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

Class of 2024–2025 Rules

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

NREL Transforming ENERGY

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Acronyms, Abbreviations, and Definitions

AHJ	authority(ies) having jurisdiction
AI	artificial intelligence
DOE	U.S. Department of Energy
DSS	distribution system simulator
IRR	internal rate of return
NPV	net present value
NREL	National Renewable Energy Laboratory
PPA	power purchase agreement
PV	photovoltaic
REopt®	Renewable Energy Integration and Optimization
SAM	System Advisor Model
SDC	Solar District Cup
SETO	Solar Energy Technologies Office
Participating team	Team that submits a registration entry via HeroX received by the September deadline
Finalist team	Team that submits a Progress Deliverable Package that demonstrates progress consistent with the prescribed evaluation statements *or* team that submits a registration entry via HeroX received by the January deadline
Competing team	Team that submits a Final Deliverable Package and Presentation File by the April deadline
District	Distinct area of developed land containing a group of mixed-use buildings served by a distribution feeder

1. COMPETITION OVERVIEW

Welcome to the U.S. Department of Energy (DOE) Solar District Cup Collegiate Design Competition!

To support DOE's ongoing work addressing structural employment gaps for professionals in the energy industry, the Solar District Cup challenges multidisciplinary collegiate student teams to develop forward-thinking approaches for campus or district solar-plus-storage systems that inspire students and professionals alike—and then design and model those systems.

The competition engages students across engineering, finance, urban planning, sustainability, and other disciplines or degree programs to reconsider how electric energy is generated, managed, and used in a geographic district. Students assume the role of a solar-plus-storage developer to produce a conceptual design and financing proposal as well as analyze electric distribution grid interactions for a district use case. For this competition, "campus" and "district" are distinct areas of developed land containing a group of mixed-use buildings served by a distribution feeder. The competition organizers provide the teams with district use cases—including energy use data for multiple buildings, electrical infrastructure, and the district master plan—to serve as the basis for the solutions the teams develop in the challenge. Continuing in the Class of 2024–2025, student teams may identify their own defined district of electrical loads and distribution for the competition.

Each team competes against other teams in one of multiple divisions. Each division is structured around a district use case. Each division's judging panel selects winning teams by evaluating the final deliverables and live presentations. The strongest submissions provide innovative solutions that maximize the district's energy offset at lowest cost while integrating aesthetic, infrastructure, and community considerations.

The Solar District Cup is designed to inspire students to develop new career opportunities, learn industry-relevant skills, engage with the professional marketplace, and prepare to lead the next generation of the distributed solar energy workforce. As competitors, students:

- Gain experience with innovative renewable energy design
- Develop real-world solutions that shape the future of solar energy
- Engage with industry professionals to forge relationships and connections that can help participating students' transition to the solar energy workforce upon graduation
- Compete to earn a trophy and national recognition.

The Solar District Cup invites participation by teams of at least three students enrolled in accredited U.S.-based collegiate institutions. In this case, "collegiate institution" refers to any school of postsecondary or higher education, including but not limited to two-year schools (such as community colleges), technical colleges, four-year colleges and universities, and graduate schools. There is no cost to register for or participate in the Solar District Cup, including the final online competition event, and participating team members receive complimentary passes to industry conferences associated with the competition. Following registration, teams receive notification of acceptance on a rolling basis up to the registration deadlines.

Competition organizers support student team success by providing free educational webinars on solar system design, modeling, and solar project development; providing access to industry-leading tools; and facilitating mentorship. Learn more at www.energy.gov/solardistrictcup.

Register to compete at www.herox.com/solardistrictcup.

Summary Timeline

The Solar District Cup Class of 2024–2025 is either a full academic year (two-semester or three-academic-quarter) or spring semester (winter/spring academic quarters) project, with student participation starting in fall 2024 or early winter 2025 and culminating in spring 2025.

- April 29, 2024—Competition announced
- May 23, 2024—Team registration opened
- August 15, 2024—Informational webinar
- August 19, 2024—Rules published
- August 29, 2024, 5 p.m. ET—Deadline for registered team members to request code for complimentary registration to the RE+ 2024 conference (Sept. 9–12, Anaheim, CA)
- August 30, 2024—District use case profiles and associated data made available. Starting Aug. 30, district use case divisions assigned to student teams within one week of their registration.
- September 26, 2024, 5 p.m. ET—Deadline for teams starting in the fall semester/quarter to complete registration. To qualify for the "bring your own district" division, teams must register by this date.
- October 2, 2024—Announcement of participating teams starting in fall semester/quarter
- November 21, 2024, 5 p.m. ET—Deadline for receipt of progress deliverable package from teams starting in the Fall, to receive feedback on rules compliance and design progress
- December 19, 2024—Progress deliverable package feedback provided
- January 16, 2025—Deadline for new winter/spring teams to complete registration
- January 22, 2025—Finalist teams announced
- April 10, 2025, 5 p.m. ET—Deadline for receipt of final deliverable package from all finalist teams
- April 17, 2025, 5 p.m. ET—Deadline for receipt of presentation files from all finalist teams
- April 19, 2025—Competing teams present projects by video conference. Live video attendance and live presentation by at least one student team member from each competing team is required (no prerecorded presentations). Only students enrolled during all or a portion of the competition timeline may present to judges at the final competition event.
- April 21-22, 2025 —Division winners announced. First-place winners of each division present in the Project Pitch event; Project Pitch winner announced.

Background

Rapid advancements in solar electric generation and battery electric energy storage technologies, along with U.S. tax incentives, have resulted in decreasing costs and increasing rates of deployment. Increasing deployment has raised concerns about land utilization and impacts on the electric grid. At the same time, preparation for careers in these technology applications—particularly at the nexus between them—has limited existing postsecondary curricula.

Although the solar industry has significantly matured during the last decade, additional opportunities exist to integrate solar-plus-storage solutions at the district scale. With innovation and careful integration, property owners and utilities alike can realize the benefits of more resilient, cost-effective, and sustainable distributed energy sources.

As stated in the DOE Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office (SETO) Multi-Year Program Plan, SETO provides research, development, demonstration, and deployment assistance for solar energy. SETO accelerates the advancement and deployment of solar technologies in support of an equitable transition to a decarbonized energy sector by 2050, starting with a decarbonized electricity system by 2035. To encourage the rapid development and growth of the U.S. solar industry, SETO has set a 2025 goal of creating a well-supported and diverse solar workforce that meets the needs of the industry and of underserved communities and employs at least 300,000 workers.

DOE has a history of supporting workforce development through competitions focused on project-based learning (e.g., Solar Decathlon, Collegiate Wind Competition, EcoCAR). Student competitors gain experience with solving relevant industry challenges that prepare them for successful careers in solar and related energy fields, benefiting from mentorship, training, collaboration, and networking opportunities. The competition supports DOE's ongoing work to help industry address structural employment gaps through comprehensive workforce development activities that simultaneously provide innovative solutions for partner districts' consideration and district-level ideas that inspire industry members. The Solar District Cup encourages collaboration between academia and industry. The program seeks to establish public-private partnerships and demonstrate corporate and nonprofit industry co-sponsorship.

2. COMPETITION PROCESS

Introduction

The Solar District Cup challenges collegiate student teams to design and model distributed energy systems for a campus or district, then present those designs to a panel of industry professionals. The strongest teams are often multidisciplinary, including students from mechanical, civil, or electrical engineering; business or finance; urban planning; construction management; engineering technology; communications; or sustainability degree programs. A campus or district is a defined area of developed land containing a mixed-use group of buildings served by a local electrical distribution feeder. The systems proposed by students shall integrate solar photovoltaic (PV) generation, battery electric energy storage, and other distributed technologies and capabilities within the district's existing energy sources, uses, and infrastructure.

The winning teams in each division of the Solar District Cup receive a certificate and national recognition. Additionally, one team is identified by a panel of industry professionals as the Project Pitch winner. All student competitors gain valuable experience in innovative renewable energy design, working with real-life examples. Competitors are provided free access to leading industry software, an opportunity to present to nationally respected judges, and connections with industry mentors.

For this competition, the organizers either assign a team a district use case or enable a team to compete with a district they have separately identified. Each team develops a solution using the data, plans, and goals of the district, which enables students to work on a real-world project with actual energy load, utility rate, and site data while developing distributed energy solutions. These use cases are developed with input from district partners to provide real-world constraints and considerations. Continuing in the Class of 2024–2025, student teams may identify their own defined district of electricity load and site data. The solutions the teams develop provide insights that could inform the partner districts for future developments of distributed energy resources.

The competition organizers host a series of online informational webinars that provide information and guidance about the competition rules, deliverables, and judging criteria to help all teams succeed. Competition organizers also support student team efforts through educational webinars on solar and battery system design, modeling, financial analysis, and project development. Additionally, through a partnership with RE+ events, registered team members receive access to the educational, poster, and trade show sessions of the national and regional RE+ conferences. At the conclusion of the competition, student teams present their solutions to judges via video conference, where winners are also announced.

Goal

The goal for each team is to design solar-plus-storage systems for a campus or district that maximizes energy offset at lowest cost while integrating aesthetic, infrastructure, and community considerations. Competition teams analyze electric distribution grid hosting capacity and assume the role of renewable energy system developers to produce a power purchase agreement (PPA), solar lease, and/or cash purchase proposal for their division's district.

