

# Aviation Noise & Emissions Symposium 2021:

A Case Study: SFO Tackling the  
Challenges of COVID & Climate

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# SFO by the Numbers

## CY 2019

- 58 Million Annual Passengers
- 13,000,000 sf facilities
- 470,000 aircraft operations
- 48 airlines
- 500,000 metric tons cargo

## Direct Economic Impact

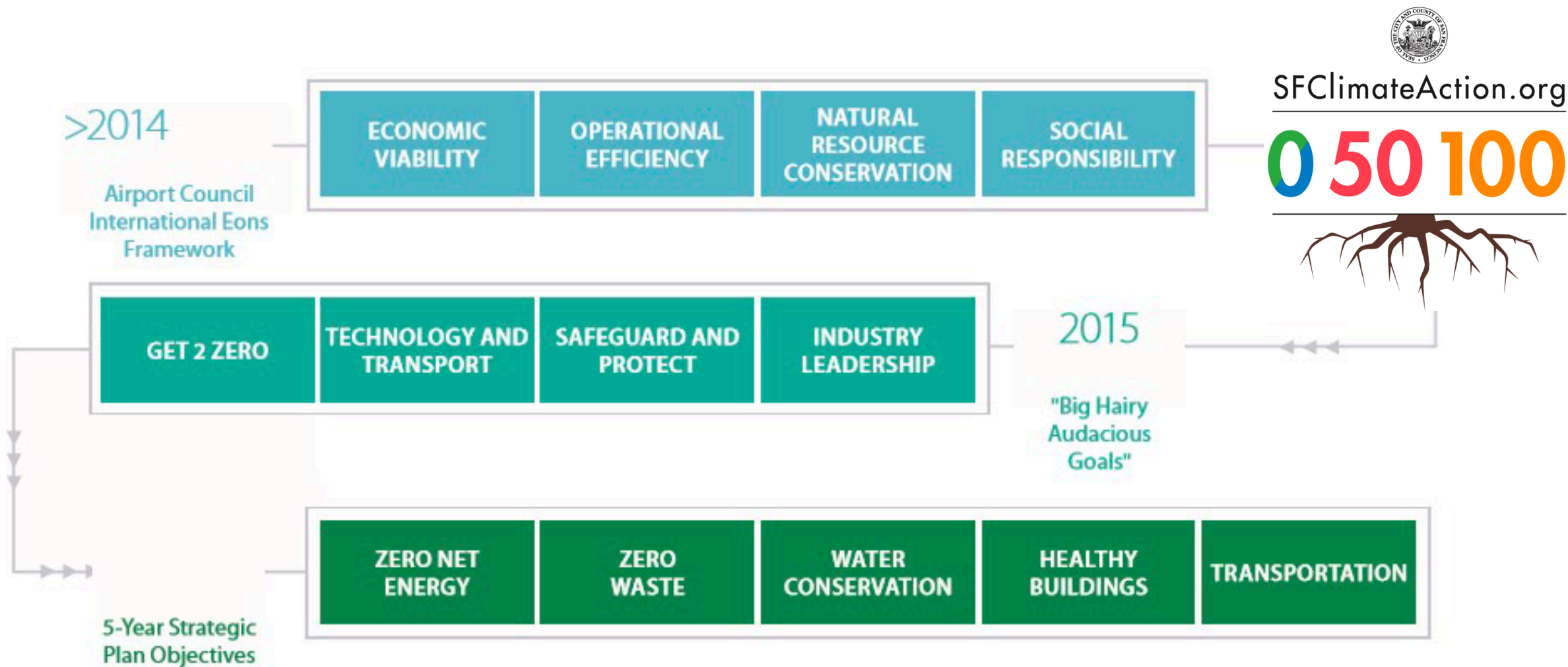
- \$11 Billion in business activity
- \$62.5 Billion benefits to the region
- 46,000 jobs (188,000 Bay Area)

## Land Use

- 5,200 acres total area
- 2,700 acres (Operational use)
- 2,500 acres (Natural tidelands and undeveloped land)



# Journey Zero





# Zero Net Energy & Health: A campus that safeguards all



## High Performance + ZNE

Prioritizing passive systems and delivering zero net energy (ZNE) buildings; completing campus-wide Benchmarking & Solar + Storage Studies; making ready utility infrastructure for electrified building systems.



