U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON

Solar Decathlon 2017: Final Report and Lessons Learned

U.S. Department of Energy Solar Decathlon 2017

This material is based upon work supported by the Department of Energy's Office of Energy Efficiency and Renewable Energy Office of Strategic Programs under Award Number DE-EE0007353.

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Contents

Introduction

Energetics Incorporated, with its project partners (collectively known as Team Energetics), has prepared the *Solar Decathlon 2017 Final Report and Lessons Learned* for the U.S. Department of Energy (DOE) to summarize and reflect on the administration of the planning, implementation, and close-out of Solar Decathlon 2017.

This final report introduces the event Program Administrator, Core Advisor Committee, event sponsors and donors, and regional stakeholders that were integral to the success of Solar Decathlon 2017. The substantial balance of this report presents evaluative metrics and lessons learned about the primary aspects of administering Solar Decathlon 2017, including Project Management, Competition and Site Management, Stakeholder Engagement, Communications, Sponsor Management, Education Programming, and Volunteer Coordination. Several appendices compliment the discussion.

About Solar Decathlon 2017

Background

The U.S. Department of Energy Solar Decathlon is one of the Department's premier showcase events in demonstrating the benefits of residential clean energy and sustainable living. The core of the event is a collegiate competition made up of ten contests that challenge student teams to design and build full-size, solar-powered houses. In addition, the Solar Decathlon seeks to provide strong leadership and presence in the areas of workforce development, consumer awareness, and innovation in energy efficiency and renewable energy, as well as leave a lasting economic impact on both the host city and the larger sustainability community.

Solar Decathlon 2017 was held from October 5-15, 2017 in Denver, Colorado. The event took place at the new Regional Transportation District's Peña Station, close to the Denver Airport and on the Denver A-Line. Fourteen teams were selected by DOE to take part in the collegiate competition, with eleven actually participating. Solar Decathlon 2017 was designed to equip tomorrow's workforce with the technological innovations, market awareness, and engagement opportunities with private industry and location-specific partners that will help support a clean energy future and ultimately transform the residential housing market and demonstrate the comfort and affordability of energy efficient, solar-powered homes.

Program Administrator Overview

For the first time, DOE established the 2017 event as a public-private partnership and selected Energetics Incorporated as Project Administrator. Energetics, with its project partners (collectively known as Team Energetics), expanded the reach of Solar Decathlon 2017 by implementing fresh and innovative ideas to enhance the value of the event to the participating collegiate students, the public, the Denver region, and to DOE and its stakeholders. New and innovative ideas included updated Solar Decathlon contests, a tradeshow with technology and professional development pavilions, focusing the student competition on innovation (including the next generation of solar technologies for housing that aligns with future residential demographics), and promoting both local and national education opportunities.

The following objectives supported the program administration of Solar Decathlon 2017:

- Faithfully steward DOE funds in the execution of this important event
- Ensure a safe and fair competition for the Solar Decathlon collegiate competition teams, while introducing innovation into the event
- Involve key regional stakeholders in the planning and execution of the event to ensure local needs are met and to enhance local economic impact
- Decrease the total energy footprint and intensity of the event
- Expand sponsor and stakeholder engagement
- Integrate all DOE Office of Energy Efficiency & Renewable Energy (EERE) offices into the competition, where applicable

Federal and non-Federal contributions were applied to Solar Decathlon 2017:

- Federal Share refers to funding from DOE to the Program Administrator to support the project. This funding includes planning and executing the event, as well as the competition prize money.
- Cost-Share, or Recipient Share, refers to cash or in-kind contributions received from sponsors, members of the Core Advisory Committee, other project stakeholders, or Team Energetics. These contributions were used to supplement the event or to offset costs to DOE or the Program Administrator that would otherwise need to be incurred.

Scope of Work

Program administration of Solar Decathlon 2017 was broken into two major task periods, with four major tasks occurring in either one or both task periods:

- Task Period 1: Planning Solar Decathlon 2017 (April 22, 2016 – December 31, 2016)
- Task Period 2: Executing Solar Decathlon 2017 (January 1, 2017 – December 31, 2017)

Project Management (Task Periods 1 and 2) encompasses all activities associated with managing team activities, communicating with the DOE client, budget and financial management, procurement and the establishment of subcontracts, managing project risk, and ensuring the timely completion of all project deliverables. The Project Management task ultimately resulted in the successful delivery of Solar Decathlon 2017.

Competition and Site Management (Task Periods 1 and 2) refers to all activities associated with planning, organizing, and executing the 2017 competition. Activities under this task include, but are not limited to:

- Develop and execute a Competition Management Plan that identifies actions for the delivery of safe and fair contests, including final rules and building code, scoring engine, and site operations plan.
- Develop and execute a Site Management Plan, including site layout, floor plans, and event descriptions.

- Develop and review the Solar Decathlon 2017 Competition Rules and requirements. This activity was implemented throughout the project and in coordination with the DOE Project Manager, the DOE Project Officer, and DOE Counsel.
- Liaise with the Solar Decathlon 2017 competition teams and ensure that teams meet deliverable deadlines.
- Plan and manage all competition and site operations at the Solar Decathlon 2017 Peña Station site, including procuring appropriate competition subcontractors (e.g., code inspectors, cost estimation, instrumentation, and safety) and equipment vendors.
- Complete all necessary procurements and execute the Solar Decathlon 2017 site plan at the Peña Station competition site, including all competition, education, and tradeshow activities.
- Successfully execute the Solar Decathlon 2017 competition.
- Complete all activities associated with competition close-out, including providing lessons learned and recommendations for the next competition.

Stakeholder Engagement (Task Periods 1 and 2) refers to all activities associated with planning, organizing, and executing Solar Decathlon 2017 with core Solar Decathlon partners (including DOE, sponsors, and key stakeholders). Activities under this task include, but are not limited to:

- Liaise with the Solar Decathlon 2017 Core Advisor Committee, which includes core partners in the Denver area and the Peña Station competition site. For Solar Decathlon 2017, these included the City and County of Denver, Denver International Airport, Denver Regional Transportation District, Xcel Energy, Panasonic Enterprise Solutions, L.C. Fulenwider, and other key stakeholders.
- Develop and execute a Stakeholder Engagement Plan, including sponsorship, communications, volunteer, and education components.
- Develop and execute a Sponsor Management Plan for cash and in-kind contributions to the event. Engage with legacy and potential new sponsors regarding sponsorship opportunities.
- Develop and execute a Communications Plan to coordinate all media and stakeholder communications associated with Solar Decathlon 2017.
- Develop and execute all K-12 and public education activities associated with Solar Decathlon 2017.
- Plan and organize all volunteer activities associated with Solar Decathlon 2017.
- Work with the Competition and Site Managers to ensure that all stakeholder requirements for the site are met, and vice versa.

Project Close-Out (Task Period 2) refers to all activities associated with Solar Decathlon 2017 close-out, including tracking and reporting all required metrics, awarding Solar Decathlon 2017 prize money, and providing lessons learned for the next Solar Decathlon.

Deliverables

The following formal deliverables were completed by Team Energetics in support of Solar Decathlon 2017:

- Concurrence from DOE on the Solar Decathlon 2017 site layout
- Solar Decathlon 2017 Rules
- Project Management and Financial Plan
- Stakeholder and Sponsor Engagement Plan, including Sponsor Prospectus
- Plans for Competition Management, Site Operations, and Event Production; the Competition Management Plan identifies actions for delivery of safe and fair contests, including final rules and building code, scoring engine, and site operations plan
- Communications Plan, including messaging and branding, platforms, channels, media outreach and partners, and final education outreach coordination plan
- Written summary of Energetics' review of team deliverables, including compliance with rules, building code, and safety requirements
- Successful completion of Solar Decathlon 2017
- Comprehensive Solar Decathlon 2017 Final Report, including lessons learned; recommendations on team recruitment, selection, and potential rules changes for future Solar Decathlons; and metrics reporting for communications, sponsor outreach, and education

Key Organizations

Project Team

The following organizations represented the Solar Decathlon 2017 Project Team, in support of DOE. Figure 1 shows Team Energetics as organized by major task area. Additional information regarding roles and responsibilities for each of the project teams can be found in Appendix A.

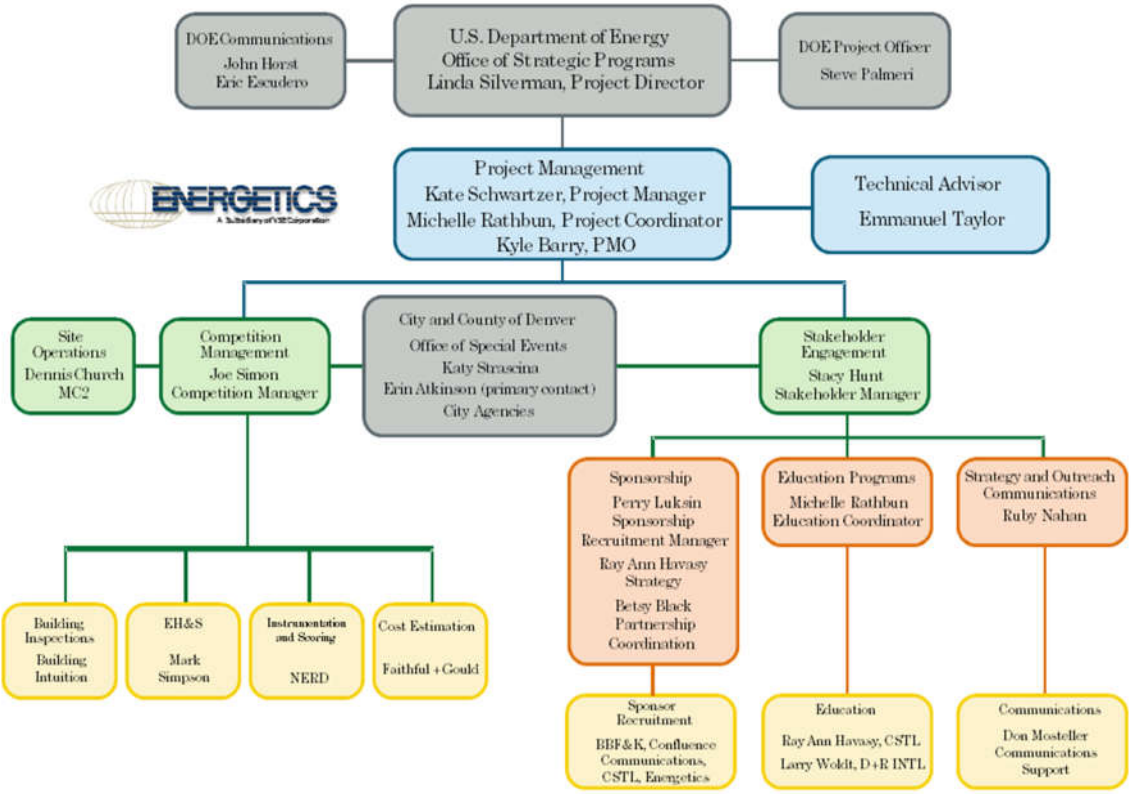
U.S. Department of Energy:

- U.S. Department of Energy, Office of Special Programs
- U.S. Department of Energy, Office of Public Affairs/EERE Communications

Team Energetics:

- Energetics Incorporated
- Confluence Communications
- MC-2
- D+R International
- The Center for Science Teaching and Learning (CSTL)
- Norton Energy Research and Development (NERD)
- Building Intuition, LLC
- Faithful+Gould

Figure 1: Solar Decathlon 2017 Organization Chart, by Task Area



Core Advisory Committee

The following organizations comprised the Core Advisory Committee for the planning and execution of Solar Decathlon 2017, and whose buy-in and contributions were critical to the success of the project:

- The City and County of Denver (CCD)
- Denver International Airport (DEN)
- Regional Transportation District (RTD)
- Xcel Energy
- Panasonic Enterprise Solutions
- L.C. Fulenwider
- Wells Fargo

Sponsors and Donors

The sponsorship component of the Solar Decathlon was significantly expanded from previous years, both in terms of scale and importance, when DOE established Solar Decathlon 2017 as a public-private partnership. The Program Administrator and its project partners collectively procured a total of $2,038,244 in pledged cash and in-kind contributions from 46 sponsors and 22 donors. Nine legacy sponsors returned to support Solar Decathlon 2017, including the American Solar Energy Society (ASES), ASHRAE, Exelon/Pepco Holdings, MicroPlanet, the National Association of Home Builders (NAHB), OxBlue, RSMeans, Schneider Electric, and Wells Fargo. The remaining sponsors were new additions to the Solar Decathlon sponsorship family.

Cash sponsorships were secured from 17 companies and organizations with contribution values ranging from as little as $2,500 to over $200,000. In total, $436,000 was raised in cash sponsorships. Thirty-three companies and organizations donated their services, equipment, labor, expertise, space, and land to Solar Decathlon 2017 in the form of in-kind sponsorship contributions, with pledged amounts collectively valued at $1,585,669. Some sponsors contributed both cash and in-kind support.

Supporting Sponsors:

- **Wells Fargo** made a $200,000 cash contribution in 2017, which includes $25,000 to fund the Education Days and the event in general. Wells Fargo also provided $8,000 to cover RTD's advertisement printing costs, and an additional in-kind donation valued at $100,000 for Wells Fargo's public outreach efforts, volunteer hours, event giveaways, and their role on the Core Advisory Committee. Another $200,000 is scheduled for the 2020 Solar Decathlon.
- **City and County of Denver** provided access to the Peña Station location and considerable staff time to issue permits, host fundraising receptions, market the event, and introduce the Solar Decathlon to other key stakeholders and sponsors across the region and state. Mayor Hancock also decided to purchase several homes for the City of Denver at the event's conclusion, which aids the region's affordable housing goals and promotes the Solar Decathlon event.
- **Denver International Airport** provided half of the event site's land, marketed the event, provided a photographer, hosted the Sustainable "Barkitecture" Competition, provided extra onsite signage, and hosted a sister architecture competition for solar-powered dog houses to shelter the airport's service dogs.

Contributing Sponsors:

- **L.C. Fulenwider** provided half of the event site's land and built the Solar Decathlon Village's road bases.
- **Schneider Electric** sent many volunteers and provided the microgrid for distributing the Solar Decathlon Village's power and connecting it to the grid.
- **RTD** ran poster advertisements and bus wraps on their trains, buses, and Peña Station platform to promote the Solar Decathlon. RTD also promoted the event digitally across their website, in news releases, and within RTD itself.
- **Xcel Energy** served as the Solar Decathlon's electrical utility that provided four points of grid interconnections, cabling, and other electrical infrastructure that put the Solar Decathlon Village onto the grid.
- **Panasonic Enterprise Solutions** donated $25,000 to the event, provided public Wi-Fi service and eight parking spaces in its parking lot, and provided last-minute meeting and shelter space during inclement weather.

Resource Sponsors:

- **Beko** made a $25,000 cash contribution to support the Education Days, digitally promoted the event across their platforms, and provided staff and products to the Sustainability Expo.

- **Center for Science Teaching and Learning** was a Core Advisory Committee member, served as the Solar Decathlon's 501c3 partner, promoted the event publicly, planned a sponsor reception in Denver, and help fundraise in addition to advising Energetics' sponsorship recruiters.
- **Westin Denver International Airport & PSAV** (audiovisual and event technology services) hosted the Solar Decathlon Opening Reception.
- **American Solar Energy Society (ASES)** presented several consumer workshops at the Solar Decathlon and promoted the event at its annual conference and online throughout its network.
- **Modern in Denver** was a media sponsor who provided a suite of promotional advertising across its platforms and featured the Solar Decathlon in an eight-page editorial story in its fall issue.
- **RSMeans** provided user licenses for its software to each school that participated in the Solar Decathlon.

Association Sponsors:

- **Denver Water** provided drinking water at the Solar Decathlon, promoted the event across its platforms, and crafted a series of water conservation tips printed on signs throughout the Solar Decathlon Village.
- **D+R International** planned, promoted, and executed the Education Days.
- **Solar Novus Today** was a media sponsor that promoted the Solar Decathlon across its platforms.
- **9 News** was a media sponsor that provided live and planned news coverage of the Solar Decathlon.
- **CH2M** made a $25,000 cash contribution to help fund the Solar Decathlon.
- **Confluence Communications** was the Solar Decathlon's communications partner, volunteer coordinator, stakeholder engagement manager, and Core Advisory Committee member who helped secure media sponsors and drive attendance.
- **MicroPlanet** provided low voltage regulators to integrate the competition homes' photovoltaic and wind energy into the microgrid.
- **OxBlue** provided live video streams and time-lapse construction camera services for the Solar Decathlon.
- **Thrive Home Builders** made a $25,000 cash contribution to help fund the Solar Decathlon.
- **Visit Denver** featured the Solar Decathlon across is web platforms, newsletters, and other tourism-focused media channels and partners throughout the Denver region.
- **WAC Lighting** made a $25,000 cash contribution to support the Education Days**.**
- **ASHRAE** provided $20,000 to pay for a photographer, a lunch for the decathletes, and a dinner for the jury members.

Affiliate Sponsors:

- **Danby Products Incorporated** provided compact refrigerators and microwaves to prize-winning educators at the Education Days.
- **National Association of Home Builders** sponsored the Victory Breakfast for the competitors.

- **WeWork** offered decathletes and jury members complimentary access to its dynamic and inspirational workspaces.
- **Exelon** donated the time and expertise of several employees who provided valuable support to the Solar Decathlon competition management team.
- The following organizations provided generous financial contributions to support Solar Decathlon 2017 teams in their innovative approaches to sustainable energy: **Bronster Fujichaku Robbins, Jacobs Engineering, Jonathan Merage Foundation, Killick Aerospace**

Friends of the Solar Decathlon:

- The following contributions were instrumental to the success of the overall event:
  - The **Solar Training Network** sponsored, planned, and delivered the Solar Decathlon Career Fair.
  - **Solar Energy International** worked in tandem with the Solar Training Network to produce the Solar Decathlon Career Fair.
  - **National Children's Theater Group** provided free performances of *The Resource Force* during the Education Days.
  - **Peet's Coffee** supplied complimentary, freshly brewed coffee to energize the decathletes during assembly of the Solar Decathlon Village.
  - **Viva Green Homes** promoted the Solar Decathlon across its media platforms to reach its partners and industry leaders.
  - The **National Electrical Manufacturers Association** provided editorial coverage of the Solar Decathlon in their magazine, *electroindustry.*
- The following contributions were instrumental to the success of the competition:
  - **EnergyLogic** donated time and energy to conduct complementary blower door tests on the competition houses for the Health and Comfort contest.
  - **Vaisala** supplied carbon dioxide sensors at a generous discount.
  - **REED Instruments** supplied light meters at a generous discount.
- The following organizations contributed generous financial support for the advancement of smart energy production through design excellence: **Liberty Mutual Insurance, Nolan Financial Group, Willis Towers Watson**

Donors:

In 2017, the Program Administrator launched a crowdfunding effort to draw upon the generosity of donors interested in contributing to the event in a non-sponsor capacity. Donations were accepted at all levels, and ranged from $25 to $3,500. Most donations were under $250. A website—www.supportsolar.org—was established to brand the effort, with all funds processed through the Solar Decathlon's 501c3 partner. Marketing of the effort was completed through #support4solar social media platforms (Facebook, Twitter, Instagram) and mass email blasts. A total of 22 donors contributed $16,575 through this mechanism.

Regional Stakeholders

An event of Solar Decathlon's magnitude—with multiple workshops and wrap-around events in a new location—would not be possible without the support, expertise, and staff from stakeholders around the Denver region. The following stakeholders provided promotional support to Solar Decathlon 2017:

- **American Institute of Architects**
- **Children's Museum of Denver**
- **Councilwoman Stacie Gilmore's Office**
- **Denver Regional Council of Governments**
- **Optic Nerve**
- **University of Denver**

In addition to providing promotional support, the following regional stakeholders also contributed to the event's programming:

- **American Lung Association** sponsored and implemented the Electric Vehicle Ride and Drive.
- **Big Brothers, Big Sisters of Colorado** hosted a one-day event for 'Bigs' and 'Littles' to explore the Solar Decathlon Village.
- **Boulder Valley School District** participated in the Education Days.
- **Building Codes Assistance Project at The Trust for Conservation Innovation** hosted a professional development workshop for building design professionals to help them understand solar energy concept, policy, and practice.
- **Colorado Renewable Energy Society** (CRES) presented on the Passive-House concept during the ASES consumer workshop and shared a booth in the Sustainability Expo with other related groups.
- **Colorado School of Mines** showcased its tiny house, which is a net-zero, solar-powered tiny house used for research and educational outreach.
- **Colorado Solar Energy Industries Association** (COSEIA) hosted consumer workshops focused on the role of renewable energy in strengthening the U.S. economy, opportunity for successful business installation of solar technology, Colorado policies shaping solar energy, and the Passive House science-based approach.
- **Denver Public Schools** participated in the Education Days.
- **Domino Strategies** organized and implemented Solar Decathlon wrap-around events adjacent to the Solar Decathlon Village.