How To Enter

1. Go to the Challenge page at www.herox.com/solardistrictcup. Send any questions about HeroX to solardistrictcup@nrel.gov.
2. Create a HeroX account if you don't already have one, including activating your account by clicking the verification link sent to your email, or sign in, and then choose "Solve this

Challenge." You'll need to accept the "Solar District Cup 2025 Competitor Agreement" to get started. This indicates your interest in competing; it is not a commitment.

3. If you know the email addresses of your team members, or if you're joining an already established team, you can choose those options, but otherwise, just choose, "No, I want to compete individually." You can set up your team at a later date, before you submit your team entry.

- By the registration deadline, the team captain must click ",” fill out the necessary form items, then choose "Save & Preview." You then must click "Submit Final Entry" on HeroX to complete the registration. This step is when you identify your collegiate institution and expected team makeup, which may change after submission. There is no cost to register. Note that you can edit and resubmit your entry as many times as you like until the registration deadline.

4. Registration entries by team members at an eligible collegiate institution that are received by the September or January deadline are deemed participating teams. All teams that successfully complete a registration entry and meet eligibility requirements are accepted.
5. For teams that request an assignment to an organizer-provided district use case, the competition organizers assign divisions no more than one week following the receipt of a complete registration entry after August 23, 2024 and up until the date on which participating teams are announced.
6. Up to five teams from a single school may submit a registration entry, with each team assigned to compete in a different division.
7. Only one person per team may submit a registration entry. Other members can 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. The team captain on HeroX should click "submit as a team" when completing the entry form.

How To Win

Each team designs its own solution for the assigned division's district use case or their own identified district use case. The strongest concepts are those that maximize the district's energy offset at lowest cost while integrating aesthetic, infrastructure, and community considerations. Winners are selected based on the teams' average scores, as determined by a panel of three to five judges who evaluate the competition entries by reviewing the deliverable packages and presentations. The first-place winners of each division compete against each other to determine a Project Pitch winner.

Divisions and District Use Cases

The Solar District Cup has multiple divisions. Each division has a set of teams that compete against each other.

Each team is tasked to design a solution for a use case of an existing mixed-use district or campus interested in increased distributed energy development. For most divisions, the competition organizers provide each team with the details of their division's district use case. Continuing in the Class of 2024–2025, there is a division in which student teams identify their own defined district use case of electricity load and site data.

A district use case is a defined geographic area served by one or more electrical distribution feeders, with a collection of spaces potentially available for PV installation, including but not limited to building rooftops, façades, open land, parking, agricultural dual use, bodies of water, and other facilities or spaces.

The use case for each district typically includes the following data sets:

- Sustainability goals of the district
- A map designating the boundaries of the campus or district in which student teams are confined to designing their systems
- Twelve consecutive months of interval load (energy consumption) data (interval refers to timesteps such as 15 minutes or one hour) for several buildings that are within the district and connected to the electricity distribution feeder system
- Electric utility rate schedule
- Base-case information for distribution system impact analysis
- A development master plan, land ownership status, list of local zoning codes and permitting requirements for land use
- Battery storage challenge (included at the final deliverable package phase for teams competing for the full academic year)
- A PV system hosting capacity heat map for the distribution system serving the campus or district.

The assigned district use cases might have selected data simulated or otherwise changed by the organizers for the competition. Information provided to teams is intended to be used only by the team members. Any data provided by the competition organizers is not for redistribution to the public or for use outside of the competition.

What To Submit

Teams participating for a full academic year are expected to submit two deliverables: a progress deliverable package and a final deliverable package. Teams that submit the progress deliverable package receive feedback from the organizer staff. Student teams participating in the spring semester (or winter/spring quarters) compete within their own division and submit only the final deliverable package. These packages are summarized in Tables 1, 2, and 3 and are described in greater detail in the appendices. Competition deliverables are submitted via the online HeroX competition platform.

Deliverable packages are considered to be on time if they are received by the respective due dates and times, as indicated on HeroX. Late submissions may be considered on a case-by-case basis and are marked as such when distributed to the reviewers or judges.

Progress Deliverable Package—Solar PV System

A complete submission for the progress deliverable is the design and analysis of interconnected solar PV systems that maximize energy offset and savings during the system's contracted (if PPA or lease) or useful (if cash purchase) lifetime for the district use case. Teams that demonstrate progress consistent with the prescribed evaluation statements become finalists. Teams do not compete against each other to become finalists.

The competition organizers evaluate the progress deliverable package using the evaluation statements in Table 1. Organizer staff reviewers evaluate the degree to which they agree or disagree with the individual evaluation statements. Written feedback regarding rules compliance and progress deliverable completion is provided to all teams that submit a progress deliverable package.

Table 1 comprises the content requirement summaries and corresponding evaluation statements for the progress deliverable package. The required file format of each component of the progress deliverable package is indicated in brackets. Each deliverable must use the information from the team's district use case and the assumptions and resources cited in Appendix A. Additional details about the required components of the deliverable package are provided in Appendices B and C.

Additionally, the submission form on the HeroX platform asks teams to answer questions about team makeup, approach to the work done to date, and planned work for winning the competition in the next stage. These additional questions are not judged, but they are used to enable continuous program improvement by the organizers.

For the student teams competing in a division for a full academic year, with a district use case assigned by the competition organizers:

- A progress deliverable package should include the four content sections summarized in Table 1. More details and guidance are provided in Appendices B and C.

For the student teams competing in the “bring your own district” division for a full academic year:

- A progress deliverable package should include a district use case profile following the guidelines provided in Appendix F.
- A progress deliverable package should also include the four content sections summarized in Table 1. More details and guidance are provided in Appendices B and C.

For the student teams competing in a division for the spring semester (winter/spring quarters) only, with a district use case assigned by the competition organizers:

- A progress deliverable package is not expected.

Table 1. Progress Deliverable Package Content and Evaluation Statements

Content	Evaluation Statement
1. Executive Project Summary	
A project overview, including PV system sizing; potential distribution system impacts; PPA, lease, and/or purchase price with financial performance; and development plan highlights [PDF].	The team communicates its solution clearly, concisely, effectively, and professionally with proper spelling and grammar.
2. Conceptual System Design	
A. Layout and specifications for the PV systems proposed on one or more rooftops, façades, parking lots, bodies of water, or ground areas within the district [PDF]. B. Estimated hourly energy production output for each system during annual period [Excel spreadsheet]. C. Descriptive report demonstrating the team's understanding of how the proposed PV system interconnection might impact the distribution network [PDF].	A. Conceptual system design (narrative, drawings, specifications) is complete and reasonable for PV system location(s) and project goals. B. Estimated energy output is provided, based on system description and climatic variables, and information is clearly conveyed. C. Report describes the possible distribution impacts of integrating their proposed PV system, system constraints that may limit PV hosting capacity, and the possible impact of interconnection costs.
3. Financial Analysis	
Financial model [Excel spreadsheet(s)] comprising: - A project financial model that uses the production data, PPA or lease price, and other inputs to calculate investor internal rate of return (IRR) at a net present value (NPV) of $0. - Customer savings analysis that demonstrates economics for the system offtaker (the district) during the contractual (if PPA or lease) or useful life (if cash purchase) of the system.	Financial model has a complete set of reasonable inputs, competently models cash flows, has a PPA or lease price that is reasonable by market standards, and has a rate of return that would be acceptable to investors.
4. Development Plan	
A project development plan [PDF] comprising: - Site plan for conceptual system design, including applicable local ordinances and site constraints - Construction plan to procure necessary permits and comply with local building codes. - Utility interconnection plan to meet local utility requirements, if grid connected. Distributional energy equity impacts of new solar development within or surrounding the district.	The building and site plan demonstrates alignment with the district master plan, zoning, and other land use or building restrictions. The construction plan includes a timeline and demonstrates compliance with permitting and relevant codes. The utility interconnection plan includes a timeline and demonstrates compliance with electrical and engineering requirements. Potential distributional energy equity impacts of the proposed design, construction, and operation are identified.

See Appendices B and C for the progress deliverable package content and formatting requirements.

Final Deliverable Package—Solar-Plus-Battery Energy Storage System

The final deliverable package includes a complete conceptual design, modeling, and analysis of a proposed **interconnected solar-plus-battery-energy-storage system(s) that maximizes energy offset at lowest cost for the division district,** given its use case parameters and conditions.

The competition organizers provide teams with a battery challenge for each district use case at the beginning of the final deliverable package phase, for which they must design a battery system and model its performance given one or more use cases. For the PV-only systems, teams are ***required*** to integrate their own input assumptions into the Excel-based financial model provided by the competition organizers and submit the completed spreadsheet in the deliverable packages. For the battery systems, students may use the Renewable Energy Integration and Optimization (REopt®) web tool, the System Advisor Model™ (SAM), or another tool of their choice to model performance and economics.

Student teams must include a customer savings analysis in the final deliverable package in addition to the project financial model. Student teams must perform a customer savings analysis for the solar-plus-battery-storage system as well as for each PV system they've proposed in their district.

Tables 2 and 3 provide a content requirement summary for the final deliverable package. The required file type for each component of the final deliverable is indicated in brackets. Additional details on the required content and formatting of the deliverable package sections are provided in Appendices B, D, and E.

For the student teams competing in a division for a full academic year, with a district use case assigned by the competition organizers:

- Submit the four content sections summarized in Table 2. More details and guidance are provided in Appendices B and D.

