

SFO

San Francisco
International
Airport

Sustainable Aviation Fuel



State of the Industry & California's Emerging Opportunities

Erin Cooke

Sustainability Director | SFO

www.flysfo.com/environment

650-821-5065 | erin.cooke@flysfo.com



SFO by the Numbers

FY 16/17

- 53.9 Million Annual Passengers
- 58 airlines
- 125 nonstop routes (46 international)
- 205,289 landings

Direct Economic Impact @ Airport (CY 2015)

- ✈ • \$7.9 Billion in business activity
- ✈ • 39,000 jobs

Land Use

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


5-Year Strategic Plan

- ✈ • Zero Net Energy
- Zero Waste
- Carbon Neutrality




SFO Outcomes

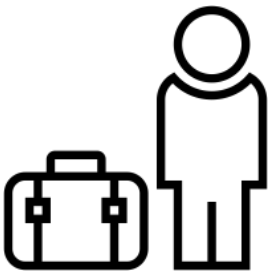


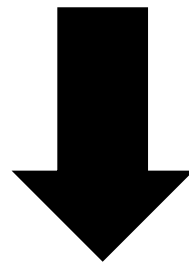

438 GWh


21,400 T

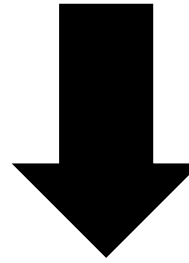

400M


24.4M

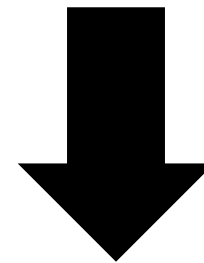

2013



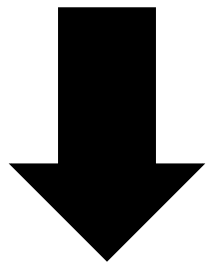
25%



33%



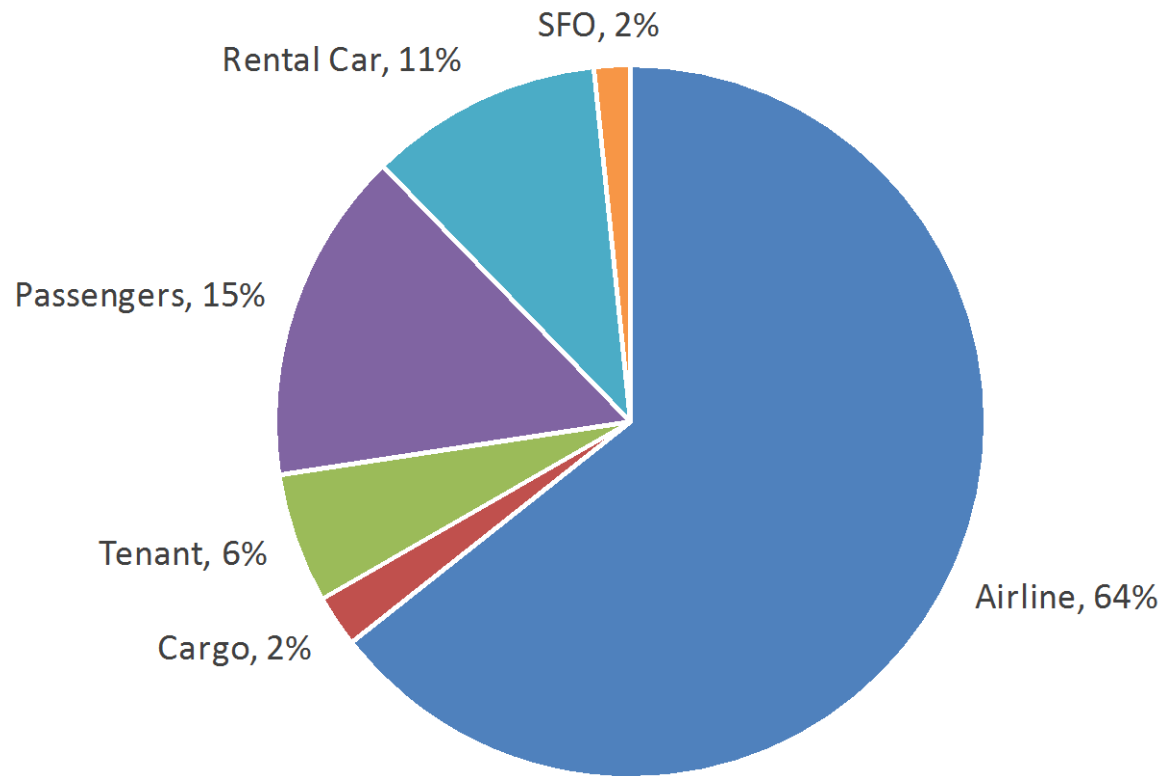
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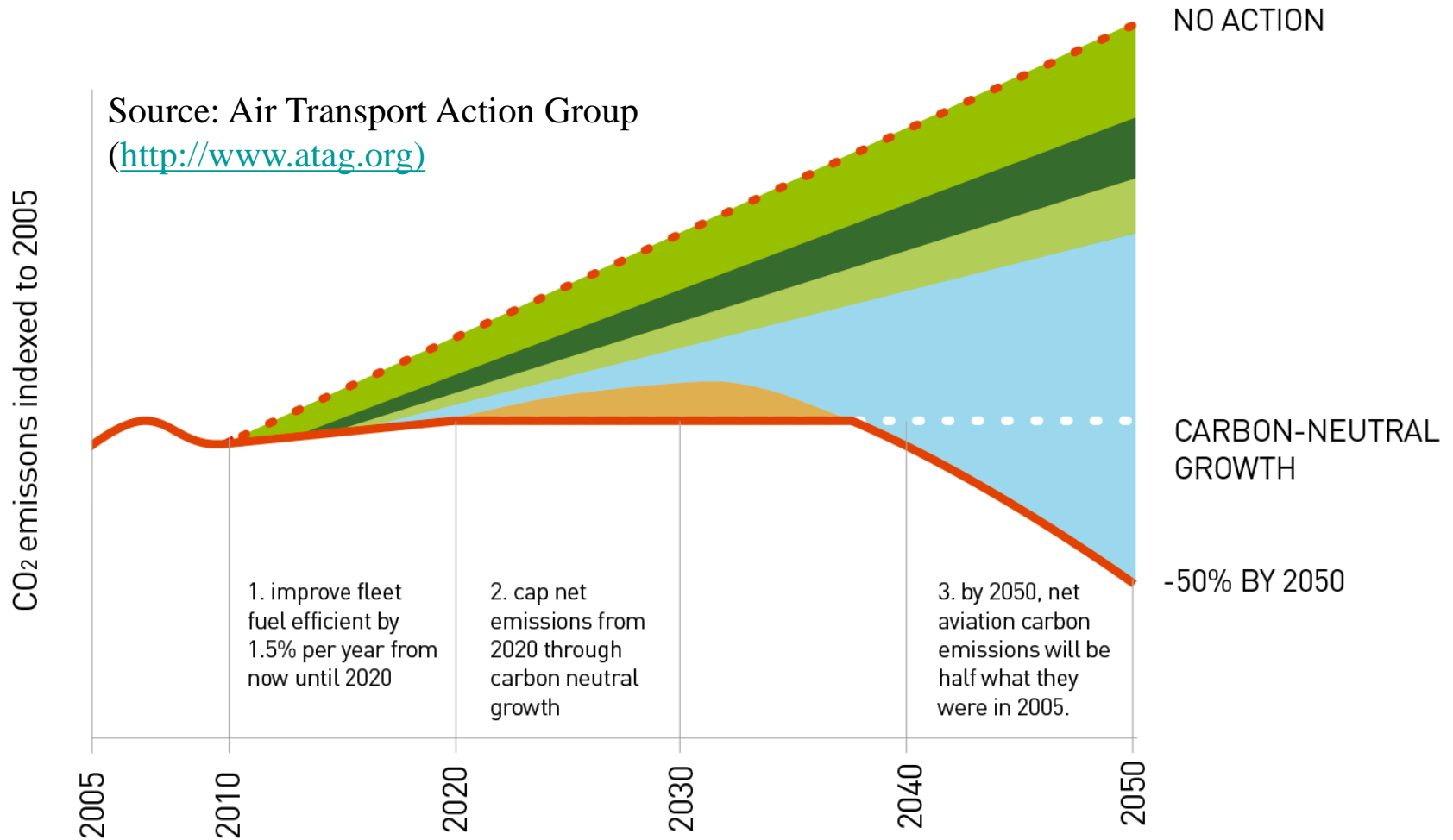
3%



2016 SFO Scope 3 GHG Emissions (Tonnes)



Industry Commitment



Known technology, operations and infrastructure measures

Biofuels and additional new-generation technologies

Economic measures

Net emissions trajectory

'No actions' trajectory

What is Alternative Jet Fuel (AJF) ?



