission to each of Trial Events 1, 2, and 3 as well as the Final Event. Outside of these events, Entrants may make multiple submissions to the platform for scoring in the Sandbox environment.

released after the judging is finalized for Challenge 2; these datasets may be proprietary industry cases that cannot be released. Proprietary datasets will be stored at a secure location by the GO Competition Administrator;[2] algorithm performance against actual datasets will contextualize and validate the GO Competition Challenge 2 results for the research and industry communities.

The "Challenge 2 Original Dataset (C2OD)" will be released at the start of Challenge 2 in order to allow Entrants to start developing solution methods and test their approach on the GO Competition platform. Entrants will be able to download the dataset in order to test algorithms within their own development environment. Entrants can also submit software to be scored against the C2OD using the official competition platform at any time. Scores will be generated after each algorithm submission and will be displayed on a set of competition leaderboards, accessible via the competition website. Entrants may choose to remain anonymous on the leaderboards or may choose to display their Entrant name associated with their scores. However, Entrants that choose to remain anonymous are ineligible for awards under this competition. For more information on scoring, see https://gocompetition.energy.gov/challenges/challenge-2/scoring.

B. Trials (Scheduled for Winter 2020, Summer 2021)

Three trial events will be conducted before the Final Event to allow the Entrants to view their performance on datasets that have not been publicly released. Approximately four, nine, and eleven months into Challenge 2, the three trial events for the SCOPF competition will be held utilizing new power system datasets, Challenge 2 Trial Dataset 1 (C2TD1), Challenge 2 Trial Dataset 2 (C2TD2), and Challenge 2 Trial Dataset 3 (C2TD3). Challenge 2 Trial Event 3 will be a prize event, smaller but similar in structure to the prize awards in the Final Event. ARPA-E reserves the right to add other trial events before the Final Event.

During the initial development phase, the GO Competition Administrator will accept requests from the competition teams for new software modules or changes to the environment and, if possible, implement these specific updates to the GO Competition platform. However, no requests for changes to the GO Competition platform will be accepted after the platform lock-down date between the first and second trial, and the GO Competition Platform will remain fixed through the Final Event, barring any changes determined to be necessary by the GO Competition Administrator. Competitors may not request further changes to the software environment after the lock-down date.

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[2] The Pacific Northwest National Laboratory (PNNL) is the GO Competition Administrator, the host team of the competition. Additionally, there are contractors and sub-contractors that are supporting PNNL and ARPA-E in regard to the GO Competition Challenge 2. These include Georgia Institute of Technology, Los Alamos National Laboratory, Texas A&M University, and the University of Wisconsin-Madison. [3] Entrants are only allowed one submission to each of Trial Events 1, 2, and 3 as well as the Final Event. Outside of these events, Entrants may make multiple submissions to the platform for scoring in the Sandbox environment.

The trial datasets will be similar in scope to those in C2OD, but they will not be publicly released until after the conclusion of each trial event. Entrants are expected to update their submitted approach throughout Challenge 2 and, in particular, before each trial event. The datasets used throughout the GO Competition Challenge 2 may increase in size and complexity.

There will be deadlines to register for the GO Competition Challenge 2 for Entrants wishing to participate in the trial events; Entrants may not participate in the trial events unless they have registered for the GO Competition Challenge 2 ahead of these deadlines. Once Entrants have successfully registered for the GO Competition Challenge 2, they do not need to re-register before subsequent Trial and Final Events. During each trial event, there will be a window of time in which Entrants must submit their SCOPF software approach before the judging is conducted; associated dates are listed below.[3] Please note the specific dates may be subject to change. Immediately following the end of the submission window, the software from all Entrants will be run and scored against C2TD1, C2TD2, and C2TD3 respectively. After each trial event, scores for each Entrant submission will be displayed on a set of competition leaderboards. The primary objective of the trial events is to give Entrants experience in using the portal for the competition and to troubleshoot any potential algorithm submission and evaluation problems in the context of a specified deadline, as will be required in the Challenge 2 Final Event. Trial event 3, noted above, has smaller prizes attached to incentivize earlier, more continuous development from the competitors throughout the competition.

Trial Event 1: December 2020 - January 2021

- **Prior to December 2nd, 2020:** Entrants wishing to participate in Trial Event 1 must submit their registration and be approved for the GO Competition Challenge 2. We encourage new entrants to submit their registration as early as possible.
- **December 2nd, 2020 – December 4th, 2020:** Submission window for Trial Event 1. Entrants participating in Trial Event 1 must submit their algorithmic approach to the GO Competition platform. Entrants may only submit one algorithmic approach to be scored in Trial Event 1.
- **January 8th, 2021:** Trial Event 1 results will be released and leaderboards will be updated to reflect Trial Event 1 performance. Trial Event 1 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 2 sandbox.

Trial Event 2: May-June 2021 (specific dates subject to change)

- **Prior to May 2nd, 2021:** Entrants not previously registered wishing to participate in Trial Event 2 must submit their registration and be approved for the GO Competition

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[3] Entrants are only allowed one submission to each of Trial Events 1, 2, and 3 as well as the Final Event. Outside of these events, Entrants may make multiple submissions to the platform for scoring in the Sandbox environment.

Challenge 2. We encourage new entrants to submit their registration as early as possible.

- **May 2nd, 2021 – May 4th, 2021:** Submission window for Trial Event 2. Entrants participating in Trial Event 2 must submit their algorithmic approach to the GO Competition platform. Entrants may only submit one algorithmic approach to be scored in Trial Event 2.
- **May 21st, 2021:** Trial Event 2 results will be released and leaderboards will be updated to reflect Trial Event 2 performance. Trial Event 2 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 2 sandbox.