For the student teams competing in the "bring your own district" division for a full academic year:

- Submit a district use case profile following the guidelines provided in Appendix F.
- Submit the four content sections summarized in Table 2. More details and guidance are provided in Appendices B and D.

For the student teams competing in the spring semester (winter/spring quarters), with a district use case assigned by the competition organizers:

- Note: The Winter/Spring timeline division challenges student teams to model solar photovoltaic (PV) systems only (without battery energy storage).
- Submit the four content sections summarized in Table 3. for solar-only designs (do not include battery energy storage systems). More details and guidance are provided in Appendices B and E.

Table 2. Final Deliverable Package Content and Judging Statements for Full Academic Year with Solar Plus Storage

Content	Judging Statements for Evaluation
1. Project Proposal	
A. Proposal document that encapsulates and summarizes deliverable sections 2–4. The proposal should make a case for why the proposed solar system and developer team are the best choice for the district [PDF]. B. Presentation that demonstrates the team's approach to the system design, operation, and innovation [PowerPoint and live presentation].	The proposal presents a clear and concise summary of the project. Both the proposal and the presentation make a compelling case for why the proposed solution is the best choice for the district given its needs, constraints, and goals.
2. Conceptual System Design	
A. Layout and specifications for PV system(s) with battery energy storage system(s) added, including summary description of results and underlying assumptions used in the analysis [PDF]. B. Estimated hourly energy production output during annual period, including battery charge and discharge cycles [Excel spreadsheet]. C. Description of how the proposed PV and storage system impacts the electrical distribution network, including interconnection costs and impact mitigation.	Conceptual system design proposes creative and innovative solution that responds to district goals, observes site and financial constraints, and demonstrates excellent analysis, system design, optimal battery use strategy, and understanding of the PV hosting capacity with distribution constraints.
3. Financial Analysis	
Financial model [Excel spreadsheet(s)] comprising: - Two project financial models: one for the solar systems (Excel-based financial model) and one for the solar-plus-storage system (battery analysis software). The solar system model outputs an IRR, and the solar-plus-storage model should output a contract price (e.g., $/kWh, $/month). - Customer savings analysis that demonstrates economics for the system offtaker (the district) during the contractual (if PPA or lease) or useful life (if cash purchase) of the system.	Financial analyses communicate a strong grasp of renewable energy project finance. Input assumptions are justifiable, calculations are correct, battery operation strategy delivers maximum economic benefits, and pricing and rate of return are attractive to the market. The outputs of both the battery analysis and the customer savings analysis are included as tabs in the Excel-based financial model.

Table 2. Final Deliverable Package Content and Judging Statements for Full Academic Year with Solar Plus Storage (cont.)	
Content	**Judging Statements for Evaluation**
4. Development Plan	
Identification of authority (ies) (AHJ) having jurisdiction over local land use, building codes, and utility interconnection rules. A project development plan [PDF] composed of: - A building and site plan demonstrating the conceptual system design, including any proposed rezoning or other planning entitlements, is in alignment with the campus master plan. - A construction schedule and development plan to implement the design, including: • Necessary construction and land use permits • Compliance with applicable local building codes • Potential risks to successful deployment - Approach to addressing potential concerns and questions of district decision makers and surrounding community members. - An Interconnection plan demonstrating compliance with utility requirements. - Distributional energy equity impacts of new distributed solar development within or surrounding the district.	Proposed development plans including building, site, construction, and interconnection, add significant value in a comprehensive, actionable, and feasible approach for the district, AHJ, and surrounding community members with distributional equity.

See Appendices B and D for the final deliverable package content and formatting requirements.

Table 3. Final Deliverable Package Content and Judging Statements for Winter/Spring Division Teams (Solar Only)

Content	Judging Statements for Evaluation
1. Project Proposal	
A. Proposal document that encapsulates and summarizes deliverable sections 2–4. The proposal should make a case for why the proposed solar system and developer team are the best choice for the district [PDF]. B. Presentation that demonstrates the team's approach to the system design, operation, and innovation [PowerPoint and live presentation].	The proposal presents a clear and concise summary of the project. Both the proposal and the presentation make a compelling case for why the proposed solution is the best choice for the district given its needs, constraints, and goals.
2. Conceptual System Design	
A. Layout and specifications for PV system(s), including summary description of results and underlying assumptions used in the analysis [PDF]. B. Estimated hourly energy production output during annual period [Excel spreadsheet]. C. Description of how the proposed PV impacts the electrical distribution network, including interconnection costs and any impact mitigation.	Conceptual system design proposes creative and innovative solution that responds to district goals, observes site and financial constraints, demonstrates excellent analysis, system design, and understanding of the PV hosting capacity with distribution constraints.
3. Financial Analysis	
Financial model [Excel spreadsheet(s)] comprising: - A project financial model that uses the production data, PPA or lease price, and other inputs to calculate investor internal rate of return (IRR) at a net present value (NPV) of $0. - Customer savings analysis that demonstrates economics for the system offtaker (the district) during the contractual (if PPA or lease) or useful life (if cash purchase) of the system.	Financial analyses communicate a strong grasp of renewable energy project finance. Input assumptions are justifiable, calculations are correct, and pricing and rate of return are attractive to the market. The outputs of the customer savings analysis are included as tabs in the Excel-based financial model.

Content	Judging Statements for Evaluation
4. Development Plan	
Identification of AHJ having jurisdiction over local land use, building codes, and utility interconnection rules. A project development plan [PDF] composed of: - A building and site plan demonstrating the conceptual system design, including any proposed rezoning or other planning entitlements, is in alignment with the campus master plan. - A construction schedule and development plan to implement the design, including: • Necessary construction and land use permits • Compliance with applicable local building codes • Potential risks to successful deployment. - An Interconnection plan demonstrating compliance with utility requirements. - Distributional energy equity impacts of new distributed solar development within or surrounding the district.	Proposed development plans including building, site, construction, and interconnection add significant value in a comprehensive, actionable, and feasible approach for the district, AHJ, and surrounding community members with distributional equity.

See Appendices B and E for the final deliverable package content and formatting requirements.

How Entries Are Scored

A qualified panel of three to five judges—comprising subject matter experts and representatives from the partner district use cases selected by the competition organizers—scores finalist submissions according to the extent to which they agree that the content and formatting requirements were met and that the solution aligns with the judging statements listed in Tables 2 and 3. Judges evaluate the final deliverable package sections using a scale from 1 to 6 (1 being "strongly disagree" and 6 being "strongly agree") with the evaluation statements, as shown in Table 4.

Table 4. Scoring Scale

1	2	3	4	5	6
Strongly disagree	Disagree	Slightly disagree	Slightly agree	Agree	Strongly agree

Judges are assigned deliverable sections and evaluation statements based on their areas of expertise, as shown in Table 5. All judges evaluate the project proposal.

Table 5. Judging Panel Makeup and Assignments

Content	System Design Judge	Financial Analysis Judge	District Use Case Judge
Project proposal	X	X	X
Conceptual system design	X		
Financial analysis		X	
Development plan			X

The judges take the following steps and actions to ensure each finalist entry receives fair consideration:

1. Judges review their assigned content of the final deliverable packages submitted by each team.
2. Each statement listed in the "Judging Statements for Evaluation" receives a preliminary score from 1 ("strongly disagree") to 6 ("strongly agree"), according to the scoring scale shown in Table 3, based on the subjective determination of each judge.
3. The evaluation statements form the basis of each judge's score, so it is critical that teams successfully complete each component of the deliverable package while maintaining a comprehensive and innovative strategy overall.
4. The scores from each judge are collected to determine the team's preliminary score. The summed score from each judge is averaged across the judging panel as the preliminary average score for each team.
5. The preliminary scores for all teams in the division yield a preliminary ranking of teams.
6. The judges witness a 15-minute live presentation by each team. Each division presents in parallel. Ten minutes are provided for judges to ask questions of each team. A maximum of five students per team may present, and up to 10 students per team may answer questions from the judges.

7. The judging panel convenes following the live video conference presentations to review preliminary scores, discuss and agree upon the final evaluation of each statement, and determine the winners of the competition.
8. Winners (up to first, second, and third places) and optional honorable mentions are identified and announced. Individual scores for each team are not released. No ranking is completed beyond third place. The judges' feedback is provided to each team individually.
9. The first-place winner of each division presents a six-minute project proposal pitch at the final event. A panel of industry judges selects a proposal pitch winner from among the presenting teams according to Table 6. The presentations are open to the public and promoted to industry, increasing the recognition of the top teams.

The competition division process is illustrated in Figure 1.

Table 6. Project Pitch Judging Statements

Content	Judging Statements for Evaluation
Project Proposal	
Presentation that demonstrates the team's approach to the system design, operation, and innovation [PowerPoint and live six-minute presentation].	The proposal presents a clear and concise summary of the project. The presentation makes a compelling case for why the proposed solution is the best choice for meeting the goals and constraints of the district use case.

