U.S. DEPARTMENT OF ENERGY
SOLAR DISTRICT CUP
COLLEGIATE DESIGN COMPETITION

Informational Webinar Will Begin Shortly

September 10, 2020

Shamara Collins, U.S. Department of Energy (DOE)
Jackie Petre, Joe Simon, & Sara Farrar, National Renewable Energy Laboratory (NREL)

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY
SOLAR ENERGY TECHNOLOGIES OFFICE

NREL Transforming ENERGY

"We loved being a part of this challenge and enjoyed every moment of teamwork and learning. … We loved the chance to jump start our journeys in solar energy."
–Class of 2020 Student

Webinar Will Begin Shortly

"[My favorite aspect was] reflecting after the final presentation and realizing that in September, I did not know what a transformer even was, while now I can confidently explain value stacking to my peers."

–Class of 2020 Student

Webinar Will Begin Shortly

What's one word to describe the Solar District Cup?

–Class of 2020 Participants

Webinar Will Begin Shortly

“This competition gave [my classes] much more structure, realism and excitement. This was truly a God-send. This was one of four projects in my senior capstone and I saw the skills from this competition that I wouldn't have focused on so much bleed into their other projects for their improvement.”

–Class of 2020 Faculty

Webinar Will Begin Shortly

"The professionalism of presentations by the interdisciplinary academic teams showing the strategic breadth and technical depth of final recommendations will indeed inform our next steps as we work to achieve our 2030 climate goals."

–Class of 2020 District Use Case Representative

Webinar Will Begin Shortly

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Class of 2021 Informational Webinar

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Webinar Housekeeping

Two Options for Audio (select audio mode):

1. Listen through your computer:
   Select the “mic and speakers” button on the right-hand audio pane display.
2. Listen by telephone:
   Select the "telephone” option in the right-hand display, and a phone number and PIN will display.

Panelists – reminder to mute your audio device when not presenting.

To Ask a Question:

Select the ‘questions’ pane on your screen and type in your question.

Having Trouble with the Webinar?

- Technical difficulties - contact the GoToWebinar Help Desk at: 888-259-3826.
- A video/audio recording of this Webinar and the slide deck will be made available.

U.S. DEPARTMENT OF ENERGY
SOLAR DISTRICT CUP
COLLEGIATE DESIGN COMPETITION

Welcome!

Shamara Collins
Science and Technology Policy Fellow
Solar Energy Technologies Office
U.S. Department of Energy

U.S. DEPARTMENT OF ENERGY | Office of ENERGY EFFICIENCY & RENEWABLE ENERGY
SOLAR ENERGY TECHNOLOGIES OFFICE

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Our Agenda

1. Introduction
2. About the Competition
3. Participation Expectations
4. Rules Overview
5. Divisions & District Use Cases
6. Training Provided
7. How to Register Your Team
8. What's Next
9. Closing Q&A

"The Solar District Cup was an immersive and technically challenging event that allowed our future innovators to work with actual region-specific utility data. Allowing students to navigate real world engineering, financial and social challenges associated with renewable technologies is educationally invaluable."

–Class of 2020 Student

Solar District Cup

A MULTIDISCIPLINARY COLLEGIATE COMPETITION THAT CHALLENGES STUDENT TEAMS TO **DESIGN** AND **MODEL DISTRIBUTED ENERGY SYSTEMS** FOR MULTIPLE BUILDINGS ON A LOCAL ELECTRICAL DISTRIBUTION NETWORK—ON A CAMPUS, ACROSS A DEVELOPMENT, OR IN AN URBAN DISTRICT.

About the Competition

- Helping to prepare students for the renewable-energy workforce
- Creating forward-thinking designs for optimized campus or urban district distributed energy systems
- Engaging students across engineering, finance, urban planning, sustainability, and other disciplines
- Reimagining how electric energy is generated, managed, and used in urban areas.

Overview

WHO
is involved

WHAT
you'll do

WHY
this competition

HOW
and what you win!

Who We Are: The Organizers

Shamara Collins
DOE

Joe Simon
NREL

Sara Farrar
NREL

Travis Lowder
NREL

Aadil Latif
NREL

Jackie Petre
NREL

Who Evaluates You: Judges

Class of 2020 judges from industry (Class of 2021 will have new & returning judges)


Dana Redden
Solar Concierge


Toyah Barigye
The Solar Foundation


Bakary Coulibaly
SolAmerica Energy


Aram Shumavon
Kevala, Inc.


Mike Coddington
NREL


Nick Heine
EPRI


Brion Fitzpatrick
Nexamp


Christopher Lord
CapIron Inc.


Kristen Fornes
ENGIE


Keith Cronin
SunHedge


Evan Riley
White Pine Renewables

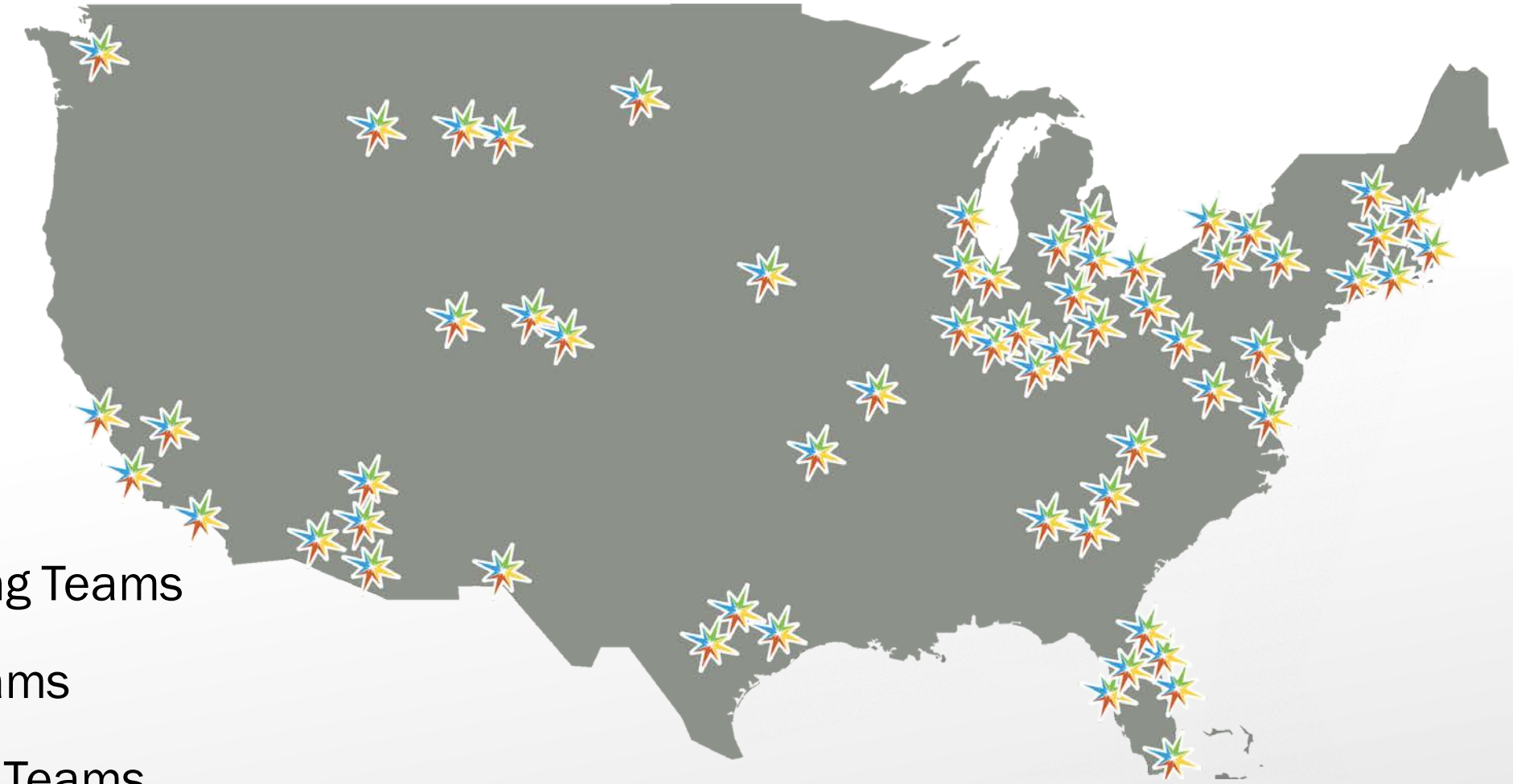

Sumit Ray
University of Michigan


Jonathan Gritz
JBG SMITH


Patrick Chavez
New Mexico State Univ.


