## Caltrain Electric Train Reconfiguration & Our Rebuttal to Staff's One-sided Presentation

**BIKES ONboard Project**
**Updated May 19, 2019**

Caltrain staff unveiled their new proposal for electric train reconfiguration at the Citizens Advisory Committee (CAC) meeting on May 15. **Staff's proposal is unacceptable.** It encourages bike theft, has fewer bike spaces than today's trains, and does not meet the board-mandated 8:1 ratio of seats-to-bike-spaces.

We call on the Joint Powers Board to honor its commitment to the public for 8:1 seats-to-bike-spaces (84 bikes per seven-car electric train) and provide seats within view of bikes to deter bike theft. We ask the board to override staff's faulty recommendation. We provide alternative recommendations below.

The board will vote on final electric train configuration at its next meeting at 10am, Thursday, June 6 at 1250 San Carlos Ave, San Carlos.

### 6-car EMU train; 7th car will be E (powered)

B (cab) C (bathroom) D (unpowered) E (powered) F (unpowered) A (cab)

### Capacity Cheat Sheet

| | Bike Cars | Bike Spaces | Seats | Sufficient seats within view of bikes | Ratio of seats-to-bike-spaces |
|---|---|---|---|---|---|
| **Today's diesel fleet** | 2 or 3 | 77 | 687 | **Yes** | 8.9 to 1 |
| **6-car EMU* (Caltrain staff's original proposal)** | 2 | 72 | 567 | **No** | 7.9 to 1 |
| **7-car EMU (Caltrain staff's new proposal)** | 2 | 72 | 675 | **No** | **9.4 to 1** |
| **7-car EMU (our recommendation #1)** | 4 | 80 | 661 | **Yes** | **8.3 to 1** |
| **7-car EMU (our recommendation #2)** | 7 | 84 | 660 | **Yes** | **7.9 to 1** |

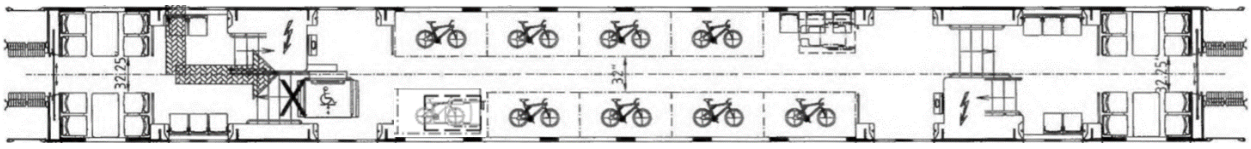
*EMU - electric multiple unit

Requirements:

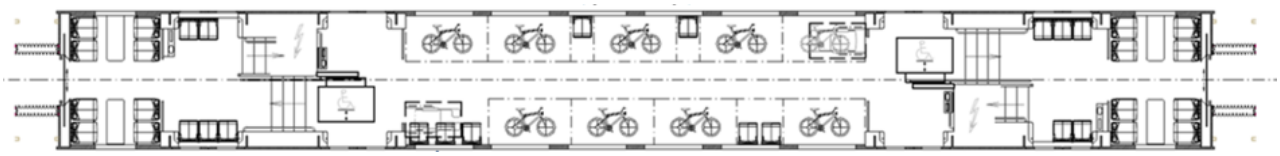
1. 84 bike spaces per seven-car EMU train to meet the board-mandated 8:1 ratio of seats-to-bike-spaces

2. At least one seat for every two bike spaces within view of bikes (same as today) to help prevent bike theft

**Caltrain staff's original bike-car layout**



**Caltrain staff's new proposed bike-car layout**

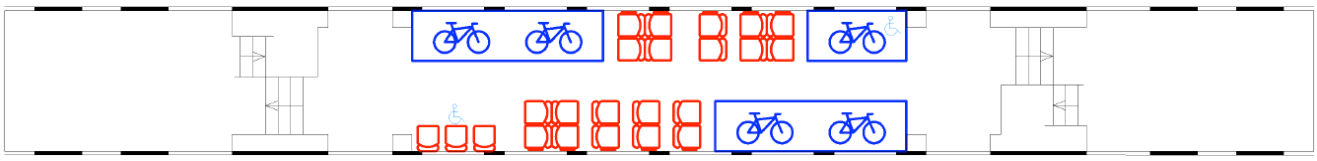


Staff's "new" proposal is the same as their original proposal – two bike cars with 36 bikes in each bike car and no fixed seats within view of bikes. The only minor change from the original layout is the addition of four folding seats in each bike car for a total of seven folding seats, three of which are at the same location as wheelchair space. Trains will likely be delayed due to congestion from standees in bike cars at all times, not just peak hours. Bike theft will likely increase with this "new" layout compared with today. Today's bike cars have at least one seat within view of two bike spaces – and bikes still get stolen from the train. Caltrain should not take a step backwards!

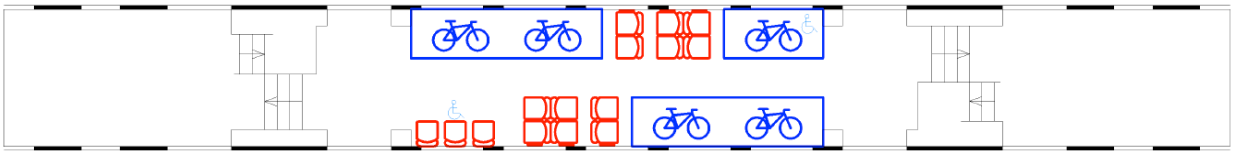
**Our Recommendation #1:**
80 bikes per 7-car EMU train
Four bike cars, 20 bikes each
Seat-to-bike-space ratio = 8.3:1

*Car Layouts (to scale):*

D/F car (unpowered) -- two per trainset



E car (powered) -- two per trainset



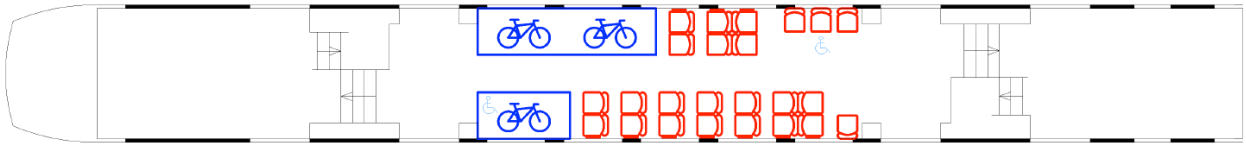
*Features:*

- Each bike car has at least half as many fixed seats as bikes to deter bike theft.
- All bike cars have the same layout with regard to bike racks for consistency, better for passenger experience and manufacturability.
- Distributes bike boardings at four cars to reduce dwell time (time train waits at the station for boarding/deboarding).
- Emergency exit windows not blocked by stacked bikes.

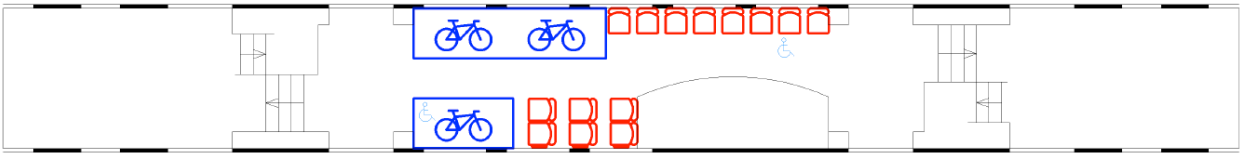
**Our Recommendation #2:**
84 bikes per 7-car EMU train
12 bikes in each and every car
Seat-to-bike-space ratio = 7.9:1

*Car Layouts (to scale):*

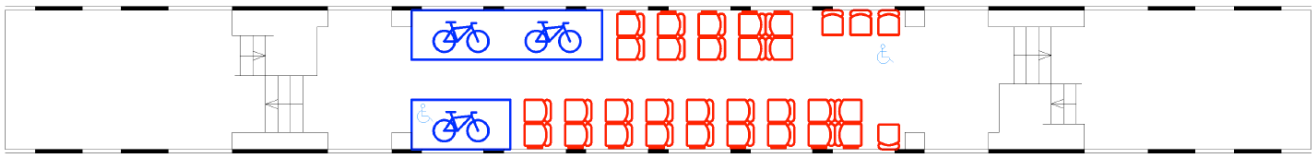
B car (cab)



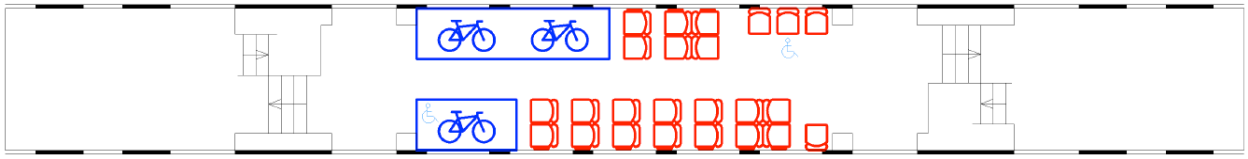
C car (bathroom)



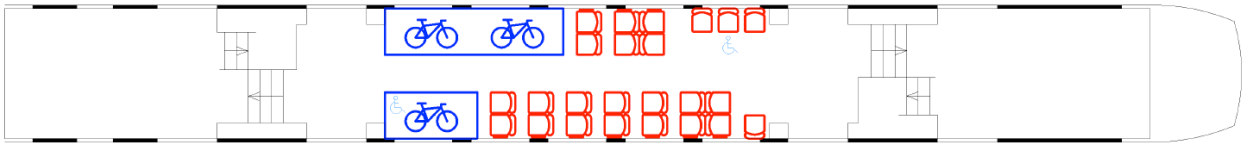
D/F car (unpowered) -- two per trainset



E car (powered) -- two per trainset



A car (cab)



*Features:*

- All but one car have more fixed seats than bike spaces to deter bike theft; the bathroom car has half as many fixed seats as bike spaces.
- All cars have the same layout with regard to bike racks for consistency, better for passenger experience and manufacturability.
- Distributes bike boardings at all cars to reduce dwell time.
- Readily scalable to longer trainsets.
- Emergency exit windows not blocked by stacked bikes.

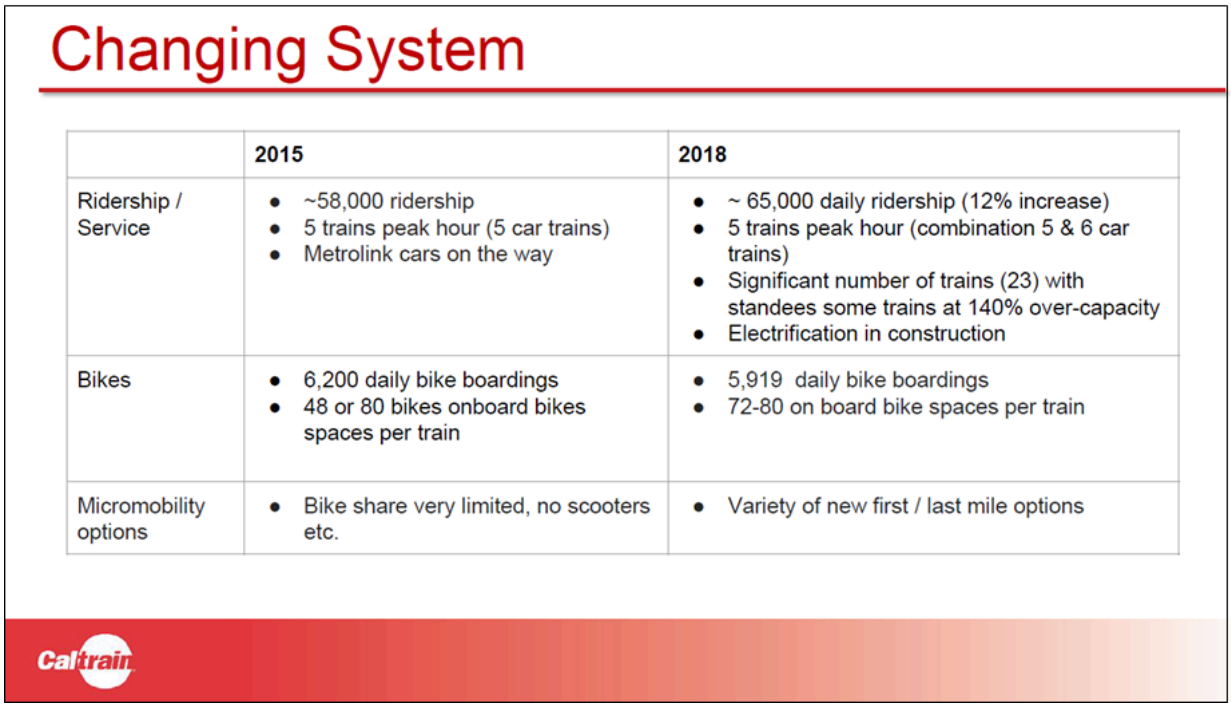
Both our recommendations include the following space-saving measures:

- No tables between seats in the bike area
- Two bike corrals have been combined with no separator in between

For details of bike and seat capacity in each car for our recommendations, see this capacity spreadsheet.

