

SOLID WASTE DESIGN COMPETITION (SWDC)
SWANA's International Student Competition



PROBLEM STATEMENT AND PROTOCOL

2019 SWANA WASTECON
Phoenix, AZ
October 21-24, 2019





1. Introduction

SWANA's International Solid Waste Design Competition (SWDC) is a student team competition to solve a "real world" problem faced by solid waste professionals. The competition aims at providing real world experience to students pursuing an education and/or career in solid waste management. The goals of the SWDC are to:

- Encourage student involvement in WASTECON, SWANA's Annual National Conference.
- Provide students with real world experience in solving complex solid waste management issues in a supportive and fun environment.
- Provide students an opportunity to display their talents.
- Establish a premier networking event for students to connect with potential employers.

This document outlines the problem statement and guidelines for the competition. **Participants are advised to read the entire document as guidelines detailed in this document must be followed.**

2. Problem Statement & Competition Format

Problem statement is provided under **Attachment 1**. Data for the problem statement will be provided in January 2019. In general, the SWDC is organized as explained below:

- Students to review Problem Statement and data. Interested teams to send completed team commitment form before the deadline listed in Section 4.
- SWANA will organize a telephonic kick-off meeting (or an online webinar) to explain problem statement and associated data.
- Following the problem statement and data release, students will be guided by the SWANA SWDC committee and paired with a mentor to assist teams with the project.
- Student teams to present their solutions through poster, report and presentation by meeting the deadlines (Section 4).

The solution to the problem statement must be detailed in a design report, poster and presentation. Guidelines for each of the three components are provided in Sections 6 through 8.

3. Eligibility to Participate

Participating teams must comply with the following criteria:

- Each participating team can have minimum of two (2) and a maximum of eight (8) team members. The recommended team size is a four (4) member team.
- Every participant must be enrolled as a full time or a part time student during competition enrollment. We understand that some students may be graduated or near graduation at time of the presentation at WASTECON. However, to ensure participation at WASTECON, **we require at least one student in the team be such that he or she anticipates graduation after the WASTECON 2019.**



- Ideally, all team members should be from the same school/university; however, exceptions can be made. A request must be made on the *Team Commitment Form* provided as **Attachment 2**, and the participant should reach out to the contacts provided to discuss further.
- The maximum number of student design teams is limited to ten (10) teams. The first ten (10) eligible entries received via *Team Commitment Form* will be entered into the competition. SWANA reserves the right to allow more teams if they can be accommodated in the conference agenda.
- The *Team Commitment Form* must be signed by a School faculty member.

4. Deadlines

The deadlines for the competition are detailed below. Submissions must be made electronically (unless specified otherwise) to the contact person identified in Section 11.

- **Team Commitment Form**: Teams must submit the Team Commitment Form (**Attachment 2**) by February 1, 2019.
- The selected participants will be notified in February 2019.
- A kickoff meeting will be held in February 2019 to go over the SWDC problem statement/data, requirements, and answer general questions.
- **Design Report**: The final design report must be submitted by September 2, 2019. The guidelines presented in Section 5 must be followed for the design report.
- **Poster**: Poster must be submitted by September 2, 2019. The guidelines presented in Section 6 must be followed for the poster.
- **Presentation**: The student design teams will present their solution at WASTECON (to be held October 21-24, 2019) in Phoenix, AZ. The date and time for the presentation are to be scheduled. The guidelines listed in Section 7 must be followed for the presentation.

5. Design Report Guidelines

The Design Report must follow the following structure:

- Report must be submitted in pdf format.
- Font must be Times New Roman, 12-point font and double-spaced text.
- Recommended format for Citations/References: Chicago Style.
- The following structure is recommended for the report. The maximum number of pages is limited to 30 pages. Tables and figures can be provided as attachments in addition to the 30 page limit. There is no page limit on the attachments (tables and figures).

- Introduction
- Assumptions and Data Analysis
- Methodology
- Conclusion and Recommendations
- References



- Tables and Figures can be provided as attachments, if additional space is required

Refer to the judging sheet provided as **Attachment 3** to gauge expectation of the judges.

6. Poster Guidelines

The following guidelines must be followed.

- Poster shall be 24”H x 36”W (horizontal format)
- All posters must be created in a desktop page layout software (Adobe InDesign, Quark Express). Posters created in Microsoft Word or PageMaker will not be accepted.
- All art must be formatted as CMYK, hi-res images at least 266 dpi in RAW .jpg format
- Final document must be saved as a hi-res PDF with all art and images embedded.
- Electronic poster file shall be submitted using Dropbox link or other similar online file sharing.
- Be clear and concise with poster design and content. Overcrowding a poster makes it difficult to read.
- Use fonts that are large enough to read at a distance. Your poster must include title, university (ies) represented, and the full team listing. Figures, graphs, and tables should be uncluttered and simple and arranged in the sequence in which you want them to be viewed.
- Provide clear labels or headings for each section of your poster.
- Remember contrast. Put light-colored text on dark backgrounds and dark text on light-colored backgrounds so that your viewer can see your text clearly.
- Drawings, illustrations, and/or diagrams must be your own work.