Trial Event 3: June-July 2021 (specific dates subject to change)
- **Prior to June 9th, 2021:** Entrants not previously registered wishing to participate in Trial Event 3 must submit their registration and be approved for the GO Competition Challenge 2. We encourage new entrants to submit their registration as early as possible.
- **June 9th, 2021 – June 11th, 2021:** Submission window for Trial Event 2. Entrants participating in Trial Event 3 must submit their algorithmic approach to the GO Competition platform. Entrants may only submit one code to be scored in Trial Event 3.
- **July 2nd, 2021:** Trial Event 3 results will be released and leaderboards will be updated to reflect Trial Event 3 performance. Trial Event 3 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 2 sandbox.

The datasets used for scoring for each trial event (C2TD1, C2TD2, and C2TD3) will be released to the public as soon as scoring and evaluation of all algorithms for the respective trial event has been completed. The trial event datasets will remain available for scoring runs using the GO Competition Challenge 2 sandbox throughout the remainder of the competition. Entrants will have the ability to submit new software/algorithms (to be tested against C2TD1, C2TD2, or C2TD3) at any time, and a continuously updated leaderboard will be maintained in the sandbox environment.

C. Challenge 2 Final Event (August – October 2021) (specific dates subject to change)
At the conclusion of Challenge 2, the Final Event will occur. GO Competition formulations, scoring, and rules will be identical (unless otherwise noted) to those in each trial event, with new Challenge 2 Final Dataset (C2FD) used for evaluation and scoring. Like the three trial events, there will be a deadline by which Entrants must register for the GO Competition Challenge 2 and Entrants will have a window of time during which they must submit their approach. Immediately following this window, the software from all Entrants will be run and scored against C2FD. Scores for each Entrant submission will be displayed on a series of competition leaderboards.

Final Event (specific dates subject to change)

- **July 12th, 2021:** Entrants not previously registered must submit their registration and be approved for the GO Competition Challenge 2. This is also the deadline to have any change of entrant forms submitted and approved. We encourage all teams and entrants to submit registration forms as early as possible.
- **August 9th, 2021 – August 11th, 2021:** Submission window for the Final Event. Entrants must submit their algorithmic approach to the GO Competition platform. Entrants may only submit one algorithmic approach to be scored in the Final Event.
- **early-October:** GO Competition Challenge 2 results will be released and leaderboards will be updated to reflect performance in the Final Event. The top performers in each scoring division will be announced. Final Event datasets without CEII or other proprietary information will be released.

Competition Trial and Final Event winners will be determined based on their Event scores subject to the winning criteria specified in the GO Competition Rules Document (see https://gocompetition.energy.gov/competition-rules). Datasets that are used for the Trial Events (C2TD1, C2TD2, C2TD3) or the Final Event (C2FD) will be made publicly available only after the scoring is finalized and the winners are announced.

D. Competition Timeline: Challenge 2

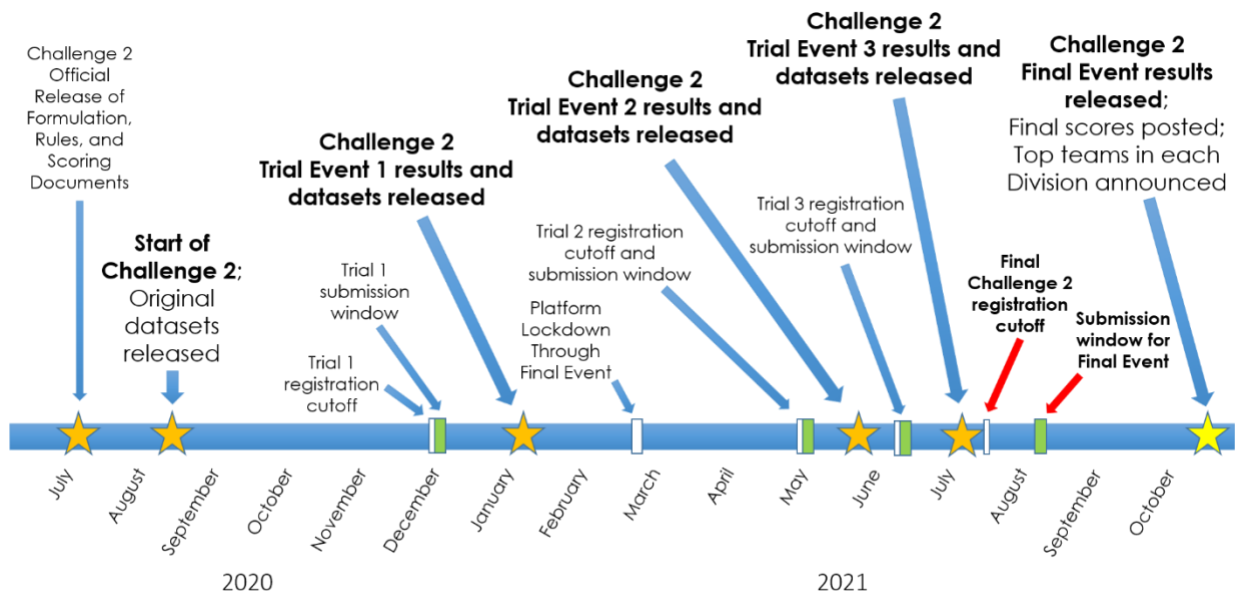The proposed Challenge 2 competition timeline is illustrated below.

Figure 2. Challenge 2 Competition Timeline.

ARPA-E intends for the competition platform to be capable of hosting a wide range of power system algorithm research competitions. Once the processes are established and the award competition model has been validated, private sector entities or other government agencies will have the option of commissioning and sponsoring additional award competitions, contributing to a new era of innovation in electric power systems research.