**Rebuttal to Caltrain Presentation at CAC Meeting on May 15**

Caltrain staff gave a presentation to the Citizens Advisory Committee that contains misleading information. We call on staff to be more objective. We offer a more balanced view below.

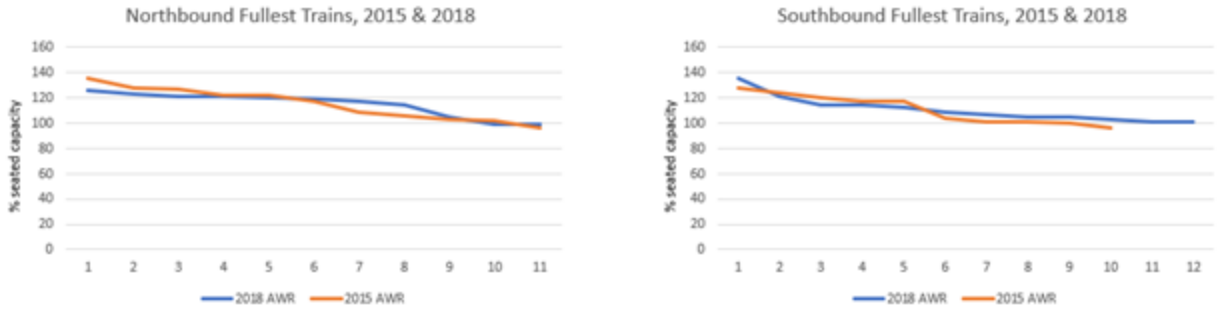



Slide 4: Caltrain staff has repeatedly stated that trains are more crowded today than in 2015. This is false. There are more passengers today, but Caltrain increased capacity since 2015 by adding a sixth car to all Bombardier trains, a sixth car to two gallery trains, and replacing one five-car gallery train with a six-car Bombardier train. Notice that the slide reports the increase in bike capacity, but not the 11% increase in seat capacity. An oversight, perhaps? The slide also reports standees, but does not report bicycle bumps. Another oversight, perhaps?

Furthermore, the increase in ridership reported on the slide is inflated because in the 2018 passenger counts, Caltrain counted only mid-week (Tuesday through Thursday) trains instead of weekday (Monday through Friday) trains as in 2015. Midweek trains have about 3% higher ridership than weekday trains according to the 2017 passenger count when both were tallied, so weekday ridership in 2018 was closer to 63,000, an 8% increase over 2015.

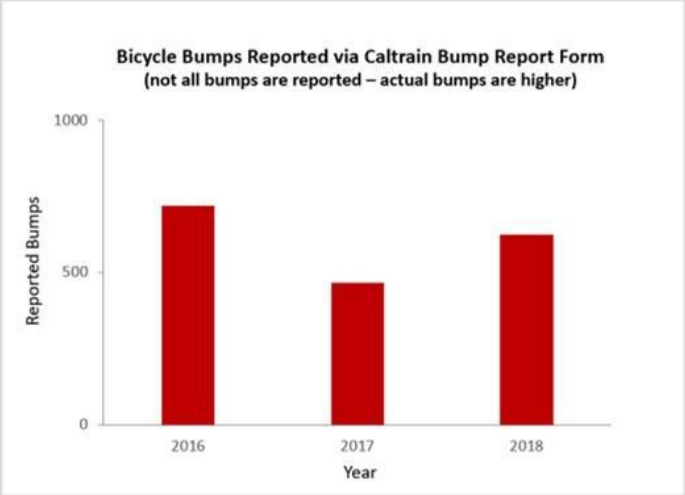
Trains are equally crowded today as in 2015 as shown in Figure 1. The addition of more capacity offset the increase in ridership.

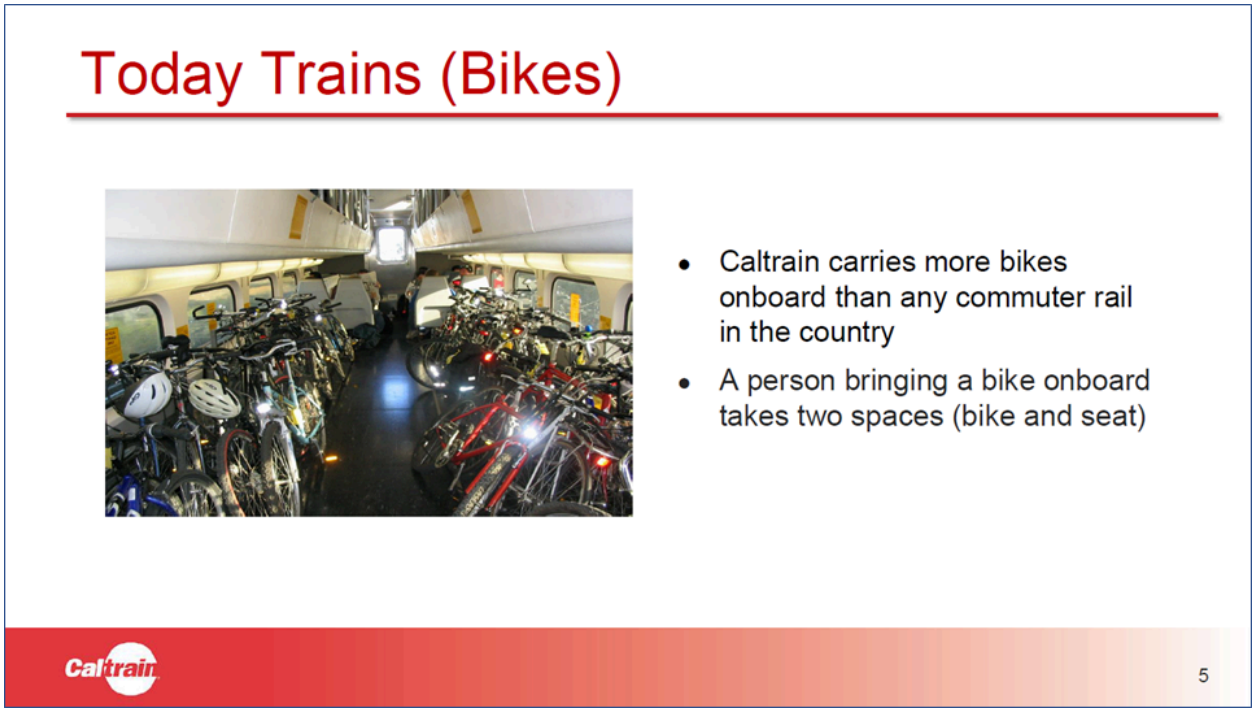
**Figure 1:** Fullest trains from Caltrain annual passenger counts




People with bicycles are the only customers denied service or 'bumped.'. Walk-on passengers are allowed to board and stand when seats are full but people with bicycles are left behind on the platform with paid tickets in hand. Maxed out bike cars force bike riders off the train and back into their cars onto the crowded freeways. As shown in figure 2, Caltain bumps hundreds of bike riders per year.

**Figure 2:** User-reported bicycle service denials






Slide 5: “A person bringing a bike on board is taking two spaces (bike and seat)” To clarify, one bike rack, which holds four bikes, takes the same space as four seats. Caltrain should think beyond just space on the train and consider how passengers access the stations. Caltrain’s bikes-on-board program brings economic benefits to the transit system. Bikes-on-board passengers do not use expensive parking lots or take seats on heavily subsidized feeder buses or shuttles, reducing the number of costly buses and shuttles that transit agencies must purchase and operate. Figure 3 shows estimated subsidies for various station access modes, where we see that only walking to/from stations is more economical than bikes on board. Bikes-on-board passengers also bring societal benefits by reducing traffic congestion, reducing pollution, and improving public health.

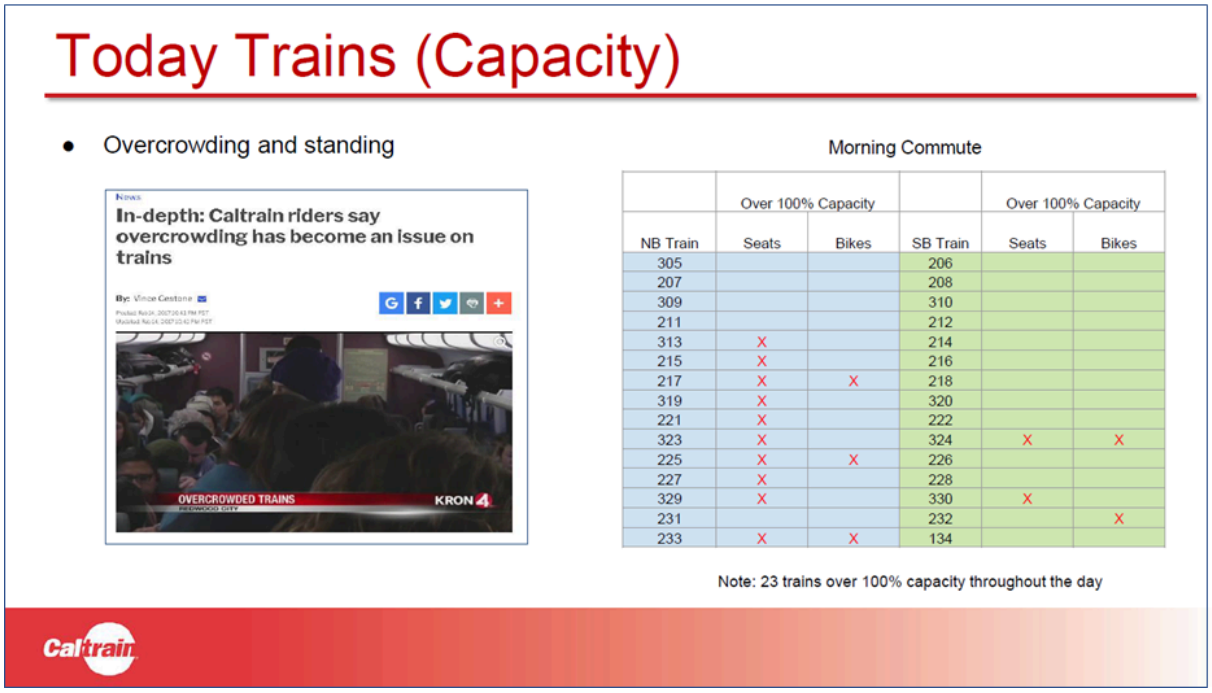
**Figure 3:** Subsidies for various station access modes

| Travel mode to station | Travel mode to destination | Subsidy |
|---|---|---|
| walk | walk | $1.78 |
| bike | bike | $8.35 |
| bus | bus | $17.77 |
| drive | walk | $45.72 |

Many people have stuff to bring with them to make Caltrain a viable travel option. According to the 2018 customer satisfaction survey, 25% of passengers brought a large item with them. Mothers bring strollers,

travelers bring luggage, bike riders bring bikes. If these folks can't bring things along, they won't be able to ride Caltrain.

Caltrain should focus on serving the needs of all passengers, not just those Caltrain considers more desirable for whatever reason.




| | Over 100% Capacity | | | Over 100% Capacity | |
|---|---|---|---|---|---|
| NB Train | Seats | Bikes | SB Train | Seats | Bikes |
| 305 | | | 206 | | |
| 207 | | | 208 | | |
| 309 | | | 310 | | |
| 211 | | | 212 | | |
| 313 | X | | 214 | | |
| 215 | X | | 216 | | |
| 217 | X | X | 218 | | |
| 319 | X | | 320 | | |
| 221 | X | | 222 | | |
| 323 | X | | 324 | X | X |
| 225 | X | X | 226 | | |
| 227 | X | | 228 | | |
| 329 | X | | 330 | X | |
| 231 | | | 232 | | X |
| 233 | X | X | 134 | | |

Slide 6: Caltrain reports on standees, but does not report on bicycle bumps anywhere in the slide deck. This gives a skewed view passenger experience. Standing on the train being transported to your destination is far better then being left behind standing on the platform going nowhere.