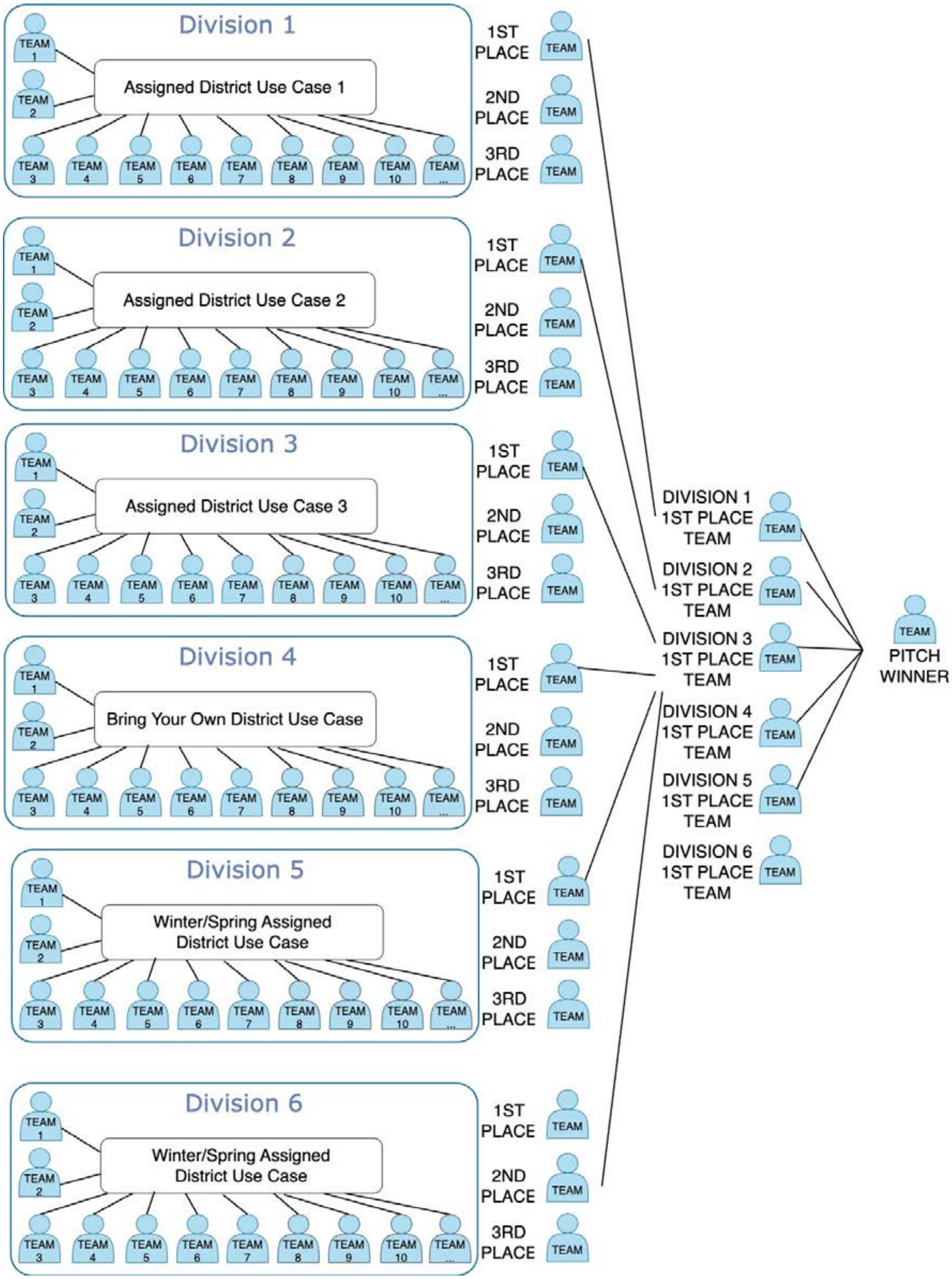

Figure 1. Division and competition process

Who Can Enter

The Solar District Cup invites teams with at least three students enrolled in accredited U.S.-based collegiate institutions to participate. Students must be enrolled in at least one class and must be pursuing a degree during the competition. Note that graduating during the competition period does not disqualify team members. To be eligible to present to judges, team members must not have graduated any earlier than the fall semester or quarter immediately preceding the final competition event. Students and faculty advisors are not required to be U.S. citizens at the time of the competition. Judges, competition organizer staff, and DOE and national laboratory employees are ineligible to compete.

Eligibility Requirements:

- Each team must have at least three student team members.
- Each student team member must be currently pursuing a degree at an accredited U.S.-based collegiate institution.

Although any level of collegiate student is eligible to compete, the scope is intended to be challenging for multidisciplinary teams of upper-level undergraduate students. Student participation may be integrated into a senior design or capstone project, count as elective or independent study course credit, be added to the curriculum of existing classes, be treated as a seminar topic, be engaged as part of a student interest club, or be an extracurricular student activity.

Each team is encouraged to have at least one faculty advisor, but this is not required for participation. Teams are also encouraged to connect with mentors inside or outside their school. If a team of students needs assistance in identifying a mentor or faculty advisor at their institution, they can contact the competition organizers for help.

By uploading a deliverable package, a team certifies that it complies with the eligibility requirements. If the organizers become aware that a team or individual is not eligible, that team may be disqualified from the competition.

Competition Events

RE+ Conference (Optional)

The competition organizers, in partnership with RE+, provide no-registration-cost access for students of registered and alumni teams to the educational and poster sessions of the in-person RE+ events:

• RE+ 2024	Anaheim, CA	Sept. 9–12, 2024
• RE+Midwest	Chicago, IL	Nov. 7-8, 2024
• RE+ Florida	Orlando, FL	Nov. 14-15, 2024
• RE+ Northeast	Boston, MA	Feb. 11-12, 2025
• RE+ Southeast	Atlanta, GA	TBA
• RE+ Texas	TBA	TBA
• RE+ MidAtlantic	Philadelphia, PA	June 10-11, 2025
• RE+ 2025	Las Vegas	Sept. 8-11, 2025

By attending these conferences, team members can engage with and learn from industry leaders. Conference registration is free to participating students who are listed as team members via HeroX. Travel expenses are the responsibility of each team.

Final Competition Event via Video Conference

The competition organizers conduct the final competition event as a video conference. At this event, teams present their projects live to industry judges, and the winners of each division are announced. Live video conference attendance and presentation by at least one student team member from each finalist team is required (no prerecorded presentations are allowed). Up to five team members may present live. Up to an additional five team members may participate in the live question-and-answer portion.

Project Pitch Event for First-Place Division Winners via Video Conference

The first-place winners of each division present to their peers and invited industry members. A panel of three to five industry judges invited by the organizers selects a Project Pitch winner. Live video conference attendance and presentation by at least one student team member from each first-place team is required.

Learning Content

Student team efforts are supported by a series of online training videos and educational webinars presented by the competition organizers on competition, design, and analysis topics. Self-paced educational content is hosted on a course curated by competition organizers in the Canvas Learning Management Platform (https://nrel.instructure.com/). Instructions for accessing the course are provided to student teams via HeroX, direct emails, and live webinars. The webinar topics relate specifically to the required elements of the deliverable packages. Faculty advisors or mentors may also provide guidance to teams on successful completion and may integrate competition activities into coursework, academic credits, or related curricula.

Instructive videos and other resources are provided to all registered team member students and faculty members. Presentations that are given live are also recorded and made available via the Canvas course. Content is added throughout the competition period and includes topics such as:

- Conceptual system design
- Distribution system impact considerations
- Solar project finance
- Development planning
- Distributional energy equity
- Using software tools for conceptual system design, customer utility rate analysis, battery energy storage system sizing, and distribution system modeling.

Additionally, throughout the competition period, the organizers host a series of webinars and optional “office hours” to provide guidance or to answer student questions. These webinars are recorded and made available on demand.

Participating students are encouraged to view the recorded presentations and review the final deliverable packages of the previous year’s teams (also accessible via the Canvas course).

Student teams are encouraged to engage with faculty advisors and/or mentors for support, guidance, and consultation. Mentors may be teachers, staff, or other industry professionals, such as collegiate alumni, members of local chapters of professional societies or associations, staff from local electric utilities, emeritus professors, adjunct instructors, or faculty from other departments.

The competition organizers also coordinate with industry to provide students free access to one or more industry tools relevant to solar system design and financial modeling.

3. COMPETITION AUTHORITY AND ADMINISTRATION

The Solar District Cup is organized by DOE and the National Renewable Energy Laboratory (NREL), which is managed and operated by the Alliance for Sustainable Energy, LLC (Alliance), for DOE. Funding is provided by DOE's Office of Energy Efficiency and Renewable Energy Solar Energy Technologies Office. The views expressed herein do not necessarily represent the views of DOE or the U.S. government.

The Solar District Cup Class of 2024–2025 is governed and adjudicated by this rules document, which is intended to establish fair contest rules and requirements. The competition is designed and administered by a team of competition organizers consisting primarily of DOE and NREL staff. In the case of a discrepancy with other competition materials or communication, this document takes precedence. The latest release of these rules takes precedence over any prior release. The organizers reserve the right to change contest criteria, rules, and outcomes as needed. Additionally, competitors are encouraged to bring to the organizers' attention rules that are unclear, misguided, or in need of improvement. For the competition evaluation, a violation of the intent of a rule will be considered a violation of the rule itself. Questions about these rules or the program overall can be directed to solardistrictcup@nrel.gov.

Alliance does not claim ownership rights in any footage, data, audio, video, photos, graphics, images or other materials or content that you make available to Alliance ("Media"), including, but not limited to, entry form submissions; content shared via email, HeroX, and Canvas; content from progress and final deliverable packages; relevant Solar District Cup-related social media posts; and recordings of webinars and competition events. Media is owned by you unless otherwise provided herein or agreed by you in writing. Notwithstanding the foregoing, you hereby grant Alliance and the DOE a non-exclusive, worldwide, perpetual, irrevocable, fully paid up, royalty-free and transferable right and license, with the right to sublicense through multiple levels, to reproduce, adapt, copy, modify, create derivative works of, distribute, publicly perform, publicly display, digitally transmit, use for any commercial purpose, and otherwise use your Media in any medium or format, whether now known or hereafter discovered, in order to use by Alliance and the DOE in any way. Further, you understand and agree that your Media is accessible, downloadable and usable by any members of the public to whom the Media is made available by Alliance.