## Adaptation + Resilience

Ensuring business continuity via the Shoreline Protection Program; maximizing green stormwater infrastructure; ensuring biodiversity thrives via native landscapes and West of Bayshore conservation area.



## Decarbonization

Designing all electric tenants in Terminal 3; Initiating Carbon-free cooking partnership with tenants; Procuring an all-electric Central Plant/ Heat Recovery Chiller Feasibility Study; Delivering EV-ready buildings & 400Hz/PCA gates.

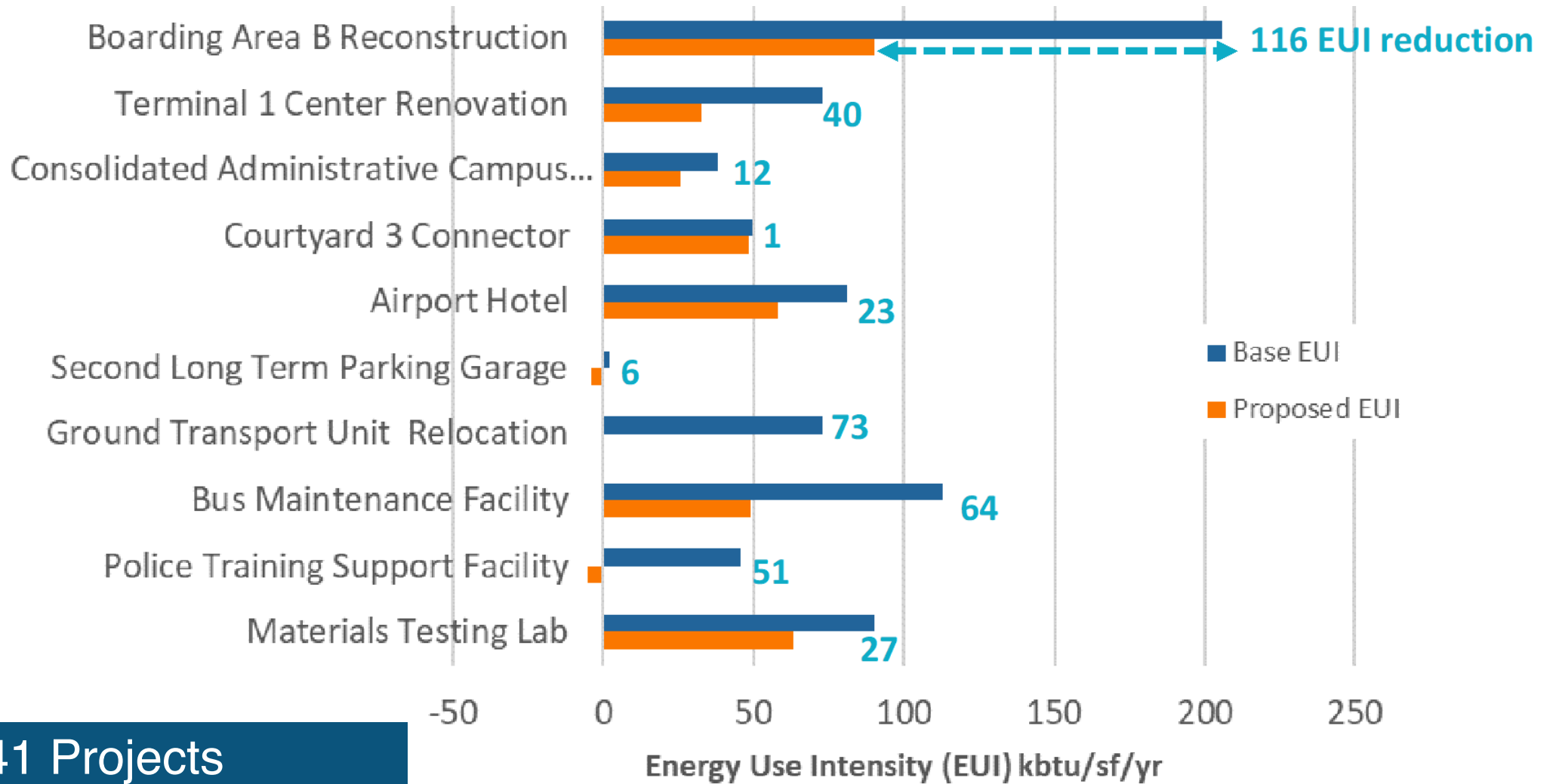


## Indoor Air Quality + Health

Low/no VOC content + emissions product selection (EPDs, HPDs); Advanced outdoor air filtration; Indoor air quality testing and Integrated systems commissioning and activation process prior to occupancy.