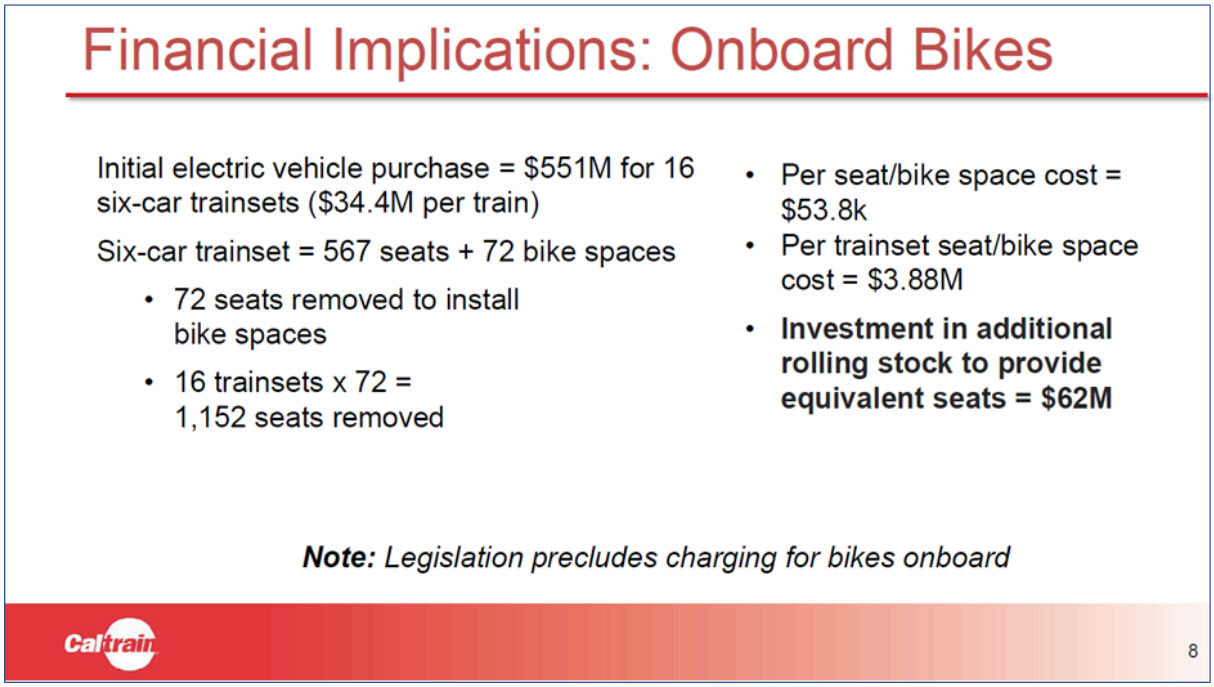
The comparison at the right of full seats and full bike cars is misleading. People with bikes are denied boarding when bike cars are full, so over-full bike cars are an anomaly due to a kind conductor who decided to let more bikes on instead of bumping them. In contrast, walk-on passengers are allowed to stand when seats are full. It is deceptive to show seats and bikes in the same table when they aren't comparable due to differences in policy.

Caltrain's standing capacity is not maxed out. According to the 2018 annual passenger count, the fullest train was 140% of seated capacity. For comparison, BART's peak trains run over 200% of seated capacity, suggesting that Caltrain still has standing space available to serve walk-on passengers.

Caltrain staff expresses concern that standees limit ridership, which will eventually be true but we're a long way from that now. Walk-on ridership continues to rise linearly as shown figure 13. Apparently standees in the bike car guarding their bikes don't have the same concern for Caltrain staff.

Caltrain's fullest trains are over seated capacity for a period of time, not for the full duration of the trip. Some passengers exit the train at each station stop, so a standee has a good chance of getting a seat at the next station stop, a trip duration of 3 to 15 minutes. This won't be true for people in the bike car.

Many will be standing their entire trip to guard their bikes, even during off-peak when the rest of the train has hundreds of empty seats. And what about having to stand on the platform with your bike after getting bumped? Apparently those standees don't matter at all. Caltrain staff expresses no concern that denying service to people with bikes limits ridership, but they are very concerned about standees on the train. What gives?




Slide 7: The financial data are terribly misleading. The cost is based on an entire new train, but the train has already been purchased. Hey, why not inflate the cost even more by adding cost of electrical infrastructure and catenary wires? You get the point.

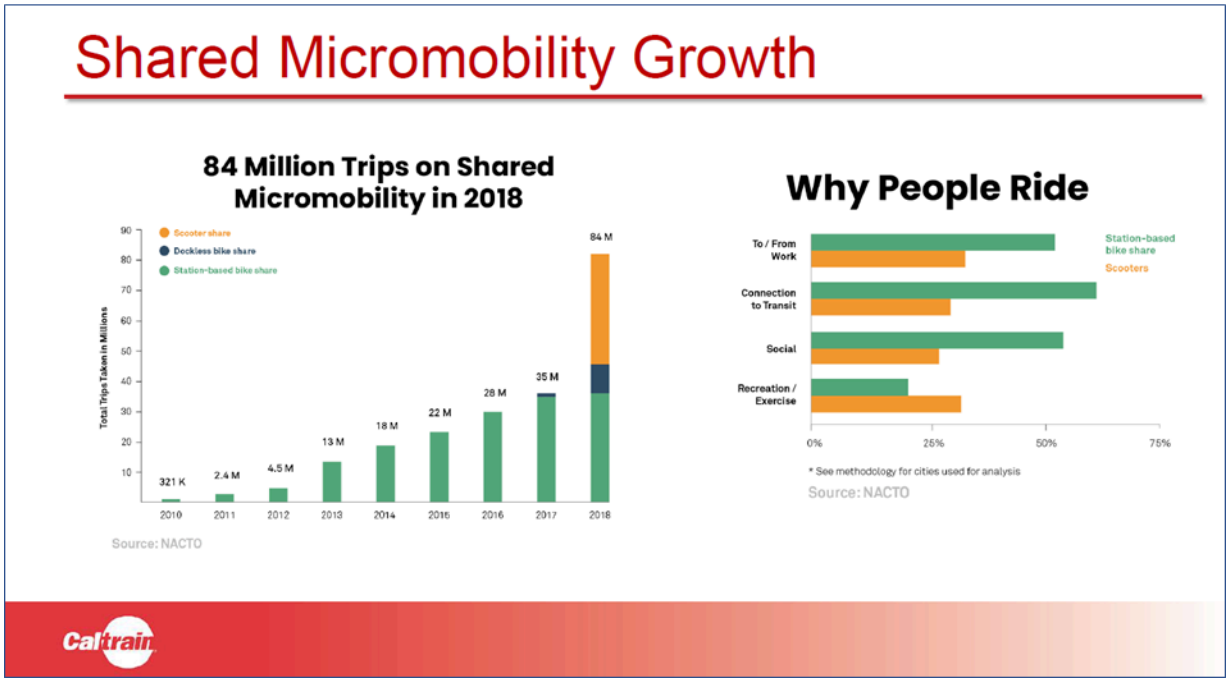
The train is a sunk cost - that money is spent irrespective of whether the train holds bike racks or seats. The relevant financial comparison is the cost of bike racks versus seats. Bike racks are surely cheaper than seats and cheaper to install. Therefore, if we're looking at capital cost only, Caltrain could save money by adding more bike racks.

An interesting financial implication is the retrofit cost to replace bike racks with seats. If bike capacity is underutilized in the future as a result of improved wayside facilities, Caltrain could swap bike racks for seats. This retrofit cost would not be $53,800 per seat!

Another financial implication is ticket revenue. Walk-on boardings continue to rise, but bike boardings have fallen off in recent years likely due to maxed out bike cars. The decrease in bike boardings costs Caltrain ridership and ticket revenue. If bike boardings had continued to rise linearly the same as walk-on boardings, then Caltrain would have made over $3 million more in ticket revenue in 2018 alone, as indicated by figure 4, based on Caltrain annual passenger counts and an average ticket price of $4.80. The additional ticket revenue from more bike capacity on EMU trains could be used in the future to

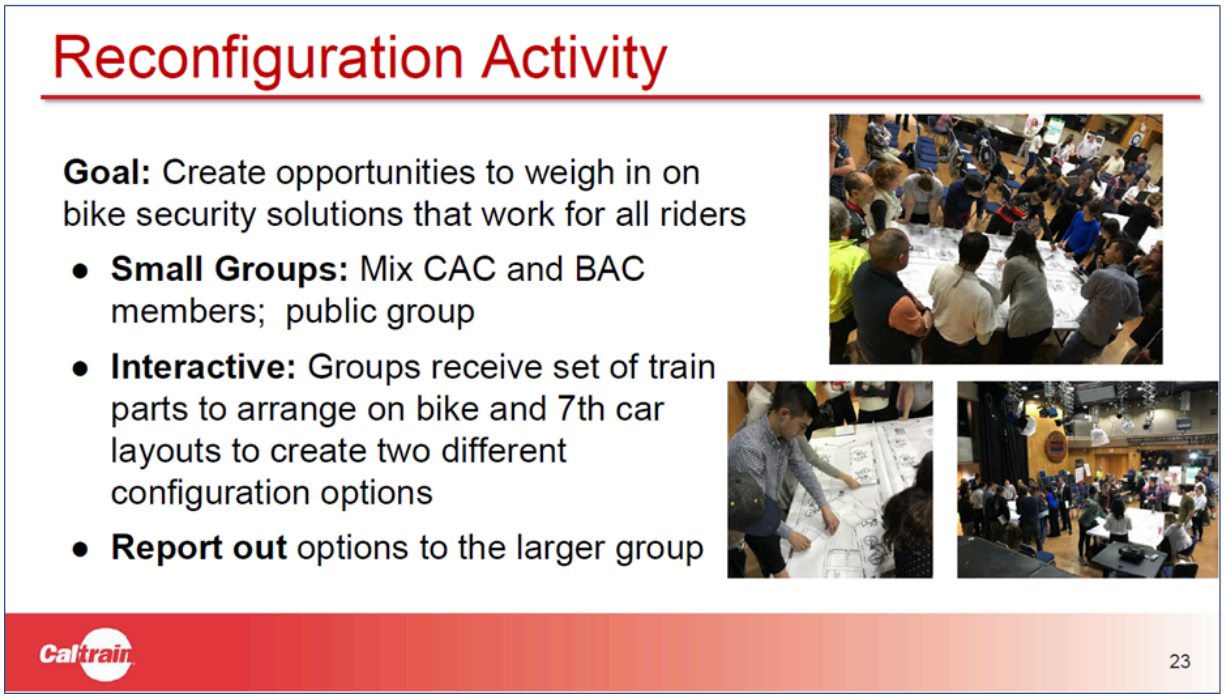
retrofit trains to replace bike racks with seats if bike capacity goes underutilized due to improvements in wayside facilities.

**Figure 4:** Caltrain boardings as per Caltrain annual passenger counts

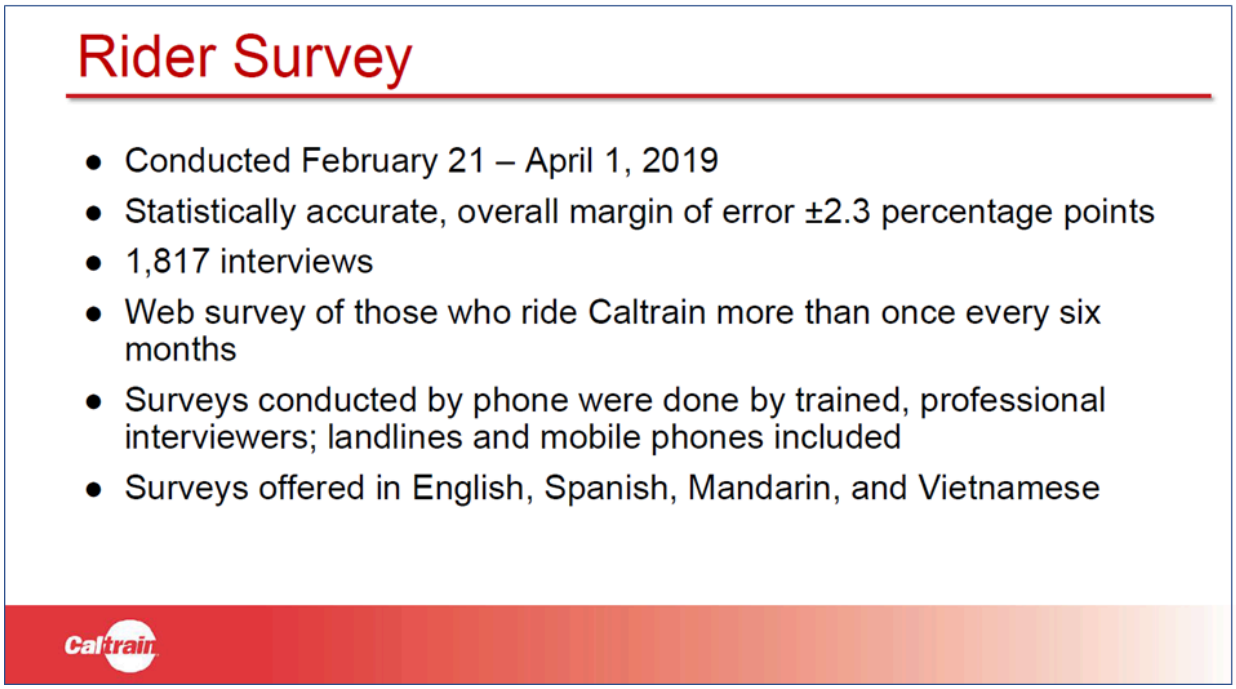




Slide 11: While these data are interesting, they are not particularly applicable to the Caltrain corridor. The data are based on a study of six cities, none in California, only two west of the Mississippi River (Denver and Portland), and all with core city populations greater than 400,000 (required to be a NACTO member city). The largest number of data points comes from New York City alone, further limiting the applicability to any city other than possibly San Francisco or San Jose along the Caltrain service corridor. For shared mobility to be viable, there must be high population density with businesses located near

