



# Registration Packet 2019



# Bike to the Future

*The future is electric.*

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## WELCOME TO BIKE TO THE FUTURE

Silicon Valley Clean Energy extends a warm welcome to all teams and participants competing in Bike to the Future 2019.

We invite students in our service area to partake in our electric bike building competition to connect engineering and design with environmental solutions and a hands-on learning approach! Please read the entire Registration Packet to gain the best understanding of the competition.

## MISSION STATEMENT

Silicon Valley Clean Energy's Bike to the Future competition provides high school students an opportunity to engage in clean transportation design, electrification and environmental innovation.

Throughout the competition, teams will explore electric bicycle technology by designing and building their own electric bike (e-bike). Challenged with the mission of constructing an e-bike from start to finish, students will engage in researching, designing, and testing their e-bike along with showcasing their e-bike's performance.

## BROUGHT TO YOU BY...

Bike to the Future is brought to you by Silicon Valley Clean Energy (SVCE) - your community-owned electricity provider. SVCE provides carbon-free electricity for residents and businesses within the majority of Santa Clara County communities. Yes, carbon-free! SVCE purchases electricity from wind, solar, and hydropower allowing for zero greenhouse gas emissions produced while providing electricity to homes and businesses. PG&E delivers this electricity to outlets and light switches over the existing power lines in which they continue to maintain.

SVCE is not only removing carbon from our electricity supply, but also from other sectors such as transportation and the built environment. As a public agency, SVCE is also dedicated to reinvesting in our community, which is why, we're hosting "Bike to the Future".

SVCE Office Location:  
Silicon Valley Clean Energy  
333 W. El Camino Real, Suite 290  
Sunnyvale, CA 94087  
(408) 721-5301

SVCE Event Organizer Contact:  
Colleen McCamy  
Community Outreach Fellow  
[colleen.mccamy@svcleanenergy.org](mailto:colleen.mccamy@svcleanenergy.org)  
(408) 721-5301 x 1016

## BIKE TO THE FUTURE OVERVIEW

### WHAT IS THE BIKE TO THE FUTURE COMPETITION?

Bike to the Future is back from the past! High school students composed in teams of 3-7 members design and build an electric bike (e-bike) to compete in challenges to test the efficiency, innovation and design of their e-bike. Teams have about 3 months, from the end of January 2019 until the event April 27, 2019 to design and construct the bikes.

Then on the event day, all teams will come together at the Santa Clara County Fairgrounds to put their bikes to test in different challenges (described below.) Winning teams will be selected based on bike performance and the judges' analysis in accordance with the scoring rubric.

### WHO IS ON EACH TEAM?

Each team consists of:

- 3-7 High School Students
  - o Teams with students from multiple high schools can be formed and multiple teams from the same high school are allowed.
- A Team Leader
  - o The team leader is a high school student team member who serves as the point of contact for SVCE staff.
- A Team Supervisor
  - o The team supervisor must be over the age of 18 and ensure student safety in the construction of the e-bike.
  - o Educators serving as team supervisors are eligible for a stipend of \$500 (one per team.)

\*Space within the competition is limited to the first 20 teams that sign-up.

## HOW IS MY TEAM GOING TO BUILD AN E-BIKE?

You are already on track to building an e-bike just by signing your team up for the competition! SVCE will provide teams with a budget (see below) for purchasing materials and resources for the e-bike. We also suggest teams seek local resources in the community to help in building e-bike. If teams need help finding guidance on their bike, they can contact Colleen McCamy (contact information provided above.)

There are also amazing articles, websites, videos and additional resources online in which students can research to aid in the building of an e-bike.

*E-bike kits may not be used in any part of the construction of the e-bike.*

## WHAT IS THE BUDGET FOR EACH TEAM?

Each team is allotted a budget up to \$1,000. A check for \$700 will be mailed to the team supervisor after Jan. 31<sup>st</sup> if all forms are turned in.

If teams need additional funding to purchase materials beyond the \$700 they can submit the additional funding request form outlining how much money and what they need to purchase. Additional funding cannot exceed \$300 which totals to \$1000 in funding for teams.

