



U.S. DEPARTMENT OF ENERGY



Net Load

Forecasting Prize

\$600,000 prize seeking probabilistic models that predict future amounts of net-load

This webinar will be **recorded** and posted on HeroX



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Under "Select a Speaker," click "Same as System."
2. Listen by telephone:
Click the 'up arrow' next to the "mute" button in the bottom left corner.
Click "Switch to Phone Audio."

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- Select the 'Q&A' button at the bottom of your screen and type in your question.
- Questions may be answered live, but all questions will be answered in writing on HeroX.

Having Trouble with the Webinar?

- Technical difficulties: Chat the webinar host for additional support.
- A video/audio recording of this webinar and the slide deck will be made available

Topics

1 Net Load Forecasting Prize Background

2 Prize Overview

3 HeroX Live Demo

4 Technical Details and Scoring

5 Q&A



U.S. DEPARTMENT OF ENERGY



The American-Made program is your **fast track to the clean energy revolution**. Funded by the U.S. Department of Energy, we incentivize innovation through prizes, training, teaming, and mentoring, connecting the nation's entrepreneurs and innovators to America's national labs and the private sector.

The American Made Program is growing:



\$100M
in cash prizes and
support



40+
prizes



300+
Network
members

AmericanMadeChallenges.org



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Net Load Forecasting Prize Background

What is the Net Load Forecasting Prize?

About the Prize:

- Seeking probabilistic models that predict future amounts of net-load a day in advance of the forecast, while promoting the adoption of probabilistic forecasts and evaluation tools for such forecasts.
- This prize offers a total of up to \$600,000 in cash prizes, with three anticipated winners and three anticipated runners-up.
- Every day for four weeks (28 consecutive days), competitors will submit probabilistic net-load forecasts for each of the predetermined substations through the Solar Forecast Arbiter platform.

Prize Goals

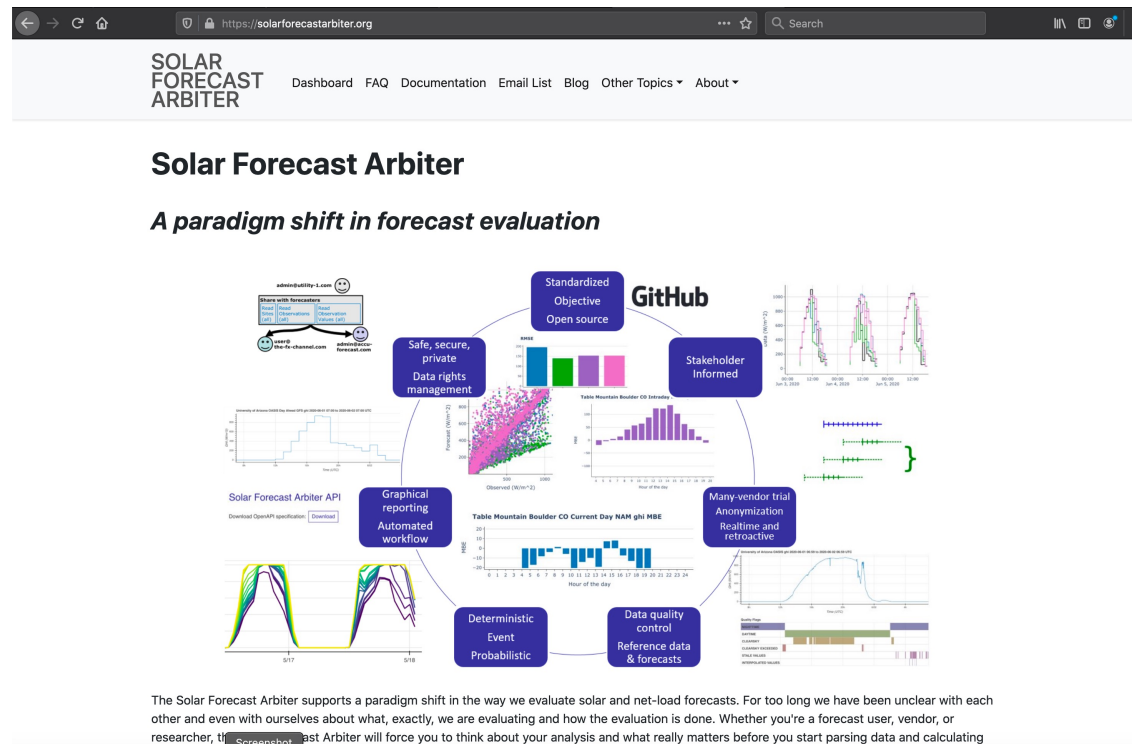
The Net Load Forecasting Prize aims to:

- (1) Increase stakeholder awareness of the state of the art in net load forecasting,
- (2) Demonstrate the feasibility of fair and high-quality evaluations of probabilistic net load forecasts using a publicly available, open-source platform, and
- (3) Promote the use of probabilistic forecast models and an industry-common evaluation platform with transparent metrics and specifications for probabilistic net load forecasts.