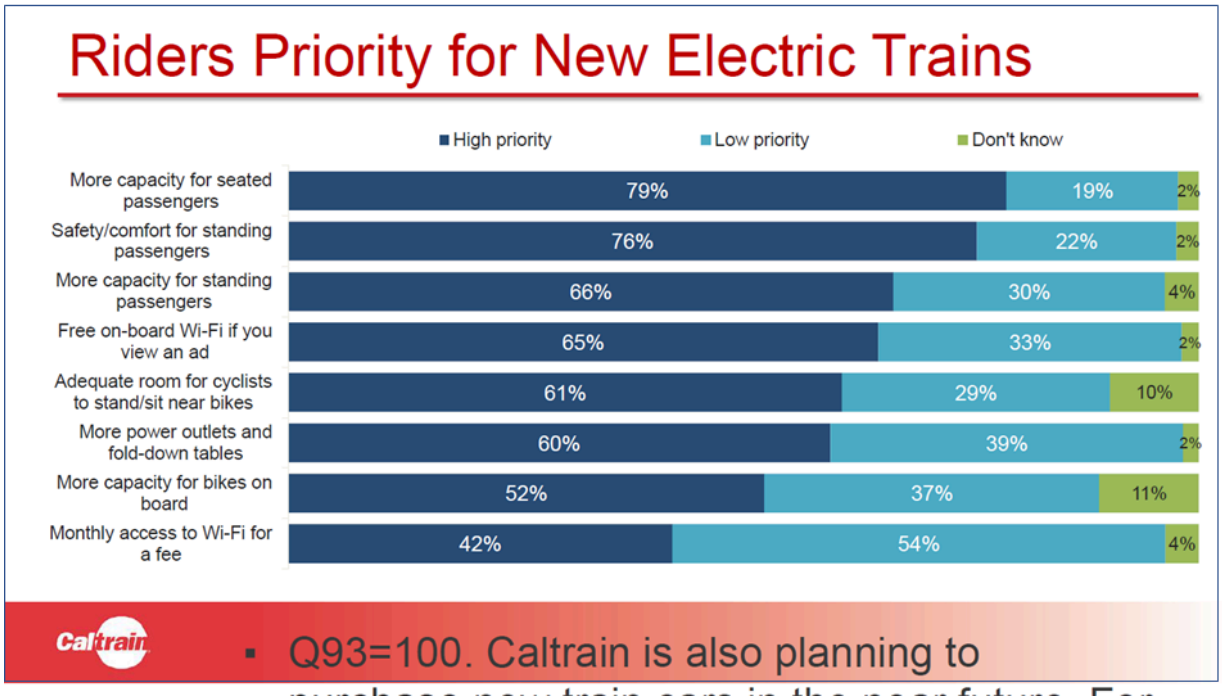
Caltrain stations. Land use policy on the Peninsula has not been conducive to the use of shared mobility and bike share attempts on the Peninsula have failed.




Slide 23: Caltrain held a public workshop on April 17 for train reconfiguration. This slide glosses over the fact that reconfiguration options staff offered at the workshop were limited to two or three bike cars. These constraints made it impossible for workshop attendees to develop configurations that had adequate seats within view of bikes and simultaneously met the board-mandated 8:1 ratio of seats-to-bike-spaces. The restricted options predetermined the outcome that staff wanted. We call on the board to direct staff to provide a complete set of options, including four or more bike cars.

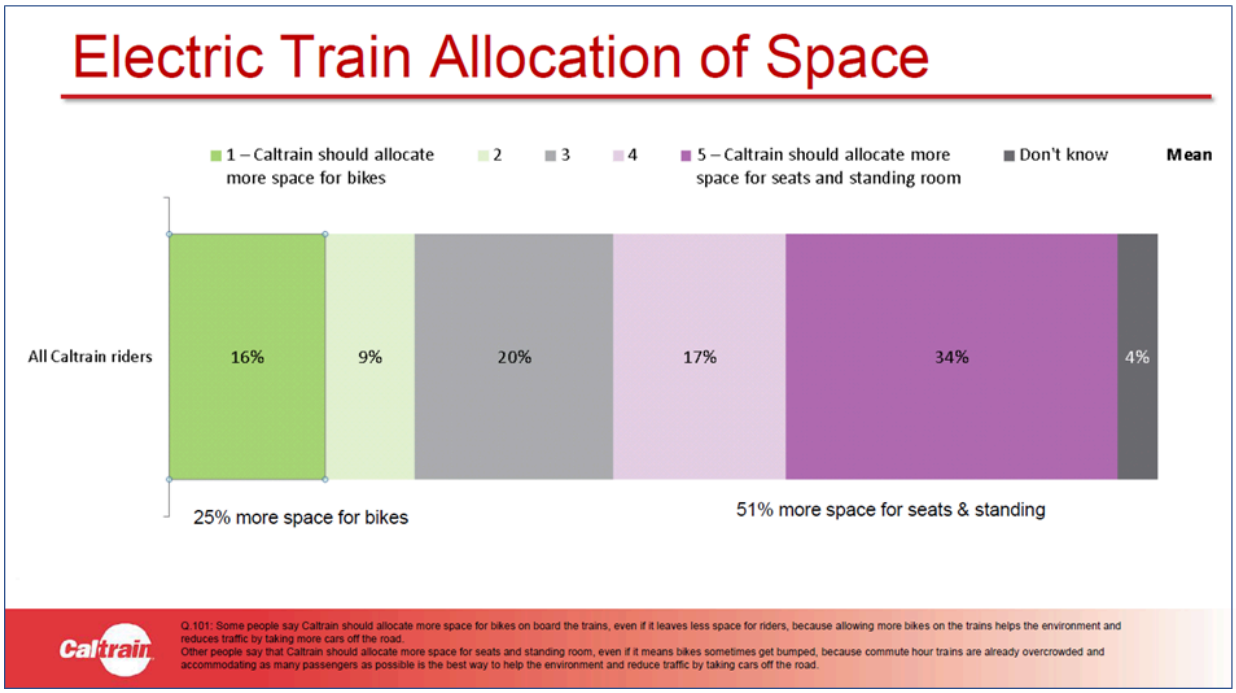



Slide 30: This rider survey was an opt-in survey. While it may be statically accurate, it is not statistically significant because it is not a random sample of all riders. The results should be taken with a grain of salt.




Slide 31: There is widespread support for bikes on board from the general ridership. While approximately 10% of passengers bring a bike on board, over half of passengers consider it high priority to have more

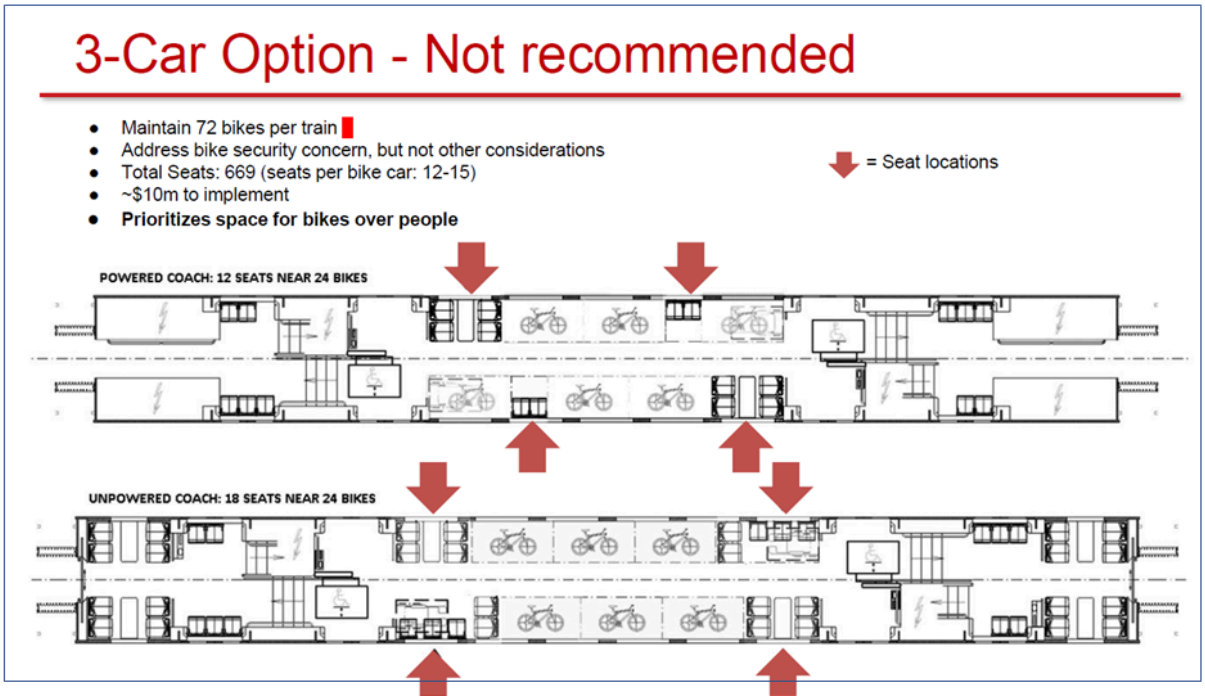
capacity for bikes on board. The survey question is unknown as it got cut off the bottom of the slide. Reminder: This survey is statistically insignificant.




Slide 32: Caltrain conducted an online push poll that pitted passengers against each other. As intended with a push poll, Caltrain got the response they were seeking to support their predetermined intention to decrease bike space compared with today. The survey question is written in fine print at the bottom of the slide. It reads:

> Some people say Caltrain should allocate more space for bikes on board the trains, even if it leaves less space for riders, because allowing more bikes on the trains helps the environment and reduces traffic by taking more cars off the road.
>
> Other people say that Caltrain should allocate more space for seats and standing room, even if it means bikes sometimes get bumped, because commute hour trains are already overcrowded and accommodating as many passengers as possible is the best way to help the environment and reduce traffic by taking cars off the road.
>
> Please indicate where your opinion falls on the scale below. "
>
> With 1 = "Caltrain should allocate more space for bikes" and 5 = "Caltrain should allocate more space for seats and standing room

Instead of pitting passengers against each other, Caltrain should focus on serving the needs of all passengers. Reminder: This survey is statistically insignificant.




Slide 38: This layout is a step in the right direction, but Caltrain needs four bike cars to help meet demand for all passengers. We provide comments on each bullet point:

- Maintain 72 bikes per train

  Caltrain originally planned six-car EMU trains with 72 bike spaces per train, but got funding to add a seventh car. That should mean more seat and bike capacity, but staff plans only more seat capacity, not more bike capacity. Electric trains should bring more capacity for all riders, but 72 bike spaces per train is fewer than today's 77 bike spaces per train. The Caltrain board mandated an 8:1 ratio of seats-to-bike-space on EMU trains, or 84 bike spaces per seven-car EMU train. That is impossible to achieve with only three bike cars and still have seats within view of bikes.

- Address bike security concern but not other concerns

  This partially addresses bike security concerns, but there are only 8 fixed seats within view of 24 bikes. In the unpowered car, the folding seats may or may not be available because they are at the same location at wheelchair space. This can lead to passenger conflicts. This layout does not address the concern of decreased bike capacity compared with today.

- Total seats: 669 (seats per bike car 12 - 15)

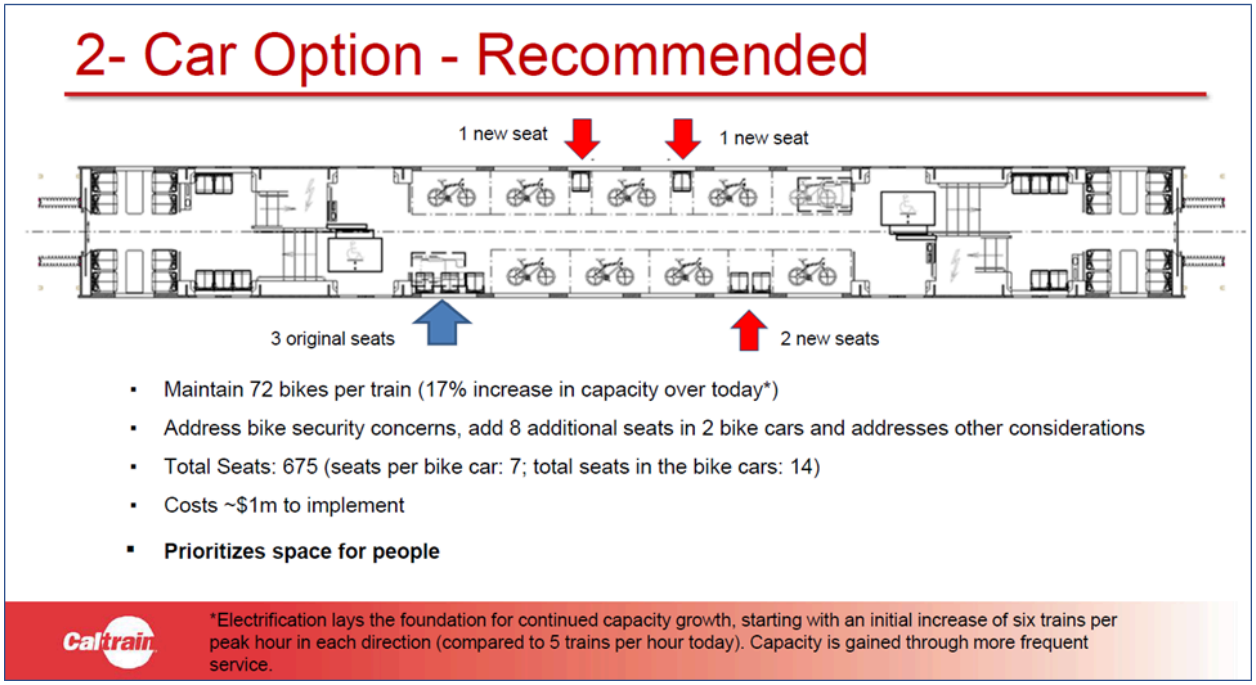
  The seat-to-bike-space ratio is 9.3:1, which does not meet the board-mandated 8:1 ratio of seats-to-bike-spaces.