\*But keep in mind that for every \$50 each team is under budget an additional 2 points will be added to the final score.

» **Accounting and receipts** for all purchased or donated items are required. The attached accounting form is to be completed throughout the process outlining all purchases and donations for the e-bike with receipts attached. Purchases before March 8<sup>th</sup>, are due in the first turn-in of the accounting form and the complete form is due on April 27<sup>th</sup>. (See timeline)

» Any **left-over funds must be returned** to SVCE. If a team drops out of the competition, all unused funds and items purchased must be returned to SVCE with the accounting forms.

## WHAT ARE THE AWARDS FOR WINNING TEAMS?

First, second, and third place teams will be awarded with scholarship prizes to be divided equally amongst team members. The scholarship amounts are:

- 1<sup>st</sup> place is awarded \$7,500
- 2<sup>nd</sup> place is awarded \$5,000
- 3<sup>rd</sup> place is awarded \$3,500

## WHAT IF MY TEAM NEEDS HELP OR HAS A QUESTION?

Teams can seek mentors who are experts in bikes, engineering, battery construction and design that may advise teams on general engineering and project management skills. The team mentors' roles are **restricted from directly taking part** in the e-bike building, designing, fabrication operation, maintenance, of the bike.

Teams may also contact SVCE Bike to Future Coordinator Colleen McCamy [colleen.mccamy@svcleanenergy.org](mailto:colleen.mccamy@svcleanenergy.org) and explore local resources for advice.

## WHEN CAN WE START BUILDING THE BIKE?

After the Bike to the Future Orientation, teams can start to research and design their e-bike. Once everyone within your team submits their packet, your team is officially in the competition. After teams have submitted their packet, the initial stipend will be mailed during the week of January 28, 2019. Teams can continue to build and work on their e-bikes until the day of the competition on April 27, 2019. *See detailed timeline below for additional dates for the competition.*

## BIKE TO FUTURE TIMELINE

Date	Task	Required Action	Check Box
January 15	Orientation	Learn about e-bikes and the competition.	<input type="checkbox"/>
January 31	Last Day to Turn in Packet	<p><u>All participants</u> must complete and turn in the following documents: <b>application, liability waiver, media release.</b> <u>All teams</u> must turn in the <b>team application &amp; W-9 for supervisor.</b> All documents can be emailed to <a href="mailto:colleen.mccamy@svcleanenergy.org">colleen.mccamy@svcleanenergy.org</a></p>	<input type="checkbox"/>
February 4	Initial Stipend Mailed	The initial stipend will be mailed to the designated address of the <u>team supervisor</u> during this week.	<input type="checkbox"/>
March 8	Progress Photos	<p><u>Teams</u> will send in their progress photos to <a href="mailto:colleen.mccamy@svcleanenergy.org">colleen.mccamy@svcleanenergy.org</a>. Please see following page for details.</p>	<input type="checkbox"/>
March 8	Midpoint Receipt Turn-in	<p><u>Teams</u> will email pictures of all the receipts and the accounting form for all the purchases thus far.</p>	<input type="checkbox"/>
April 16	Event RSVP	<p><u>All participants</u> must complete the Google Form confirming that they have reviewed the event schedule.</p>	<input type="checkbox"/>
April 27	Bike to the Future Competition Day	Time to have fun and show off your amazing bikes!	<input type="checkbox"/>



## COMPETITION PROTOCOL

The following guidelines must be followed in order to remain within the Bike to the Future competition. These guidelines are to ensure the safety of each participant and that each team has an equal opportunity to win.

### TECHNICAL GUIDELINES

An e-bike is a bicycle in which can run on an integrated electric motor as well as pedaling. E-bikes can be a pedal-assist or a power-on-throttle system (see resources on further definitions and information.) Both types are allowed within the competition.