Tips for imbedded graphics:

- Use high-resolution images.
- Do not cut and paste art or screen-filled shapes from PowerPoint.
- Text may be copied and pasted from PowerPoint into the layout software, but it will require applying the “create to outline” setting after pasting.

Refer to the judging sheet provided as **Attachment 3** to gauge expectation of the judges.

7. Presentation Guidelines

Each of the participating teams will present their solution during the 2019 SWANA WASTECON. Presentation date and time will be posted on the SWANA Website by the end of September 2019 and participating teams will be informed. Presentation order will be chosen randomly. A computer and projector will be provided for the presentation (Microsoft PowerPoint is required and you must use the room computer). Plan for no more than a 20-minute presentation followed by 10 minutes for question and answer. Skype or online presentation can be allowed if a participating team cannot attend WASTECON because of a valid reason.

Presentation Guidelines and Tips:

- REMEMBER that the judges are your client and your firm is hired to solve their “real world” problem.
- The presentation needs to flow in a way that makes sense. Much as with writing a paper it should present the problem, discuss the alternatives and provide a solution.
- Don’t read word for word from the slides. Slides should contain a summary of what you will say. Also, don’t overwhelm the slide with too many images or complicated animations. Slides should be clean and easy to read with a common theme.
- Be sure to recognize team members that were not able to be present, and anyone who provided mentorship throughout your project.
- Each speaker should have somewhat equal time presenting. It should not be mostly one person presenting and other people standing next to the only presenter. It is also nice to see everyone participating when responding to questions from the judges.
- Clearly state the main points, assumptions, and conclusions. You will have to make assumptions in the real world, so the judges need to see and understand your thought process.
- Understand that there is a balance to the amount of background information that should be presented. You can assume there might be people in your audience (including judges) that might not be familiar with the topic, so a little background is helpful, but it should be limited, since it is not the main purpose of the competition.
- Discuss the challenges that you were faced with and how that affected the outcome. Practice presenting and answering questions in front of an audience. The judges understand that you are a student, but like to see that you understand the basic engineering principles, and that you can think about their questions and come up with a reasonable answer.
- Consider videotaping yourself during a practice presentation and make notes of distracting mannerisms (i.e. saying “ummm” or “like” too often).
- Practice timing yourself. Make sure you dress for the part. You are presenting as though you are trying to win a job. Attire should be professional.

Refer to the judging sheet provided as **Attachment 3** to gauge expectation of the judges.

8. Judging

Judging sheet is provided as **Attachment 3**. The following Table provides a breakdown of the total points:

Item	Maximum Points
Design Report	100
Poster	25
Presentation	125
TOTAL	250



9. Award

Two team awards will be presented to the top teams with maximum overall scores. SWANA reserved the right to cancel presentations at WASTECON if one or no team is available to present – in that case winning teams will be based on overall scores for the Report and Posters.

The **minimum** award money is listed in the table below. In addition to these awards, every participating student will receive:

- a free conference registration for the 2019 SWANA WASTECON Conference
- a free one year SWANA membership
- a free SWANA Young Professionals Webinar voucher

Rank	Prize
First Place Prize	\$2,500 (minimum)
Second Place Prize	\$1,000 (minimum)
Third Place Prize	TBD

The minimum awards are indicated above. In the past, awarded amounts were as much as double the advertised minimum amounts. Smaller monetary awards will also be given out for the best use of visual aids, best presentation, and most innovative and realistic solution. It may be possible for a team to receive more than one award.

10. Closing Remarks

Although most of information may be available online, participants should note that financial information may require contacting vendors. If this is the case, please remember that you are acting as a consultant. Be professional, polite, persistent and concise in the requests to obtain necessary information.

At the end of the day, a consultant may need to contact the client for data requests. If you run into an issue that requires critical information that you believe is not provided, please contact the persons listed below.

11. Contact Persons

All submissions must be made electronically (unless specified otherwise) to **all contacts** listed below. Any question regarding the competition must be directed to Mateja or Bridget. If urgent assistance is required, contact Mateja Vidovic Klanac at 561-613-5928 or Bridget Wlosek at 704-208-2211.

- Mateja Vidovic Klanac (mvidovicklanac@scsengineers.com)
- Bridget Wlosek (wlosekbk@cdmsmith.com)
- Nathan Mayer (nmayer@swa.org)
- Karam Singh (ksingh@hdrinc.com)



ATTACHMENT 1 – Problem Statement



Problem Statement

During recent years, there has been much controversy and discussion regarding recycling metrics. Not everyone defines recycling or the processes that constitute recycling in the same way. Definitions of municipal solid waste (MSW) also vary state to state. This is further compounded by the differing methods to calculate a recycling rate. All of these factors make it difficult to collect and analyze data and to compare the effectiveness of recycling programs from one region to another.

Most commonly, recycling has been based on weight-based metrics. In the last few years, however, the solid waste community has a change in thought to quantify environmental impacts associated with recycling. As an example, recycling performance can be based on avoided greenhouse gas (GHG) emissions or energy-saving reductions, rather than gauging recycling performance on a weight-based metric. Thoughts like these may be game changer in understanding true significance of “recycling” as a term. For example, one ton of aluminum has far more of an environmental impact than one ton of glass; therefore, a recycling program would obtain a higher recycling credit for the one ton of aluminum than the one ton of glass. In a weight-based metrics system, one ton of aluminum and one ton of glass hold equal value.