- ~$10 million to implement

  There is no breakdown of the $10 million price tag for this configuration.

- Prioritizes space for bikes over people

This is confusing, especially given the (staff-recommended) configuration on the following slide, which states it prioritizes people. The train doesn't change size between the two configurations and both configurations hold 72 bikes. Perhaps the people change size???




Slide 39: Staff's recommended option is unacceptable. The only minor change from the original layout is the addition of four folding seats in each bike car for a total of seven folding seats, three of which are at the same location as wheelchair space. Bike theft will increase with this "new" layout compared with today. Today's bike cars have at least one seat within view of two bike spaces – and bikes still get stolen from the train.

Our comments on the bullet points:

- Maintain 72 bikes per train (17% increase in capacity over today)

  This bullet point obfuscates the loss in bike capacity by mixing train capacity (bikes per train) and line capacity (bikes per peak hour). Bike capacity per train decreases 7% and bike capacity per peak hour increases only 11%. Electric trains will come on line in 2022 and we already need more bike capacity today!

  The so-called capacity increase of 17% is based on an atypical mix of today's train types. See this capacity spreadsheet for details.

- Address bike security concerns, add 8 additional seats in 2 bike cars and addresses other considerations

  False, this does not address bike security concerns. There are no fixed seats within view of 36 bikes. This layout is prone to bike theft, just like to original layout. While there are seven folding

seats, three of the folding seats are at the same location as wheelchair space. This may lead to passenger conflicts. It also does not address the concern of decreased bike capacity compared with today; we're not sure what "other considerations" it addresses.

- Total seats: 675 (seats per bike car: 7 total seats in the bike cars: 14)

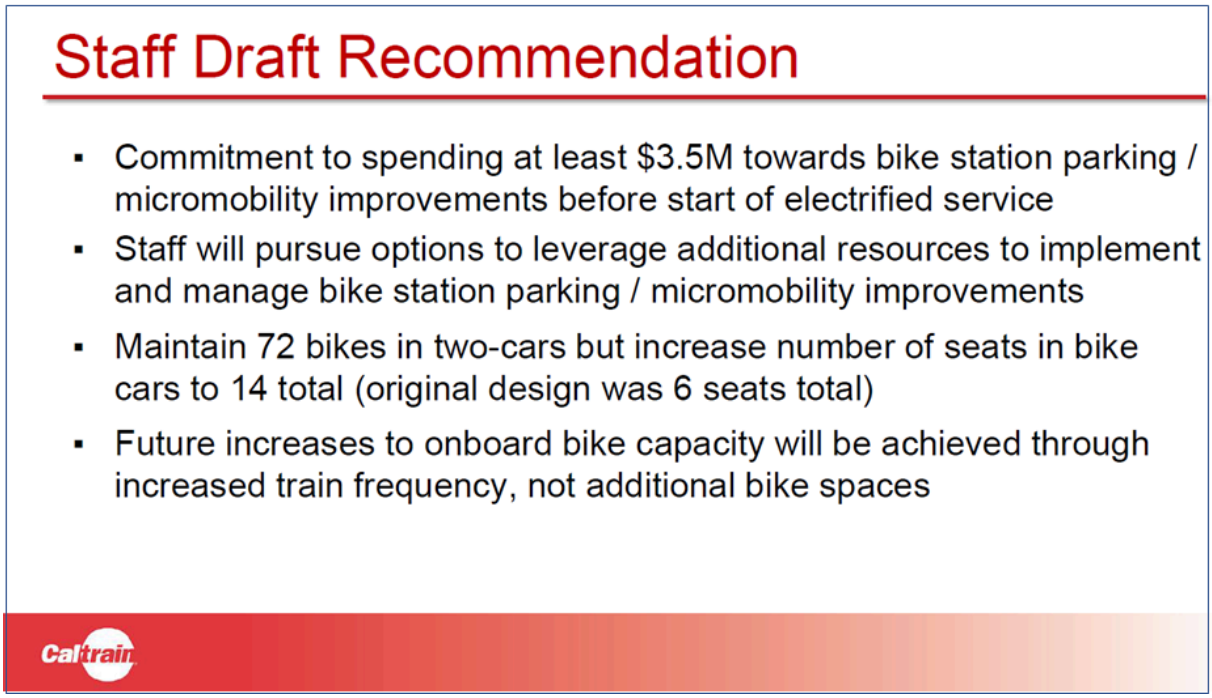
  The seat-to-bike-space ratio is 9.4:1, which does not meet the board-mandated 8:1 ratio of seats-to-bike-spaces.

- Costs ~$1 million to implement

  There is no breakdown of the $1 million price tag for this configuration.

- Prioritizes space for people

  False, the space allocated for bikes is exactly the same for the two options, which means the space allocated for people (seated and standing) must be the same, too.




Slide 40: We're excited about the commitment to improve bike parking and micromobility, but we're deeply disappointed that staff has essentially ignored public outcry about better bike security and more bike capacity. It's also disturbing that staff is trying everything to convince the board to abandon the 8:1 ratio for seats-to-bike-spaces. We call on the current board to honor the 8:1 ratio unanimously approved by the board in 2015. The public was promised an increase in bike capacity on EMU trains at the 8:1 ratio. This promise must be kept.

**Caltrain Options Offered at the Workshop on April 17**

Caltrain staff held a public workshop on April 17, but the constraints staff put on reconfiguration options precluded any meaningful improvement in bike-car layout.

Caltrain staff offered workshop attendees three options (all of which we find unacceptable):

Option 1: Two bike cars, no reconfiguration (current design)
Option 2: Reconfigure two bike cars
Option 3: Reconfigure three bike cars

Staff should have provided drawings of all seven cars and let workshop attendees work with the full train, not just three cars.

Here's an explanation of Caltrain staff's three options (drawings from Caltrain website, not to scale).

**Option 1: Two bike cars, no reconfiguration (current design)**

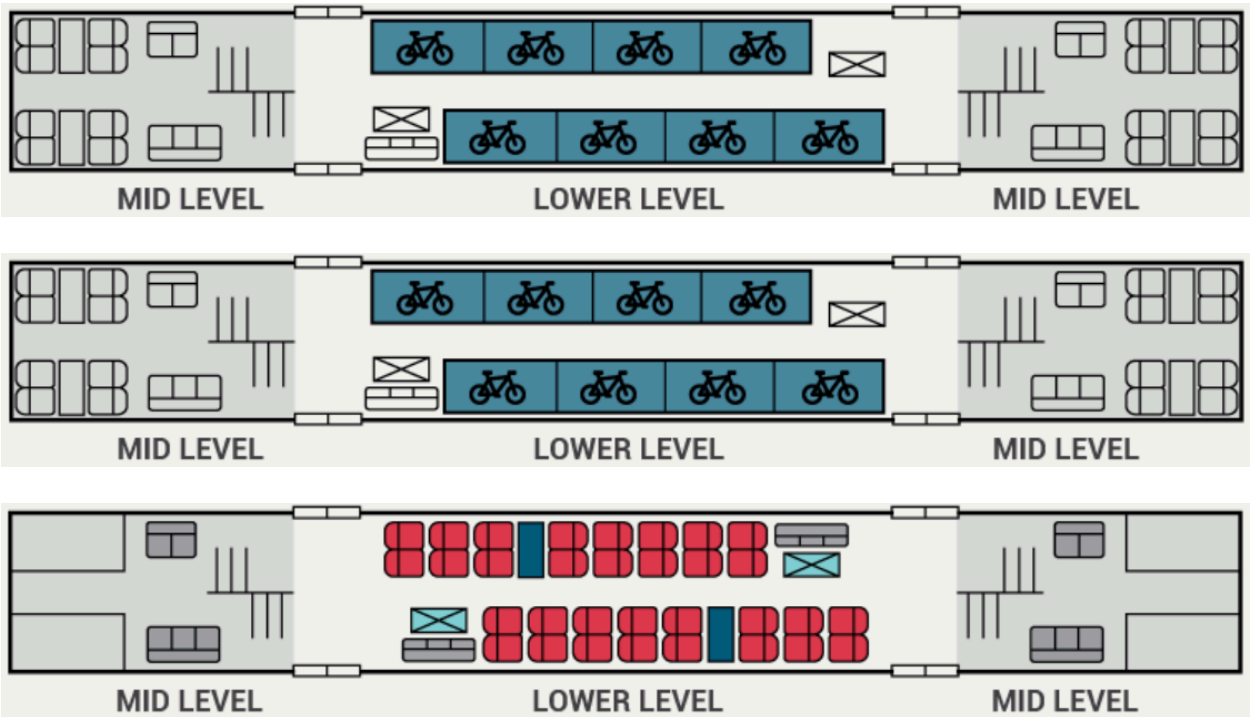

The current design has no fixed seats within view of bikes. Two bike cars hold 36 bikes each (four on each rack) for 72 bikes per train. One of the bike racks is at the same location as wheelchair space (marked with an x in a rectangle). The other wheelchair space has three folding seats.

Option 1 is a throw away. The current design encourages bike theft. Caltrain took no public input on this design, and it took over a year of public outcry about bike theft to get Caltrain to finally reconsider. Problems with option 1 is the whole reason Caltrain agreed to hold a workshop.

**Option 2: Reconfigure two bike cars**


Option 2 is a non-starter. The only way to put seats within view of bikes is to remove bike racks to add seats in each bike car, reducing bike capacity. EMU trains already have fewer bike spaces (72 per train) than today's diesel trains (77 per train). Reducing bike capacity even further would be an even bigger step backwards. Furthermore, this would not meet the board-mandated 8:1 ratio of seats-to-bike spaces.

**Option 3: Reconfigure three bike cars**




Option 3 won't have enough seats within view of bikes, even after seats and bike racks are swapped among the cars. To meet the 8:1 seat-to-bike ratio, each bike car would need 28 bike spaces for 84 bikes per train. There would be up to eight fixed seats within view of bikes in each bike car. Eight seats is not enough to guard 28 bikes. Bike cars today have at least half as many seats as bikes and bikes still get stolen. We need to match today's trains, not make matters worse with fewer seats within view of bikes.

The workshop should have offered additional options to be an earnest attempt to solve the layout problem:

1. Reconfigure four bike cars
2. Allow bikes in every car

Four or more bike cars would allow sufficient seats within view of bikes, reduce dwell time by distributing bike boardings at more doors, and simplify operations with better consistency among cars.

We want to work with Caltrain toward a viable solution, but they have not offered viable options. We asked for two things to make the workshop more productive:

- Provide drawings of all seven cars at the workshop

- Provide electronic drawings in advance of the workshop

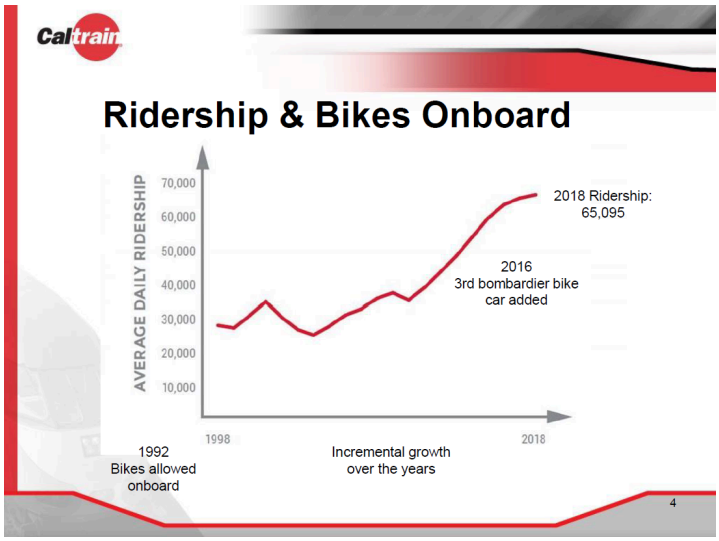
Caltrain staff refused both our requests. But there's more than one way to skin a cat, so we lifted the drawings from a publicly available document Caltrain filed with the Federal Railroad Administration and traced them into CAD (computer aided design) software. That's how we got the to-scale drawings shown in our recommendations above. 😊

Caltrain staff now claims the board-mandated 8:1 ratio of seats-to-bike spaces no longer applies. Staff is moving forward as though the ratio has been abandoned, but that is inconsistent with the board-approved contract with the train builder in which the 8:1 ratio is a requirement.