Judges may not have personal or financial interests in; be an employee, officer, coordinator, or agent of any entity that is a registered participant in; or have a familial or financial relationship with an individual who is a registered competitor in this contest.

The Solar District Cup is a collegiate design competition. There is no expectation that any of the submitted entries will be built or implemented by the students or partner districts.

4. PARTNERS

The Solar District Cup depends on partnerships to be successful. We would like to thank the following organizations for their support of the competition and the student teams.

Aurora

This software company has created a cloud-based platform that uses data, automation, and artificial intelligence to streamline workflows and grow solar businesses faster. The company provides complimentary accounts with access to their Aurora Solar and Helioscope software to all participating teams for the duration of the competition.

RE+ Events

RE+ Events, powered by the Solar Energy Industries Association and the Smart Electric Power Alliance, brings clean energy leaders together in marketplaces across the United States and internationally to expand business prospects and share best practices. RE+ Events offers attendees and students year-round access to resources for growing their businesses as the industry changes, as well as opportunities to have an impact on the future of clean energy through exhibition at events and speaking opportunities at educational seminars.

District Use Cases

The Solar District Cup Class of 2024–2025 has multiple divisions. Each team's effort centers on a distinct use case of a real-world, mixed-use district or campus interested in pursuing distributed energy solutions. The Solar District Cup would not be able to provide real-world district and campus use cases without the collaboration of our use case partners and their willingness to share valuable data with the student teams.

"I am astonished by all of the compelling renewable energy possibilities that the Solar District Cup student teams offer. We will take each one of your proposed ideas into great consideration in our plan to achieve tangible solutions as we propel our way toward our goals of becoming climate neutral by 2050. Thank you for your time and effort on this project, and best of luck to each and every student in your future endeavors!"

—Rosny Jean, Ph.D.
Solar District Cup Class of 2022–2023 district use case representative from Florida A&M University

"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. The positive takeaway was the opportunity to view things from the mind of today's students and has ultimately inspired me to take serious consideration of the many solutions I observed."

—Patrick Chavez
Solar District Cup 2020 district use case representative from New Mexico State University

District Use Case partners for the Class of 2024–2025

- To be identified at student team registration

Appendix A. Resources for Assumptions

Appendix A.1. Resources for Financial Model Input Assumptions

This section provides a series of assumptions and resources to serve as a baseline for all teams' design and analysis. NREL and other organizations regularly publish cost benchmarks and industry analysis documentation that estimate the costs for system technologies and components, the prevailing cost of capital for financial inputs, market-appropriate PPA prices, and other related figures. Teams are encouraged to conduct their own research, and several starting resources are provided here. Assumptions should be cited where appropriate, and, if deemed necessary by the team, justified in the project proposal. Although teams are encouraged to discuss the competition and their proposed solution with industry professionals, costs or assumptions not publicly available to all teams are not to be used in calculations. Unless qualified alternates are used following the previously described process, all teams should use the input values listed under the "Financial Assumption" section.

Note that in addition to providing system production output, NREL's System Advisor Model (SAM) also includes default assumptions for many of the input values required to run the financial model. SAM and the following specified materials can be used as a baseline for successful analysis. The link for SAM is provided (users are required to register when using SAM for the first time, but registration is free).

Students may use any resources or tools desired to derive their financial modeling inputs, study modeling mechanics, or validate their results. Teams are ***required*** to integrate their own input assumptions into the organizer-provided Excel-based financial model and submit the completed spreadsheet in the deliverable packages.

Financial Model Baseline Assumptions

- Closing costs and fees, assume 2% of project cost. example assumption: Assume that the systems you design will be financed as part of a larger portfolio of projects that total $50 M, and closing that $50 M portfolio will cost $1 M. As a developer, you will spread that $1 M across all the projects in your portfolio to avoid overtaxing any one project. Accordingly, take the aggregate cost of your district design and divide it by $50 M to get a percentage. Then multiply that percentage by $1 M to get the proportion of closing costs and fees for your district systems. You may allocate this across your projects proportional to their total cost. For example: If your total district solution costs $5 M, then it is 10% of your aggregate portfolio, so it would bear $100,000 of closing costs. If you have three systems in your portfolio of 500 kW, 1 MW, and 5 MW, then the division of closing costs among them would be: $7,692 (500 kW), $15,385 (1 MW), and $76,923 (5 MW).
- Property tax: Assume $0 during the PPA or lease.
- Sales tax: Assume all sales tax is already expressed in the total system cost.
- Corporate income tax rate: 21% for federal. State tax can be found via an online search.
- Construction timeline: approximately 8 months.
- For purposes of this competition, PV lifetime is 30 years (e.g., if your PV system has a 20-year PPA, there are 10 years of "residual value" on the system).
- PPA or lease contract term is 20 years.
- System degradation is 1.0% per year.
- Inflation (applies an annual increase to operating costs) is 2% per year.

Written Resources

Note that many of the resources below, while providing valuable information on costs and financing terms, do not contain up-to-date figures that can be used in the financial model. The organizers encourage teams to use the most recent resources in the list below to source input assumptions and to conduct their own supplementary research.

- CohnReznick Quarterly Considerations Q3 2023 provides a datapoint on recent tax equity yields in the market.
- NREL's *U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark* provides data points for PV system and component costs. Additional unitized balance-of-system costs are available in the "Financial Model Assumptions" section.
- NREL's *Floating Photovoltaic System Cost Benchmark* provides cost and other data for solar "floatovoltaics" design.
- NREL's *Capital Costs for Dual-Use Photovoltaic Installations: 2020 Benchmark for Ground-Mounted PV Systems with Pollinator-Friendly Vegetation, Grazing, and Crops* provides cost and other data for solar "agrivoltaics" design.
- NREL's *Current and Future Costs of Renewable Energy Project Finance Across Technologies* provides data points for PV cost of capital (debt, financial tax equity, and financial partner equity inputs).
- NREL's *Best Practices for Operation and Maintenance of Photovoltaic and Energy Storage Systems (3rd Edition)* provides cost figures for operation and maintenance.
- NREL's *Model of Operation and Maintenance Costs for Photovoltaic Systems* describes software for a model to estimate operation and maintenance costs related to PV systems.
- NC Clean Energy Technology Center's Database of State Incentives for Renewables and Efficiency provides information on state and local incentives for PV and solar-plus-storage.
- HeatSpring provides free instructional videos related to Solar District Cup topics.
- Examples of real-world solar development project proposals from SunPower and Borrego Energy are provided in the data rooms for reference.
- Norton Rose Fulbright's Cost of Capital: 2024 Outlook provides additional information about terms and rates related to solar developer financing.
- NREL's "Identifying Potential Markets for Behind-the-Meter Battery Energy Storage: A Survey of U.S. Demand Charges" provides an orientation to the economic benefits of on-site battery energy storage operation.

Models and Software Tools

- Aurora—Can be used to create 3D site layouts, design PV systems, perform shading analysis, and estimate PV system performance, especially for building roof-mounted systems.
- HelioScope—Can be used to create 3D site layouts, design PV systems, perform shading analysis and estimate PV system performance, especially for ground-mounted and single-axis tracker systems with one-line electrical diagrams.
- Enact Solar—Can be used to design PV systems, estimate PV system performance, and estimate financial project savings and rate of return.
- SAM—Can be used for PV system production modeling (especially for bi-facial panel and single-axis tracker solar systems), financial model validation, and battery operation analysis.
- REopt®—Can be used for battery sizing and operation analysis as well as system sizing for back-up power, energy resilience, and emissions savings.
- OpenDSS—Can be used for distribution system impact analysis of PV and batteries, especially voltage constraints. It's an electric power distribution system simulator (DSS) for supporting distributed resource integration and grid modernization. It is an open-source tool available free of charge.
- NREL Annual Technology Baseline (see Electricity Technologies: Commercial PV and Commercial Battery Storage) and levelized cost of energy calculator—Can be used to source data points and validate the inputs/outputs of other models.
- ArcGIS Online—Can provide parcel, zoning, and other information for plan development.

- Organizer-provided Excel-based financial model—*required* for use as a template financial model for the system(s) proposed by competing teams.

Customer Savings Analysis Guidance for Solar and Storage Systems

The customer savings analysis is an evaluation of the economics for the *offtaker* of the solar-plus-storage system, whereas the financial analysis is an evaluation of the economics for the *investors* in the solar-plus-storage system. Several tools are available to perform the customer savings analyses, including the Excel-based financial model, SAM, and REopt.

Charts displaying annual and cumulative customer savings (or losses) during the contract lifetime period should be included in the proposal document, along with a table displaying total system characteristics, such as the example in Table 7. A breakout of each system's individual savings can also help the customer determine which systems may be more economic and therefore more likely to be chosen for installation.