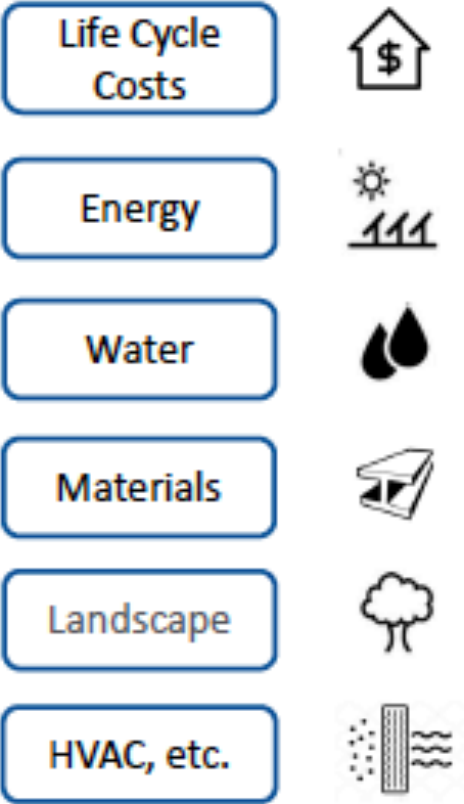
# Investment: ZERO Committee



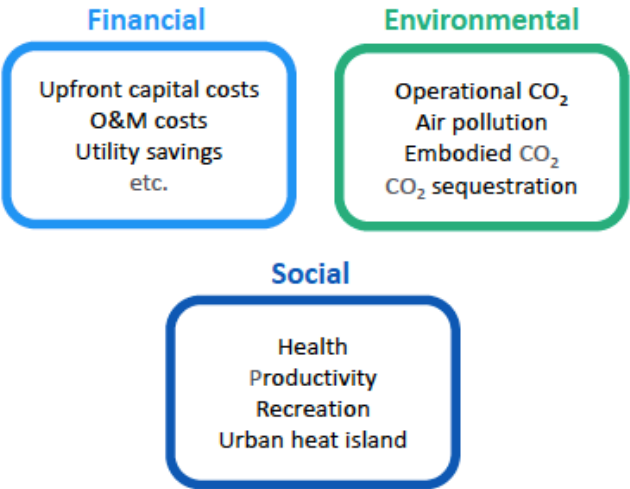
- 1. Reviewed 41 Projects
- 2. Invested \$86m in 10 Projects
- 3. Average 41 EUI Savings

# Investments: Triple Bottom Line Cost Benefit Analysis

## Strategies & inputs



## Impacts



Benefit/Cost		Lifetime NPV
	Occupant Recreation	\$1,885,000
	Community Recreation	\$465,500
	Health - Heat Island	\$61,900
	Carbon Sequestration	\$7,250
	Social Value Air Pollution	\$1,000
	Upfront Capital Costs	-\$1,350,000
Total Lifetime NPV =		\$1.07m

Benefit  
Cost  
Ratio  
1.8



# Metrics: Green Building & Health Rating Systems



## LEED Gold Certification

- 12 Certified & 6 Targeted Buildings
- 2 Certified & 4 Targeted Tenant Improvements
- 37 approved credits – Campus Master Sites Program
- Targeted LEED for Communities