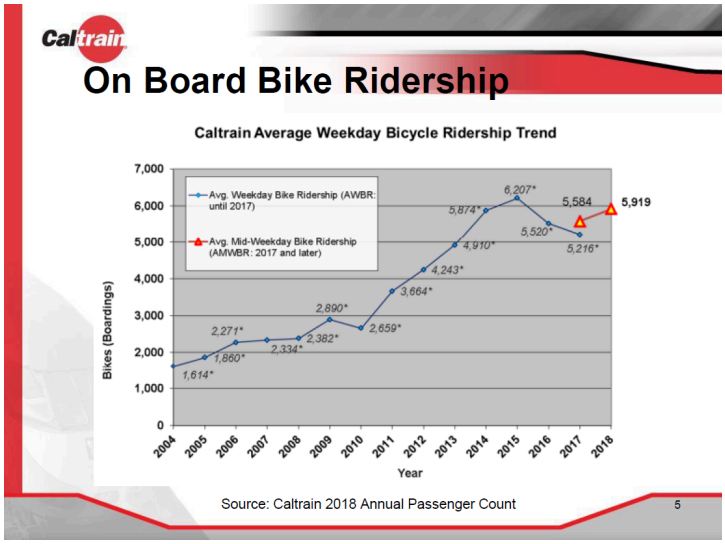
While the concept for the workshop is commendable, the constraints placed on reconfiguration options prescribed a preordained layout. Caltrain needs four or more bike cars for a viable solution.

**Staff Presentation at the Workshop & Our Rebuttal**

Caltrain staff gave a presentation at the start of the workshop similar to this presentation provided at the March 7 Joint Powers Board meeting. We are concerned about the bias against bikes on board and we offer a more balanced view by adding context to slides from staff's presentation, as shown below.




Slide 4: This slide shows total boardings including walk-on boardings and bike boardings. Walk-on boardings continue to rise, but bike boardings have dropped (see slide 5 below) leading to leveling off of total boardings.




Slide 5: Bike boardings fell off in 2016. Staff claims this is due to wet weather in February, when the passenger counts are taken. This is not plausible. While February 2017 was very rainy, February 2016 and 2018 were very dry as shown in the chart below. Bike boardings are capped by limited bike capacity. The decline in bike boardings is most likely due to maxed out bike cars forcing people with bicycles off the train and back into their cars onto the crowded freeways.

**Figure 1:** Rainfall in February

Total rainfall for February in San Francisco

| Days | Year | Inches | Millimetres |
|---|---|---|---|
| 2 | 2018 | 0.4 | 11 |
| 19 | 2017 | 7.6 | 193 |
| 4 | 2016 | 1.0 | 25 |
| 3 | 2015 | 1.5 | 37 |
| 13 | 2014 | 5.8 | 148 |
| 4 | 2013 | 0.9 | 22 |
| 10 | 2012 | 1.1 | 28 |
| 8 | 2011 | 4.9 | 125 |
| 11 | 2010 | 3.4 | 87 |

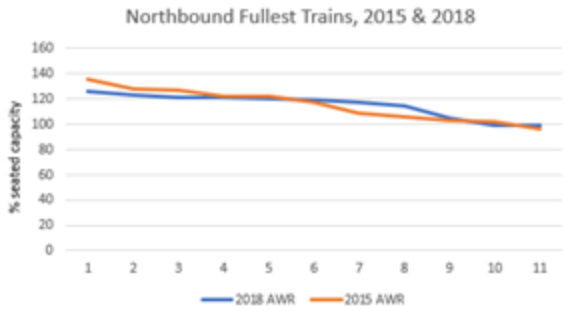
## 2018 Context

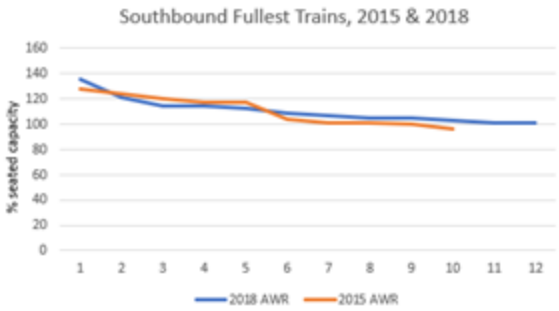
- Daily ridership: ~65,000 **(up 12% from 2015)**
- Daily bike boardings: 5,919

Slides 6 and 7: Bike mode share is dropping. In 2015, 11% of passengers brought a bike on board. In 2018, only 9% of passengers brought a bike on board. Bikes-on-board passengers were Caltrain's fastest growing passenger segment, until bike capacity ran out. Walk-on boardings continue to rise because walk-on passengers are allowed to stand when seats are full, but people with bicycles are left behind on the platform, discouraging use.

Slide 7 shows in bold that ridership has increased 12% since 2015, but Caltrain has since added capacity with the Bombardier cars purchased from Metrolink. In fact, the fullest trains in 2015 and 2018 were comparably full, as shown by the graphs below for average weekday ridership (AWR). To suggest trains are more full today than in 2015 simply isn't accurate.

**Figure 2:** Fullest trains from Caltrain annual passenger counts




## Today - Bikes on Train

- Caltrain carries more bikes onboard than any commuter rail in the country
- A person bringing a bike onboard is taking up two spaces (bike and seat)

8

Slide 8: Caltrain can be proud to be a national leader in bike carriage on trains. Other transit agencies surely envy Caltrain's bicycle mode share.

"A person bringing a bike on board is taking two spaces (bike and seat)" To clarify, one bike rack, which holds four bikes, takes the same space as four seats. Caltrain should think beyond just space on the train and consider how passengers access the stations. Caltrain's bikes-on-board program brings economic benefits to the transit system. Bikes-on-board passengers do not use expensive parking lots or take seats on heavily subsidized feeder buses or shuttles, reducing the number of costly buses and shuttles that transit agencies must purchase and operate. Figure 3 shows estimated subsidies for various station access modes, where we see that only walking to/from stations is more economical than bikes on board. Bikes-on-board passengers also bring societal benefits by reducing traffic congestion, reducing pollution, and improving public health.

**Figure 3:** Subsidies for various station access modes

| Travel mode to station | Travel mode to destination | Subsidy |
|---|---|---|
| walk | walk | $1.78 |
| bike | bike | $8.35 |
| bus | bus | $17.77 |
| drive | walk | $45.72 |

Many people have stuff to bring with them to make Caltrain a viable travel option. According to the 2018 customer satisfaction survey, 25% of passengers brought a large item with them. Mothers bring strollers, travelers bring luggage, bike riders bring bikes. If these folks can't bring things along, they won't be able to ride Caltrain.

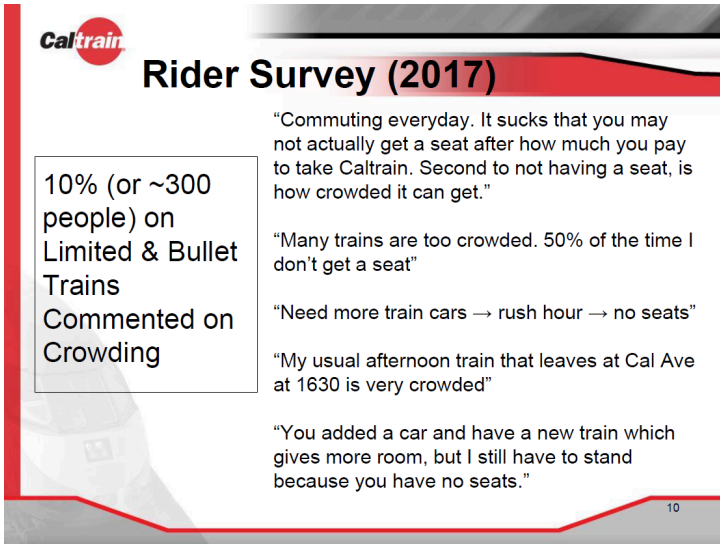
Caltrain should focus on serving the needs of all passengers, not just those Caltrain considers more desirable for whatever reason.


Slide 9: Caltrain accurately reports crowding on trains, but it's not increased from 2015. Figure 2 above shows that the fullest trains are comparably crowded in 2015 and 2018.

Caltrain neglects to report crowding in bike cars. Due to high demand for bike space, bike cars fill first while there are still empty seats elsewhere in the train, as shown in the photos below.

**Figure 4:** Southbound train 360 leaving San Francisco, April 1, 2019 - bike car crammed full, empty seats in non-bike cars in the same train

**Figure 5:** Northbound train 313 leaving San Jose, April 1, 2019 - bike car crammed full, empty seats in non-bike cars in the same train




Slides 11: Some peak trains have standees, but just because customers complain about crowding doesn't mean they want to throw other passengers off the train. It's a plea for more capacity for everyone.

Staff selected quotes about too few seats, but omitted all quotes about bike bumps and over-crowded bike cars. This gives a very one-sided view of the situation. We compiled a sampling of complaints about over-crowding in bike cars, as shown in figures 6 and 7 below.

**Figure 6**

## Overcrowded Bike Cars – Rider Survey (2017)

"BIKE CARS ARE OVERCROWDED DURING RUSH HOUR AND SOME BIKES CANNOT FIT ONBOARD WHICH IS UNACCEPTABLE"

"BIKES ARE TURNED AWAY AT 22ND EVERY DAY, DISCOURAGING USE."

"WISH YOU WOULD MAKE MORE ROOM FOR BIKES. IT SUCKS WHEN YOU'RE NOT LET ONTO A TRAIN BECAUSE THE BIKE CAR IS FULL."

"I LOVE RIDING THE TRAIN. MY ONE CONCERN IS THE LACK OF BIKE SPACE. I HAVE SEEN PEOPLE GET REFUSED BECAUSE THE BIKE CARS WERE FULL."

"IT'S GETTING SUPER CROWDED AT PEAK TIMES, HARD TO GET BIKES ON AT MANY STOPS. "

"MANY TRAINS DURING MY COMMUTE ARE AT OR ABOVE CAPACITY FOR BICYCLES, RESULTING IN "BUMPING""

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2

**Figure 7**

## Social Media Customer Complaints – Maxed Out Bike Cars

**Julien Mercay** @jmercay — Follow

@Caltrain Bike cars full again at RWC (#232 SB). 3rd time in a week that I'm late to work. Please increase bike capacity.

8:41 AM - 21 Aug 2018

2 Likes

**Adina Levin** @alevin — Follow

At HSR/Caltrain local policymaker working group, late because I got bike-bumped.

