ARPA-E GO COMPETITION CHALLENGE 3: DATASETS AND TIMELINE UPDATED 2022-03-08

A. Challenge 3: February 15th, 2022 – May 15th, 2023

Challenge 3 will focus on the multi-period SCOPF problem and utilize multiple unique datasets. Each dataset will consist of a collection of power system network models (topologies) of different sizes with associated operating scenarios including bids, offers, weather, and contingencies (for more details on the distinction between power system network models and operating scenarios, see details on scoring: https://gocompetition.energy.gov/challenges/challenge-3/scoring).

Challenge 3 will extend the OPF problem presented in Challenges 1 and 2 into a market dispatch problem including time series data for weather, intermittent generation, and demand. Challenge 3 will include new models for emerging technologies such as storage, consumer participation (bid-in demand), distributed energy resources (DERs), and renewables and new temporal constraints and considerations including unit commitment, combined cycle plant configurations, and reserve requirements. 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 twelve-month period of Challenge 3. 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. Note that the competitive events may include datasets that will not be publicly released; 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]

[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 3. These include Arizona State University, Georgia Institute of Technology, Los Alamos National Laboratory, National, Renewable Energy Laboratory, Texas A&M University, and the University of Wisconsin-Madison.

The topologies of the open source datasets will be released prior to each event, but the operating scenarios will not be released until all judging is completed and the winners are determined. After each event is scored and the leaderboard posted, the full contents of each open source dataset (topologies and scenarios) will be released and remain available on the GO Competition Challenge 3 sandbox for testing and trial runs throughout the remainder of the competition. Entrants will have the ability to submit new software/algorithms on sandbox datasets from any previous event at any time in the competition sandbox (the sandbox may be temporarily offline directly after each event while the GO Competition Administrator is evaluating and scoring that event's submissions).

The "Challenge 3 Original Dataset (C3OD)" will be released at the start of Challenge 3 in order to allow Entrants to start developing solution methods and test their approach on the GO Competition platform. Entrants can submit software to be scored against the C3OD using the official competition platform (sandbox) at any time. Entrants will also be able to download the dataset in order to test algorithms within their own development environment.

Scores will be generated for every algorithm submitted to each competitive event 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-3/scoring.

B. Competitive Events (Scheduled for Summer 2022, Fall 2022, Winter 2023, Spring 2023)

Four competitive events will be conducted approximately three, six, nine, and twelve months into Challenge 3. The four competitive events for the OPF competition will be held utilizing new power system datasets: Challenge 3 Dataset 1 (C3D1), Challenge 3 Dataset 2 (C3D2), Challenge 3 Dataset 3 (C3D3), and Challenge 3 Dataset 4 (C3D4). ARPA-E reserves the right to add other competitive events before the end of the challenge. The datasets used throughout the GO Competition Challenge 3 may increase in size and complexity.

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 will, 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 event, 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.

There will be deadlines to register for the GO Competition Challenge 3 for Entrants wishing to participate in the competitive events; Entrants may not participate in the competitive events unless they have registered for the GO Competition Challenge 3. Once Entrants have

successfully registered for the GO Competition Challenge 3, they do not need to re-register before any subsequent event. During each competitive event, there will be a window of time in which Entrants must submit their 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 C3D1, C3D2, C3D3, and C3D4 respectively. After each competitive event, scores for each Entrant submission will be displayed on a set of competition leaderboards. The primary objective of competitive events I and 2 is to give Entrants experience using the portal for the competition and to troubleshoot any potential algorithm submission and evaluation problems in the context of a specified deadline. Challenge 3 competitive events 3 and 4 are prize events. Event 3 has smaller prizes attached to incentivize earlier, more continuous development from the competitors throughout the competition. The majority of the GO Challenge 3 prize award is reserved for Event 4, also known as the "Final Event".