## Fitwel 2- Star Certification

- Harvey Milk T1C Fitwel



## ParkSmart Gold Certification

- Long-Term Parking Garage #2



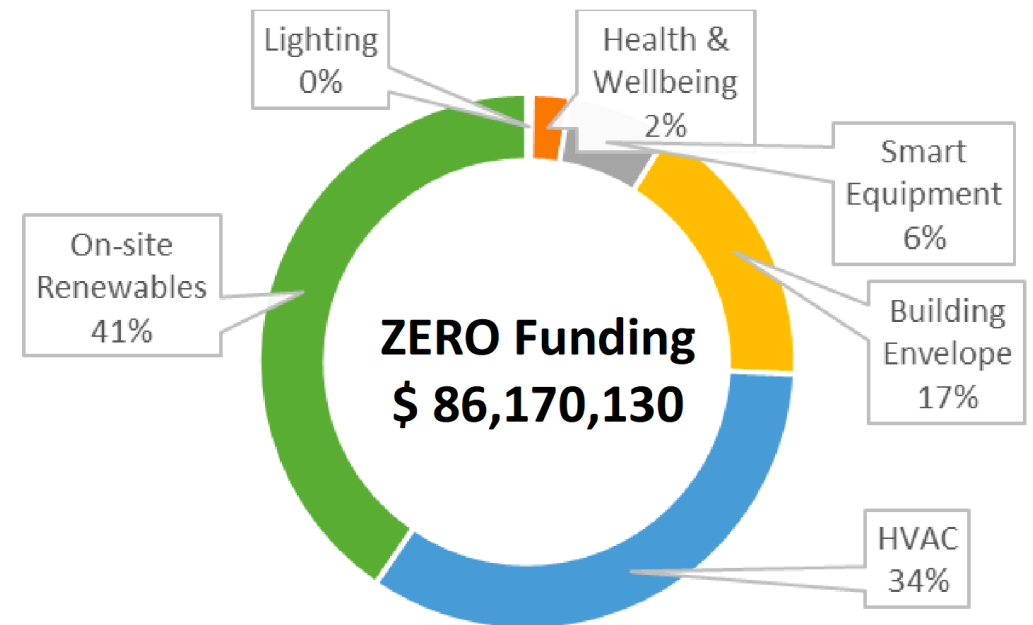
## Living Building Net Zero Certification