6:10 PM - 22 Feb 2018

3 Likes

**murphstahoe** @murphstahoe — Follow

What's old is new again many bumps off @caltrain 269

5:34 PM - 30 Jan 2018

2 Likes

**Cliff Bargar** @thecliffbar — Follow

Replying to @thecliffbar @CaltrainStatus and 2 others

Lots of people with bikes are getting bumped at Palo Alto, Menlo, and RWC from NB277 @BikesOnCaltrain 😞

6:31 PM - 4 May 2018

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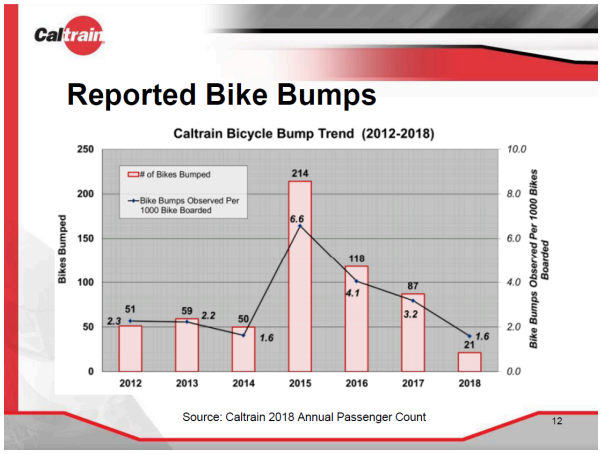
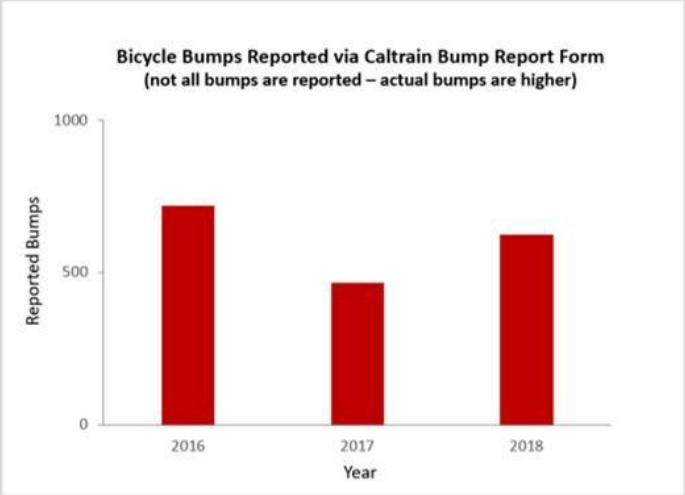
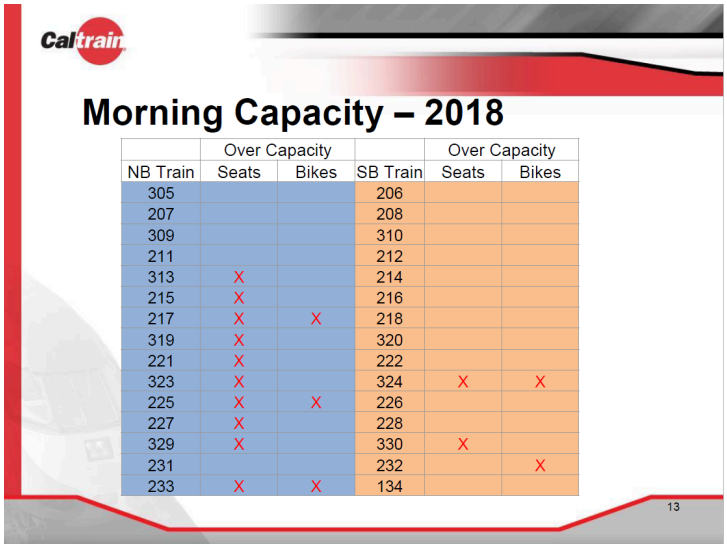


Slide 12: Caltrain counts bumped bikes during its annual passenger counts. In 2012 through 2017, 460 trains were counted, but in 2018 only 184 trains were counted resulting in a lower bump count in 2018. Caltrain attempted to normalize the results by showing a line for "bike bumps observed per 1000 bikes boarded," but if too few trains are counted, then this calculation is meaningless. As an extreme example, if only one train is counted and it happened to bump no people with bikes, then a calculation of bike bumps per 1000 bikes boarded would be zero, even if other trains bumped many people with bikes.

Bicycle bumps reported via Caltrain's bicycle bump form for the full year have increased as shown by the graph below (not included in staff's slide deck), suggesting that Caltrain counted too few trains in the 2018 passenger counts to provide an reliable comparison with previous years.

**Figure 8:** User-reported bicycle service denials




| | Over Capacity | | | Over Capacity | |
|---|---|---|---|---|---|
| NB Train | Seats | Bikes | SB Train | Seats | Bikes |
| 305 | | | 206 | | |
| 207 | | | 208 | | |
| 309 | | | 310 | | |
| 211 | | | 212 | | |
| 313 | X | | 214 | | |
| 215 | X | | 216 | | |
| 217 | X | X | 218 | | |
| 319 | X | | 320 | | |
| 221 | X | | 222 | | |
| 323 | X | | 324 | X | X |
| 225 | X | X | 226 | | |
| 227 | X | | 228 | | |
| 329 | X | | 330 | X | |
| 231 | | | 232 | | X |
| 233 | X | X | 134 | | |

Slide 13: This comparison of full seats and full bike cars is misleading. People with bikes are denied boarding when bike cars are full, so over-full bike cars are an anomaly due to a kind conductor who

decided to let more bikes on instead of bumping them. In contrast, walk-on passengers are allowed to stand when seats are full. It is deceptive to show seats and bikes in the same table when they aren't comparable due to differences in policy.

Caltrain's standing capacity is not maxed out. Figure 9 shows the fullest train was 140% of seated capacity. For comparison, BART's peak trains run over 200% of seated capacity, suggesting that Caltrain still has standing space available to serve walk-on passengers.

**Figure 9:** Fullest trains from Caltrain 2018 annual passenger counts

**Table 12: FULLEST TRAINS – SOUTHBOUND (AT 95% SEATED CAPACITY OR ABOVE)**

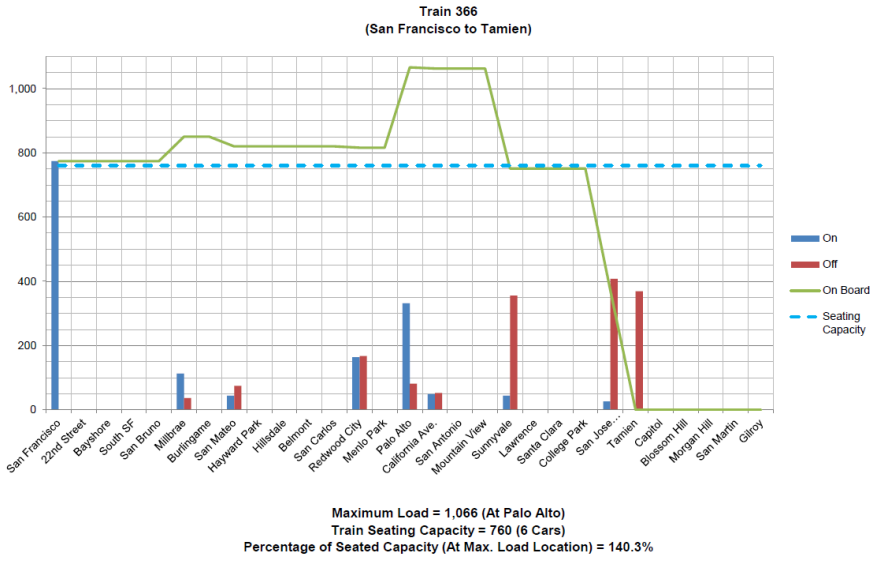
| Southbound | | | | | | |
|---|---|---|---|---|---|---|
| | Train Number | Depart SF | Leaving Station | Max Load | Train Capacity | Percent of Seated Capacity |
| b | 366 | 4:38 PM | Palo Alto | 1,066 | 760 | 140% |
| b | 376 | 5:38 PM | Millbrae | 952 | 760 | 125% |
| b | 324 | 7:59 AM | Millbrae | 898 | 760 | 118% |
| | 360 | 4:12 PM | Palo Alto | 767 | 650 | 118% |
| | 278 | 5:58 PM | Millbrae | 885 | 760 | 116% |
| g | 268 | 4:58 PM | California Ave. | 853 | 760 | 112% |
| | 330 | 8:35 AM | Millbrae | 712 | 650 | 110% |
| b | 370 | 5:16 PM | Millbrae | 823 | 760 | 108% |
| | 272 | 5:27 PM | San Francisco | 822 | 760 | 108% |
| | 262 | 4:23 PM | California Ave. | 692 | 650 | 106% |
| | 258 | 3:34 PM | California Ave. | 679 | 650 | 104% |
| b | 380 | 6:16 PM | San Francisco | 678 | 650 | 104% |

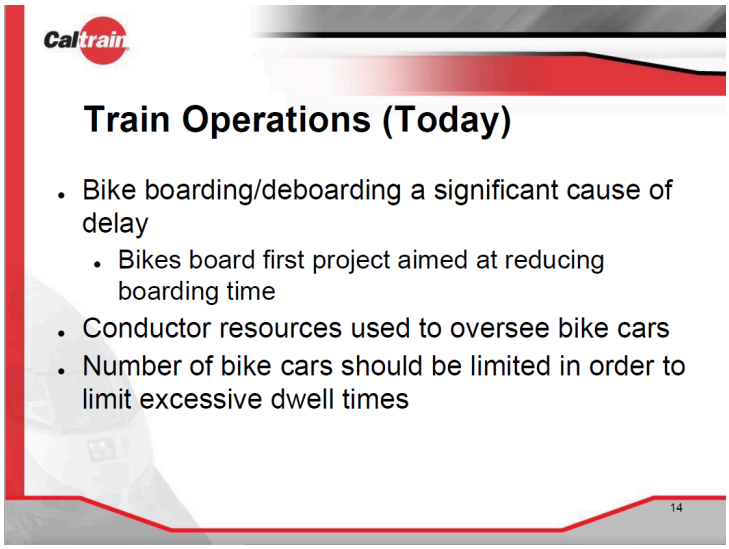
*"g" = Gilroy train; "b" = Baby Bullet express train*

***Note:*** *Train capacity is average seated capacity and based on the scheduled fleet assignment. Trains with capacity of 760 are the ones which 6-car consist is assigned.*

Passengers are willing to stand for short durations. Caltrain's fullest trains are over seated capacity for a period of time, not for the full duration of the trip. For example, passenger load on the fullest train, train 366, is shown in figure 10 below. Some passengers exit the train at each station stop, so a standee has a good chance of getting a seat at the next station stop, a trip duration of 3 to 15 minutes.

**Figure 10:** Fullest train in Caltrain 2018 annual passenger counts






Slide 14: This slide is especially dubious. Let's clarify a couple things. All passengers cause dwell time delays – the more passengers boarding/deboarding, the longer the dwell time (time the train sits at the station). Caltrain has no evidence that bikes cause dwell time delays. Bikes are required to board last, so they get blamed for delays, but Caltrain's carefully conducted 2010 *Bike Count and Dwell Time Study* shows that bikes do not cause dwell time delays.

We applaud the "bikes board first" procedure implemented on March 11, 2019, because walk-ons can board at other doors. Distributing boarding at all doors is the fastest way to load the train.

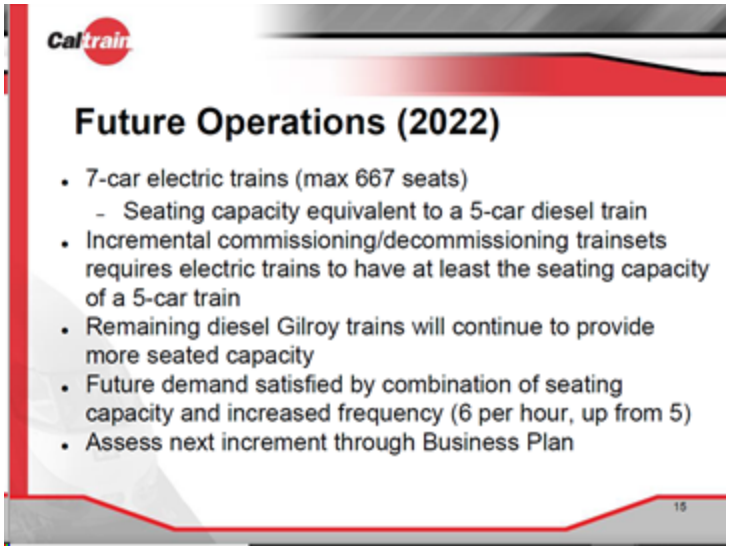
Limiting the number of bike cars will likely extend dwell time, not reduce it. Restricting one passenger segment to a limited number of cars will result in longer dwell times. BART understands this and permits bikes in all cars, except the first. BART passengers self-distribute to load trains as fast as possible. Below is a screen shot from BART's website:

**Figure 11:** From BART website

**Frequently Asked Questions about Bikes on BART**

**1. Why doesn't BART designate one car just for bicycles?**

Because BART trains stop for only 15 to 30 seconds at almost all stops, attempting to load and unload all bicycles in one car will likely cause delays. BART's strategy is to disperse cyclists along the length of the train allowing multiple bikes to enter and exit simultaneously—utilizing up to 18 doors rather than just two (since bikes are not allowed in the first car, a 10 car train has 18 doors on 9 cars for bicyclists to use).




Slide 15: The first bullet point shows the main problem. Electric trains will have no more capacity than today's diesel trains. Caltrain runs a mixture of five- and six-car diesel trains today with average seating capacity of 687 seats per train.

The second bullet point seems to be a nearly found issue. It was never mentioned with six-car EMU trains, which have only 567 seats. It seems odd that this has suddenly become a priority. Could staff be using this as an excuse to try to convince the board to abandon the 8:1 ratio of seats-to-bike-spaces so they don't have to add bike capacity to seven-car EMU trains?

Future demand will not be "satisfied by combination of seating capacity and increased frequency." One more train per hour will bring only ~25% more line capacity as shown below, and the increase in seating capacity is primarily due to the high-capacity, seven-car diesel trains in the fleet, not the EMU trains.