The Solid Waste Authority of Valley County (SWAVC) is falling short in meeting its recycling goal of 80% by weight by 2035. Furthermore, the County’s Solid Waste Director leads a state advisory board assessing potential changes as to how the State determines recycling rates. The SWAVC needs assistance in determining what changes need to be made to their program to meet the recycling goal as well as suggestions on how recycling rates should be determined.

Student design teams are tasked with helping SWAVC with the following:

1. Using the County data provided, assess waste generation and calculate recycling rates using the following models:
 - California
 - Florida
 - Oregon
 - European Commission (used by the United Kingdom)

Locating the mythology may require review of government laws, published guidance documents, or contacting the agency. Each model will use different terminology and therefore assumptions will need to be made. Some models allow for renewable energy credits; for these models please show the results with and without the renewable energy credit. Provide details on your findings. How did the models compare? What waste were included/excluded and counted within the recycling definition, waste definition, recycling rate method; how did this impact the results? Which models and factors had the greatest or least variances in the results? What other key findings did you discover?

2. Develop future waste projections for years 2019 through 2040 based on population growth projections provided, and run only year 2035 waste projections within each model. What recycling goals can be achieved in 2035 assuming no program changes within the current integrated solid waste management system? How did renewable energy credits impact the results?
3. SWAVC would like to achieve a recycling goal of 80% by weight by 2035. What waste streams should be targeted, how much must be recycled, and what programs/facilities will be needed to be implemented and constructed to achieve this? Develop scenarios for achieving the County goals including a financial analysis and timeline of when waste system changes should occur.



The financial analysis should reflect only the system changes, and at a minimum should consider the relevant costs for collection, processing, disposal, education/outreach, as well as any new program or facilities capital and operation/maintenance costs. Model each scenario within the four models. What were your findings? How did your team consider increases in diversion and what impacts does this have within the models? How realistic is it to achieve the recycling goal? Which models/scenarios help achieve these goals easier?

4. Based on your findings, recommend the best integrated solid waste management system for SWAVC.
5. Based on your findings, recommend which model should be implemented at the State level.

Additional information and data will be provided in January 2019. This will include historical population data and growth projections, annual waste quantity and composition data, collection programs, general details on SWAVC's Integrated Solid Waste Management System, etc.

As previously stated, an all-inclusive kickoff meeting will be scheduled in February 2019 to go over the SDC process, requirements, and answer general question.

As a consultant, the results of your work are highly dependent on the assumptions you make. As shown in the Judging Form in **Attachment 3**, documentation of assumptions and data analysis are highly weighted scoring criteria. Please note that the contacts provided in Section 11 will serve as your Client. Do not hesitate to contact them to clarify any data you believe is missing or questions you may have. Answers to all questions will be provided in Q/A format to all student design teams.



ATTACHMENT 2

Team Commitment Form



Form 1 – Team Commitment

Name of School: _____

Team Members and Contact Information:

<u>Name</u>	<u>Email</u>	<u>Phone</u>	<u>Anticipated Graduation (MM/YY)</u>

(Maximum team members = 8)

Choose Name of Your Consulting Firm: _____

Designated Team Contact (Captain): _____

School Faculty Name/Phone Number/Email: _____ / _____ / _____

School Faculty Signature: _____

Any Requested Exception to Section 4 Criteria: Yes No

If NO, we understand that the participant comply with requirements of Section 4. If YES, briefly state the requested exemption and reason below:



ATTACHMENT 3

Judging Form

Design Report (Maximum Points = 100)			
Description	Max. Points	Awarded	¹Comment #
Introduction	5		
Realistic/Innovative Assumptions and Data Analysis	25		
Review and Selection of Models	20		
Feasibility of Achieving 80% Goal by 2035	20		
Conclusion and Recommendations	10		
References	5		
Formatting & Appearance	5		
Grammar, Spelling & Overall Technical Writing	5		
Visual Aids (Graphs, Pictures etc.) presented clearly	5		
Poster (Maximum Points = 25)			
Proposed solution and data are clearly described and interpreted	5		
All components of problem given appropriate level of attention	5		
Poster “stands alone” requiring no additional explanation	5		
Visually attractive, text legible, effective use of figures, tables, & graphic devices	5		
Easy to follow, focused, and organized	5		
Presentation (Maximum Points = 125)			
Clear introduction, sets stage for presentation	15		
Main points are developed, organized, and well formulated	15		
Material presented at an appropriate level and pace for audience, yet includes relevant detail and clarity	10		
Visual aids are clear, well-constructed, and effective, aiding in understanding	15		
Realistic solution to problem with high likelihood of success	10		
Solution considers broad range of impacts such as environment, economics, society, and sustainability	15		
Questions answered competently, all members demonstrate a clear understanding of topic	20		
Team presents a professional image, projecting enthusiasm and competence	15		
Timing (presentation rehearsed and less than 20 min.)	10		