Solar Forecast Arbiter – Partnership with EPRI

- The Net Load Forecasting Prize will use the [Solar Forecast Arbiter \(SFA\)](#), an open-source, [cloud-ready](#) platform that facilitates the evaluation of forecasts for solar irradiance, solar power, and net load.
- As co-sponsor of the prize, EPRI will provide historical net load data for competitors to train forecasting models, as well as providing operational support for the forecast evaluation platform used during the evaluation phase of the prize.



<https://forecastarbiter.epri.com>



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Net Load Forecasting Prize Overview

Prizes to Win

The Net Load Forecasting Prize offers a total prize pool of \$600,000 in cash.

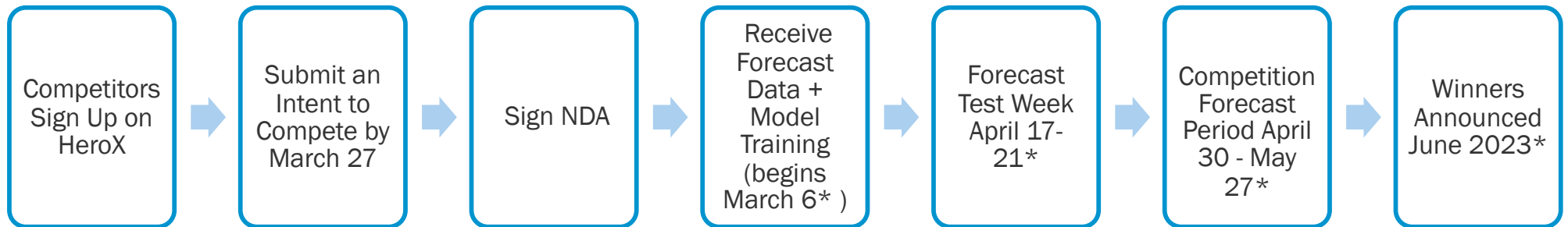
	Number of Prizes Awarded	Prizes
Winners	Up to three anticipated cash prizes	First: \$200,000 Second: \$150,000 Third: \$100,000
Runners-up	Up to three anticipated cash prizes	Fourth, fifth, and sixth each receive \$50,000

Who can compete?

- The Net Load Forecasting Prize is open to:
 - Private entities (for-profit and non-profit)
 - Non-federal government entities
 - Academic organizations
- Individuals and federal employees are not eligible to apply
- Full eligibility can be found in the [official rules](#)



Prize Process



* date anticipated

Intent to Compete HeroX Submission Package

All competitors must submit an intent to compete submission package by March 27 at 5 p.m. ET

Intent to compete form can be found on HeroX:

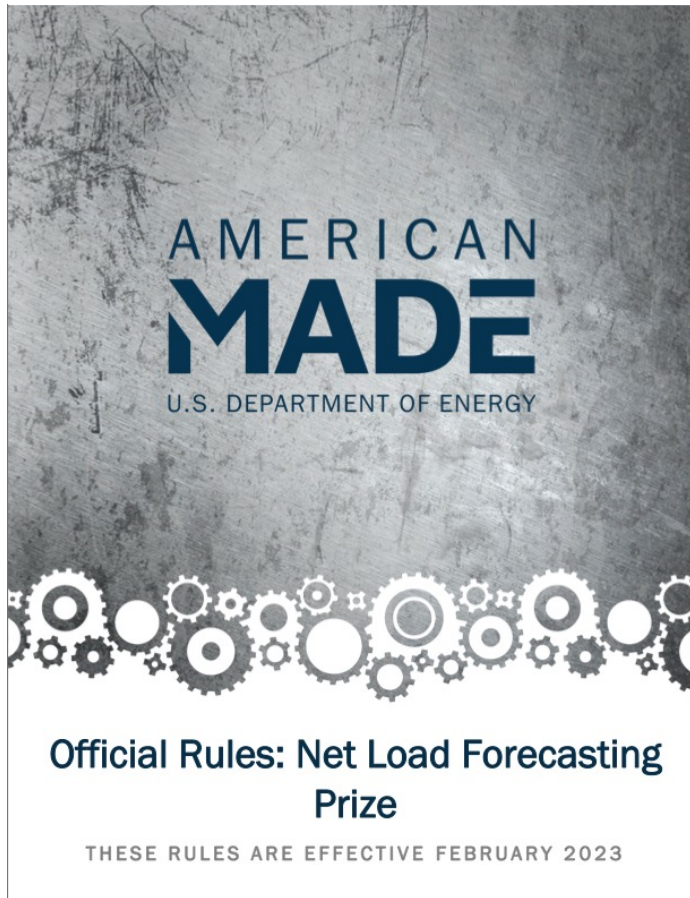
1. Go to:
[HeroX.com/net-load-forecasting](https://heroX.com/net-load-forecasting)
2. Create a HeroX Account
3. Click on “Follow”
4. Click on “Solve This Challenge”