Robert Koester
Ball State University

Who Participated in the Class of 2020

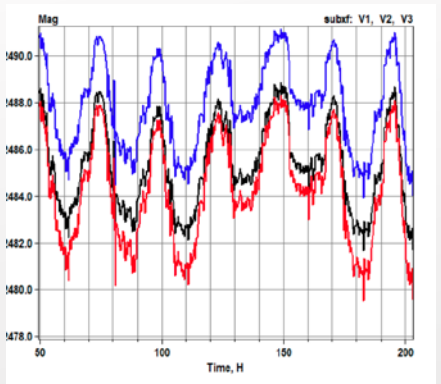


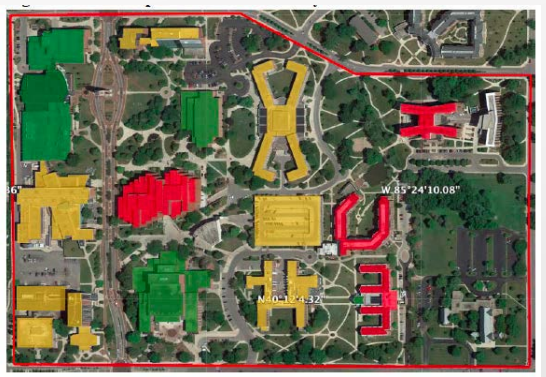
- 61 Participating Teams
  - 35 Finalist Teams
  - 26 Competing Teams

What You'll Do

Assume role of solar + storage developer to create:

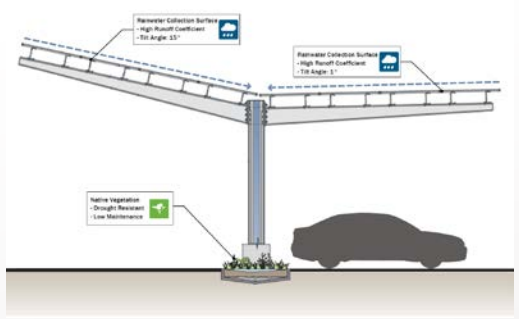
- Project proposal
- Conceptual system design
- Distribution system impact analysis
- Financial model
- Development plan.

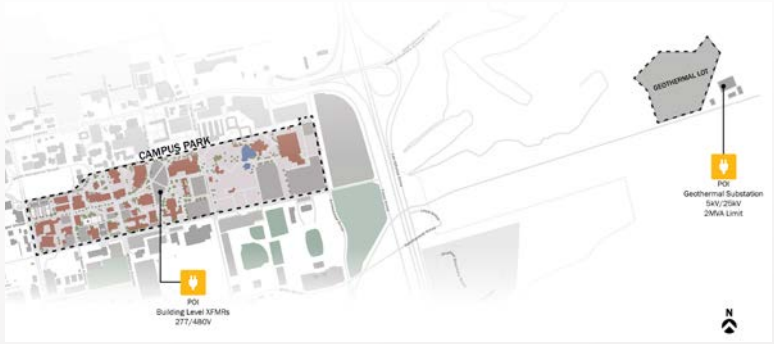




Why We're Conducting the Competition

- Help address workforce development gaps in the energy industry
- Showcase innovative solutions for increased penetration of distributed energy generation at the campus or district scale
- Inspire industry to think differently about optimized district energy systems.





How and What You Win

- Design a solar + storage system for a campus or district that maximizes energy offset and financial savings
- Gain valuable experience with real-life examples of innovative renewable energy design and engagement with industry
- Win a trophy and national recognition!

SOLAR TODAY *Magazine*

Going for Gold: The Race for the Solar District Cup

Students from across the country competed in a new collegiate design competition that challenged teams to rethink real-world energy solutions while preparing to enter the solar workforce.

About Participation

WHO
participates

WHEN
to engage

WHY
participate

HOW
to compete

Who You Are: Eligibility

- A team composed of at least 3 students
- Enrolled student
  - Accredited U.S.-based collegiate institutions
  - At least one class and pursuing a degree
- Any level college student
  - Challenge aimed at upper-level undergraduate
- Multidisciplinary teams highly encouraged

Engineering	Business or finance
Urban planning	Construction management
Communications	Sustainability or environmental policy
Marketing	Architecture

- Faculty advisor and/or mentor
  - Recommended (not required).

Why Participate?

- Build experience with innovative renewable energy design
- Develop real-world solutions that shape the future of solar energy
- Network with industry for career connections
- Enhance education and build resume
  - Senior design or capstone project
  - Elective or independent study course credit
  - Part of class curriculum or thesis
  - Seminar topic
  - Student interest club
  - Extracurricular activity.

Free Training & Resources

- HeatSpring learning platform
  - Solar District Cup specific training webinars
  - “HeatSpring Solar Executive MBA” content
  - Office Hours with industry experts
  - Training videos for specific tools.

heatspring

SOLAR DISTRICT CUP

8-MODULE ONLINE COURSE

ASSIGNMENT 1 / 12

Lesson 1: Solar District Cup Deep Dive - Joe Simon (NREL) (40:58) (40:56 minutes)

Module 1 - Solar District Cup Specific Training (Required)

- Lesson 1: Solar District Cup Deep Dive - Joe Simon (NREL) (40:58) Video (40:56 minutes)
- Lesson 1: Solar District Cup Deep Dive - Joe Simon (NREL) (PDF) Download (.pdf)
- Lesson 2: Conceptual System Design Training - Dr. Andy Walker (NREL) (54:23) Video (54:22 minutes)
- Lesson 2: Conceptual System Design Training - Dr. Andy Walker (NREL) (PDF)) Download (.pdf)
- Lesson 3: Distribution System Impact Analysis Training - Dr. Aadil Latif (NREL) (29:10) Video (29:09 minutes)