Table 7. Sample Solar-Plus-Storage Summary

System	Aggregate Size	All-Inclusive PPA Price	PV Only Price	Year 1 Generation	Total 20-yr Savings
PV system	3.3 MW	$0.11/kWh	$0.07/kWh	3,960,000 MWh	$1,200,000
Battery storage system	1 MW/ 2 MWh			Based on demand charge mgmt. strategy	$1,800,000 (with PV system)

Note: The numbers shown in Table 7. are not based on a real system and are provided for illustrative purposes. In fact, adding a battery may create negative savings (which student teams may choose to characterize as the value of resilience[1] or some other nonmonetary benefit). Further examples of how student teams can display customer savings and system specifications can be found in the proposal documents in the data room.

The customer savings analysis depends on the agreement structure under which the battery is contracted, i.e., PPA, lease, or some other arrangement (e.g., tolling agreement, shared savings agreement). Student teams should determine which contracting mechanism is best given their battery discharge strategy and state regulatory environment and include the rationale behind their choice in the proposal documents.

Student teams may find that the economics of a battery system are not as compelling as stand-alone PV. If this is the case, teams may make this statement in their proposal and focus on the system configuration that offers the district the best value (e.g., stand-alone PV installed on select rooftops, façades, or bodies of water). However, teams are still required to provide the summary results of their battery evaluation and provide a rationale for either including or excluding it in their system proposal.

Appendix A.2. Guidance for Distribution System Impact Considerations

Distribution system PV hosting capacity analysis is often performed by utilities to calculate the maximum distributed generation capacity a given distribution system can host without violating

[1] For more on the value of resilience, see https://www.nrel.gov/docs/fy20osti/74241.pdf.

thermal and voltage constraints on the system. Utilities often use distribution system simulation tools to conduct hosting capacity analysis and publish hosting capacity heat maps on their websites,

Students in an assigned district use case division may use the heat maps provided in the data room to ensure that proposed solar-plus-storage systems comply with system constraints. If the proposed PV systems violate hosting capacity limits, teams should either:

a. Iterate and reduce the system size until it complies with the hosting capacity limit, or
b. If the proposed PV system sizes are necessary to make the project economics work, then the teams should propose methods (both wired and non-wires alternatives) that may be employed to relax these constraints. The cost of these potential upgrades should be considered and documented in the distribution system impact summary report.

Appendix A.3. References for Development Plan

Resource references for use in the development plan include potential authority(ies) having jurisdiction (AHJs) for land ownership and use, zoning ordinances, building restrictions or regulations, permitting, codes, and interconnection. These AHJs could be any combination of levels at a district or campus; city, municipal, or township; county; state; federal; utility; and public utility commission.

- Zoning ordinances—Look at county or a citywide zoning map and municipal code to find the appropriate zoning districts, any overlay zones or special planning areas, and applicable land use policies or necessary planning entitlements (permits).
- Land use plans—Look for additional development standards that may be part of a specific area plan or campus master plan. Also, double-check transportation plans for rights of way and easements that may inform property boundary and construction setbacks.
- NREL's database and interactive map of solar energy siting regulation and zoning ordinances—Collection of documented solar siting ordinances and zoning laws throughout the United States at the state, county, township, and city levels.
- National Register of Historic Places—Consider any individual building or aesthetic viewshed area concerns.
- U.S. Geological Survey National Map Viewer—Determine the site conditions and topography of the prospective ground-mounted solar system locations. Also reference online satellite imagery. The district master plan may also have specific references.
- U.S. Department of Agriculture Web Soil Survey—Consider the soil conditions for ground-mounted solar. Caliche or bedrock might require more costly drilling for structural posts. Sandy soils might require deeper post embedment to meet snow or wind loading requirements for structural reliability. Corrosive soils might require measures to protect embedded posts from corrosion.
- U.S. Fish and Wildlife Service Critical Habitat Mapper—Consider any habitat that may be impacted by your proposed solar development, including riparian areas and endangered species.
- U.S. Fish and Wildlife Service National Wetlands Inventory Mapper—Consider water bodies, ephemeral streams, drainage, or underground water systems in the placement of your proposed ground-mounted solar systems and any underground support infrastructure.
- Federal Emergency Management Agency (FEMA) Flood Map Service Center—Consider any floodplain risks or added permitting for ground-mounted systems.
- We define "energy equity" as an equitable distribution of the social, economic, and health benefits and burdens of energy across all segments of society. According to the Initiative for Energy Justice, "Energy justice refers to the goal of achieving equity in both the social and economic participation in the energy system, while also remediating social, economic, and health burdens on those historically harmed by the energy system ('frontline communities')." Distributional energy equity refers to the allocation of the benefits and burdens of energy

investments and considers whether the decisions being made disproportionately affect historically marginalized communities.[2] This aspect of energy justice concerns the siting of energy infrastructure and access to energy services.[3,4]

- Argonne National Laboratory Energy Justice Mapping Tool—Consider disadvantaged communities adjacent or nearby the district use case locations.

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[2] Sovacool, Benjamin K., Michael H. Dworkin. 2015. *Energy Justice: Conceptual Insights and Practical Applications*. Applied Energy. Volume 142. https://www.sciencedirect.com/science/article/pii/S0306261915000082.

[3] Sovacool, Benjamin K., Johannes Kester, Lance Noel, Gerardo Zarazua de Rubens. 2019. *Energy Injustice and Nordic Electric Mobility: Inequality, Elitism, and Externalities in the Electrification of Vehicle-to-Grid (V2G) Transport.* Ecological Economics. Volume 157. https://www.sciencedirect.com/science/article/pii/S0921800918307602.

[4] Sovacool, Benjamin K., Mari Martiskainen, Andrew Hook, Lucy Baker. 2019. *Decarbonization and its Discontents: A Critical Energy Justice Perspective on Four Low-Carbon Transitions.* Climatic Change. 155. https://link.springer.com/article/10.1007/s10584-019-02521-7?utm_source=getftr&utm_medium=getftr&utm_campaign=getftr_pilot.

Appendix B. Deliverable Package Submission Requirements

File Name Requirements

Submitted deliverable package files must be named as follows:

- [DistrictUseCaseAbbreviation]_[SchoolShortName]_[DeliverableSection].[extension]
    - [DistrictUseCaseAbbreviation] is provided within the district use case profile.
    - [SchoolShortName] is your collegiate institution's commonly recognized and distinct short name, abbreviation, or acronym.
    - [DeliverableSection] is given in the Appendix C and D format requirements.
    - [extension] is PDF, XLSX, ZIP, or PPTX.

Note that HeroX has a file size maximum of 100 MB for individual files.

Appendix C. Progress Deliverable Package Requirements

1. Executive Summary

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 6 pages total; any additional pages submitted are not reviewed. Title page does not count toward this limit.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ExecutiveSummary.PDF

Content Requirements

☐	Title page that includes names of school, team, district use case, and deliverable section (This page does not count toward the page limit.)
☐	Brief narrative of system design (e.g., locations, rationale, total system size, total production), potential distribution system impacts, financial information including PPA or lease price with the project IRR and NPV for the systems under PPA or lease, savings for the district, and development considerations (e.g., zoning, permitting, conformity with district master plan)
☐	Summary tables of system sizes, total annual production, and associated PPA, lease, or cash purchase prices (if systems have individual associated prices; if one price for all systems, indicate this)
☐	Summary graphics (e.g., overhead graphic of district-wide solar solution, flowchart depicting team collaboration process, charts from financial analysis)

2.A. Conceptual System Design—Layout and Specifications

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 30 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ConceptualDesign.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Design narrative: System design summary of approach and solution (maximum 2 pages)
☐	Specifications: Listing of equipment selection and specifications, including size in Standard Test Conditions (STC) Direct Current (DC) rating of each system and total project size (maximum 2 pages)
☐	Drawings: Summary site plan(s) showing layout of all proposed installations
☐	Individual system plans showing panels and location of associated equipment
☐	Shading model image for each proposed installation
☐	Annotated list of references or citations, including any AI technology

2.B. Conceptual System Design—Energy Production

Format Requirements

☐	Packaged into a single Excel file, multiple tabs expected
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate results.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be carefully reviewed.
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_EnergyProduction.XLSX

Content Requirements

☐	Hourly generation profile for each proposed solar installation during a year
☐	Details of inputs and process used to calculate the hourly generation profile
☐	Source of irradiance data used

2.C. Distribution System Impact Summary

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to pages 5 total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DistributionApproach.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Summarize understanding of the distribution system impacts originating from the PV system interconnection on the distribution network. Summarize sensitivities of these impacts in relation to PV system size and interconnection location.
☐	Summarize factors that limit PV hosting capacity on the distribution network and impact their interconnection cost.
☐	Annotated list of references or citations, including any AI technology

3. Financial Analysis—Financial Model and Customer Savings Analysis

Format Requirements

☐	Packaged into a single Excel file with multiple tabs for each PV system or multiple Excel files representing each PV system
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate results.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be documented (links to external spreadsheets are prohibited).
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_Financial.XLSX

Content Requirements

☐	The Excel-based financial model (for calculation of investor economics) is *required* for the project financial analysis.
☐	Calculate a reasonable project IRR and an investor NPV of $0 given a certain PPA or lease price and other input assumptions.
☐	Customer savings analysis *of solar systems only* included as a separate tab in the Excel-based model or as a separate spreadsheet. This analysis should present savings for the system offtaker (i.e., the district) during the contractual life (if PPA or lease) of the system. If a cash purchase, those savings can be calculated during the useful life of the system. Student teams may use a tool of their choice for the customer savings analysis (including spreadsheets of their own design).
☐	Annotated list of references or citations, including any AI technology