Solar Decathlon 2017 Metrics and Lessons Learned

This section discusses the key metrics and lessons learned from Team Energetics' experience with planning and administering Solar Decathlon 2017, organized by the project's primary aspects: project management, competition and site management, stakeholder engagement, communications, sponsor management, education programming, and volunteer coordination efforts. Results from surveys of the university competition teams, sponsors, and middle school teachers participating in Education Days are also presented and discussed, which helped to inform Team Energetics' evaluation of these aspects of Solar Decathlon 2017.

Project Management

Team Energetics successfully planned and delivered Solar Decathlon 2017 through the use of proactive project management principles. Regular communication with the team and the DOE client was implemented through conference calls, meetings, and email status reports, all of which varied in frequency based on the level of activity on the project. Energetics utilized the expertise of its corporate contracts and accounting personnel to execute contracts and subcontracts and manage the budget and submit invoices. Lessons learned pertain to project initiation, DOE's project management role given the new public-private partnership model, and status reporting.

Lessons Learned

- The time to contract (i.e., award announcement to final signing of the agreement) should be shorter in the future, to enable additional time for the Program Administrator to secure subcontractors, meet early requirements of the project (most importantly, drafting the competition rules), and court sponsors.
- Changes in DOE management at the outset of the project led to a lack of clarity in project vision and hampered the project early on. The Program Administrator had to adjust frequently during the negotiation phase to account for changes in DOE management.
- The new public-private partnership model in 2017 shifted the financial risk to the Program Administrator. This model may deter future private sector entities from applying to serve as Program Administrator in the future.
- At the outset of the project, DOE should define the jurisdiction of their personnel regarding competition management, communications, site management, and sponsor fundraising. DOE activities in support of Solar Decathlon 2017 were largely siloed and it was unclear how much involvement federal personnel could have in fundraising. A more active and collaborative role (e.g., communications helping to fundraise) by DOE staff across project aspects could have benefitted the project.
- A contractual relationship between DOE and the university teams—or alternatively the Program Administrator and the university teams—should be a requirement in the Funding Opportunity Announcement (FOA). Solar Decathlon 2017 did not require the teams to contract with DOE or the Program Administrator, which led to inefficiencies related to liability requirements, insurance requirements, and the cleanup of teams' solar envelopes. In the event that the Program Administrator is required to contract with the university teams, DOE's financial

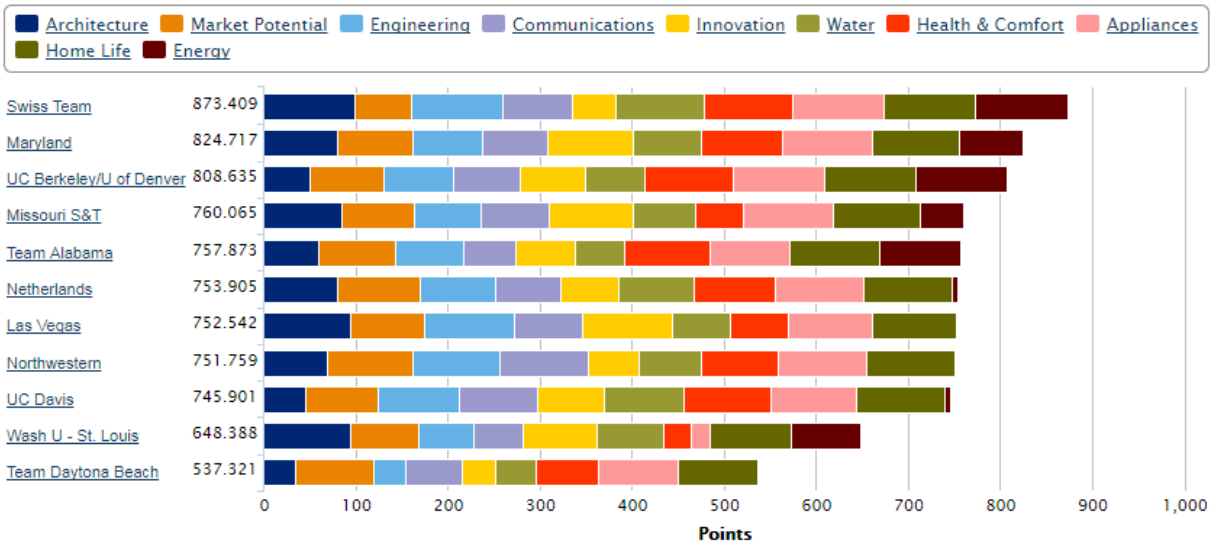
contribution to the project should be commensurate with the administrative burden to meet this requirement, along with other project costs.

- As noted in the Competition Management section of this report, the ability for the Program Administrator to subcontract to the university teams for common items (e.g., cranes, landscaping), would yield a safer and more organized site and cost savings for the teams and the project as a whole.
- In addition to quarterly reporting required under the agreement with DOE, Energetics submitted weekly status reports via email of major actions taken to support the project. The frequency was amended to biweekly or monthly during the planning and closeout stages, when activity was light. These reports kept the DOE client updated on support for the project, managed project risk by enabling course correction when needed, and demonstrated progress toward implementation.

Competition and Site Management

Team Energetics successfully planned and delivered the Solar Decathlon 2017 competition and associated events at Peña Station in Denver, Colorado. The competition results were accepted by the collegiate teams, and the event attracted more than 25,000 from the Denver area and nationally to the Solar Decathlon Village. Figure 2 depicts the final standings of the 2017 competition. The official certified results are located in Appendix B. Results organized by teach of the 10 contests can be found on the Solar Decathlon website: https://www.solardecathlon.gov/2017/competition-scores.html

Figure 2: Solar Decathlon 2017 Final Standings



Metrics

- Successful delivery of all project deliverables to DOE on time and within budget: Complete
- Competition results accepted by Solar Decathlon 2017 competition teams: Complete. See standings in Figure 2 above and certified results in Appendix B.

- 2017 Competition Teams' satisfaction with Program Administrator's responsiveness and communications (collected via survey after the competition): Complete. See survey results section of this report.
- Number of attendees at Solar Decathlon 2017, if attainable: 25,000 including decathletes and advisors, members of the general public, Education Days students and teachers, workshop providers and Expo exhibitors, volunteers, and staff.

Lessons Learned

Competition Management

Team Energetics successfully completed the Solar Decathlon 2017 competition and delivered all prize funding in accordance with the competition rules and results. Lessons learned and other recommendations resulting from the competition include the following:

Structure and Timing of Team Selection

- The Program Administrator should be selected prior to DOE selecting the competition teams. This will allow for some level of oversight from the Competition Manager on the number and quality of teams that enter the competition.
- DOE and the Program Administrator should ensure that only committed teams are eligible to participate in the competition. This should require the following:
  - Down-selection by DOE in partnership with the Program Administrator. Early down-selection is preferable to teams dropping out later in the competition process, both in terms of constraints on planning on the part of the Program Administrator as well as the optics for sponsors and other program partners.
  - Require that all university teams provide a letter of support from a University Administrator to ensure that the university properly understands the level of commitment required from the participants and from the school at-large.

Sponsorship

- As currently structured, the cost-share/sponsorship requirements for the Program Administrator put the Program Administrator in competition with the university teams for sponsors. The Program Administrator heard on multiple occasions that a targeted sponsor (i.e., Tesla) was more interested in supporting a university competitor than supporting the larger project. This made collecting cash sponsorships necessary to support the project very difficult. Pursuing a different structure that promotes a stronger partnership interest between the university teams and the Program Administrator is desirable.

Development and Structure of the Competition Rules

- The Program Administrator should have a greater say in the development and structure of the competition rules, early in the process, given changes to the program's structure.
- Increase the focus on innovation in the rules; avoid over-relying on what has been done in previous Solar Decathlons.

- The rules should clearly list the insurance requirements for the teams, which will flow down from requirements from DOE, the Program Administrator, and the event landowner(s).

Structure of Contests

- A more equal measure between juried and measured contests would reduce the risk introduced by the prize purse structure.
- The rules (and jury selection more generally) should require jurors to provide a greater amount of detail in assigning scores.

Closeout Requirements

- The Rules must incorporate more stringent penalties for teams during close-out. The Program Administrator had to deal with a high number of issues during close-out (especially trash), including one team threatening to abandon their house onsite due to a lack of funds. This uncertainty, with no real way to enforce when teams left the site, led to a great deal of stress and cost for the Program Administrator.

Participation of Non-U.S. Teams

- The rules should incorporate elements related to the participation of non-U.S. teams. The teams should be required to bring their own equipment, such that it is not incumbent on the Program Administrator to provide the necessary means for the schools to get their house up and running. This is most important in connecting the teams to the electrical grid.

Holding In-Person Meetings with the Teams

- For Solar Decathlon 2017, DOE and the Program Administrator agreed to hold a series of webinars in lieu of an in-person workshop. While the decision was made due to cost and personnel constraints, the in-person meeting likely would have helped to further prepare the teams and allow for a clearer explanation of competition components and expectations.

Site Management

Date Selection

- Avoid scheduling future Solar Decathlons in October. Although October allows for school-age students to attend with their schools, late-autumn dates introduce a number of risks that may adversely impact the project, including:
  - University student teams and faculty members are constrained by the fall semester, which places undue stress on the students while potentially discouraging some teams/students/faculty from joining the project.
  - Late-autumn (particularly in Denver) introduces volatility in the weather. During the 2017 competition, the Program Administrator had to plan for summer heat, autumn winds, and winter snow, which greatly impacted planning and led to higher costs. In addition, the site had to shut down for one of the available public days due to snow. Spring or summer are recommended to reduce the risk of weather significantly impacting the project.

Site Selection

- Future Solar Decathlon Villages should be required to have previously-hardscaped surfaces. This is particularly true for areas (like Denver), which have relatively volatile weather. Non-hardscaped surfaces can be adversely impacted by the weather (particularly mud and snow) and require significantly more maintenance.
- Future Solar Decathlon Villages should be located in areas that see relatively high amounts of foot traffic. Significant effort went into promoting the 2017 event, due to its non-downtown location in a developing part of the region with a relatively new public transit stop.