Competitive Event 1: July - August 2022 (specific dates subject to change)

- **Prior to July 6th, 2022:** Entrants wishing to participate in Event 1 must submit their registration and be approved for the GO Competition Challenge 3.
- **July 6th, 2022 – July 7th, 2022:** Submission window for Event 1. Entrants participating in Event 1 must submit one software package to the GO Competition platform to be scored in Event 1.
- **August 8th, 2022:** Event 1 results and leaderboards will be released. Event 1 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 3 sandbox.

Competitive Event 2: October - November 2022 (specific dates subject to change)

- **Prior to October 3rd, 2022:** Entrants not previously registered wishing to participate in Event 2 must submit their registration and be approved for the GO Competition Challenge 3.
- **October 3rd, 2022 – October 5th, 2022:** Submission window for Event 2. Entrants participating in Event 2 must submit one software package to the GO Competition platform to be scored in Event 2.
- **November 7th, 2022:** Event 2 results and leaderboards will be released. Event 2 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 3 sandbox.

Competitive Event 3: January – February 2023 (specific dates subject to change)

- **Prior to January 9th, 2023:** Entrants not previously registered wishing to participate in Event 3 must submit their registration and be approved for the GO Competition Challenge 3.

[3] Entrants are only allowed one submission to each of Competitive 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.

- **January 9th, 2022 – January 11th, 2023:** Submission window for Event 3. Entrants participating in Event 3 must submit one software package to the GO Competition platform to be scored in Event 3.
- **February 6th, 2023:** Event 3 results and leaderboards will be released. Event 3 datasets without CEII or other proprietary information will be released for download and to the GO Competition Challenge 3 sandbox.

Competitive Event 4: March 2023 - May 2023 (specific dates subject to change)

- **March 6th, 2023:** Entrants not previously registered must submit their registration and be approved for the GO Competition Challenge 3. This is also the deadline to have any change of entrant forms submitted and approved.
- **March 13th, 2023 – March 15th, 2023:** Submission window for the Final Event. Entrants participating in Event 4 must submit one software package to the GO Competition platform to be scored in the Final Event.
- **May 15th, 2023:** GO Competition Challenge 3 results and leaderboards will be released. Final Event datasets without CEII or other proprietary information will be released for download.

Event 3 and Event 4 (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).

C. Competition Timeline: Challenge 3

The proposed Challenge 3 competition timeline is illustrated below.

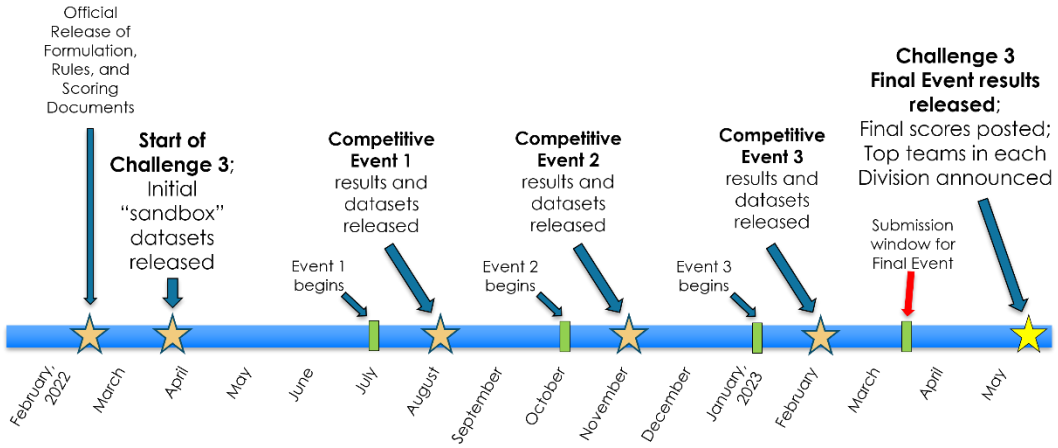

Figure 2. Challenge 3 Competition Timeline.

ARPA-E intends for the competition platform to be capable of hosting a wide range of power system algorithm research competitions. 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.