4. Development Plan—Building, Site, and Construction Plans

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 12 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DevelopmentPlan.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Identification of AHJ and applicable land use, zoning ordinances, permitting requirements, and analysis of compliance with development standards
☐	Demonstration of compliance with district use case master plan (if applicable)
☐	Identification of site constraints and demonstration of compliance with other land use, environmental, or building restrictions or regulations
☐	Identify applicable local construction permitting and codes
☐	Approach to procure necessary permits and comply with local codes
☐	Proposed timeline for permitting, construction, and interconnection
☐	Identify distributional energy equity impacts of new solar development within or surrounding the district, including design, construction, operation, environmental, and workforce impacts (impacts could be benefits or burdens)
☐	Annotated list of references or citations, including any AI technology

Appendix D. Final Deliverable Package Requirements for Full Academic Year Teams

1.A. Project Proposal—Written

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 18 pages total; any additional pages submitted are not reviewed. Title page does not count toward this limit.
☐	ANSI A (8.5" x 11") paper size must be used
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ProjectProposal.PDF

Content Requirements

☐	Title page that includes names of school, team, district use case, and deliverable section (This page does not count toward the page limit.)
☐	Executive summary of the project, including the proposed PV systems, battery system, pricing, and how the proposed solution is uniquely tailored to serve the district's needs, constraints, and goals (2 pages). The executive summary must include a 200-word narrative summary of the proposed project for promotion and outreach and ideally contains charts, tables, graphics, or other visuals.
☐	Introduction of the team, including student team member field of study and work performed on proposal, and advisors, including both faculty and external mentors (1–2 pages)
☐	Project overview with charts, tables, and summary graphics, including narratives describing the following (up to 12 pages):
	System sizing and design rationale with a table of location, size, and annual production (1–3 pages), see Table 7
	The solar and storage system's potential impacts on the local distribution system (1–3 pages)
	Proposed PPA, lease, and/or purchase price; price justification; sources for model inputs; expected savings for the district during the contract lifetime; and the economic benefits of the system for investors. This section should also include a summary of the applicable state and local policies and regulations (e.g., net metering, state incentives) and how these have influenced the system economics (1–3 pages).
	Development plan highlights and how the proposed solar and storage solution conforms to the district master plan (1–3 pages)
☐	Conclusion recapping Project Pitch and benefits to the district (1 page)

1.B. Project Proposal—Pitch Presentations

Format Requirements

☐	File type: PowerPoint, with all fonts and images embedded without external file references and no embedded video or audio
☐	16:9 aspect ratio
☐	Written in complete, grammatically correct, and spell-checked English
☐	Duration of 15 minutes for division presentation and 6 minutes for pitch presentation
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DivisionPresentation.PPTX
☐	Optional: a second, shorter presentation. File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_PitchPresentation.PPTX

Content Requirements

☐	Title slide including names of school, team, and district use case
☐	Summary of team's solar-plus-storage solution, as well as its approach to: • Competition, including team structure and work effort • Understanding of the district's constraints and goals • Solar-plus-storage design • Expected operation • Distribution system risks • Financial performance • Development plans.
☐	Innovation as it relates to: • Analysis methods • Technology selection, system design, and operation • Financial result.
☐	Pitch how this project proposal helps achieve the district goals.
☐	Pitch why your project and presentation stands out.

2.A. Conceptual System Design—Layout and Specifications

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 35 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ConceptualDesign.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Design narrative: System design approach and description of final solution (maximum 2 pages)
☐	Map of PV system locations
☐	Specifications: Description of equipment selection strategy and specifications, including size (STC DC rating) of each system, total project size, and battery details with a summary table of the size and specifications of major components (maximum 2 pages)
☐	Drawings: Diagram showing location of all proposed PV and battery systems within the district
☐	Individual PV system plans showing panels and location of associated equipment
☐	One-line electrical diagrams for each system and wiring required between systems
☐	Shading analysis/model image for each PV installation

2.B. Conceptual System Design—Energy Production and Battery Cycles

Format Requirements

☐	Packaged into a single Excel file, multiple tabs expected; 8760 rows if hourly (24 hours/day*365 days/year) plus row(s) with column titles/units.
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate values other than the software outputs.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be carefully reviewed.
☐	Proofread document for spelling, grammar, legibility, and formatting.
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_EnergyProduction.XLSX

Content Requirements

☐	Hourly generation profile for each solar system during a year
☐	Details of inputs and process used to calculate the hourly generation profile

☐	Source of irradiance data used
☐	Inputs for the battery charge/discharge strategy

2.C. Distribution System Impact Summary

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 10 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DistributionApproach.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Summarize understanding of the distribution system impacts originating from solar-plus-storage system interconnection on the distribution network. Summarize understanding specifically of the origin of thermal and voltage constraints on the distribution system. Summarize sensitivities of these impacts in relation to the electricity network grid hosting the proposed PV system sizes and interconnection locations.
☐	Summarize factors that limit PV hosting capacity on the distribution network and their impact on interconnection cost. Consider: capacity (amps) of service lines and transformers; voltage regulation, frequency regulation, reactive power and power factor, protection (setting and location of breakers).
☐	Summarize how the use of battery systems and/or smart inverter control modes can help improve PV hosting capacity. If non-wires alternatives are employed to relax thermal or voltage constraints on the distribution system, these methods and their impact on the distribution system should be discussed in the report.
☐	Use the provided hosting capacity heat map(s) to ensure that the proposed PV systems do not violate hosting capacity constraints on the distribution system. Summarize how hosting capacity heat maps have been incorporated in the design workflow to ensure distribution system constraints have been satisfied.

3. Financial Analysis—Financial Model and Customer Savings Analysis

Format Requirements

☐	Packaged into a single Excel file with multiple tabs for each PV system or multiple Excel files representing each PV system. Additional tabs for the battery and analysis and customer savings analysis required.
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate results.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be documented (links to external spreadsheets are prohibited).
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_FinancialModel.XLSX

Content Requirements

☐	The Excel-based financial model (for calculation of investor economics) is *required* for the solar portion of the project financial analysis. For the solar-plus-storage analysis, student teams may use SAM, REopt, or another tool of their choice. The relevant outputs of this analysis—e.g., summary of inputs and outputs, cash flows, charts, and others—should be pasted in a tab or multiple tabs in the Excel-based model spreadsheet.
☐	Calculate a reasonable project IRR and an investor NPV of $0 given a certain PPA or lease price and other input assumptions.
☐	Possible purchase option to the district (depending on instructions in use case profile)
☐	Customer savings analysis *of solar and storage systems* included as a separate tab in the Excel-based model or as a separate spreadsheet. This analysis should present savings for the system offtaker (i.e., the district) during the contractual life (if PPA or lease) of the system. If a cash purchase, those savings can be calculated during the useful life of the system. Student teams may use a tool of their choice for the customer savings analysis (including spreadsheets of their own design).

4. Development Plan—Building, Site, and Construction Plans

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 25 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DevelopmentPlan.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Analysis of AHJ for land ownership; zoning ordinances; other land use or building restrictions or regulations; permitting; codes; and interconnection. These AHJs could be any combination of levels at a district or campus; city, municipal, or township; county; state; federal; utility; or public utility commission.
☐	Include table with row for each site location for proposed installation, including assessor parcel numbers, zoning, any overlay zoning, and specific site or development considerations.
☐	Identification of applicable land use, zoning ordinances, permitting requirements, and analysis of compliance with development standards
☐	Analysis of aesthetic appearance in surrounding viewshed
☐	Demonstration of compliance with or fulfillment of district use case master plan (if applicable)
☐	Identification of site constraints, and demonstration of compliance with other land use, environmental, or building restrictions or regulations
☐	Identify applicable local construction permitting and codes
☐	Approach to procure necessary permits and comply with local codes
☐	Proposed timeline for permitting, construction, and interconnection
☐	Construction staging approach of physical needs for equipment, vehicles, and temporary storage
☐	Identification of risks to successful project development and deployment
☐	Strategy to engage community members and achieve buy-in for project
☐	Identify distributional energy equity impacts of new solar-plus-storage development within and surrounding the district, including design, construction, operation, environmental, and workforce impacts (impacts could be benefits or burdens). Address who is included and who is not in the proposed distributed energy solution. Consider what trade-offs are being made in the proposed solution.
☐	Annotated list of references or citations, including use of

Appendix E. Final Deliverable Package Requirements for Spring Semester Teams

1.A. Project Proposal—Written

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 18 pages total; any additional pages submitted are not reviewed. Title page does not count toward this limit.
☐	ANSI A (8.5" x 11") paper size must be used
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ProjectProposal.PDF

Content Requirements

☐	Title page that includes names of school, team, district use case, and deliverable section (This page does not count toward the page limit.)
☐	Executive summary of the project, including the proposed PV systems, pricing, and how the proposed solution is uniquely tailored to serve the district's needs, constraints, and goals (2 pages). The executive summary must include a 200-word narrative summary of the proposed project for promotion and outreach and ideally contains charts, tables, graphics, or other visuals.
☐	Introduction of the team, including student team member field of study and work performed on proposal, and advisors, including both faculty and external mentors (1–2 pages)
☐	Project overview with charts, tables, and summary graphics, including narratives describing the following (up to 12 pages):
	System sizing and design rationale with a table of location, size, and annual production (1–3 pages), see Table 7
	The solar and storage system's potential impacts on the local distribution system (1–3 pages)
	Proposed PPA, lease, and/or purchase price; price justification; sources for model inputs; expected savings for the district during the contract lifetime; and the economic benefits of the system for investors. This section should also include a summary of the applicable state and local policies and regulations (e.g., net metering, state incentives) and how these have influenced the system economics (1–3 pages).
	Development plan highlights and how the proposed solar solution conforms to the district master plan (1–3 pages)
☐	Conclusion recapping Project Pitch and benefits to the district (1 page)