More Program Administrator Control/Contracting

- Load-in and load-out were challenging from a logistical perspective. The Program Administrator should be given final authority on schedule for all cranes that will be onsite. One solution might be to have the Program Administrator contract with the teams directly and subcontract with the crane and other logistics companies. This will reduce risk from a safety perspective, and will also ensure that the schools are using their cranes most efficiently (from a cost and competition perspective).
- Prior to the next competition, all existing electrical equipment (currently located at the Wind Farm) should be sufficiently tested and deemed to be competition-ready by a certified electrician familiar with the local codes of the next competition host.

Rules Requirements

- Schools need to plan for and be responsible for their personnel and maintenance (e.g., mud mitigation) of their solar envelope in case of inclement weather.

Feedback from University Teams

Team Energetics conducted a survey of the Solar Decathlon university teams in order to solicit feedback on their experience with Solar Decathlon 2017. The below information represents a summary of survey results. The survey was distributed to university teams via Survey Monkey, an online survey tool, with 106 individuals responding, including:

- 82 university team members who attended this year's Decathlon
- 6 university team members who participated, but did *not* attend
- 17 university faculty advisers who attended
- 1 faculty advisor who did *not* attend

The Solar Decathlon university team survey contained 26 questions, the majority of which were designed to capture open-ended responses. The team members were all asked to provide their school affiliation. From this, we were able to show that for every question, we received at least one response from every team. Areas in which we sought direct feedback included:

- Program Administrator-to-university team communications practices
- Application process
- Activities associated with designing, building, and transporting the houses to the competition site

- Project funding and fundraising activities
- The competition
- Opportunities for career development
- Overall experience

Initial Impressions

The communications outputs that Energetics developed as the Program Administrator (e.g., competition guidelines and event-related announcements)—shared using platforms such as webinars and a closed email network (a Group iO)—were well received overall. Ninety-one (94%) respondents indicated that the communication approaches were sufficient.

Eighty-five (82%) respondents gave the following responses to questions about the **Solar Decathlon's application process**:

- 73% found there was sufficient time to apply.
- 27% were either neutral or admitted to not being part of the application process.
- 18% indicated they would have benefitted from more time to complete the initial application.

The survey results also showed that over the course of two years, the number of university students involved in the 11 teams; including core team members, the 10 Solar Decathlon contests, and/or the construction phase ranged anywhere from 10 to 200 members on each team.

Eighty-five (82%) out of 106 respondents admitted to **facing obstacles when it came to designing, building, and transporting their teams' houses** to the Solar Decathlon event site. Transportation was the most commonly shared obstacle, especially from the international teams. The team members also cited internal issues, such as delegating work amongst themselves, as obstacles.

When it came to activities such as **fundraising for their Solar Decathlon project** entries, 82 (80%) out of 106 of team members shared a range of suggestions. These recommendations spoke largely to starting early, working with industry, and collaborating with their universities directly (including their schools' broader professional networks and alumni). From that group:

- 84% were satisfied with the current prize structure.
- 16% were not satisfied with the current prize structure.

A similar number of team members also replied to a question about the possibility of receiving **funding from DOE** through any of the following:

- During the initial selection process: *Preferred by 10% of respondents*
- At the end of the event: *Preferred by 22% of respondents*
- Combining the two options, which would create a new model for the current prize structure: *Preferred by 68% of respondents*

Eighty out of 106 team members responded to a question about their experience in participating in the Solar Decathlon; specifically how it impacted their **interest in pursuing careers linked to energy, building, and design**:

- 93% replied positively.
- 7% cited that it did not impact their interest in pursuing careers in these areas.

Of the 80 team members who weighed in on the benefits of **Solar Decathlon's networking opportunities**:

- 89% indicated that it was a positive networking experience.
- 6% remained neutral on the matter.
- 5% indicated that it was not beneficial.

The survey also provided an opportunity for the team members to share their thoughts on the **most challenging aspects of competing in the Solar Decathlon**. The majority acknowledged that it was a tough competition, where every team had the opportunity to interpret the challenge of building a house in a unique way. Overall, it was seen as a huge undertaking and while incredibly rewarding, a number of teams faced a variety of hurdles along the way (e.g., Hurricane Irma, balancing their academic commitments, fundraising, and meeting project deadlines). Recruiting, retaining, and managing student teams—while tracking progress, learning new skills, and producing high-quality work—were recurring themes in the survey results.

The team members highlighted what they considered the **best aspects of the competition**.

- Social aspects—including team spirit, new friendships, and the opportunity to interact with other schools—were among the top responses from the 80 respondents.
- The satisfaction of building a house, seeing the other houses, and showcasing their houses to the jurors, the general public, and their fellow competitors were also popular responses.
- As a whole, survey respondents shared that the various aspects of competing in the competition, although quite difficult, was found to be rewarding overall.

Recommendations and Lessons Learned

The team members who participated in the survey submitted recommendations to help make participating in the Solar Decathlon a more positive experience for future teams/universities. A selection of these comments are shared below, organized into two categories: *competition dynamics* and *technical elements.*

Competition Dynamics

- Seventy-eight out of 106 team members responded to a question about **moving the competition to the summer**. 81% preferred moving it to the summer, with some citing that this would help address academic issues in addition to recruiting team members.
- Fifteen out of 106 team members commented on **making the Solar Decathlon more affordable** to the teams. Recommendations include:
  - Establish a fixed budget for every school or downsize the houses to save on production costs.
  - Provide assistance with fundraising and securing product/material donations to help offset costs.

  - Provide a letter from DOE to each university, congratulating the team on being accepted into the competition and highlighting the level of effort required to compete, to enable teams to demonstrate to their administration and sponsors their funding needs.
  - Offer amenities to the teams—onsite housing, options for transportation to/from the site, and food options that were in closer proximity to the site—to help the teams save money.
- Seven out of 106 respondents recommended that more information be provided about the **building site conditions**. Multiple team members expressed concerns about the impact of the unpredictable Denver climate and the relatively isolated site on their construction and on the event. The site location created housing and transportation hardships for some of the university team members. They expressed a desire for higher foot traffic to appeal to potential sponsors.
- Despite the fact that the Solar Decathlon is a competition, team members indicated an interest in **more opportunities for cross-team interactions**. Recommendations include:
  - Offer a space where all the teams could meet informally for meals and breaks during the construction and disassembly phases.
  - Offer more time for the teams to meet with each other outside of the competition.
  - Introduce the teams either virtually or in-person before the competition.

Technical Elements

- It was suggested that more **resources on building inspections** and other required processes be shared earlier in the competition, so that the teams knew what exactly they needed to do during construction.
- While many respondents expressed that the rules were thorough and generally comprehensive, some expressed that **additional guidance would be helpful**.
  - Establish clearer guidelines about project scope and budgets.
  - Develop and release to teams a 1-2 page *lessons learned* or *best competition practices* document to illustrate common principles for successful competition entries.
- Six out of 106 respondents expressed the need improve **how the Solar Decathlon's building codes are handled**.
  - Overall, there seemed to be a consensus that the design criteria needed to be smoothed out; including stricter building code enforcement in the drawings, as well as improved communication regarding onsite code violations.
  - Three survey participants noted variations in the enforcement of building codes (i.e., ramps) and how the electrical code compliance was addressed.
  - One recommendation was to try to share all the violations at once, rather than a few each day, especially if the majority are visible from day one.
- A number of survey participants noted the hardships in **transporting their houses** from their universities to the event site. It was suggested that this is an area that could potentially be explored with DOE.

Stakeholder Engagement

From the very beginning of the project, Team Energetics sought to engage national, state, and local resources to contribute to Solar Decathlon. Energetics established a Core Advisory Committee to assist with planning and executing the Decathlon.

Metrics

- Successful delivery of all project deliverables to DOE on time and within budget: Complete.
- Number of engaged local, regional, and national stakeholders: Fifteen regional stakeholders contributed financial resources and staff labor to execute the event.
- Number of committed Core Advisory Committee members and key stakeholders: Seven Core Advisory Committee members contributed to event planning and execution.
- Number of stakeholders who return to support the 2019 competition: Undetermined at this time. DOE pushed the 2019 competition to 2020, and the location is still subject to approval. Site selection will determine if the Denver-area stakeholders remain for 2020. Anecdotally, a number of sponsors—including those who could not contribute in 2017—have indicated their interest to support future events.

Lessons Learned

- Key stakeholders expected to provide significant in-kind contributions that impact the success of Solar Decathlon should be contractually bound to DOE to deliver specific items to fulfill their in-kind contribution. 2017 expectations (i.e. from City for promotional and sponsorship recruitment support) were vague and not accountable.
- DOE's expectations for in-kind contributions should be recalibrated. It is unrealistic to expect that businesses not being paid by DOE for services will have enough focus on supporting Solar Decathlon to fulfill cost share.
- Because regional and local stakeholders are only volunteering their time and resources, expectations for precisely what they will contribute should be clearly defined at the earliest date possible, and the program administrator should take care to not burden stakeholders with any responsibilities critical to the event's core functions.

Communications

Team Energetics successfully leveraged the expert communications teams at DOE and in the Denver region to successfully promote Solar Decathlon 2017. Led by Confluence Communications, Team Energetics organized and led the communications and outreach efforts to help promote Solar Decathlon 2017. More than 500 media stories were published since January 2016, and the DOE and Team Energetics communications team successfully reached nearly all local media in the Denver region (print and TV).

Metrics

- Web site and blog (use EERE's Google Analytics account to track data for the Solar Decathlon website, which includes the blog): Approximately 150,000 visitors from 2016-2017.

- Public Outreach: Utilized local stakeholders and sponsors, as well as DOE and EERE communications teams to reach all major print and TV outlets.
- National/Regional/Local Media: 500 published media stories since January 2016, with a reach of more than 100 million.
- Social media: Doubled the reach of Solar Decathlon from previous years.
  - Reach of 2.8 million people
  - 9.9 million unique users of #SolarDecathlon on Twitter and Instagram
  - Followers by platform, 48,256 total:
    - Facebook: 22,166
    - Twitter: 18,173
    - Pinterest: 3,623
    - YouTube: 1934
    - Instagram: 1,147
    - Flickr: 272
    - Google+: 256
    - LinkedIn: 685
- Print collateral (manual inventory count—how many publications delivered and how many were left. Rely on printing company for ad sales/benefit to them.): Out of a total of 10,000 visitor guides, approximately 1,900 remained. The printing company was paid market price for their services, and therefore ad sales or other benefits did not apply.

The following metrics are tracked by DOE. Please refer to the DOE Communications report on Solar Decathlon 2017 lessons learned.