- Airport Operations Facility

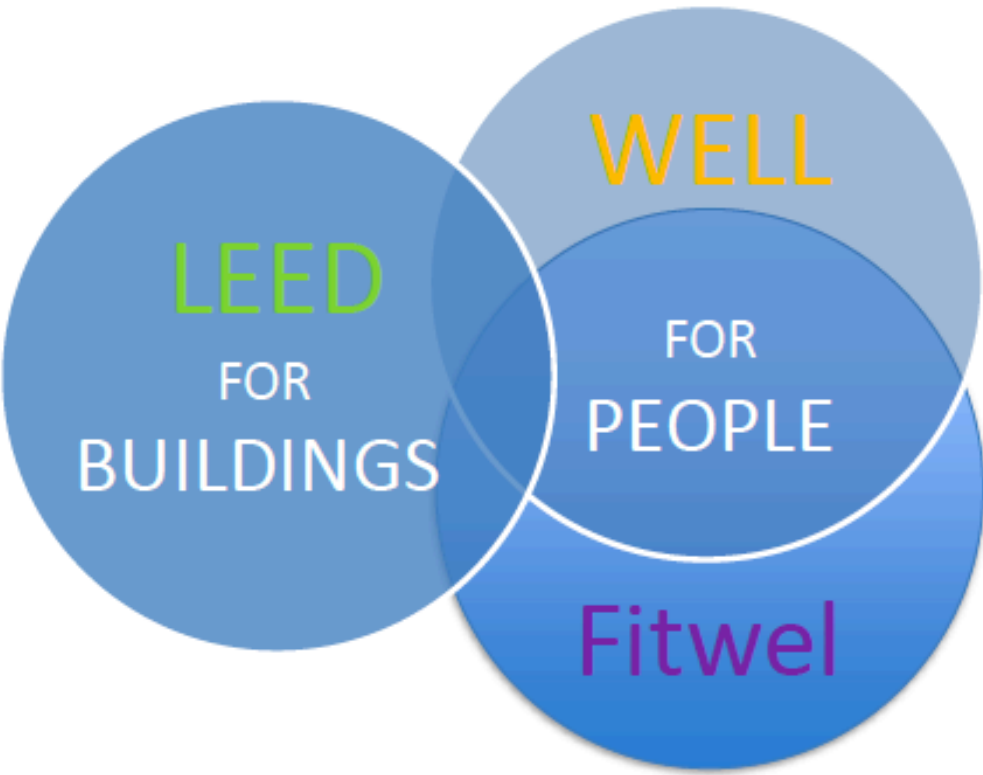







## Targeted WELL Building Standard

- Harvey Milk Terminal 1 Boarding Area B
- Courtyard 3 Connector



# Metrics: Recovery/Resilience to COVID-19 & Health Ratings

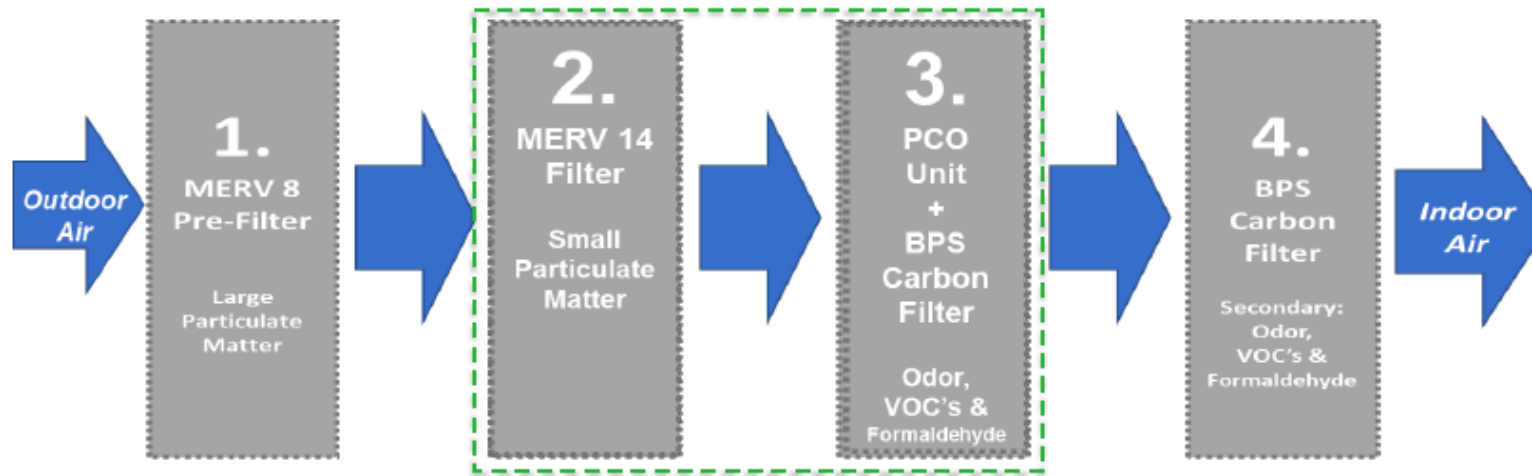


-  1. Improving passenger confidence in flying through SFO
  -  2. Enhancing the safety, health and wellbeing for all SFO employees
  -  3. Ensuring the financial recovery, stability and vitality of SFO & its business partners
  -  4. Caring for supporting SFO's community and local workforce
  -  5. Building resilience and future-proofing the Airport
- #SFOstrong





# Redefining Readiness:



## Notes:

PCO = Ultra-Violet Photocatalytic Oxidation  
BPS = Bonded Particulate Structure  
VOC = Volatile Organic Compound

- Naphthalene:  $0.053 \mu\text{g}/\text{m}^3$
- Formaldehyde:  $9 \mu\text{g}/\text{m}^3$