SOLAR EXECUTIVE MBA TRAINING

ENROLL AND START TODAY

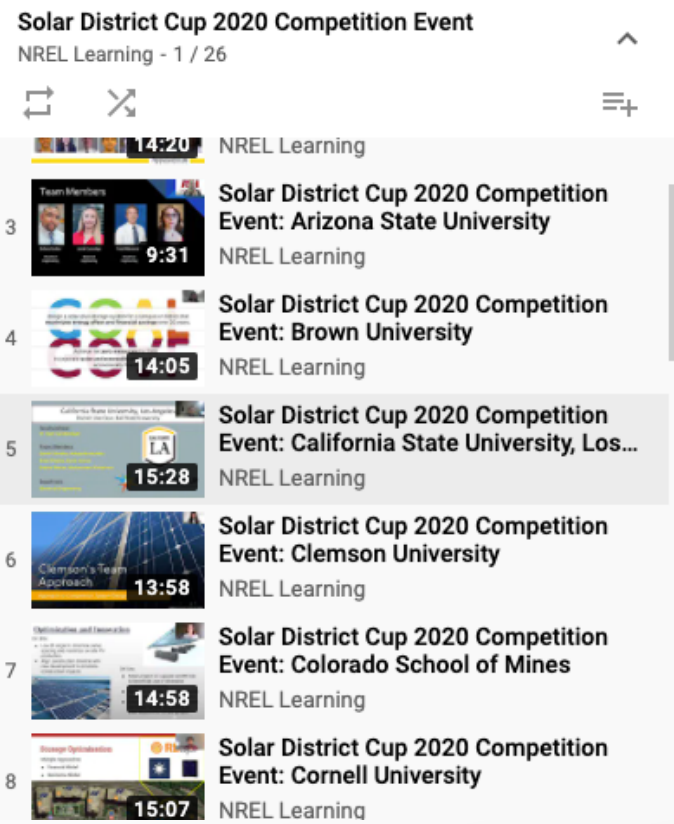
NEXT SESSION: OCT 12 - NOV 22, 2020

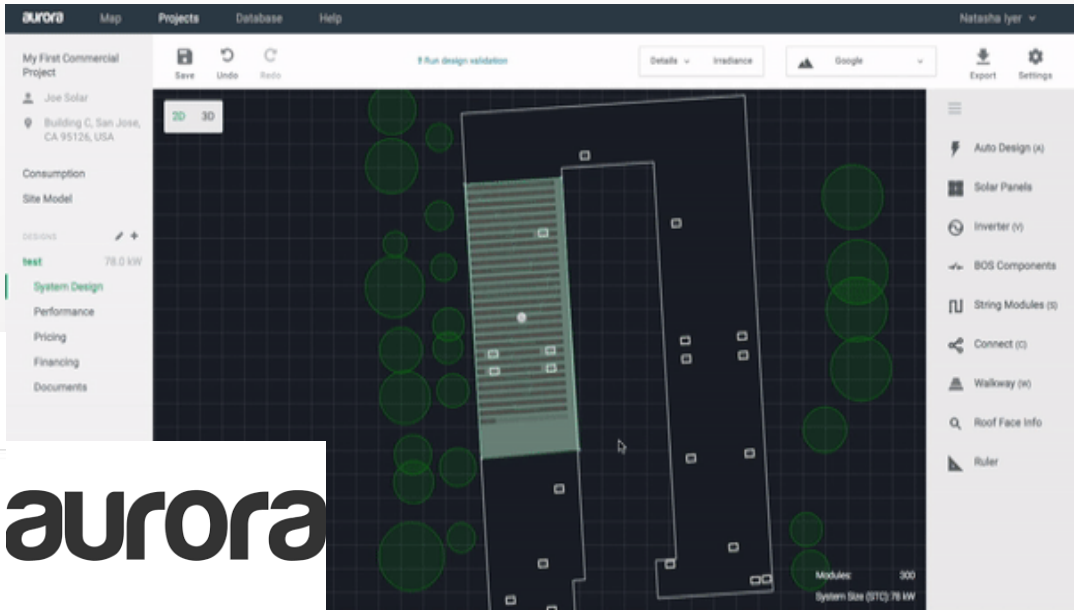
* Enroll now to access all course materials
* Instructor present during session dates
* Complete the course anytime

Price $1,995

Free Training & Resources (continued)

- Modeling and analysis tools
- Solar Power International conference
- Class of 2020 competing team presentations and final deliverable packages.





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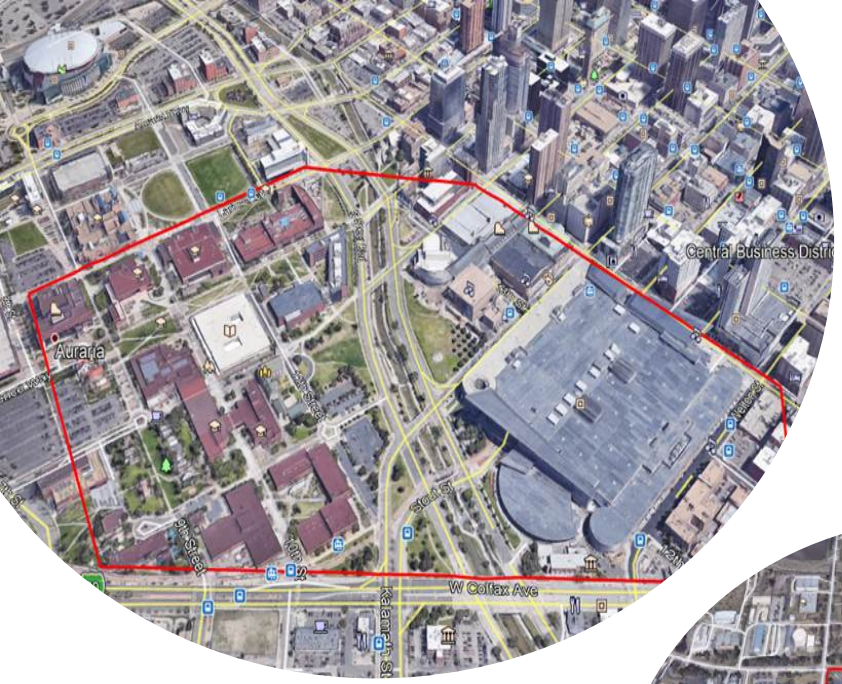
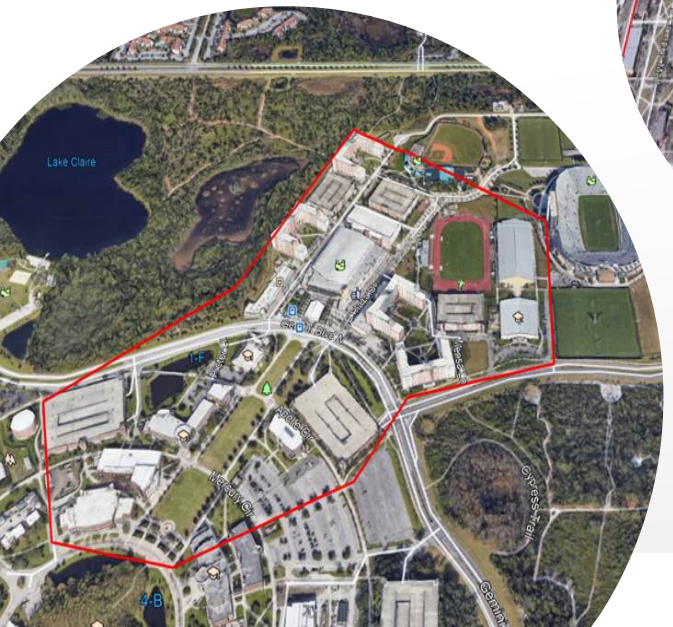
How to Compete: Solar District Cup 2021 Rules