- Professional/trades media
- Industry associations
- Alumni network

Lessons Learned

General

- This project is best served by an overall project leader, not just an overall administrating organization.
- Identify one file storage and exchange solution that can be accessed by all parties involved in the project, including DOE, subcontractors, stakeholders, and sponsors. Identifying a solution that works for DOE and its firewall represents the greatest challenge.

Branding Guidelines

- Align the Identity Guidelines and Rules about branding and sponsor recognition to reduce confusion to teams.

Website

- The DOE web contractor was tremendous to work with. The staff was talented, skilled, and responsive to requests.

- Scoring visualization needed to be reviewed by the DOE or Program Administrator content lead earlier in production. Assumptions were made by technical people that were not reasonable for a non-technical audience that affected usability of the scoring visualization, which led to inefficiencies late in the process. Given that scoring is the most viewed content on the website, it is also worth investing in an update for future competitions.
- There was a pretty serious crunch with content that needed to be posted just before the start of the event, such as the Virtual Visit page, Scoring database, and Team Page updates. The Communications Team should phase in these changes or stage updates to prevent a high workload for the Communications Team and the DOE web contractor.
- Although the Communications Team tried hard to ensure photos and blogs were ready to go by a certain hour each day, agreed upon in advance, the reality on the ground didn't make that schedule possible. It put a lot of strain on DOE web contractor. More staff, either on the part of the Program Administrator or the DOE web contractor, will help ensure efficiency in loading resources to the web.
- The Program Administrator created a Visit Virtually section on the website for the first time in the event's history. Overall, this page ranked 41st among all 3,473 pages on solardecathlon.gov. For only the month of October, it was the 16th most visited page. The performance of this page was limited by the fact that it did not go live until October 5. To improve traffic and raise awareness of this resource, competition organizers should require teams to submit computer-animated walkthroughs earlier in the process and host them there.

Social Media

- Benchmarking followers as part of social media strategy development was a useful exercise that allowed the 2017 competition organizers to better understand audience growth and impact.
- Pinterest and LinkedIn showed the most potential for future growth. Google+ appears to be extinct.
- Changing the precedent for the event's hashtag from #SD2017 to #SolarDecathlon was a big win. A social media monitoring platform, Keyhole, was used to observe hashtag performance for the first time. This allowed us to recognize conflicts with using the standard approach, such as competing with Saviour's Day. Ultimately, more than 10 million people were reached with the #SolarDecathlon hashtag, all of which can be attributed to association with our branded event.
- Given Snapchat's enormous growth since the 2015 competition, the Program Administrator developed a strategy for piloting the platform during the event. This approach focused on creating a geofilter for the event site. This avoided the need to save all correspondence in alignment with the government requirement for record keeping. However, it limited the ability to interact with others on the platform. In retrospect, an "Our Story" should have been used so that the hundreds of snaps using the geofilter would have been available to all.
- App-based experience posts are becoming increasingly popular. Two of the top posts in terms of engagement—the People's Choice Award and Which House Are You Quiz—relied on using Facebook extensions. Twitter now offers a free poll as well, signaling the growth of more interactive content across platforms.

- The fact that Facebook's algorithm is currently promoting Live Broadcasts was noted by the Communications Team in advance of the event. However, staffing limitations allowed the organizers to only broadcast two of the award ceremonies. The Overall Award Ceremony received more than 200 hours of watch time alone. In addition, the Facebook Live Broadcast house tours performed better than the Solar Decathlon Minute videos and the 360 videos of all 11 houses.
- Video content is king. For future events, the Communications Team recommends making the investment to conduct more of it throughout the full lifecycle of the competition process, not focused solely on the event. This will require resources, but they would be well invested as engagement with video is really high.
- Working with the DOE web contractor to administer the social media accounts was clunky at first. While there were times when it was beneficial to have that support, most of the posts around and during the event were made directly by Confluence Communications, EERE Communications, or the DOE Office Public Affairs. It was a much more efficient approach for the people on the ground to have full administrative access.
- To underscore the lesson learned bullet above, these two lessons learned were received from the DOE web contractor:
  - During the event, multiple staff from the EERE/DOE digital team were given administrative rights to Solar Decathlon social media accounts, and that was hugely successful.
  - Staff from EERE/DOE digital shot the Solar Decathlon Minute and Facebook Live videos and uploaded them directly to an established playlist on YouTube, which was embedded on the website. That was very helpful and efficient.
- Engaging a sponsor for social media would be an ideal way to boost posts for reaching a wider audience, as well as allowing for social media influencer opportunities.

Photography/videography

- Examine what is actually useful in terms of photography. This is an incredibly time-consuming task for the Communications Team, and it should be examined to evaluate its true value and return on investment.
- Finding the budget to hire AP photographers is highly recommended. They may cost more, but they do high-quality work, and their work better meets Solar Decathlon photography needs.
- Flickr has some general "bugginess," but remains the best platform for storing and distributing photographs. Also, it holds tens of thousands of Solar Decathlon photos from years past.
  - Efforts should be made to standardize image tags in advance. In addition to the AP style information added to each image description, all photo captions should include a link to www.solardecathlon.gov to drive site traffic.
  - Flickr albums were reorganized to allow for a better user experience on the web. However, that reorganization was not ideal. The album structure is predicated on photo embeds on the website, but not all photos on Flickr get embedded on the website. Another attempt should be made to optimize the album structure on Flickr, and that process should include input from the media relations team and members of the media, if possible.

- During the planning phase, gather input to shot lists from DOE, especially where suitably capturing and posting images of VIPs and DOE staff are concerned.

Competition SME (Rules, team deliverables, team mentoring)

- The Communications Team should have some input into Communications Contest rules to ensure team deliverables will work within/coordinate with communications planning for the event.
- Team mentoring (early in the process and often throughout the project) really makes a difference to the quality of the communications products the teams produce, which, in turn, helps the event.

Blogs

- The blog introducing the team designs was very effective. The associated promotion on social media featuring a video of the team renderings was especially helpful in driving traffic to the website.
- Alumni blogs provided interesting content, but they were not effective enough to warrant the effort required to actually get them. If these are done again, the content strategy needs to be better thought out and scheduled.

Village Insider (GovDelivery email newsletter)

- The strategy for this needs to be reconsidered to identify how it might help both build sponsorship and provide sponsorship fulfillment benefits. The Communications Team informed the schedule on this based on budget and NREL recommendations, but believe this could have been used to much greater effect.
- The option to subscribe to the newsletter was removed from the website after the last competition and not reinstated until the year of the event. This should always be active on the website, even if content is not being regularly sent out.

Volunteer and Event Management Support

- Tasks around this effort were pretty successful. Support for the volunteer program was a bit behind schedule on the website, because it happened at the same time other content was going live in anticipation of the event. Schedule these actions sooner, to mitigate delays.

Sponsor Management

The sponsorship component of the Solar Decathlon was significantly expanded, both in terms of scale and importance, when DOE established Solar Decathlon 2017 as a public-private partnership. The Program Administrator and its project partners collectively procured a total of $2,038,244 in pledged cash and in-kind donations from 46 sponsors and 22 donors.

Team Energetics faced a number of obstacles in procuring sponsors, particularly up to the level required by the contract. This fact was exacerbated by a number of issues, including:

- The change in Administration cast some level of doubt as to the status of the business climate in 2017. This hindered potential sponsors from making commitments until the Administration's

priorities (and their impact on the business climate) became clear, which was too late for the event.

- Core potential sponsors (e.g., solar companies, builders, other energy companies) faced down years in 2016 and 2017 that precluded them from supporting Solar Decathlon 2017.
- Legacy sponsors (e.g., BP, Lowes, Bosch) experienced management changeovers or changes in their business models that precluded them from supporting Solar Decathlon 2017.
- The Program Administrator was set in competition with the teams for sponsorship funds. Energetics heard from a number of sponsors that they were more interested in supporting the teams than they were the larger project.
- The selection of Denver as the site location limited the recruitment of companies outside of the Denver market.
- The site selection process did not require a budgetary commitment from the host city, which would've demonstrated a commitment to the project and potential sponsors.
- The time to contract hindered Energetics' ability to court sponsors early in the 2016 cycle. In addition, the two-year cycle left Energetics with six months to court sponsors, as commitments for 2017 were made early in 2016.
- Legal and technical challenges related to the new model of Solar Decathlon created uncertainty about how engaged DOE personnel could be in the sponsorship program.

Metrics

- Total sponsorship revenue reached: $2,038,244 raised in total, including the following:
  - $1,585,669 from in-kind sponsorships
  - $436,000 from cash sponsorships
  - $16,575 from individual donors
- Number of industry partners recognized and recruited in the Solar Decathlon 2017 sponsorship program: 46 cash and in-kind sponsors, plus 22 individual donors
- Sponsorship partner satisfaction (obtained through survey): Complete. See survey results section of this report
- Reported positive feedback (1-10 scale, qualitative data): 7.8 weighted average of overall rating. See survey results section of this report.

Lessons Learned

- Early senior-level DOE (Secretary and Assistant Secretary level) visibility on the project, either directly or indirectly, would signal to sponsors that their contributions are valued by DOE.
- DOE and the Program Administrator should work closely together to right-size the sponsor benefit levels. Team Energetics added lower-tier sponsor levels in mid-2017, which resonated with a broader set of potential sponsors.

- The Program Administrator and university team sponsor programs should be more closely aligned in order to take advantage of potential synergies and mutual opportunities to reduce costs.
- The site selection process should require a cash and in-kind commitment from the host site to support the project.
- The selection of site within a larger market would increase potential foot traffic, media visibility, and the potential sponsor pool.
- A contract needs to be established at least two years out from the date of the event in order to allow teams and the Program Administrator to capture potential sponsors early in their budget and planning cycles.
- At the outset of the project, DOE legal needs to establish clear policy for the Department's capacity to engage with potential sponsors in support of the Program Administrator.

Feedback from Survey of Sponsors

Sponsors were asked to answer five survey questions about their experience sponsoring Solar Decathlon 2017. The number of questions was intentionally minimized to enhance the survey response rate and promote thoughtful reflection and answers. Fifteen of 45 sponsors responded to the anonymous survey, for a 33% response rate. From a scale of 1 to 10, sponsors submitted a weighted-average rating of 7.8 to describe their overall level of satisfaction with sponsoring Solar Decathlon 2017. One-third of all respondents submitted perfect ratings, while over two-thirds rated their experience no lower than 7. No respondent ranked their level of satisfaction below 5.

Sponsors were pleased with the variety of opportunities offered to promote their brand at Solar Decathlon 2017. They gave an average rating of 8.3 out of 10 to describe their level of satisfaction with "the array of opportunities offered to activate their brand" that Team Energetics provided them in exchange for their sponsorship contributions. 80% of the survey respondents gave a rating of 8 or 10, while the lowest rating from one user was a 6.