All e-bikes must include:

1. **Motor** – there are multiple types of available motors for an e-bike (hub drive, mid-drive, and friction drive.) All motor types are allowed.
2. **Battery and Battery Charger** – Each team must build their own battery! There are many resources on building your own battery pack to store electricity. While there are many different batteries with varying chemistry and dimension, Lithium-ion batteries are a popular choice for e-bikes as they are power dense and light-weight.
3. **Controller** – The controller serves as the “brain” of the e-bike. It communicates between the battery management system, motor, and the propulsion system ensuring the appropriate levels of power are distributed throughout the bike.
4. **Throttle (if not pedal assist)** – The throttle is the connection between what the rider wants the e-bike to do and what the e-bike actually does – like an “on-off switch” for the bike’s use of electric power. Throttles come in thumb throttles, half twist, and full twist – and all types are allowed.
5. **Bike Frame**– Now that you have all the other compartments, you need a bike to put it on! Both recumbent bikes (riders positioned in a seated reclined position) and upright bikes (riders positioned to lean forward to use the handlebars) are allowed in the competition.

» We encourage teams to be creative and resourceful in obtaining materials and value repurposing, recycling, and using donated materials.

### Prohibited materials for any part of bike:

- ✗ E-bike conversion kits
- ✗ Material previously used in Bike to the Future
- ✗ DIY battery kits
- ✗ Anything gas powered or open flames

» Built batteries may not exceed **650 watt-hours** for the maximum power output. An on-site safety inspection at the start of the competition day will verify the amount.



## COMPETITION OVERVIEW

Each team will compete with their bike in a series of different competitions measuring efficiency, battery range, design and innovation. Additional challenge logistics and rubrics will be provided.

The different challenges include:

### **Marty McFly By Acceleration:**

- This challenge will test the time it takes each e-bike to reach 20 mph from a starting point of 0 mph.
- The shortest average time to reach 20 mph wins this sector of the competition.
- Each team will compete in this round three times and scores will be an average of the three trials.
- All riders must remain seated on the bike at all times and riders pedaling during this challenge is prohibited (unless a pedal assist bike.)

### **Battery Flux:**

- This challenge will test battery efficiency and range. The amp hour of each battery will be recorded before and after e-bikes travels the designated course.
- SVCE will provide teams with a watt meter for teams to attach to their e-bike battery.
- The team with the smallest difference between amp hours recorded before and after wins this round.

### **Innovation:**

- This category will evaluate the new ideas, innovative components, and design included within the team's electric bike.
- The event's selected judges will award points based on a rubric.

### **Looks Like Team Spirit:**

- One team will be chosen by judges to win the team spirit section.
- The winning team will be awarded 5 additional points.

**Poster Presentation:**

- Teams will create a poster outlining the design and building logistics of their e-bike. An outline of poster content will be sent to teams.
- Using a rubric, judges will determine points for the posters.
- The set-up of the poster presentation will be similar to a science fair in that teams will be standing next to their posters as judges walk around and hear the presentations.

**Time Machine Solutions:**

- This portion of the competition applies the learning in building the e-bike to a global solution. Teams will all receive the same transportation problem of the future.
- This will be included within the poster presentation portion and scored on a separate rubric.

**Bike Before the Bell Obstacle:**

- This challenge will test the e-bike performance in situations requiring maneuverability, bike safety and stopping, which happens when biking on streets. Thus, teams will participate in an obstacle course where teams will move through different challenges. (A detailed course description will be provided.)
- Points will be awarded to teams who finish the course in the least amount of time.

**Thrifty Fifty:**

- An additional 2 points will be added to the team's total score for every \$50 under \$1000.
- Teams are allowed a maximum of 20 Thrifty Fifty points to be accounted for in their total score.

**Progress Photo:**

- On March 8, teams will submit one photo update showing the progress of the building an e-bike.
- These pictures will be posted on SVCE's Facebook and Instagram. The team with the picture that has the most likes, comments and shares (all equivalent in the accounting) by March 25 will be awarded 5 points.