Item	Content	Will Be Made Public	Scored
Intent to Compete HeroX Submission Package	Cover page	No	No
	One summary PowerPoint slide	Yes	No
	Intellectual property licensing agreements (if applicable)	No	No

Winner Selection Process

- Following the forecast submission competition period, DOE will review scores and take into consideration program policy factors to make the final winner determination.
 - Scores will be calculated using a **Continuous Ranked Probability Score**.
 - The CRPS score will evaluate competitors on the accuracy of their forecasts compared to a benchmark.
 - A positive skill signifies that the forecast is more accurate than the reference, or benchmark, forecast (in this case, the persistence ensemble forecast, described in [Official Rules](#)).
- Winners will be publicly announced in June 2023 (anticipated)

Read the Rules



Official rules of the
Net Load Forecasting Prize
are available online

<https://americanmadechallenges.org/challenges/net-load-forecasting/docs/Net-Load-Forecasting-Rules.pdf>

Or

[Net Load Forecasting HeroX Page](#) > Resources Tab

Important Dates

- Program Announced and Registration Opens: February 7, 2023
- Intent to Compete HeroX Submission Package and SFA Platform Registration Deadline: March 27, 3 p.m. ET
- Solar Forecast Arbiter Technical Webinar for Registered Competitors: April 12, 12:30 p.m. ET
- Solar Forecast Arbiter Test Week (via SFA platform): April 17, 2023 thru April 21, 2023
- Forecast Submission Period (via SFA platform): April 30, 2023 until May 27, 2023
- Winners and Awards Announced: June 2023 (anticipated)

Register

Feb 7 – March 27

Test

April 17 - 21

Forecast

April 30 – May 27

Win!

June 2023

February

March

April

May

June



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HeroX Live Demo

HeroX.com/net-load-forecasting



Follow along





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Net Load Forecast Technical Details and Scoring



Solar Forecast Arbiter

- Solar Forecast Arbiter (SFA) is an open-source, cloud-ready platform that facilitates evaluation of forecasts for solar irradiance, solar power, and net load.
- The Solar Forecast Arbiter is hosted and managed by the Electric Power Research Institute (EPRI).

SOLAR
FORECAST
ARBITER

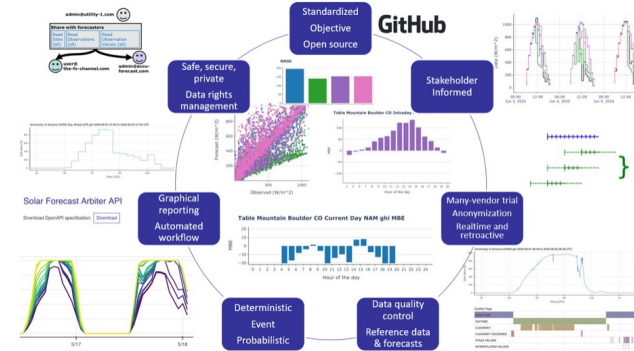
[Dashboard](#) [FAQ](#) [Documentation](#) [Blog](#) [Other Topics](#) [About](#)

Note: The Solar Forecast Arbiter is now under the stewardship of the Electric Power Research Institute (EPRI). For more info, contact forecastarbiter@epri.com.



Solar Forecast Arbiter

A paradigm shift in forecast evaluation



The Solar Forecast Arbiter supports a paradigm shift in the way we evaluate solar and net-load forecasts. For too long we have been unclear with each other and even with ourselves about what, exactly, we are evaluating and how the evaluation is done. Whether you're a forecast user, vendor, or researcher, the Solar Forecast Arbiter will force you to think about your analysis and what really matters before you start parsing data and calculating statistics. This can be an unfamiliar and uncomfortable process. Stick with it and we think you'll see the value in this approach. **So what's the value? Clear, transparent communication of the skill of a precisely-defined forecast.**

The Solar Forecast Arbiter is open source to its core. The code is open source, the deployment configurations are open source, and the code is openly developed on GitHub. This leads to evaluations of solar irradiance, solar power, and net-load forecasts that are impartial, repeatable and auditable. Dive into the code at github.com/SolarArbiter.