A given sponsor's overall prominence online and onsite was and determined by the monetary value of their contribution, which placed them into one of six sponsorship categories where they could access as little as five to as many as thirty different promotional opportunities. Online, sponsors were listed on the Solar Decathlon website, the Support Solar donation webpage, and promoted in the Solar Decathlon's social media campaigns. Onsite, sponsors were published in the Visitor Guide and marketed on signs located throughout the Solar Decathlon Village. Top sponsors had VIP privileges, such as green room access and tickets to the Solar Decathlon's most anticipated ceremonies and events, in addition to mentions in official press releases. These sponsors also had complimentary booth spaces at the Sustainability Expo and opportunities to meet decathletes face-to-face by speaking at events, recruiting them at the Career Fair, and even joining decathlete competition dinners.

Sponsors were also pleased with the amount of additional attention their brand received by sponsoring Solar Decathlon 2017. When asked to rate their satisfaction with the amount of additional online and media impressions, sales, or other positive outcomes of their sponsorship, sponsors gave their experience a 7 on average. Two-thirds of survey respondents gave a score from 4 to 7, while the final third of respondents gave perfect marks. It is important to note that sponsorship evaluation is an

imprecise art that each sponsor undertakes with a widely varying degree of sophistication. Therefore, this question was designed to capture their conclusions rather than the evidence they used, such as sales metrics, social media attention, or otherwise.

When sponsors were asked to rank their reasons for sponsoring Solar Decathlon 2017, the most highly rated reason was because their target demographic typically attended the event. The array of sustainable technologies featured at Solar Decathlon 2017 was ranked second, on average, followed by five factors that received almost equal weight from sponsors, listed in slightly descending order of importance:

- Media attention earned by the event (tied for 3rd)
- Interfacing with the U.S. Department of Energy (tied for 3rd)
- The Solar Decathlon's brand value (tied for 5th)
- Their ability to interface with likely customers and sell their product (tied for 5th)
- Educational premise of the Solar Decathlon

The event's location played a smaller role in their decision to sponsor the Solar Decathlon, while "other" reasons motivated them even less and affiliating with a rooftop solar-power-focused event influenced them the least.

Finally, sponsors were given an opportunity to share their wisdom or other parting thoughts on their experience sponsoring Solar Decathlon 2017, and nine sponsors responded. The balance of their responses was overwhelmingly positive. The following quotes highlight the anonymous testimonials and feedback:

- "The Solar Decathlon team was outstanding and did a great job. The weather didn't help, but oh well, it's Colorado."
- "Great work in 2017. Looking forward to the next one!"
- "We thought it was a great partnership and Energetics did a fabulous job working with us to maximize the value of our sponsorship."
- "It would be fantastic to relocate the event back to DC. The accessibility is perfect and the educational value of the event fits in perfectly with the surrounding Smithsonian museums visited by people from all over the country and world."
- "Location, traffic suffered due to location, a more centrally located event will draw more visitors."
- "I was pleased to invest time with like-minded individuals and interface with humans of all kinds. The types of people and their commitment to each other and our planet is inspiring."
- "I wish there'd been some pics taken of our particular workshop that were on the DOE event website we could easily share via social media."
- "We did our work mostly form a commitment to the industry perspective than from a sponsorship perspective. We did not advertise at the event. We wanted to help educate the competitors."
- "The exposure we received was amazing. The students and what they created was fantastic. The PR team did a great job helping us arrange interviews."

Education Programming

Team Energetics, led by Energetics and D+R International, successfully completed the Solar Decathlon 2017 Education Days. More than 4,000 students from 27 Denver-area schools participated in the event, which enabled middle school students and teachers to tour the Solar Decathlon homes, speak and learn from the collegiate attendees, and attend workshops hosted by local Denver area sponsors. The Education Days program was especially attractive to potential sponsors and donors (including new sponsors from the Denver area), with some sponsors earmarking their cash or in-kind donations specifically for the education programming.

Metrics

- Number of participating mentors: 27 participating mentors
- Number of schools, and number of students participating: 2 districts, 27 schools, 4,000 students
- Number of visitors to Education Days: 4,000 students
- Number of Educational Workshops: 9 workshops
  - National Theatre for Children provided six workshops on October 5-6
  - Denver Water provided three workshops on October 12-13
- Completed questionnaires to teachers: 17 teachers responded. See summary of responses below.

Lessons Learned

- Two school districts served as good partners: Aurora and Jefferson Counties. They acted as the point of contact to recruit and coordinate school participation from across the region. It helped that their schools could attend on the same day.
- Schools were eager to participate, especially with the bus grants removing the cost burden. Teachers expressed to us that they are challenged to find science-based field trips, as it is easier to identify and plan humanities-based field trips.
- Conduct early outreach to take advantage of free networking. This could include forming an education committee to invite the local school districts and educational partners (e.g., DOE, NREL) several months in advance, then hold regular meetings or communications. This would enhance participation, and create synergies of co-programming and lesson planning.
- Consider dates and location that best engage students. A summer session would preclude schools from visiting on field trips. Late in the school year would be best for weather, teacher planning, and engagement. It may be beneficial to co-locate with an event where students and families are already visiting, such as a STEM competition that targets middle school students and their families.
- The Student Choice Award was a success. Team Energetics collected input from students on the student guide booklets. The winning team was Northwestern and they received a plaque at the final ceremony.
- The K-12 Teacher Workshop was cancelled due to low registration numbers. A local district should be enlisted early on in the planning process to support teacher participation and develop content for the workshop that matches the local districts' professional development gaps.

- The Education Center booth in the Sustainability Expo drew low interest or participation by students and families. If space allows, this would be better located as a separate kiosk on the Village walkway or inside the event welcome tent.
- Volunteers served as Education Mentors for the school visits, and it was valuable to have the individual docent liaisons to improve the school experiences. During the peak school visit days, this was the majority of the onsite volunteers that day.

Feedback from Survey of Middle School Teachers

The survey for the middle school teachers was distributed to 18 Denver-area schools. Seventeen middle school teachers responded, including:

- Five teachers with 20+ years of classroom teaching experience
- Four teachers with 10-20 years of classroom teaching experience
- Five teachers with 5-10 years of classroom teaching experience
- Three teachers with 1-5 years of classroom teaching experience

The survey shared with the middle school teachers covered 25 questions. As with the university team survey, the survey for the middle school teachers also captured open-ended responses. Areas in which direct feedback from the teachers was sought included:

- Level of familiarity with the Solar Decathlon
- Program Administrator-to-teacher communications practices
- Event-planning and logistics
- Overall experience

Initial Impressions

Of those 17 teachers who responded to the survey, 7 individuals (41%) shared that **their primary reason for attending the Solar Decathlon** was an equal combination of the following four elements:

- A chance to demonstrate how classroom learning (specifically science, engineering, and math) has real-world applications
- To present aspects of renewable energy and energy efficiency in a more “hands-on”/interactive environment that was relatable to them
- Introduce the students to a realm of possibilities when it comes to pursuing STEM-based careers
- Provide a solid opportunity to interact with the university teams and hear the perspectives of university students

29% indicated that they saw a strong value in the Solar Decathlon, and recognized its *real-world* applications. Of the 14 teachers who responded to a question tied to overall satisfaction with the Solar Decathlon: 93% were satisfied with their experience.

When it came to communications, **one-way communications channels** such as the Solar Decathlon website, pre-event emails, and the printed materials that were distributed onsite came out ahead overall.

- 100% of those who responded to the survey found the Solar Decathlon website to be a good source for sharing information. The same results applied when speaking to the online application process and pre-event informational emails.
- The visitor guide was also something that respondents took interest in. 82% found it useful.
- 70% found the student guide to be useful.

Overall, input associated with the Solar Decathlon's **interactive communications** were mixed.

- The majority of the teachers who responded (88%) felt that their tour guides were knowledgeable.
- The Education Day workshop was well received by 64% of the respondents.
- In general, DOE's social media activity surrounding the event proved to be significantly less popular.
  - 76% reported not utilizing the Solar Decathlon's social media platforms, with some reporting that they generally do not use social media in their curriculum.
  - 23% found the Solar Decathlon social media platforms useful to some degree.

Of the 14 teachers who responded to a question about attending the next Solar Decathlon:

- 86% said they'd be interested in attending the next Solar Decathlon.
- Only 2 (14%) out of 14 teachers would not.

Of the 14 teachers who responded to the question on how the Solar Decathlon measured up against other school field trips:

- 80% responded positively with commentary, including mentions of:
  - Being impressed by the houses
  - Approving of the interactive aspects
  - Among the best field trip experiences; exceeding expectations
- 10% responded negatively to the comparison, including mentions of:
  - That it was not well organized; it was crowded and there not enough time to see the houses, given the constraints of the travel time (long bus ride).
  - Disappointed that their assigned guide was not more knowledgeable.
- The remaining two (10%) teachers provided neutral responses.

When the topic of STEM (Science, Technology, Engineering, and Math) education was presented in the survey, all who opted to reply to this question provided positive answers. Of these 14 respondents:

- 100% responded positively to a question about incorporating the teachings of the Solar Decathlon into their curriculum.
- 86% shared that the event was inspirational in steering middle students to take more STEM-focused classes.

Of the 14 teachers who responded to a question to a question if the Solar Decathlon inspired their middle school students to take action at home to increase/improve energy efficiency;

- 86% shared that their students were inspired to do so.
- 14% provided a neutral response.

Recommendations and Lessons Learned

The responses provided by the teachers respondents overall are organized into two categories, *educational content* and *logistics*.

Educational Content

- A few survey respondents communicated the need for DOE or the Program Administrator to provide more information about energy conservation, including details tied to *tech challenges for students, career information,* plus *building and design processes* (e.g., information about architecture, building envelopes, and affordable building materials).
- One survey respondent suggested that event organizers consult with middle school educators to help with organization and design of both the programming and the materials that are shared at the event, to improve engagement at the middle school level. This also corresponds to a second recommendation to make the onsite quizzes more challenging.
- Three respondents noted that high school students would benefit from experiencing the Solar Decathlon, as it shows the practical applications of math and science classes, and these students would also potentially be inspired by what they saw. One respondent noted that focusing on middle schools for the educational outreach isn't the ideal age group. High school students are more likely to appreciate the complexity, design, and coordination needed to build a home.
- One teacher recommended that the Solar Decathlon show how to create some of the technologies that were utilized in the homes, which measures energy usage, while another noted the need for practical application at the middle school level (e.g., demonstrate how students could build an outdoor classroom using grey water systems and solar energy).