## Advanced Filtration

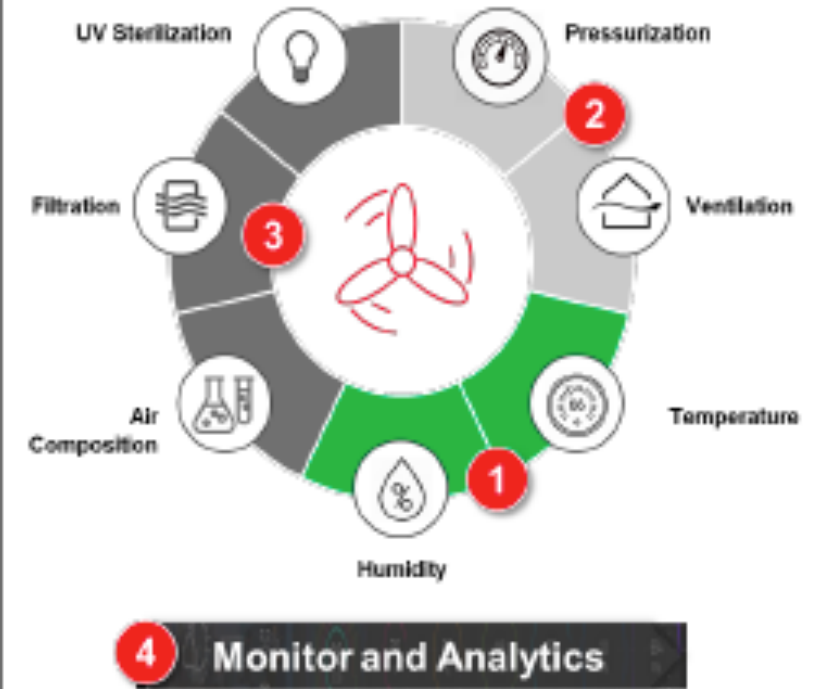
	BAB	TIC
BENEFIT	Improved Indoor Air Quality	
EUI IMPACT	~0.25	

1. Eliminate Airborne particles
  - Temperature  $68^{\circ} - 73^{\circ} \text{F}$
  - Humidity 40 - 60%
2. Control Air
  - Displacement Ventilation
  - High Ventilation Rates
  - Positive Pressure
  - 100% Outside Air

3. Clean the Air
  - Minimum MERV 14 Filters
  - UV Purification
  - Local Air Purifiers
4. Monitor the Air
  1. Continuous HVAC Monitoring
  2. Local Air Quality Monitors