This project page contains reference materials describing project use cases, metrics, reference data, and more under the Other Topics menu. Visit the [Solar Forecast Arbiter Dashboard](#) to browse data and evaluate forecasts. Documentation for the Dashboard, API, and core analysis package is available at the [Documentation](#) page.

For a quick introduction to the project, see this [ESIG blog post](#) or this short [presentation recording](#). Additional information may be found on the

Probabilistic Forecast Requirements

Competitors must submit day-ahead probabilistic forecasts to the SFA that meet the following requirements:

- Issue time of day: 10 a.m. local at each site
- Lead time to start: 14 hours
- Run length: 24 hours
- Interval length: 1 hour
- Interval label: Ending
- Interval value type: Average
- Variable: Net load (% of peak)
- Percentiles: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100.

The forecasted net load percentiles for each of the 24 hourly intervals beginning with hour 01 on day+1 through hour 24 on day+1 must be sent to SFA in the required format before 10 a.m. in the applicable forecast location. Forecasts will be [time-stamped](#) with the end time of each interval (i.e., hour 01 = 00:01 until 01:00; hour 02 = 01:01 until 02:00; ... ; and hour 24 = 23:01 until 00:00).

A final site list will be posted on [HeroX](#).

Data and Test Week

- We anticipate providing competitors with net-load data from 4-6 sites across the U.S.
- Data for forecast model training is expected to be available on the Solar Forecast Arbiter on or around March 6, 2023.
 - Competitors can only gain access to training data after they have submitted their Intent to Compete package and their countersigned NDA is accepted.
- There will be a week provided (anticipated to last from April 17 to April 21, 2023) for competitors to test uploading forecasts to the SFA platform.



Leaderboard

- Throughout the competition, we expect to maintain a public, anonymized leaderboard.
- Teams will be able to see how they are performing against other teams.
- Following the competition, we will only reveal the names of winning teams.

Energy, Environment & Resources

Stage: Won Prize: \$375,000

MY ENTRIES

Summary Timeline Updates 22 Forum 11 Teams 112 Entries **Leaderboard** Resources FAQ

Leaderboard

Kona, Hawaii Seattle, Washington Hanford, California Salt Lake City, Utah Table Mountain Boulder, Colorado
Goodwin Creek, Mississippi Bondville, Illinois Titusville, Florida Sterling, Virginia Millbrook, New York

1	Eager Cub (as of 3/13/22, 5 PM MDT)	0.265 (1st) crps	▼
2	Suited Hound (as of 3/13/22, 5 PM MDT)	0.246 (2nd) crps	▼
3	Ready Rabbit (as of 3/13/22, 5 PM MDT)		

American-Made SOLAR FORECASTING PRIZE

LEADERBOARD RANKINGS

Anonymous Team Name		Rank Change From Last Week
1 st	Prompt Molly	▲ 0
2 nd	Chief Gibbon	▲ 0
3 rd	Sunny Donkey	▲ 0
4 th	Suited Hound	▲ 0
5 th	Pretty Wren	▲ 0
6 th	Ready Rabbit	▲ 0
7 th	Intent Mite	▲ 0
8 th	Giving Imp	▲ 0
9 th	Viable Moray	▲ 0
10 th	Eager Cub	▲ 0

CRPS - Forecast Scoring

The scoring of forecasts will proceed as follows:

- The **Continuous Ranked Probability Score** (CRPS) is a score that is designed to measure both the reliability and accuracy of a probabilistic forecast.
- The CRPS will be calculated for each set of the 28 submitted forecasts—e.g., $CRPS_{i,k}$ for the i -th location and the k -th competitor. The Forecast Skill will be calculated against the CRPS of the baseline persistence ensemble forecast, which will be designated as $CRPS^{PEF}_i$ for the i -th location:

$$Forecast\ Skill_{i,k} = CRPSS_{i,k} = 1 - \frac{CRPS_{i,k}}{CRPS^{PEF}_i}$$

- Competitors' final forecast scores will be calculated as follows: competitors' Forecast Skill values will be averaged across all locations and then rounded to two decimal points. This value will be multiplied by 100. The result of this multiplication will be the competitor's total.

Get Started Today!

- Follow the Challenge on HeroX:
<https://www.herox.com/net-load-forecasting>.
- Read the [Rules](#).
- **Submit your Intent to Compete by March 27, 2023, at 3 p.m. ET.**
- Email Solar.Prize@nrel.gov with any questions.