- Goal: Alternative jet fuels manufactured with feedstocks that can be grown or produced without negatively impacting food supplies, water or land use
- Importantly, they are also ‘drop-in’ fuels which share the same properties as the jet fuel we use today, so can simply be blended with the current fuel supply as they become available
- Certification through the global fuel standards agency ASTM allowed 5 approved alternative jet fuels (ASTM 7566) to operate 5,500 commercial flights since 2011

Image Source: International Civil Aviation Organization (2013), 2013 Environmental Report. Retrieved from <http://cfapp.icao.int/Environmental-Report-2013/files/assets/basic-html/index.html#1>

Source: Sustainable Fuel (n.d.), in Aviation: Benefits without borders. Retrieved from <https://aviationbenefits.org/environmental-efficiency/sustainable-fuels/>



Potential Benefits of including SAF

- Reduction in global GHG emissions
 - GHG emissions from airlines contribute 2 to 3% of total global emissions
 - Using biofuels to help power jet engines reduces particle emissions in their exhaust by as much as 50 to 70 percent, [a recent NASA study confirms](#).
- Increase in total volume of renewable fuels
 - Airline industry is developing a strong track record for partnering with SAF producers to build new facilities
 - High quality fuel, valued by Airlines
- Reduced criteria pollutant emissions from jet fuel combustion
 - Significant reduction in PM and SOx
 - Slight reduction or no change in NOx

5

Certified pathways to produce drop-in jet fuels

3

Airports distributing alternative fuels to regular flights

2,500+

Commercial flights flown on sustainable alternative fuels

Source 1: California Air Resource Board (March 17, 2017). Low Carbon Fuel Standard: Evaluation of Alternative Jet Fuel Inclusion. Retrieved from https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/031717presentation.pdf




Source 2: National Aeronautics and Space Administration (April 24, 2017). NASA Study Confirms Biofuels Reduce Jet Engine Pollution. Retrieved from <https://climate.nasa.gov/news/2580/nasa-study-confirms-biofuels-reduce-jet-engine-pollution/>

Image Source; ICAO
<https://www.icao.int/environmental-protection/GFAAF/Pages/default.aspx>



Airline & Alternative Fuel

SAJF OFFTAKE AGREEMENTS

PRODUCER		OFFTAKER(S)	NEAT QUANTITIES
	+	 UNITED  Gulfstream  Sky NRG  KLM  World Fuel	 5 M gpy from 2016  3 yr agreement 30/70 blend  3 yr agreement enabling LAX fits
	+	 CATHAY PACIFIC  UNITED	 375M usg  90-180 M gpy over 10 yrs
	+	 Southwest  FedEx	 3 M gpy  3 M gpy
 TOTAL  AMYRIS	+	 CATHAY PACIFIC	 48 A350 deliveries 10% blend
	+	 jetBlue	 10M gpy, 10 yrs
	+	 Lufthansa	 Up to 40M gal over 5 yrs (MOU)
	+	 SkyNRG  SAS  OSLO  KLM  Lufthansa Group	 (Bioport on demand)



Source: Commercial Aviation Alternative Fuels Initiative (n.d.) Retrieved from <http://www.caafi.org/default.aspx>



ARB staff is considering developing a proposal to:

- **LCFS** credits based upon fuel “life cycle” GHG emissions (CO₂, N₂O, +) and Carbon Intensity
- Allow Alternative Jet Fuel (SAF) to generate LCFS credits as an opt-in fuel
- Conventional jet fuel would not be subject to the regulation and would not generate deficits
- Not developing new set of specifications for jet fuel



Source: California Air Resource Board (March 17, 2017). Low Carbon Fuel Standard: Evaluation of Alternative Jet Fuel Inclusion. Retrieved from https://www.arb.ca.gov/fuels/lcfs/lcfs_meetings/031717presentation.pdf

Image Source: San Francisco International Airport Widen Database (2014). Retrieved from: <https://p.widencdn.net/ns4t1s/landing-square>



Airport Roles & Leadership

- Build Knowledge & Awareness of Airport Staff
- Facilitate Airline Support & Information Sharing
- Consider Local Logistics (GreenHub)
- Collective Goal Setting & Advocacy



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