1.B. Project Proposal—Pitch Presentations

Format Requirements

☐	File type: PowerPoint, with all fonts and images embedded without external file references and no embedded video or audio
☐	16:9 aspect ratio
☐	Written in complete, grammatically correct, and spell-checked English
☐	Duration of 15 minutes for division presentation and 6 minutes for pitch presentation
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DivisionPresentation.PPTX
☐	Optional: a second, shorter presentation. File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_PitchPresentation.PPTX

Content Requirements

☐	Title slide including names of school, team, and district use case
☐	Summary of team's solar-plus-storage solution, as well as its approach to: • Competition, including team structure and work effort • Understanding of the district's constraints and goals • Solar design • Expected operation • Distribution system risks • Financial performance • Development plans.
☐	Innovation as it relates to: • Analysis methods • Technology selection, system design, and operation • Financial result.
☐	Pitch how this project proposal helps achieve the district goals.
☐	Pitch why your project and presentation stands out.

2.A. Conceptual System Design—Layout and Specifications

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 35 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_ConceptualDesign.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Design narrative: System design approach and description of final solution (maximum 2 pages)
☐	Map of PV system locations
☐	Specifications: Description of equipment selection strategy and specifications, including size (STC DC rating) of each system and total project size with a summary table of the size and specifications of major components (maximum 2 pages)
☐	Drawings: Diagram showing location of all proposed PV systems within the district
☐	Individual PV system plans showing panels and location of associated equipment
☐	One-line electrical diagrams for each system and wiring required between systems
☐	Shading analysis/model image for each PV installation

2.B. Conceptual System Design—Energy Production and Battery Cycles

Format Requirements

☐	Packaged into a single Excel file, multiple tabs expected; 8760 rows if hourly (24 hours/day*365 days/year) plus row(s) with column titles/units.
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate values other than the software outputs.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be carefully reviewed.
☐	Proofread document for spelling, grammar, legibility, and formatting.
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_EnergyProduction.XLSX

Content Requirements

☐	Hourly generation profile for each solar system during a year
☐	Details of inputs and process used to calculate the hourly generation profile
☐	Source of irradiance data used

2.C. Distribution System Impact Summary

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 10 pages total; any additional pages submitted are not reviewed.
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☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DistributionApproach.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
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☐	Summarize factors that limit PV hosting capacity on the distribution network and their impact on interconnection cost. Consider: capacity (amps) of service lines and transformers; voltage regulation, frequency regulation, reactive power and power factor, protection (setting and location of breakers).
☐	Summarize how the use of smart inverter control modes can help improve PV hosting capacity. If non-wires alternatives are employed to relax thermal or voltage constraints on the distribution system, these methods and their impact on the distribution system should be discussed in the report.
☐	Use the provided hosting capacity heat map(s) to ensure that the proposed PV systems do not violate hosting capacity constraints on the distribution system. Summarize how hosting capacity heat maps have been incorporated in the design workflow to ensure distribution system constraints have been satisfied.

3. Financial Analysis—Financial Model and Customer Savings Analysis

Format Requirements

☐	Packaged into a single Excel file with multiple tabs for each PV system or multiple Excel files representing each PV system. Additional tabs for the battery and analysis and customer savings analysis required.
☐	Include column labels and relevant units.
☐	Include all formulas used to calculate results.
☐	Explain any macros or associated internal scripts.
☐	Indicate where cells are using an input assumption versus a calculated result.
☐	Generate natively if possible; exports from other programs should be documented (links to external spreadsheets are prohibited).
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_FinancialModel.XLSX

Content Requirements

☐	The Excel-based financial model (for calculation of investor economics) is *required*. The relevant outputs of this analysis—e.g., summary of inputs and outputs, cash flows, charts, and others—should be pasted in a tab or multiple tabs in the Excel-based model spreadsheet.
☐	Calculate a reasonable project IRR and an investor NPV of $0 given a certain PPA or lease price and other input assumptions.
☐	Possible purchase option to the district (depending on instructions in use case profile)
☐	Customer savings analysis *of solar systems* included as a separate tab in the Excel-based model or as a separate spreadsheet. This analysis should present savings for the system offtaker (i.e., the district) during the contractual life (if PPA or lease) of the system. If a cash purchase, those savings can be calculated during the useful life of the system. Student teams may use a tool of their choice for the customer savings analysis or (including spreadsheets of their own design).

4. Development Plan—Building, Site, and Construction Plans

Format Requirements

☐	File type: single, bookmarked PDF with all fonts embedded and 300-dpi minimum resolution
☐	Up to 25 pages total; any additional pages submitted are not reviewed.
☐	ANSI A (8.5" x 11") paper size must be used.
☐	Minimum font size of 11 points, minimum 0.5" margin on all sides
☐	Written in complete, grammatically correct, and spell-checked English
☐	File name: [DistrictUseCaseAbbreviation]_[SchoolShortName]_DevelopmentPlan.PDF

Content Requirements

☐	Heading or title block with names of school, team, district use case, and deliverable section
☐	Analysis of AHJ for land ownership; zoning ordinances; other land use or building restrictions or regulations; permitting; codes; and interconnection. These AHJs could be any combination of levels at a district or campus; city, municipal, or township; county; state; federal; utility; or public utility commission.
☐	Include table with row for each site location for proposed installation, including assessor parcel numbers, zoning, any overlay zoning, and specific site or development considerations.
☐	Identification of applicable land use, zoning ordinances, permitting requirements, and analysis of compliance with development standards
☐	Analysis of aesthetic appearance in surrounding viewshed
☐	Demonstration of compliance with or fulfillment of district use case master plan (if applicable)
☐	Identification of site constraints, and demonstration of compliance with other land use, environmental, or building restrictions or regulations
☐	Identify applicable local construction permitting and codes
☐	Approach to procure necessary permits and comply with local codes
☐	Proposed timeline for permitting, construction, and interconnection
☐	Identification of risks to successful project development and deployment
☐	Strategy to engage community members and achieve buy-in for project
☐	Identify distributional energy equity impacts of new solar-plus-storage development within and surrounding the district, including design, construction, operation, environmental and workforce impacts (impacts could be benefits or burdens). Address who is included and who is not in the proposed distributed energy solution. Consider what trade-offs are being made in the proposed solution.
☐	Annotated list of references or citations

Appendix F. Guideline for District Use Case

Student-defined district use cases for the "bring your own district" division must be located in a state or territory of the United States.

A district use case is a defined geographic area containing a collection of buildings (a minimum of five and up to 20) served by one or more electrical distribution feeders with a collection of spaces potentially available for PV installation, including but not limited to building rooftops, façades, open land, parking, agricultural dual use, bodies of water, and other facilities. The use case for each district typically includes the following data sets:

- The energy or environmental sustainability goals of the district use case
- A map (.kml file) designating the boundaries of the campus or district within which student teams are confined to designing their systems
- Twelve consecutive months of interval load (energy consumption) data (in intervals ranging from 15 minutes to hourly) for several buildings that are within the district and connected to the electricity distribution feeder. The organizers can assist with generating synthetic electric load data if needed.
- Electric utility rate schedule
- Base case information for distribution system impact summary, including available information about electricity meter, distribution feeder, and transformer locations.
- A development master plan, land ownership status, local zoning codes, and permitting requirements for land use
- District interest in battery storage capabilities (included at the final deliverable package phase)
- A PV system hosting capacity heat map for the distribution system serving the campus or district. The organizers can assist with generating a synthetic PV system hosting capacity heat map if needed.

Use Case Profile

Provide a narrative description of the campus or district use case (four pages, including map figures/graphics). Also include reference citations for the data and other information sources.

Category	Data Files or Links
District name	
Short name	
Location (city, county, state)	
Master plans and maps	
Electric utility rate(s) or tariff(s)	
State renewable energy policies	DSIRE Website https://programs.dsireusa.org
Baseline site plan	(a Google Earth .kml file)

Appendix F. Guideline for District Use Case

Category	Data Files or Links
Roof conditions	For this competition, teams shall assume that roofs are of sufficient condition and age with sufficient structural capacity to support the installation of rooftop solar arrays. Teams should use the maps and aerial views available to assess the presence of obstructions or roof materials that may limit solar system installation.
Electric interval load data	Teams should identify and obtain available building metering data. The organizers can assist with generating synthetic electric load data if needed.
Meter locations	Teams should use available resources to identify meters (i.e., the point of interconnection for the solar systems) on buildings where possible. If no point can be located, an assumption about the location of the meter may be substituted.
Authority Having Jurisdiction (AHJ)	Identify the AHJ(s) for land and building ownership, zoning ordinances, building codes, construction permitting, other regulations, and interconnection where applicable.
Electric Distribution System	Reference any available electric utility or district information about line hosting capacity, substation loading, or electricity distribution heat map.

U.S. DEPARTMENT OF ENERGY

SOLAR DISTRICT CUP

COLLEGIATE DESIGN COMPETITION

Class of 2024–2025 Rules