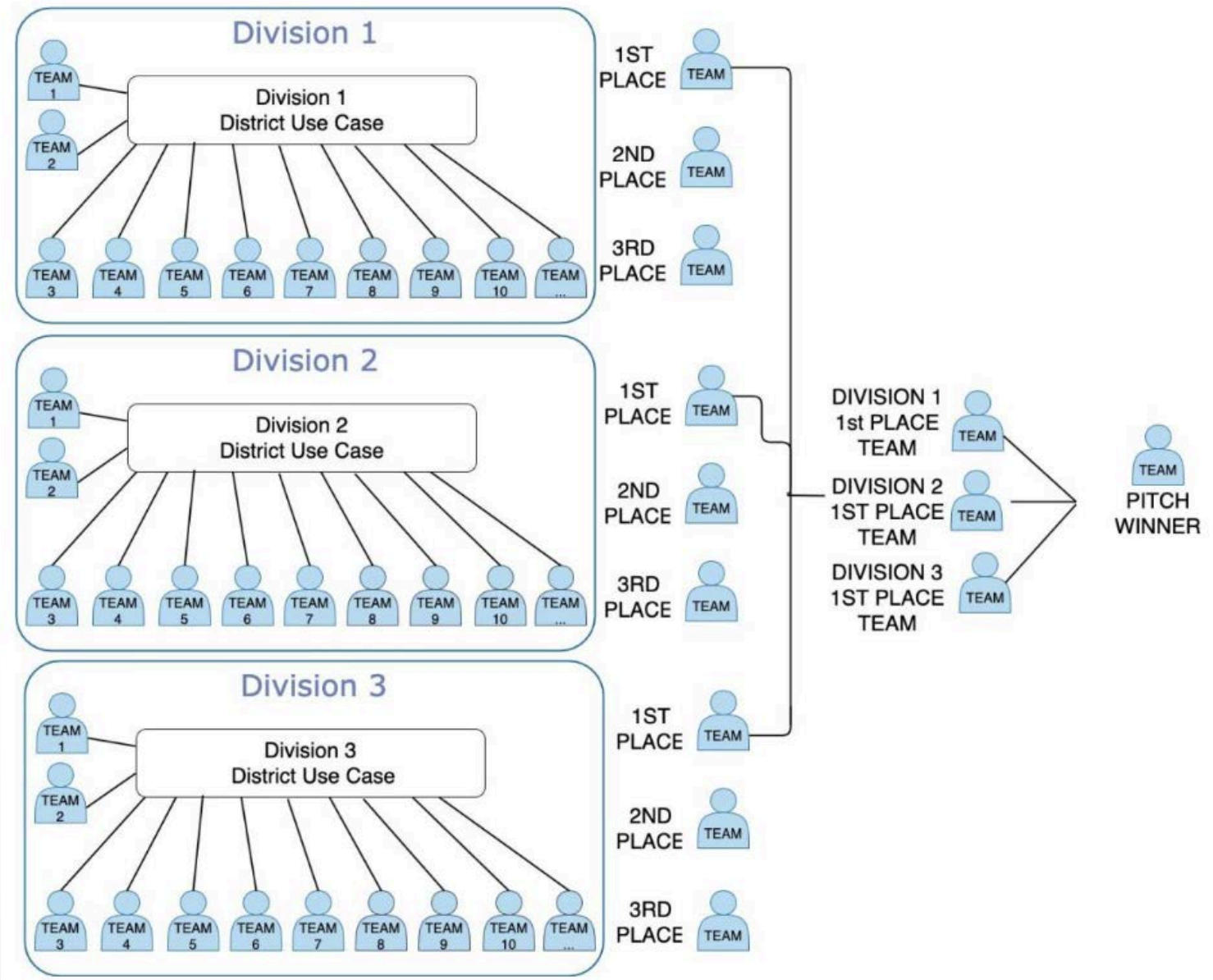


2021 District Use Cases

- City of Denver/Auraria Higher Education Center
- University of Nebraska-Lincoln East Campus
- University of Central Florida Campus.

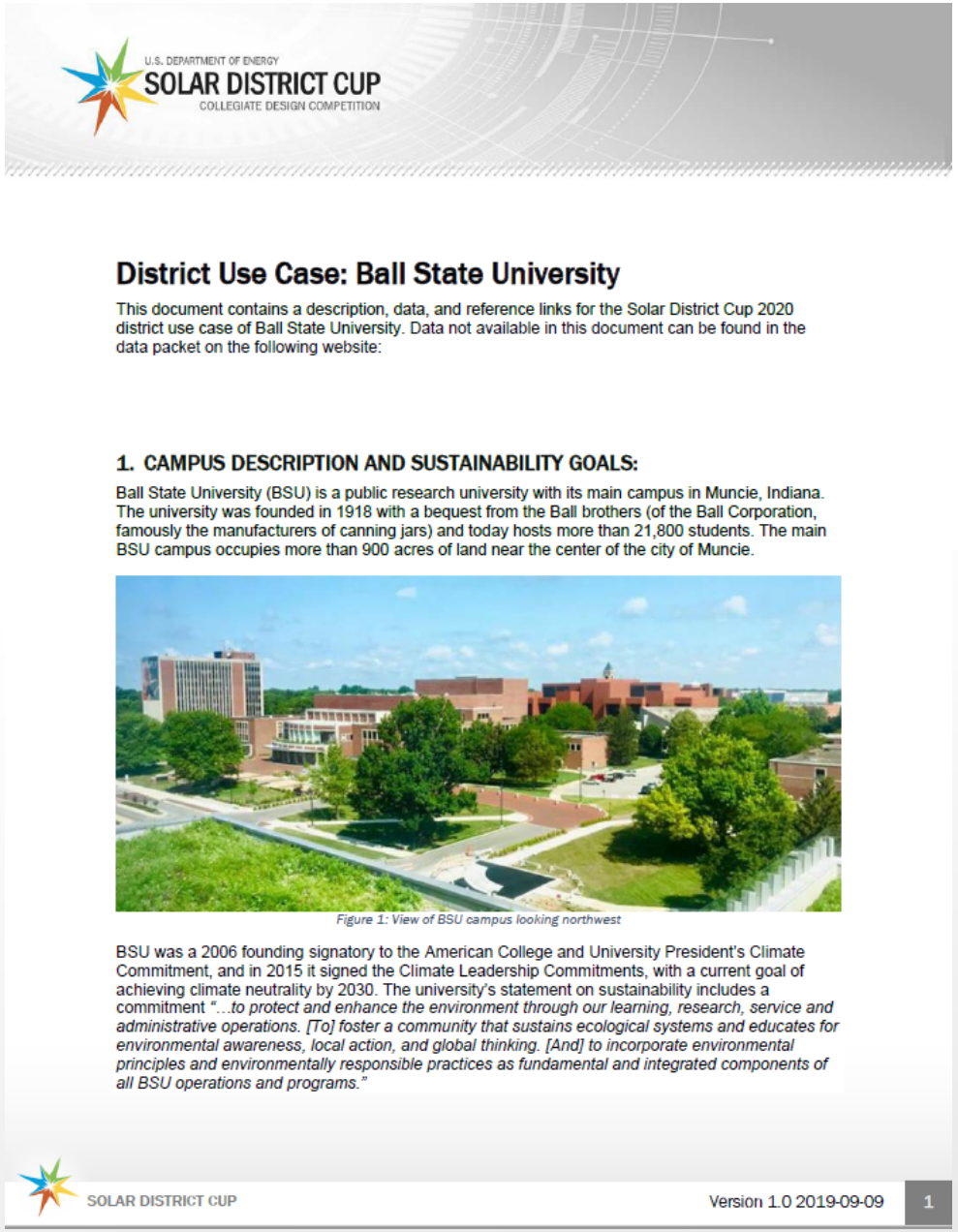
Divisions

- 3 divisions
- Teams assigned to divisions by the competition organizers
- Winners of each division selected by judges
- Proposal pitch winner selected at final event.



Use Case Profile

- Available in a secure online data room at start of competition
- Serves as the “challenge document,” outlining each district use case and the task for students
- Profile and data room contain several datasets to complete the challenge, including:
  - Annual interval energy usage for multiple buildings (.xlsx)
  - District Google Earth map with identifiers (.kmz)
  - Distribution system and substation models (OpenDSS).



U.S. DEPARTMENT OF ENERGY
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District Use Case: Ball State University

This document contains a description, data, and reference links for the Solar District Cup 2020 district use case of Ball State University. Data not available in this document can be found in the data packet on the following website:

1. CAMPUS DESCRIPTION AND SUSTAINABILITY GOALS:

Ball State University (BSU) is a public research university with its main campus in Muncie, Indiana. The university was founded in 1918 with a bequest from the Ball brothers (of the Ball Corporation, famously the manufacturers of canning jars) and today hosts more than 21,800 students. The main BSU campus occupies more than 900 acres of land near the center of the city of Muncie.