## COMPETITION GUIDELINES:

- The bike must be built by the students within the teams. Direct help in the construction of the e-bike from people outside of the team is not allowed and can disqualify teams from participating in the competition.
  - The point distribution for teams is at the discretion of the selected judges for the event.
  - Good sportsmanship throughout the entire building process and event is required for all teams.
  - In the case of a tie, a tiebreaker question determines the winning team. The tiebreaker question will be provided ahead of time with the time machine solution question. The tiebreaker question will have a separate rubric in which the judges will use to determine the winner of the tie. If the tie is for 1<sup>st</sup> or 2<sup>nd</sup> place the team that didn't win the tiebreaker question will receive the next placing.
  - Make sure to have fun building the e-bike! While it is a competition, Bike to the Future was created so that high school students can have fun in participating and learning engineering applications in the hands-on construction of e-bikes.
  - The event will take place rain or shine! So make sure your bikes are prepared for all weather by making sure there are exposed wires or battery parts that can be dangerous if wet.
- 
- If a team drops out or terminates their status within the competition, funds and purchased equipment must be given back to Silicon Valley Clean Energy. As there is a restricted number of teams able to compete, we want to make sure that the participating teams are committed to the competition.
  - Returning participants and teams are not able to use the material purchased or donated from last year's event. Bikes must start from scratch with all different bike material than the previous competition.

### CHALLENGES & POINT BREAKDOWN:

Event	First Place	Second Place	Third Place	Fourth Place	Fifth Place
Marty McFly By Acceleration	50	40	30	20	10
Battery Flux	60	50	40	30	20
Bike Obstacle	15	8	6	4	2
Progress Photo	5	0	0	0	0
Looks like Team Spirit	5	0	0	0	0
	Maximum Points			Minimum Points	
Innovation	40	←-----→			0
Time Machine Solutions	20	←-----→			0
Poster Presentation	20	←-----→			0

**Total Maximum of  
215 points – not  
including Thrifty Fifty points**

➤ Points will be awarded to teams in two different ways. For most challenges, points will be awarded based on the ranking within each challenge. Teams that place first through fifth will receive the allotted points for the Acceleration, Battery Flux, Obstacle rounds. However, only teams that win first place for the Looks Like Team Spirit and the Progress Photo will be awarded the five points.

Additionally, for Innovation, Time Machine Solution, and Poster Presentation, points will be awarded based on a rubric and thus, each team will have the opportunity to gain points in these categories.

## SAFETY REQUIREMENTS

Safety throughout the entire competition is the highest priority for Silicon Valley Clean Energy and we want to ensure that all teams take the necessary safety precautions when building their e-bikes. All safety requirements must be followed to remain eligible for the competition.

### BIKE BUILDING SAFETY:

- The power output of the e-bike battery cannot exceed 650 Watt-hours.
- A team mentor or adult supervisor must be present if a team is using any hazardous equipment.
- Any accident or injury must be reported to SVCE staff immediately.
- The necessary personal protective equipment must be worn when using power tools.
  - When using a spot welder make sure to wear safety glasses, long sleeves, gloves, remove all rings and metal jewelry and ensure proper ventilation.

### BIKE RIDING SAFETY:

- A helmet must be properly worn at all times when riding the e-bike.
- All bikes must pass a day-of safety inspection prior to participating at the event.
- Close-toed shoes along with long sleeves and pants must be worn during the competition when riding the e-bike.
- Any team that operates their bike unsafely will be given a warning by event staff. Further unsafe behavior will result in disqualification.
- Paramedics will be onsite at the event to ensure safety and any accident or injury must be reported immediately to staff.



Bikes that reach over 20 mph are not allowed to be ridden on publicly accessible roads. Please make sure that all teams are following the California E-Bike laws for proper e-bike safety.

## RESOURCES

The resources below are to get teams started in research. The list should not be viewed as a comprehensive list of resources to utilize and where to purchase materials from. There are some great resources online to help in building e-bikes!

### GENERAL INFO:

- [Electric Bikes 101](#)
- [E-Bike Terminology](#)
- [E-Bikes School](#)

### MOTOR AND THROTTLE TYPES:

- [Motor Comparisons](#)
- [Throttle Comparisons](#)

### BATTERY:

- [Battery Basics](#)
- [Battery Building](#)

### MATERIAL PURCHASING:

- [Grin Technologies](#)
- [EV Deals](#)
- [18650 Battery Store](#)

### SILICON VALLEY CLEAN ENERGY:

- [Website](#)  
<https://www.svcleanenergy.org/>

### BIKE TO THE FUTURE 2018:

- [Website Page](#)  
<https://www.svcleanenergy.org/biketothefuture/>
- [2018 Video](#)  
<https://www.youtube.com/watch?v=-V0k2pCaEfI>



\* Click on the resources above which are linked to the correlating websites.