## Good Practices

1. Eliminate before airborne
2. Control the air
3. Clean the air
4. Monitor the air



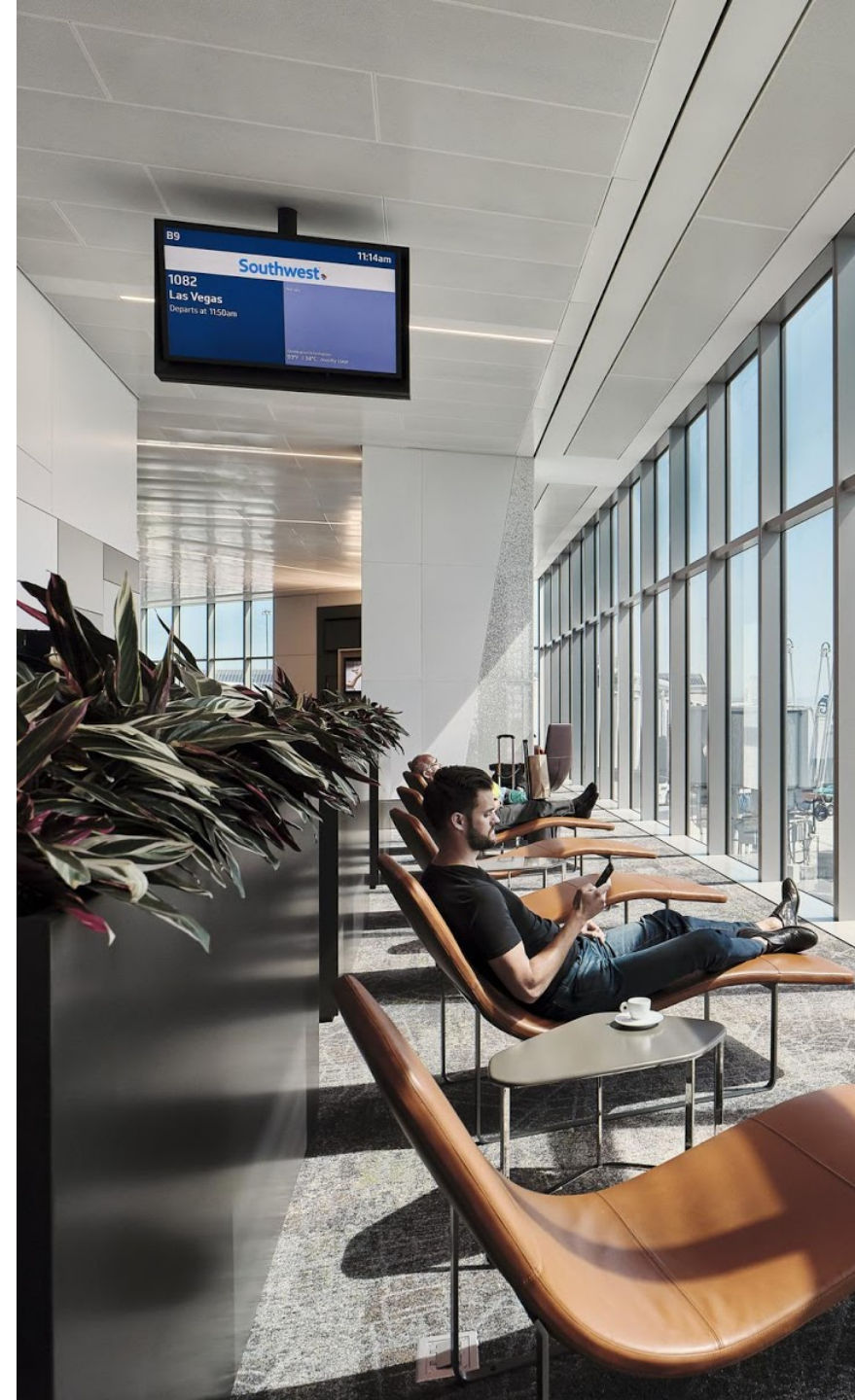
# Redefining Readiness: Health & Safety

## Airport Facility Design:

1. **Highly efficient air filtration system** creates cleaner indoor air
2. **Dynamic glazing** improves thermal comfort and reduces glare for occupants
3. **Building material selection** support improved planetary and human health
4. **Increased stair visibility** promote walking
5. **Water hydration stations** encourage drinking water and promote bottle reuse
6. **Public art** installations improve passenger experience
7. **Gym** provides easy access to stay active
8. **Reflection rooms** provide access to relaxation

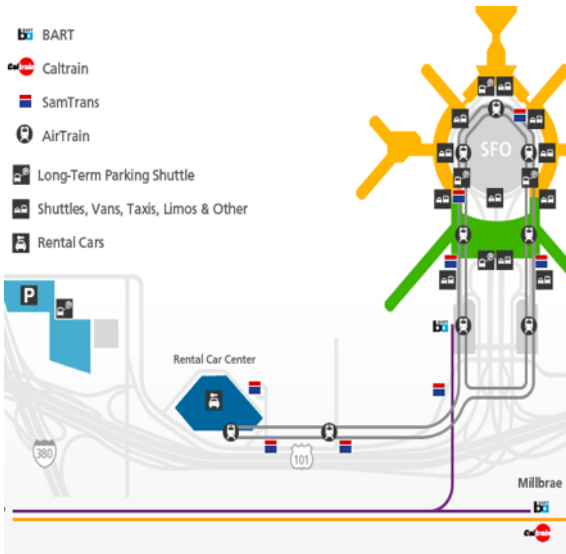
## Airport Programs and Operations:

1. **Green cleaning program** protects the health of custodial staff, employees, and passengers
2. **Comprehensive air quality plan** and extensive **air quality testing**
3. **Satisfaction surveys** (passengers and airport employees) promote continuous airport improvement
4. **Emergency Preparedness Plan, trained staff and medical equipment** provide safe operating conditions
5. **Nutritional food** option program encourages healthy eating habits
6. **Daily exercise classes, yoga and meditation** programs encourages staff to prioritize health and wellness