Figure 1: View of BSU campus looking northwest

BSU was a 2006 founding signatory to the American College and University President’s Climate Commitment, and in 2015 it signed the Climate Leadership Commitments, with a current goal of achieving climate neutrality by 2030. The university’s statement on sustainability includes a commitment *“…to protect and enhance the environment through our learning, research, service and administrative operations. [To] foster a community that sustains ecological systems and educates for environmental awareness, local action, and global thinking. [And] to incorporate environmental principles and environmentally responsible practices as fundamental and integrated components of all BSU operations and programs.”*

SOLAR DISTRICT CUP Version 1.0 2019-09-09 1

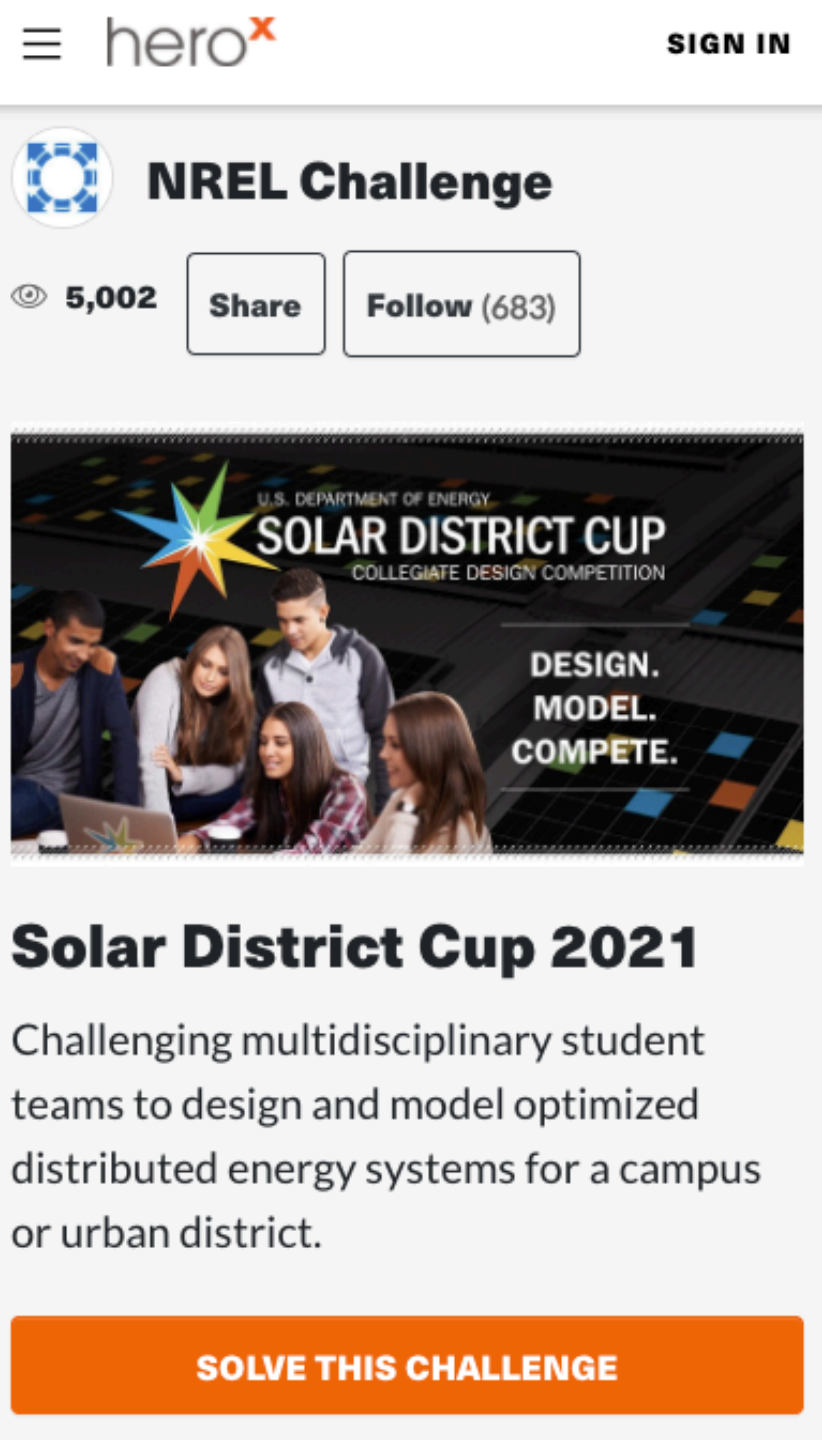
"I remember thinking how extraordinarily lucky I was to be part of a team this passionate and willing to overcome the obstacles thrown our way the past few months. I really loved my team, they inspired me, and helped me grow. My favorite aspect of Solar District Cup were definitely the connections.

"The industry relationships, professors that were just as excited about this as we were and became friends in addition to mentors, and of course the peers that became lifelong friends who I wouldn't have known otherwise."
–Class of 2020 Student

Convinced?

How to Register a Team

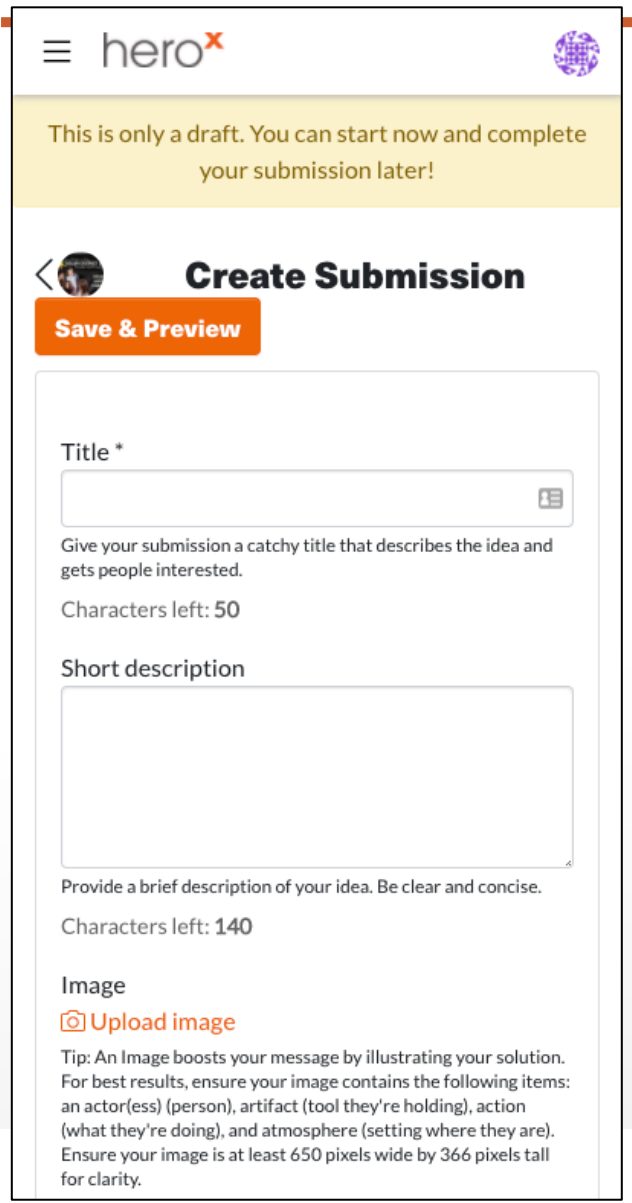
1. Go to the Challenge page at www.herox.com/solardistrictcup
2. Choose “Solve this Challenge.” This indicates your interest in competing; it is not a commitment (yet)
   a. Sign-in or create a HeroX account if you don’t already have one (and remember your password)
   b. Agree to the Terms of Use
   c. Confirm your email address
   d. Accept the Challenge-Specific Agreement
   e. Indicate “Would you like to compete as a team?”
      i. Yes, I want to create my own team (with email addresses of invited team members)
      ii. Yes, I want to join a team
      iii. No, I want to compete individually (can create or join other teams later)
   f. Form a team with one Team Captain.