## 2019 BIKE TO THE FUTURE TEAM APPLICATION

Only **ONE PER TEAM** is needed for the team application in order for teams to be registered.

- Team Name: \_\_\_\_\_
- Participant High School: \_\_\_\_\_
- Participant: \_\_\_\_\_
  
- Faculty or Parent/Guardian Supervisor: \_\_\_\_\_  
 Email: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Cell Phone: \_\_\_\_\_  
 Department/Program: \_\_\_\_\_

- Team Leader: \_\_\_\_\_      ➤ Other Contact: \_\_\_\_\_  
 Email: \_\_\_\_\_                      Email: \_\_\_\_\_  
 Phone: \_\_\_\_\_                      Phone: \_\_\_\_\_

Commitment to participate: I agree to use the SVCE-provided materials in the design and building of an e-bike to compete in the 2018 "Bike to the Future" and follow all safety and competition guidelines.

\_\_\_\_\_  
Faculty or Parent/Guardian Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Faculty or Parent/Guardian Printed Name



**In addition to this application each team must turn in a W-9 for the team supervisor to send the stipend to the team.**

## 2019 BIKE TO THE FUTURE PARTICIPANT APPLICATION

**EACH PARTICIPANT within each team must fill out a participant application in order to register.**

- Participant Name: \_\_\_\_\_
- Team Name: \_\_\_\_\_
- Participant High School: \_\_\_\_\_
  
- Participant Emergency Contact: \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Cell Phone: \_\_\_\_\_  
 Relation: \_\_\_\_\_
  
- Bike Jersey Size: \_\_\_\_\_  
\*jersey sizing are in Men's and Women's sizing but runs small due to the close fit\*

Commitment to participate: I agree to use the SVCE-provided materials in the design and building of an e-bike to compete in the 2018 "Bike to the Future" and follow all safety and competition guidelines.

\_\_\_\_\_  
Participant Parent/Guardian Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Faculty /Guardian Printed Name

\_\_\_\_\_  
Date

**➤➤ In addition to this application each participant must complete the attached personal liability release and video/audio/photo consent form.**

## Video/Photo/Audio Consent Form

**Are you over 18? (YES) (NO)**

Event and Location of Photo/Video or Audio Recording:

**SVCE's Bike to the Future e-bike competition at Santa Clara County Fairgrounds**

Event Date: **April 27, 2019**

Photographer/Videographer: \_\_\_\_\_

Address: \_\_\_\_\_

Phone Number: \_\_\_\_\_

I, the undersigned, do hereby consent and grant permission to Silicon Valley Clean Energy (SVCE) recording my image and/or voice and grant SVCE all rights to use these sounds, still or moving images in any media whatsoever for promotional, advertising, or other purposes of SVCE.

I agree that all rights to the sound, still or moving images, and any and all plates, negatives, recording tape, memory and/or digital files belong to SVCE.

I waive all claims to compensation or damages based on the use of my image or voice, or both, by SVCE. I acknowledge I am participating on a voluntary basis and have not been promised, nor do I expect, any compensation for my participation. I also waive the right to inspect or approve any finished photograph or video or audio recording.

I understand that this consent is perpetual, that I may not revoke it, and that it is binding on me, my heirs and assigns.

I am 18 years of age or older and I am competent to contract in my own name or I am the parent and/or legal guardian of the minor person named below.

I have read this consent form before signing below, and I fully understand the contents, meaning and impact of this consent form.

Participant's Name (please print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Phone: \_\_\_\_\_

Address: \_\_\_\_\_

If the participant is under 18 years of age, a parent or legal guardian must sign below agreeing to and acknowledging the terms stated above on behalf of the participant.