Logistics

- Five respondents commented on the need for improved organization for unloading and loading the buses at the Solar Decathlon event site. This caused long wait times for many of the visiting school groups. They expressed that with better planning, the middle school visitors would be able to spend more time touring the Solar Decathlon houses. Recommendations include staggering the bus arrival and departure times and adding more signage for the buses.
- Many respondents expressed disappointment in the amount of time available to see the Solar Decathlon houses. The timing of the day created a sense of feeling rushed. Recommendations include extending visiting hours and offering additional field trip days.

Volunteer Coordination

Successful completion of the Solar Decathlon would not have been possible without the support of an army of volunteers from across the country. Nearly 400 volunteers worked a total of more than 2,500 hours (over 500 shifts) in support of Team Energetics and the Solar Decathlon university teams. The volunteers were responsible for a large of number of tasks, which contributed to the success of the

project, including serving as greeters, managing the flow of visitors to the site, and providing educational tours of the site.

Team Energetics courted volunteers to serve at the Solar Decathlon throughout the course of this project. This included utilizing a database of previous volunteers, leaning on sponsors to provide staff to the event, and advertising on the Solar Decathlon website and associated media feeds. Volunteers reported finding out about volunteer opportunities at the Solar Decathlon through the following sources (listed in order of prevalence). See Appendix C for additional details.

- Solar Decathlon 2017 Sponsor or Stakeholder
- Federal Agency or Office
- Word of mouth
- Colleague or employer
- Websites
- Solar Decathlon alumni or prior participant
- Education provider
- Media or advertising
- Professional organizations
- Social media

Metrics

- Number of volunteers: 398 Volunteers and Interns registered online, 10 registered onsite
- Number of volunteer shifts available and covered: 594 shifts available and 502 shifts covered
- Number of volunteer hours worked: 2,510 hours worked

Lessons Learned

- Welcome/Volunteer Tent
  - The one Welcome Tent worked well. If the tent is meant as space for attendees as well as volunteer registration, signage should be clear on the outside. Many attendees walked in "just to see what was there," and happily found the leaderboard.
  - The sectioned off office in the back of the tent with a table and power was a positive addition for staff to more privately catch up on reminder phone calls and emails.
  - The sectioned off portion for brochures and other materials kept the tent organized and clean for the visitors.
  - The leaderboard was popular, but the DOE laptop was hard wired to sleep mode regularly, requiring staff to log into it often. It would be nice to see a larger leaderboard located outside, if the weather permits. If it needs to remain inside, the use of the Welcome Tent makes sense.
  - A large map of the Village hanging on the wall inside the Welcome Tent would be useful in the future for Refresher Trainings of volunteers.
  - The HVAC in the tent was much appreciated due to the unpredictable Denver weather.
  - The availability of water and cups was appreciated by attendees, volunteers, and staff.
- The layout of the Village worked well for the execution of the volunteer program. The Volunteer Manager provided Refresher Trainings inside or just outside the Welcome Tent, then directed Greeters to each end of the Village with boxes of Visitors Guides, and asked Docents to begin

tours. Legacy Docents giving new Docents a preview tour before new Docents give their own tours is a best practice that should be continued in the future.

- Providing two positions for Docents to stand (and signs "Tours Offered Here") was nice, though most attendees came through by the main Welcome Tent. Placing a Greeter (or staff) right by the Docents, welcoming attendees and asking if they want a free Docent-led tour, worked well. If no Docent was available right then, standing with them and looking for a Docent coming back and introducing the group to the Docent was extra helpful.
- Go-live with the volunteer registration page open and active by the month of May.

Feedback on Roles

Volunteer Coordinators

- Two Volunteer Coordinators are needed to manage heavy check-in/out times while also scheduling appropriate breaks. One was provided in 2017, which was acceptable, but coverage was a bit lean when the Volunteer Manager was called away.
- Schedule two volunteers to open at 8:00 a.m., with one starting at 10:00 a.m. and closing registration for the day.
- Schedule at least one registration volunteer for each half of the day.
- Provide training for everyone giving Refresher Training.

Docents

- We had significantly more Docents register this year than in previous years, and they were very prepared. A group of Volunteers came from New Mexico and spent several days as Super Docents, also training new Docents and providing numerous VIP tours.
- We scheduled 10 Docents per shift, and at peak times could have used more. In the future, schedule fewer Docents for the afternoon shifts.

Visitor Liaison and Greeters

- The Visitor Liaison role changed this year, as we obtained the numbers of tours given at each competition house. Instead we placed two "Greeters/Visitor Liaisons" at each end of the Village with a clicker to count attendees coming into the Solar Decathlon. This role and process should be more formal in the future.
- We did not require 10 Greeters per shift due to having one Welcome Tent and the smaller size of the Village. If we no longer need Visitor Liaisons, we should plan for four clicker Greeters and six more general Greeters to hand out Visitors Guides.
- It was useful to place a Greeter with Visitors Guides to hand out and introduce the Docent-led tours at the "Tours Offered Here" sign.
- If we have the use of a golf cart in future Solar Decathlons, place boxes of Visitors Guides at each entrance before each shift so the volunteers don't have to carry them.

Runner and Interns

- The function of the runner was to check and care for volunteers throughout the Village, including the following actions:

  - Communicate via radio
  - Be the eyes and ears for the desk
  - Provide ice, water, sunscreen, and umbrellas
- Each intern was provided a Certificate of Appreciation for contributing to the event, plus a movie gift card in small amounts for those exceptionally helpful in recruiting and onsite.
- To bolster intern numbers, in addition to calling it a Solar Decathlon internship, call it an "event planning" or "events and communications" internship to attract more college students seeking experience in these areas.
- Finalize intern schedules two weeks prior to the start of the event.
- Identify at least two volunteer registration-focused interns.
- Prior to the second week of public exhibits, schedule an intern or two at the Registration Desk to help with phone calls.

Education Days Mentors

- Receiving Education Days field trip student and bus totals a few weeks before the event helped to refine how many Mentors were needed per day.
- Schedule the start time for Mentors 30 minutes later than was scheduled in 2017. Note that this will impact the amount of time for Mentors have to look around the Village before their shift.
- Provide the Mentors a brief refresher training before handing them over the Education Days organizers. Once they were handed off to the organizers, each was provided a binder with a schedule and assigned to a bus.
- Food provided by the organizers—including vegetarian requests—was appreciated by the Mentors.

Daily Open/Close

- Ensure consistency in creating check-in spreadsheets (i.e., who does, what time of day). The check-in sheet should be completed by 10am on the day prior to the shifts. Organize the check-in sheet by shift, then by name.
- Add a Look Book check-out column spreadsheet to indicate who has checked out a Docent look book.
- One copy is used for managing check-in and the other is used by interns to place reminder calls.

Preparedness for Weather Conditions

- Umbrellas are useful for use in the sun and rain.
- Due to inclement weather, the Welcome Tent with HVAC was also used for the Juror morning meetings and breaks. This worked well.
- The Volunteer Team (and Volunteers) worked well with Competition Organizers and Security Staff to ensure all were safe during unpredictable wind storms. Pre-defined shelters in a nearby building could benefit future events.

Other Logistics

- Volunteers were asked to self-manage their breaks. However, the Volunteer Manager and Coordinators should specify the amount of break time for younger Volunteers (i.e., limit to 20 minutes).
- Secure at least three radios and write the user's name on each with pen and painter's tape.
- Secure sponsors to provide lunch for the Volunteers and to provide a solar-powered cell phone charging station.

Documents/Training

- The Safety Card was useful for volunteers to easily fold up in their pockets.
- Many volunteers were very happy with the training. Two PDF copies of the Training were printed out at the Welcome Tent for Volunteers to read if they were newly registering or hadn't watched the training.

End of Event Clean Up/Load Out

- Produce Intern Certificates in time to hand out on the final Saturday of the event.
- Schedule two extra volunteers/interns/shifts on Sunday to help with packing up
- Strike the majority of the tables at the Welcome Tent volunteer desk after the final afternoon check-in (approximately 2:00 p.m.).
- Pack up all office supplies and remaining Visitors Guides.
- Collect all check-in sheets for final scan/archiving.
- Give away the remainder of the t-shirts at the Victory Breakfast as swag, along with water bottles. This action was popular with the competition teams.

Appendix A. Solar Decathlon 2017 Project Team Roles & Responsibilities

Team Energetics is composed of multiple organizations in support of Solar Decathlon 2017. The table below highlights the key responsibilities of each team member.

Organization	Roles and Responsibilities
U.S. Department of Energy	***DOE Project Solar Decathlon Manager***: The U.S. Office of Strategic Programs is the organization within the Department of Energy responsible for funding and executing Solar Decathlon 2017. Team Energetics will work with the Project Lead to plan and execute Solar Decathlon 2017. ***DOE Project Officer***: Team Energetics will work with the DOE Project Officer regarding any and all changes to the Project Plan, the contract for Solar Decathlon 2017, and regarding the completion and delivery of all deliverables with Solar Decathlon 2017. ***DOE Communications***: Team Energetics will work with DOE Communications on all applicable external communications products and materials.
Energetics Incorporated	Team Energetics is responsible for planning and executing Solar Decathlon 2017. • Prime contract performer; primary liaison with DOE team • Project management lead; responsible for the timely completion of all key project deliverables and ensuring project stays within budget, from project initiation through close out • Lead for all key competition management activities, including developing competition rules and requirements and coordinating with Solar Decathlon 2017 Decathlon teams • Responsible for establishing teaming agreements and subcontracts with all required team members, vendors, sponsors, and other organizations • Lead for all sponsor management program activities • Lead for all Education Days activities • Provide technical support to the competition and site management performers The ***Project Manager*** is responsible for leadership and vision on the project, and integrating best principles in project management to ensure that the project is delivered on-time and within budget. Other responsibilities include: overseeing project controls and procedures, supervising cost and budget control and contract oversight, preparing all project status reports, and overseeing budget and staffing. The ***Technical Advisor*** is responsible for supporting the Project Manager in understanding the technical requirements for completing Solar Decathlon 2017. The Technical Advisor will also support the Competition and Site Management team regarding the planning and execution of Solar Decathlon 2017. The ***Competition Manager*** is responsible for planning and executing the 2017 Solar Decathlon competition. He will serve as the primary liaison to the 2017 collegiate teams, and is responsible for working with DOE to develop and refine the competition Rules and requirements. He is also responsible for establishing subcontracts (to be approved by the Project Manager, and, as necessary, the DOE Project Officer) with vendors required for a successful competition, including: building inspectors, safety officers, and code officials, among others. He is also responsible for working with the