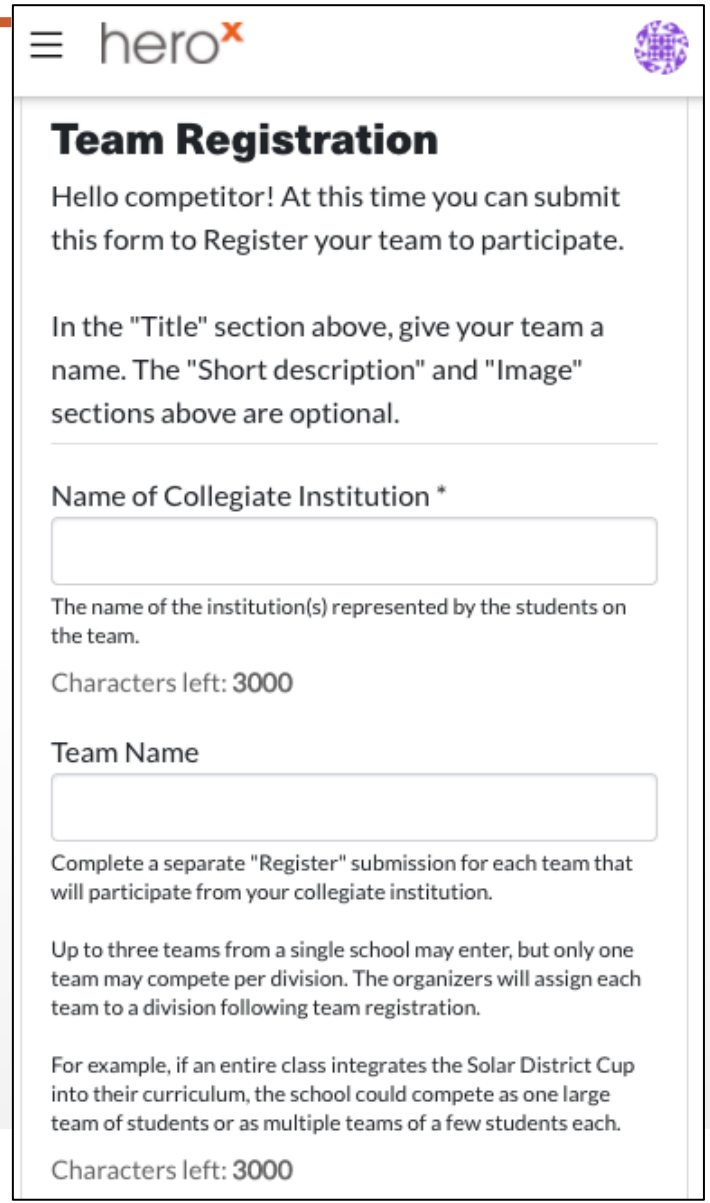


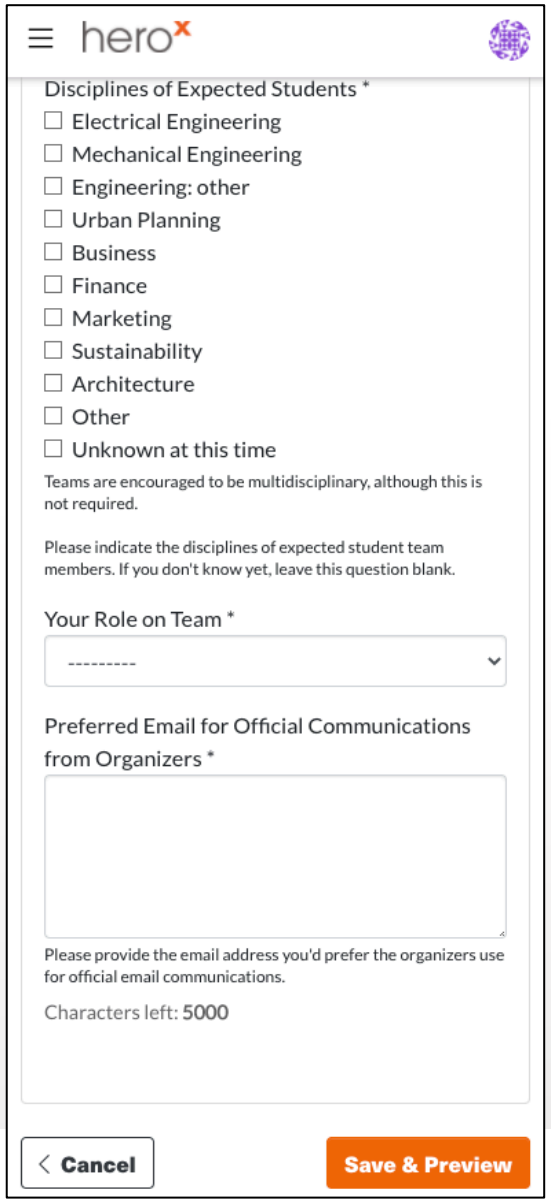
How to Register a Team (by Sept. 29)

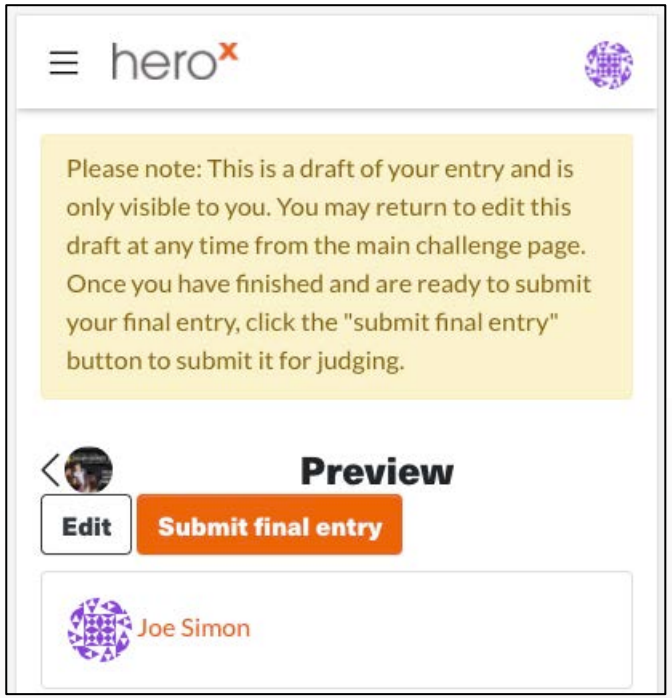
3. By the registration deadline, one person from each team must click "Begin Entry" and then submit a Register entry on HeroX to complete registration. This step is when you identify your collegiate institution and expected team makeup. There is no cost to submit a Register entry.
4. Registration entries received by the deadline are deemed participating teams. All teams who successfully complete a Register entry and meet eligibility are accepted.
5. Divisions are assigned by the competition organizers following receipt of a complete Register entry and by the date on which participating teams are announced.
6. Multiple teams from a single school may submit a Register entry, but only one team may compete per division. Three divisions are expected.
7. Only one person per team may submit a Register entry. Other members join that registered team via HeroX. Team members may be added or removed from a team at any time. Once you have registered a team, you can invite additional members using HeroX.