# Zero Carbon: Low carbon alternatives by land, sky



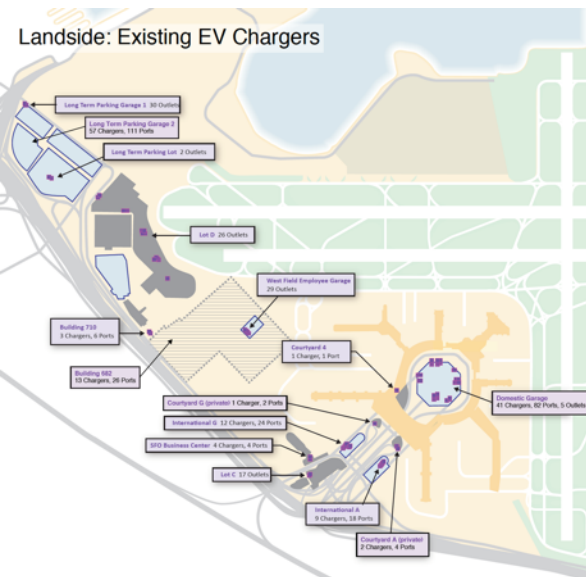
## Intramodality + Regionalism

The Airport is working with regional agencies to provide seamless connections and incorporate on-Airport movement into platforms such as Google Maps.



## Campus-wide Services

The SFO Airtrain is being extended to the Long Term lot, providing last mile connections for North Field employees. With its completion, on-Airport passenger trips will become primarily electric.



## Electrification

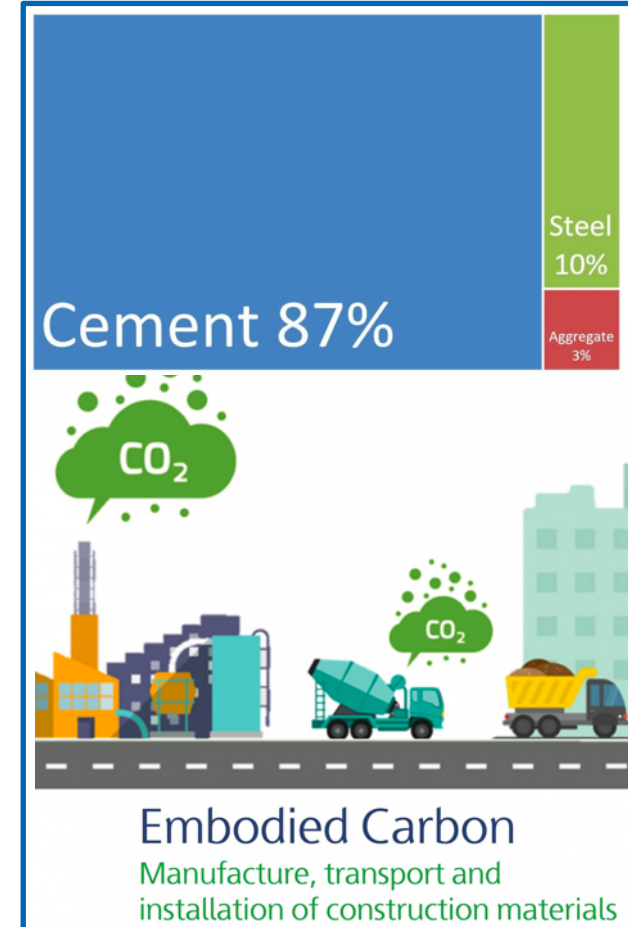
Zero Emissions Vehicle Readiness Planning for existing facilities and the future Airport Development Plan (ADP) to minimize supply-side assets through controls/ load management to maximize infrastructure for all modes/users landside + airside.



## Sustainable Aviation Fuel

Reducing SFO's largest emissions source through the delivery of its SAF Feasibility Study targeting make-ready logistics, supply chain, infrastructure, financial actions to deliver high volumes SAF by 2020.

# Zero Waste: Healthy Products, Building Materials





# From Safety to Sustainability

- Recycling Programs for Masks and Gloves
- Campaigns to Promote Reusable PPE
- “Refundable” Plastic Barriers
- Green Cleaning Program
- Reusable Foodware, Bags and Products
- Construction & Demolition Debris

## Masks are Magic

There is no debate – masks are a critical tool to stop the spread of COVID-19 in our community while out in public in California as well as while working and traveling through our airport. In so many ways, the Motivating Volunteer Participation (MVP) team partnered up with Safety and created the following videos so you can easily get covered by:

- A SFO Mask and PPE accessible through Health & Safety: <https://youtu.be/GbNYz7ou>
- A Simple No-Sew Mask: <https://youtu.be/f6OXDXfwCfw>
- Custom Made MVP Pleated Mask: <https://youtu.be/yAZTvmgnDQ>



## MATERIALS RECOVERY AREAS WHAT GOES WHERE?