**Figure 12:** Train and Line Capacity (assuming the 8:1 ratio is met for EMU trains)

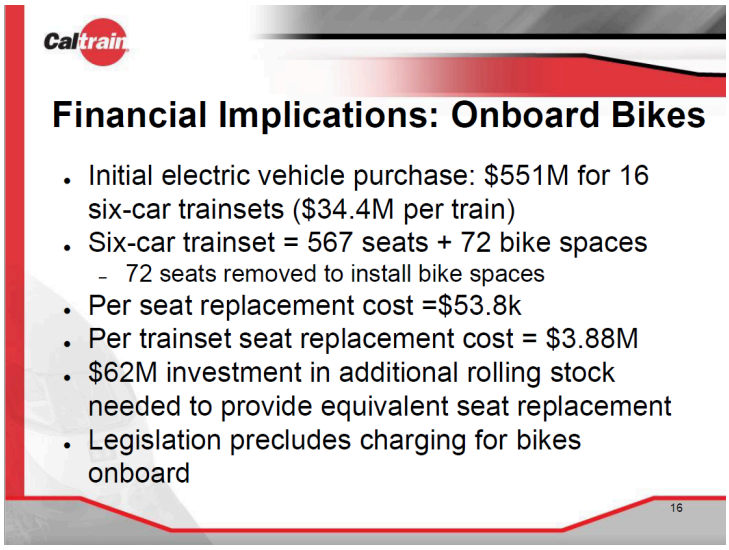
| **Train Capacity** | **Seats** | **Bikes** |
|---|---|---|
| Today's diesel fleet | 687 | 77.6 |
| Seven-car EMU trains | 660 | 84 |
| Seven-car diesel trains | 910 | 72 |
| Mixed fleet (79& EMU & 21% diesel) | 708 | 81.5 |

| **Line Capacity** | **Seats** | **Bikes** |
|---|---|---|
| Peak service today (5 trains per hour) | 3437 | 388 |
| Peak service 2022 (6 trains per hour) | 4273 | 489 |

| | | |
|---|---|---|
| Peak line capacity increase in 2022 | 24.3% | 26.0% |

See this capacity spreadsheet for more details.

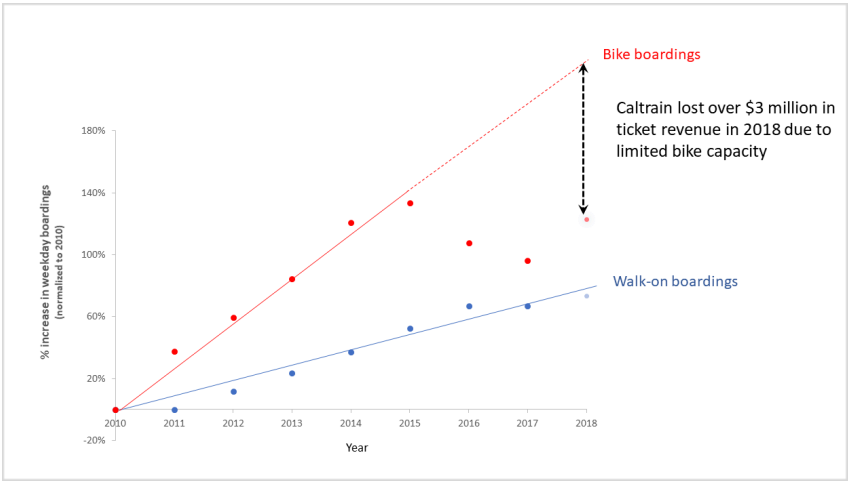
Some trains are already running over 125% seated capacity today, let alone in 2022. Caltrain needs to run longer, more frequent trains to meet future demand. Caltrain is spending $2 billion to electrify its line to run trains that have less capacity than today's trains. Low capacity is the problem with this program, not bikes.




Slide 16: The financial data are terribly misleading. The cost is based on an entire new train, but the train has already been purchased. Hey, why stop at just a new train? Why not add cost of electrical infrastructure and catenary wires? You get the point.

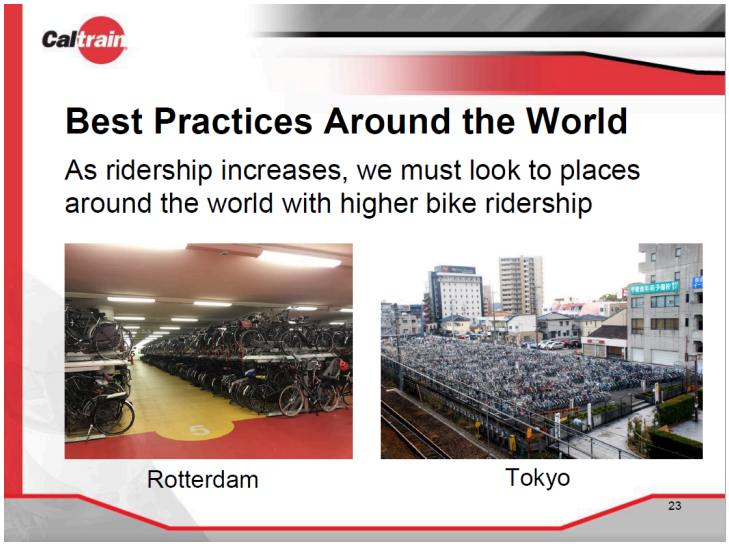
The decrease in bike boardings costs Caltrain ridership and ticket revenue. If bike boardings had continued to rise linearly the same as walk-on boardings, then Caltrain would have made over $3 million more in ticket revenue in 2018 alone, as indicated by the graph below, based on Caltrain annual passenger counts and an average ticket price of $4.80. The additional ticket revenue from more bike capacity on EMU trains could be used in the future to retrofit trains to replace bike racks with seats if bike capacity goes underutilized due to improvements in wayside facilities.

**Figure 13:** Caltrain boardings as per Caltrain annual passenger counts



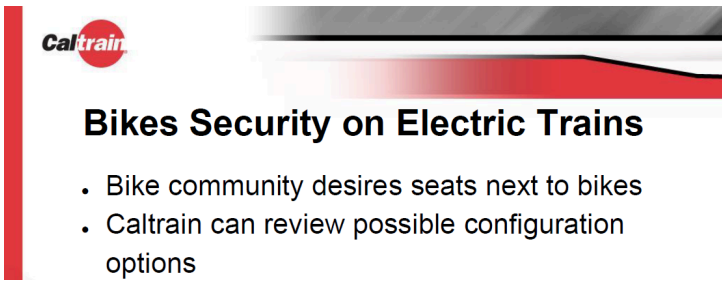


Slide 21: Bike and scooter share will work for some people and we support providing as many alternatives as possible to get people out of their cars. Bike share is most suitable in a dense network with short trips, so it works in San Francisco. Bay Area Bike Share failed on the Peninsula and the bikes were removed. Two private companies tried dockless bike share on the Peninsula, but those bikes were also removed. We cannot rely on bike share to replace bikes on board, particularly on the Peninsula.

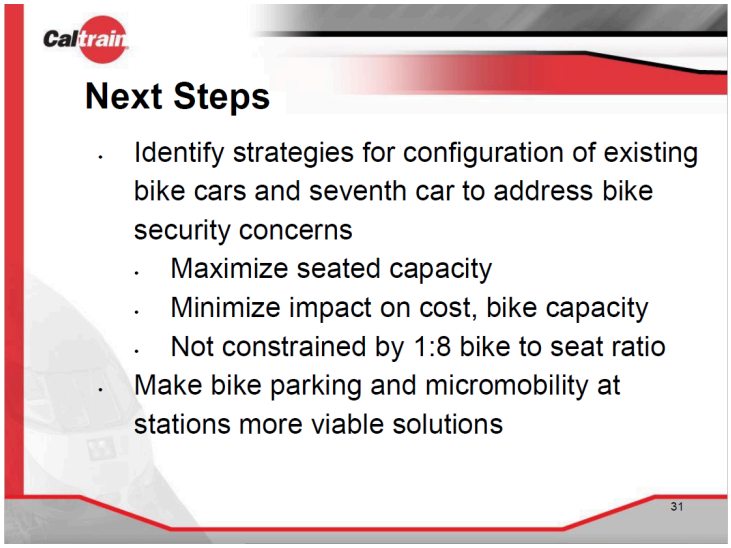



Slide 23: We fully support improved wayside options to increase bicycle mode share. However, before bike parking at Caltrain stations can look like Rotterdam or Tokyo, our urban sprawl must be converted to dense housing near stations, businesses must relocate to be near stations, and public transit must be vastly improved. Once all that has been accomplished, then people won't need their bikes at both ends of their commutes, but that won't happen by 2022 when Caltrain electrifies. Bikes on board provide the most environmentally friendly solution to the first/last-mile problem besides walking. The vast majority of people live/work too far from stations to walk, but a bicycle extends their range to several miles.

Another best practice around the world, ignored on this slide, is bikes on board. For example, Copenhagen has increased bike capacity on S-trains to meet increasing demand. The bicycle-optimized S-trains have a 5:1 ratio of seats-to-bike-spaces and 9 million passengers (nearly 10%) brought bikes on board in 2015.




Slide 29: "Bike community desires seats next to bikes" To clarify, the bike community desires rearranging seats and bikes along the whole train, not replacing bike racks with seats. Seats within view of bikes is critical to allow passengers to guard their bikes against theft. Seats near bikes will also help keep trains on time because passengers need to be in bike cars to be able to help rearrange bikes in stacks according to destination to smooth boarding and exiting.



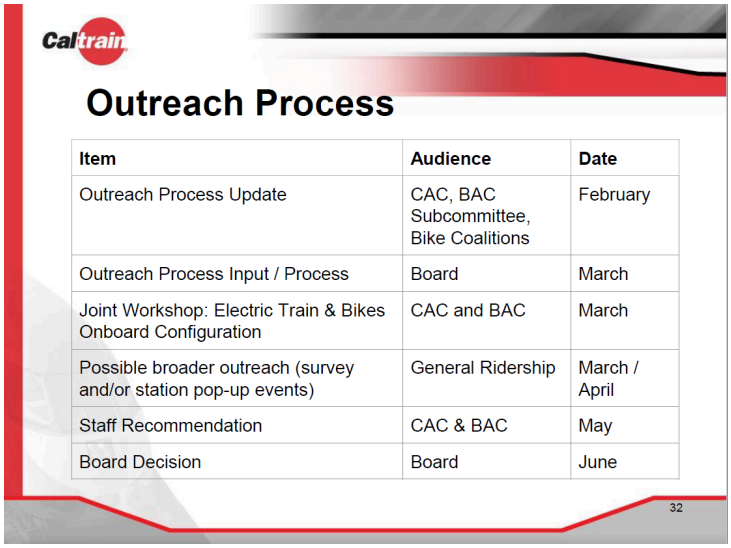

Slide 31: “Maximize seated capacity” should be “maximize ridership.” It’s clear that walk-on riders are willing to stand (walk-on boardings continue to rise), but capped bike capacity reduces ridership (bike boardings have leveled off). If Caltrain really wants to maximize seats, they should run more seven-car diesel trains in the mixed fleet as originally planned. Seven-car diesel trains have over 900 seats compared with fewer than 700 seats on seven-car EMU trains.

“Not constrained by 1:8 bike to seat ratio” is against the mandate of the Joint Powers Board. The board explicitly approved an 8:1 ratio of seats-to-bike-spaces for the RFP (request for proposal) in 2015. The board approved the 8:1 ratio a second time in 2016 as part of the contract with Stadler, the train builder. The board approved the 8:1 ratio a third time in December 2018 when the board authorized purchase of additional rail cars in accordance with the contract with Stadler.

The contract with Stadler states *“Each trainset shall include bike racks with a capacity for a minimum of bikes as defined by a seats to bike ratio of 8 to 1 (i.e. for every eight seats there must be a place for one bicycle).”* Staff’s claim that they are not constrained by the 1:8 ratio is contrary to the contract approved by the board.

The board unanimously approved the 8:1 ratio in 2015 with the understanding that there would be no fewer seats than today. Seven-car EMU trains have almost as many seats as trains today. Seven-car EMU trains with 84 bike spaces per train would adequately fulfill the board’s directive.

It’s noteworthy that SMART trains in Sonoma County, California have a seat-to-bike-space ratio of 6.6:1 and SMART recently celebrated its 100,000th-cyclist passenger.



## Outreach Process

| Item | Audience | Date |
|---|---|---|
| Outreach Process Update | CAC, BAC Subcommittee, Bike Coalitions | February |
| Outreach Process Input / Process | Board | March |
| Joint Workshop: Electric Train & Bikes Onboard Configuration | CAC and BAC | March |
| Possible broader outreach (survey and/or station pop-up events) | General Ridership | March / April |
| Staff Recommendation | CAC & BAC | May |
| Board Decision | Board | June |

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Slide 32: The CAC/BAC workshop was held April 17. The outreach process states “possible broader outreach.” We encourage broader outreach, because this is an important decision and should be carefully considered by a wide range of stakeholders.

The board is scheduled to vote on train layout and bike capacity at its meeting at 10am, June 6, 2019 at 1250 San Carlos Avenue, San Carlos.

Contact us: bikesonboard@sonic.net

Website: SFBCmomentum.org/bob