How to Register a Team (continued)









What Happens After Registration?

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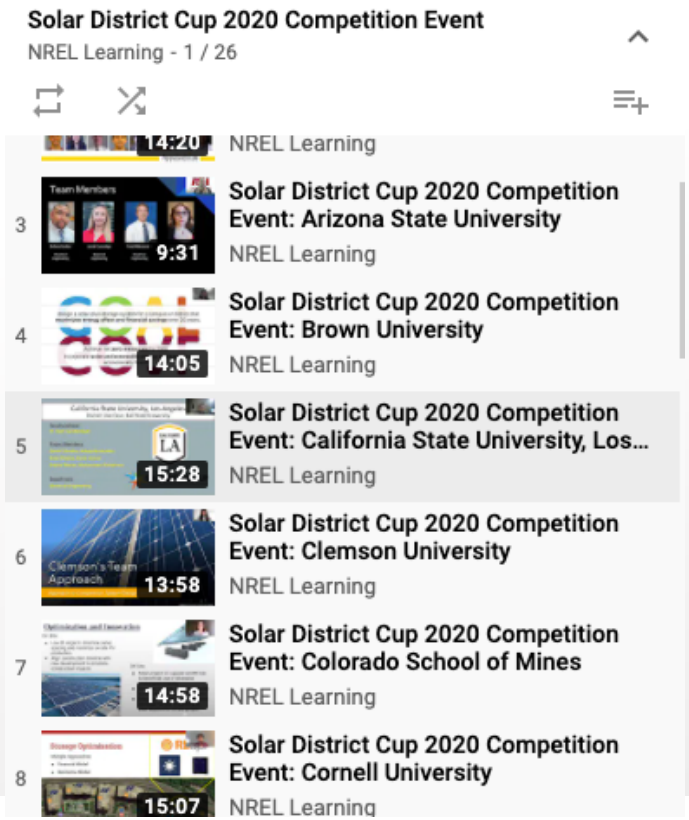
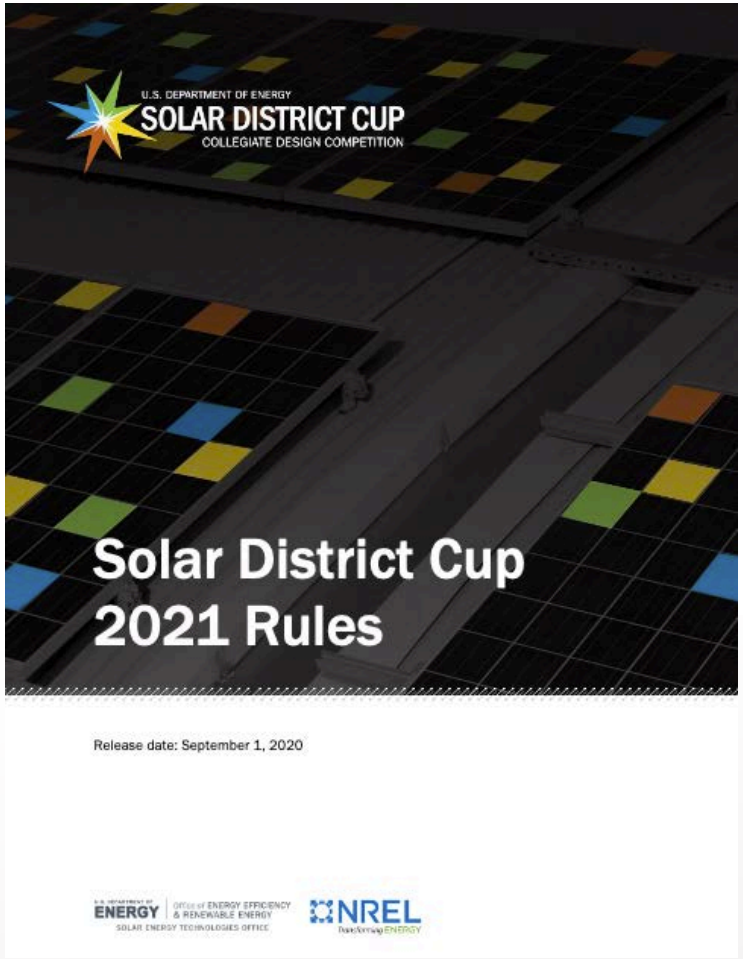
What to Do After Registration and Before Teams and Divisions Announced

- Read the Rules published on HeroX Solar District Cup Resources
- Watch recordings of the 15-minute project presentations of the Class of 2020 competing teams, available on NREL's Learning Channel in this YouTube Playlist.
- Sign-up for HeatSpring learning
  - Curriculum Support
  - Starting Monday, September 21
- Build a team
  - Recruit team members
  - Identify faculty advisor
  - Find mentors.





heatspring

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Warm-Up Workshop: October 8

Warm up your team and design solutions with this workshop, featuring:

- Deep dive into the Rules
- District use case review
- Introduction to the Class of 2021 participating teams
- Top 10 tips to take home glory
- Learning from the pros: guest speakers

Expect 3-hour video conference (with break time)

More details to come!

Also watch for announcement to attend the Solar Power International Virtual Tradeshow, October 21–22.

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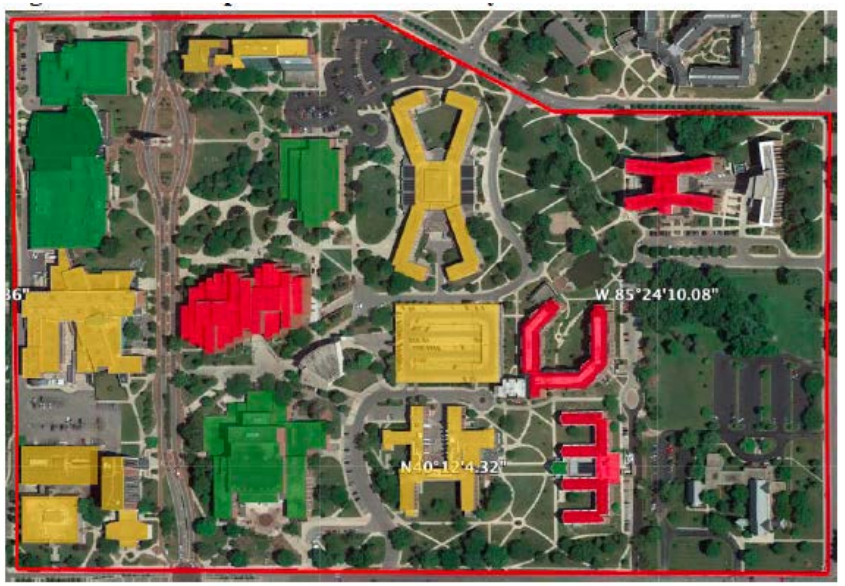
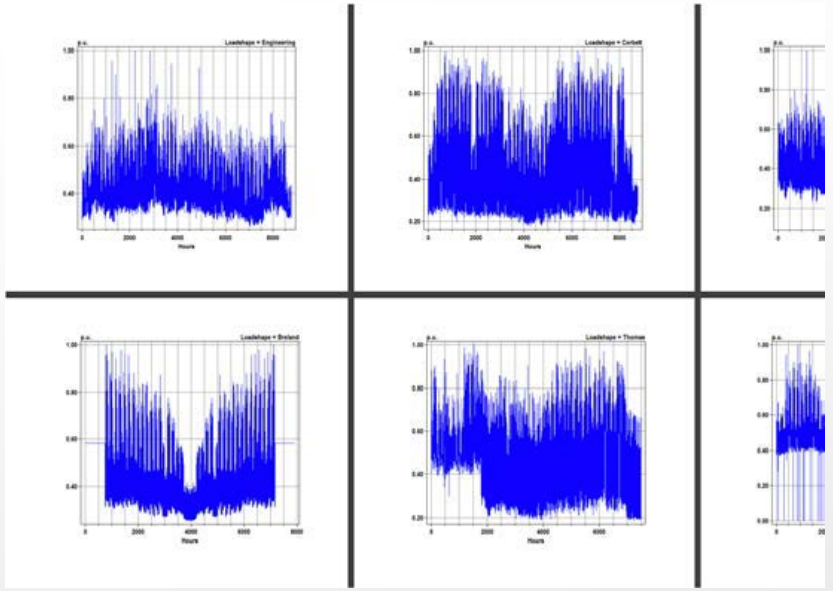
What to Submit

Progress Deliverable Package: Solar Systems

- Executive summary
- Conceptual system design
- Distribution system impact analysis
- Financial analysis
- Development plan.