Parent/Guardian Name (please print): \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Address (if different): \_\_\_\_\_

Phone (if different): \_\_\_\_\_

## Personal Waiver of Liability

**Name:** \_\_\_\_\_ **School:** \_\_\_\_\_

**Email:** \_\_\_\_\_

**Phone:** \_\_\_\_\_ **Are you over 18?** (Circle one) YES / NO

**WARNING: RECREATIONAL SITES ARE INHERENTLY DANGEROUS PLACES. A PERSON CAN BE INJURED OR EVEN KILLED WHILE AT A RECREATIONAL SITE.**

The effect of your execution of this document will prevent you, your heirs, assigns, personal representative(s), next of kin, guardian(s) and legal representative(s) ("releasor(s)"), from making any claims against Silicon Valley Clean Energy (SVCE), its directors, officers, representatives, agents and employees of ("releasees") arising out of, in consequence of, or in any manner relating to your presence at or near entry upon the Santa Clara County Fairgrounds during the period of: **April 27, 2019**

**RELEASE, WAIVER AND INDEMNITY:** In consideration of being permitted to enter the Premises, I, on behalf of myself, heirs, assigns, personal representatives, next of kin, guardians and legal representatives hereby:

1. Release, Waive, Discharge, and Covenant Not to Sue the Releases for all claims, loss, damage, expense and liability on account of any injury, including death, arising from the negligence or other acts or omissions, howsoever caused, arising out of, in consequence of or in connection with my presence at or near, or entry upon the Premises.
2. Agree to Indemnify, Defend, Protect and Hold Harmless the Releases from all claims, loss, damage, expense and liability they may incur arising from any claim brought by myself, on my behalf, or by my heirs, assigns, personal representatives, next of kin, guardians or legal representatives and excepting only such loss to the extent it directly results from the sole negligence or willful misconduct of Releases.

**ACKNOWLEDGEMENT OF RISKS:** I understand and am aware that being at or near the Premises and the engagement in activities on the Premises poses risks of injury or death. The possible risks include, but are not limited to:

1. Injuries arising from slipping, falling, tripping or drowning;
2. Injuries arising from supervision or instruction, negligent or otherwise; or
3. Being struck by, colliding with, or injured by falling objects, other participants or vehicles, equipment, materials, supplies or structures.

### **GENERAL TERMS AND CONDITIONS**

1. The partial or complete invalidity of any one or more provisions of this Release of Liability and Indemnity Agreement shall not affect the validity or continuing force and effect of any other provision.
2. This Release of Liability and Indemnity Agreement is intended to be as broad and inclusive as permitted by the laws of the State of California.
3. No oral representations, statements or inducements apart from the foregoing written agreement have been made.

This Release of Liability and Indemnity Agreement extends to and includes any and all claims, liabilities, injuries, damages and causes of action that the parties do not presently anticipate, know, or suspect to exist, but that may develop, accrue or be discovered in the future.

**RELEASOR EXPRESSLY WAIVES ALL RIGHTS UNDER CALIFORNIA CIVIL CODE SECTION 1542, WHICH PROVIDES:**

"A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must have materially affected his or her settlement with the debtor."

**KNOWING AND VOLUNTARY EXECUTION:** I have carefully read this Release of Liability and Indemnity Agreement and fully understand its contents. I understand that by signing this document I am waiving valuable legal rights and agree to be bound to the terms and conditions set forth above.

**IF YOU ARE OVER 18, you may sign, otherwise please have your guardian complete the Consent and Release.**

Signed: \_\_\_\_\_ Dated: \_\_\_\_\_

Print Name: \_\_\_\_\_

School and Team Name: \_\_\_\_\_

**Parent's Consent and Release for Minor:**

I certify that I am the parent/legal guardian of this minor who is under the age of 18, and I acknowledge that I have read this Agreement and fully understand its contents. I understand that by signing this document I am waiving valuable legal rights of this minor, and agree to be bound fully by the terms and conditions set forth above.

Signature of Parent or Guardian: \_\_\_\_\_

Relationship: \_\_\_\_\_ Date: \_\_\_\_\_