	Site Operations Manager to ensure that all site requirements at Peña Station will meet competition requirements, and the Stakeholder Engagement Manager regarding needs and requirements from Solar Decathlon 2017 stakeholders. He will be supported by several volunteers and/or paid staff including an assistant competition manager, jury coordinators, competition observers, and Rules inspectors. The ***Site Operations Manager*** is responsible for coordinating with the Competition Manager and Stakeholder Engagement Manager to ensure that all site requirements associated with the competition and other in-scope events, including the K-12 Education Days, adult education workshops, and the sustainability tradeshow, are planned and executed. The ***Sponsorship Program Managers*** are responsible for managing and directing the Solar Decathlon 2017 sponsorship program. They are responsible for managing Solar Decathlon 2017 sponsor recruiters, maintaining all tools and resources associated with the Solar Decathlon 2017 sponsor program, and completing any necessary agreements or other applications associated with sponsorship. The sponsor team must work closely with the Stakeholder Engagement manager and CSTL, which is responsible for providing strategy and direction to the sponsorship program for Solar Decathlon 2017. The ***Solar Decathlon 2017 Safety Officer*** is responsible for reviewing team safety plans, providing education on safe working practices, and providing oversight of university team activities on the competition site. MC2, Team Energetics site operations manager, will also provide safety oversight during the 2017 competition. The ***Education Program Lead*** is responsible for planning and executing all education activities at Solar Decathlon 2017. This includes engagement with schools in the Denver area for Education Day at the Solar Decathlon.
City and County of Denver	The City and County of Denver partnered with the U.S. Department of Energy and Team Energetics to plan and execute Solar Decathlon 2017. The Stakeholder Engagement manager is responsible for engaging the City and County of Denver, and other key area stakeholders, on all applicable matters concerning Solar Decathlon 2017. The City and County are members of the Core Advisory Committee.
Confluence Communications	Lead for all key Stakeholder Engagement and Communications activities: • Primary liaison with the Core Advisory Committee, including the City and County of Denver and competition site partners, and other key stakeholders, for all necessary project needs and requirements • Lead team member for coordinating with City and County of Denver for all wrap-around events • Responsible for serving as liaison with DOE Public Affairs and EERE Communications for all applicable communications activities • Support for sponsor program activities ***The Event Production Manager*** is responsible for working with the Site Operations manager and Stakeholder Engagement manager to ensure that all production needs for the Solar Decathlon are met. This includes onsite volunteer engagement, onsite sponsor engagement and planning, and other special events occurring at Solar Decathlon 2017. ***The Stakeholder Engagement Manager*** is responsible for all aspects of Stakeholder Engagement at the Solar Decathlon, including sponsorship, communications, education programming, and volunteer recruitment and staffing. The Stakeholder Engagement Manager is responsible for working with the Core Advisory Committee on

	relevant aspects of the project, and ensuring that all key stakeholders associated with the project are kept abreast of project activities and requirements. The ***Strategy and Outreach Communications Lead*** is responsible for managing any and all external communications associated with Solar Decathlon 2017. She is responsible for working closely with the Stakeholder Engagement manager regarding external communications, and for engaging with DOE Communications when necessary or appropriate.
Center for Science Teaching and Learning	• 501c3 partner that will accept all donations from event sponsors and make disbursements at the direction of the Project Manager. • Support Energetics in the development of the student Education program at Solar Decathlon 2017 as a member of the Education Support Team. The Education Support Team is responsible for supporting the Education program lead, and for engaging with sponsors for the education program. • Support for sponsor program activities, particularly sponsor program strategy and direction.
MC-2	Site management and operations lead: • Responsible for coordinating with the Energetics' competition manager to ensure that all site needs match competition needs. • Lead for development of the Solar Decathlon 2017 Sustainability Tradeshow.
D+R International	• Support Energetics in the development of the K-12 Education program at Solar Decathlon 2017 as a member of the education support team. The Education Support Team is responsible for supporting the Education program lead, and for engaging with sponsors for the education program. • Support for sponsor program activities.
Norton Energy Research and Development	• Partner for competition instrumentation support. • Scoring and database and server management support. • The Competition Support team is responsible for managing competition instrumentation during the event, as well as maintaining the scoring database and server management.
Building Intuition, LLC	Responsible for reviewing team construction drawings and providing feedback to ensure code compliance and inspecting team houses at competition for temporary occupancy and tours.
Faithful+Gould	Responsible for reviewing each team's cost estimate and confirming states costs reflect expected project costs. The estimation lead will review each team's cost estimate and confirm that the stated costs reflect expected project costs, ensuring that each solar decathlon jury fairly evaluates each team's submission.

Appendix B. Certified Competition Results

2017
U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON

Solar Decathlon 2017 Final Results

10/17/2017

To whom it may concern,

The U.S. Department of Energy Solar Decathlon 2017 competition, occurring from October 5, 2017 through October 14, 2017 has been completed and evaluated in accordance with the Solar Decathlon 2017 Rules dated September 5, 2017 and released to the official Solar Decathlon website and Groups.IO message board. I am the Competition Manager, ultimately responsible for the scores & standings.

Following the procedures outlined within the Rules, each of 11 competing teams were evaluated across 6 juried contests and 4 measured contests, each worth up to 100 points. For each jury, a set of 3 industry professionals and one federal representative was selected. They then worked extensively over the 6-weeks prior to the event to review and discuss each team's deliverables. On site, each jury spent equal time walking through each house and listening to each team's presentations before deliberating and assigning an integer score to each team. For the measured and observed contests, the Organizers utilized a clearly defined and consistent process for evaluating actual house and team performance on tasks ranging from maintaining consistent temperatures, humidity, indoor air quality, and to completing tasks like washing towels or boiling water. In addition, each team was measured on their energy consumption and production to evaluate net energy and energy value.

Throughout the entire event, all data used as inputs for calculating scores and the calculated scores were made available to all teams for review and evaluation. While all measurement tools have some margin of error, an equal approach was taken for all teams under an identical set of considerations and requirements. Rarely, either the organizers or teams would notice a minor error in the data (for example, a cooking task was recorded as taking place at 3:30am when the village was closed ultimately having the scoring engine assign 0 points because it took place outside of allowable hours, when it should have been recorded at taking place at 3:30pm). When identified, those errors were quickly resolved and updates released.

As indicated in the Rules, teams had until 5:00pm on the final day of contest week to protest any decisions or question any final calculation. The juried contest announcements during the final award ceremonies were not allowed to be protested. As all noted concerns by teams have been reviewed and addressed, using the Protest Resolution Committee when necessary, it is my opinion that the ranking shown below represent the final and accepted results for the U.S. Department of Energy Solar Decathlon 2017.

SCORES AND STANDINGS

Current scores and standings for each team competing in the U.S. Department of Energy Solar Decathlon 2017 are presented below.

Overall scores in the first table accurately reflect penalties, but the point totals shown in the bar graph below, the Scores by Team and Scores by Contest tabs do not. Therefore, the overall score totals shown in the two scoring displays on this page may not match.

Overall Scores

Rank	Team	Score
1.	Swiss Team	872.910
2.	Maryland	822.683
3.	UC Berkeley/U of Denver	807.875
4.	Missouri S&T	758.315
5.	Team Alabama	757.873
6.	Northwestern	750.758
7.	Netherlands	750.275

Last Update Tuesday, October 17, 2017, at 9:05:03 AM MST

Overall Scores

5.	Team Alabama	757.873
6.	Northwestern	750.758
7.	Netherlands	750.275
8.	Las Vegas	748.542
9.	UC Davis	745.152
10.	Wash U - St. Louis	642.888
11.	Team Daytona Beach	532.091

Last Update Tuesday, October 17, 2017, at 9:05:03 AM MST

It is the understanding of the Solar Decathlon competition management team that the scores listed here were calculated in full accordance with the Solar Decathlon Rules and under equal consideration for all teams. Where a judgment call had to be made, such as with assignment of a penalty, the logic for each decision was clearly communicated to teams and an opportunity to protest was provided.

Should any questions arise with the scores noted here, we are happy to provide additional documentation on the calculation process and evaluation metrics in accordance with the Rules.

Thank you,

Joe Simon
Competition Manager
U.S. Department of Energy Solar Decathlon 2017

Appendix C. How Volunteers found out about Solar Decathlon

Sponsor / Stakeholder	73
Schneider Electric	42
Wells Fargo	15
City and County of Denver	4
DaVita Green Team	3
SolarCity	1
Sponsor company	1
Xcel Energy	1
City of Boulder	1
GE emails	1
IIT Bombay	1
Navigant	1
Non-Profit	1
Solar Industry Events	1

Federal Agency / Entity	51
DOE	31
NREL	16
DOE Building Technologies newsletter	1
EPA	1

Word of Mouth	47
Friends and Family	19
DOE Employees	8
Email	7
Word of mouth	6
Organizers	4
Known about it	3

Colleague, Classmate, Employer	30
Work / Company / Employer	15
Coworker / Colleague	12
Classmate	1
CTA Email	1
Denver Employee Volunteers	1

Websites	25
Online	16
Craigslist	3
Indeed.com	1
Internships.com	1
Swissinfo.ch	1
Federal Online web site news	1
Volunteer Match	1
Workforce Management	1

Alumni / Prior Participant	24
Prior Attendee	9
Prior Volunteer	8
Alumni from previous SD	6
Hired SD Alumni	1

School / Education Provider	24
School/Faculty	11
Boulder Valley School District	1
Colorado School of Mines	1
Cornell University solar home	1
Cottonwood Institute	1
CU Boulder Career Board	1
CU Boulder	1
CU Denver Design build program, Denver Design Week	1
DU/Berkeley	1
Metropolitan State University	1
Middlebury College Alum	1
UC Boulder	1

Media / Advertising	24
Denver Post	16
Home Power Magazine	2
RTD bus/train advertising	2
IEEE Denver Section Subscription	1
Solar Today 2003	1
Airport train flier	1
Tiny House (by Courthouse)	1

Professional Organizations	23
CRES	7
ASES	4
AIAS	2
AEE (Rocky Mountain Chapter)	1
Archinect	1
Denver Design Week	1
Denver Film Society	1
Emerging Professionals Group	1
ISES	1
MNSEA	1
Rocky Mountain Association of Energy Engineers	1
SIE	1
Sustainable Construction congress (Bogotá, Colombia)	1

Social Media	10
Facebook	4
LinkedIn	4
Twitter	2