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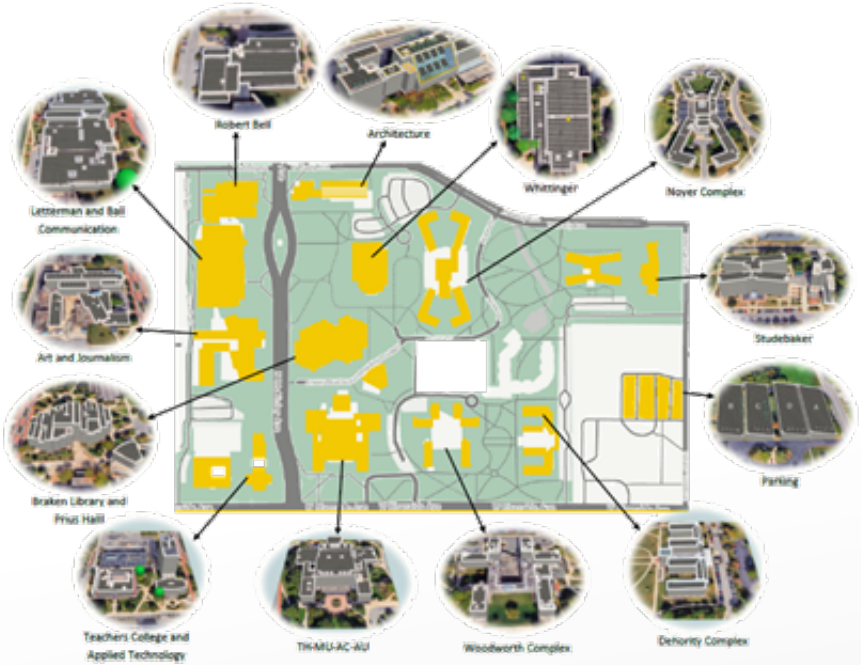
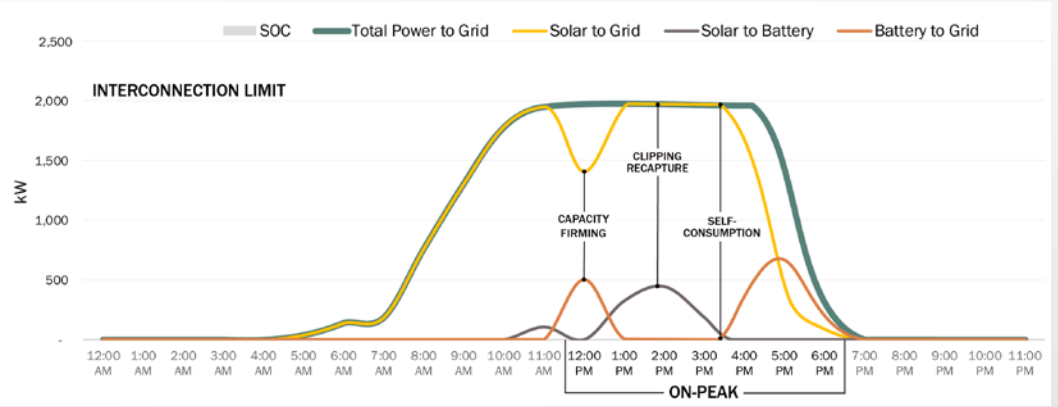
What to Submit

Final Deliverable Package: Solar plus battery energy storage systems

- Project proposal
- Conceptual system design
- Distribution system impact analysis
- Financial analysis
- Development plan.

Project proposal–pitch presentations





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Final Competition: April 25 & 26, 2021

- Present to division judges on Sunday, April 25
- Winners announced and pitch presentations by division 1st-place teams on Monday, April 26.

SOLAR DISTRICT CUP 2020 SCHEDULE

PDT	MDT	CDT	EDT	Sunday, April 26		
8:00 a.m.	9:00 a.m.	10:00 a.m.	11:00 a.m.	Teams Login and Check-In with Division Coordinator		
9:00 a.m.	10:00 a.m.	11:00 a.m.	12:00 p.m.	Welcome, Logistics Overview, and Judge Introductions for each division		
			DIVISION	Crystal Parks	New Mexico State University	Ball State University
9:30 a.m.	10:30 a.m.	11:30 a.m.	12:30 p.m.	Illinois Institute of Technology	Indiana University–Purdue University Indianapolis	Western Washington University
10:00 a.m.	11:00 a.m.	12:00 p.m.	1:00 p.m.	Hanover College	Northern Arizona University	New Mexico State University
10:30 a.m.	11:30 a.m.	12:30 p.m.	1:30 p.m.	Appalachian State University	Clemson University	Arizona State University
11:00 a.m.	12:00 p.m.	1:00 p.m.	2:00 p.m.	BREAK (30 minutes)		
11:30 a.m.	12:30 p.m.	1:30 p.m.	2:30 p.m.	The University of Virginia	University of Cincinnati	California State University, Los Angeles
12:00 p.m.	1:00 p.m.	2:00 p.m.	3:00 p.m.	Colorado School of Mines	University of Colorado Boulder	The Ohio State University
12:30 p.m.	1:30 p.m.	2:30 p.m.	3:30 p.m.	Dartmouth College	Marquette University	Georgia Institute of Technology
1:00 p.m.	2:00 p.m.	3:00 p.m.	4:00 p.m.	BREAK (30 minutes)		
1:30 p.m.	2:30 p.m.	3:30 p.m.	4:30 p.m.	Cornell University	Embry-Riddle Aeronautical University	Florida International University
2:00 p.m.	3:00 p.m.	4:00 p.m.	5:00 p.m.	Alfred University	Brown University	Creighton University
2:30 p.m.	3:30 p.m.	4:30 p.m.	5:30 p.m.		West Virginia University	University at Buffalo, The State University of New York

"My favorite moment was being able to watch other teams present. Seeing what other teams came up with and the creativity that this project inspired was truly amazing." –Class of 2020 Student

Next Steps: Recap

RECRUIT

Team members, faculty advisor, and mentors

REGISTER

Your team on HeroX by September 29

READ

The Rules to plan your participation

LEARN

Using the resources provided by the Organizers

DESIGN

Your solutions!

U.S. DEPARTMENT OF ENERGY
SOLAR DISTRICT CUP
COLLEGIATE DESIGN COMPETITION

Questions?

"It was my great honor to participate in the Solar District Cup, this challenge was a wonderful learning experience for me, and I believe we created some great results."
–Class of 2020 Student

"Overall excellent program. I really enjoyed it and will recommend to any student interested in renewable energy."
–Class of 2020 Judge

"The educational experience is quite positive, especially for a project-based course like senior design."
–Class of 2020 Faculty

Tag & follow on social:

#SolarDistrictCup

Learn more, sign up for our newsletter, and register a team at:

energy.gov/solardistrictcup

solardistrictcup@nrel.gov

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