

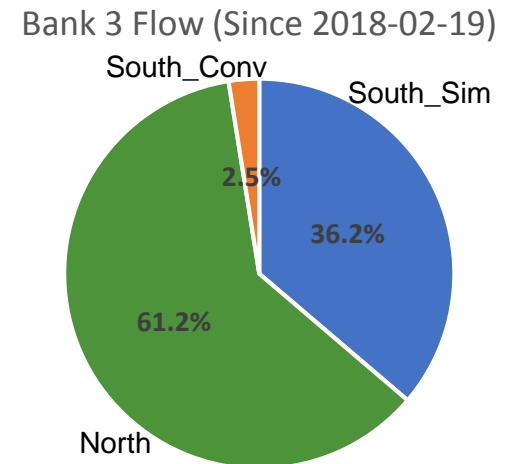
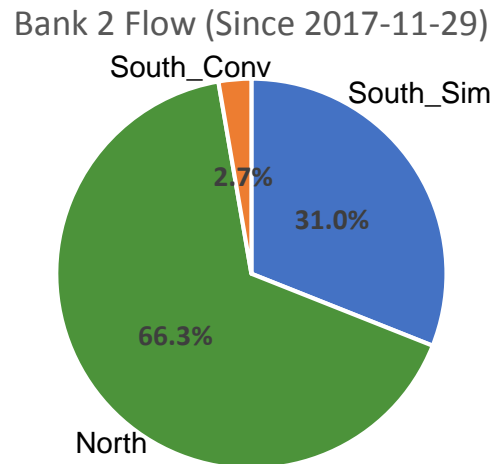
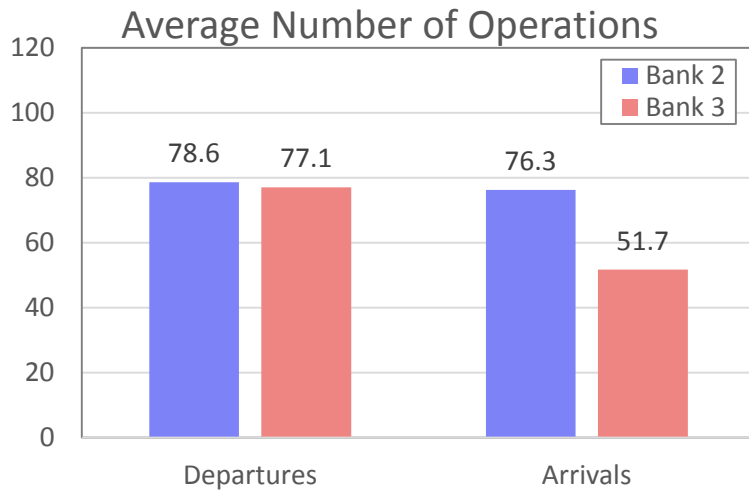
# Benefits of surface departure metering while 'doing no harm' to other operational metrics

Airspace Technology Demonstration 2 (ATD-2)  
Industry Workshop

September 4, 2019

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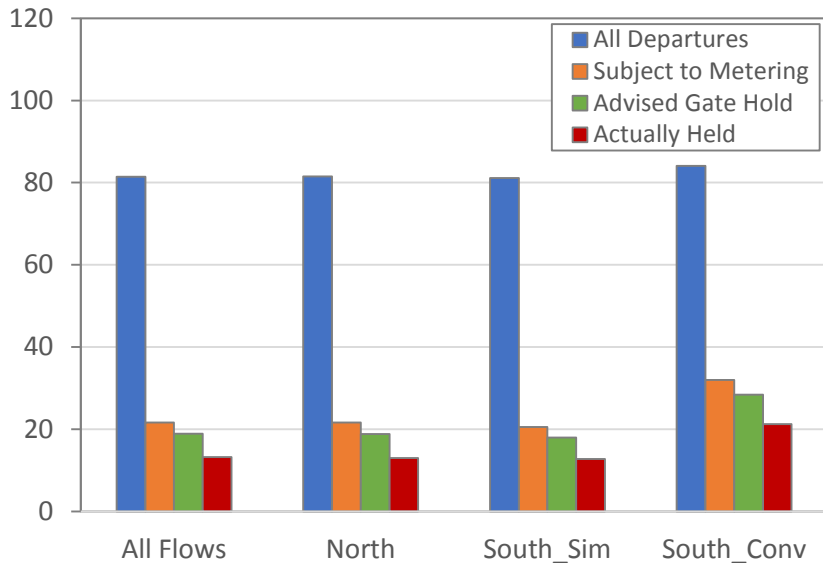
- Surface metering started in late Nov 2017 (Phase 1C)
  - Bank 2 was metered in 472 of 609 (77.5%) 2017-11-29 to 2019-07-31
  - Bank 3 was metered in 369 of 527 (70.0%) 2018-02-19 to 2019-07-31
- Bank 2 and Bank 3 have similar number of departures
- Bank 2 has 47.6% more arrivals than Bank 3 which causes increased surface congestion



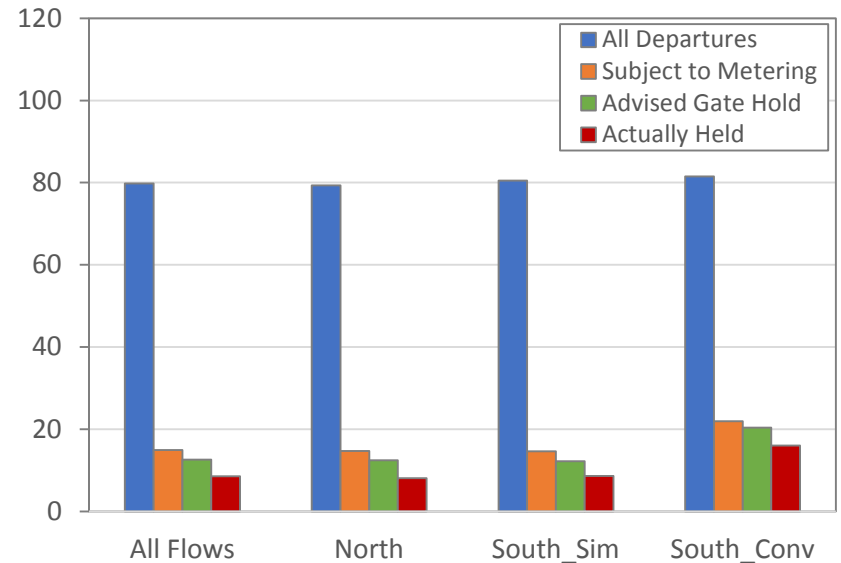


- More departures were subject to metering and held at the gate in bank 2 compared to bank 3
- Among all the departures in Bank 2 (Bank 3)
  - 26.6% (18.7%) of departures were subject to metering
  - 23.2% (15.8%) of departures were advised a gate hold
  - 16.2% (10.7%) were actually held at the gate

Bank 2: 2017-11-29 to 2019-07-31

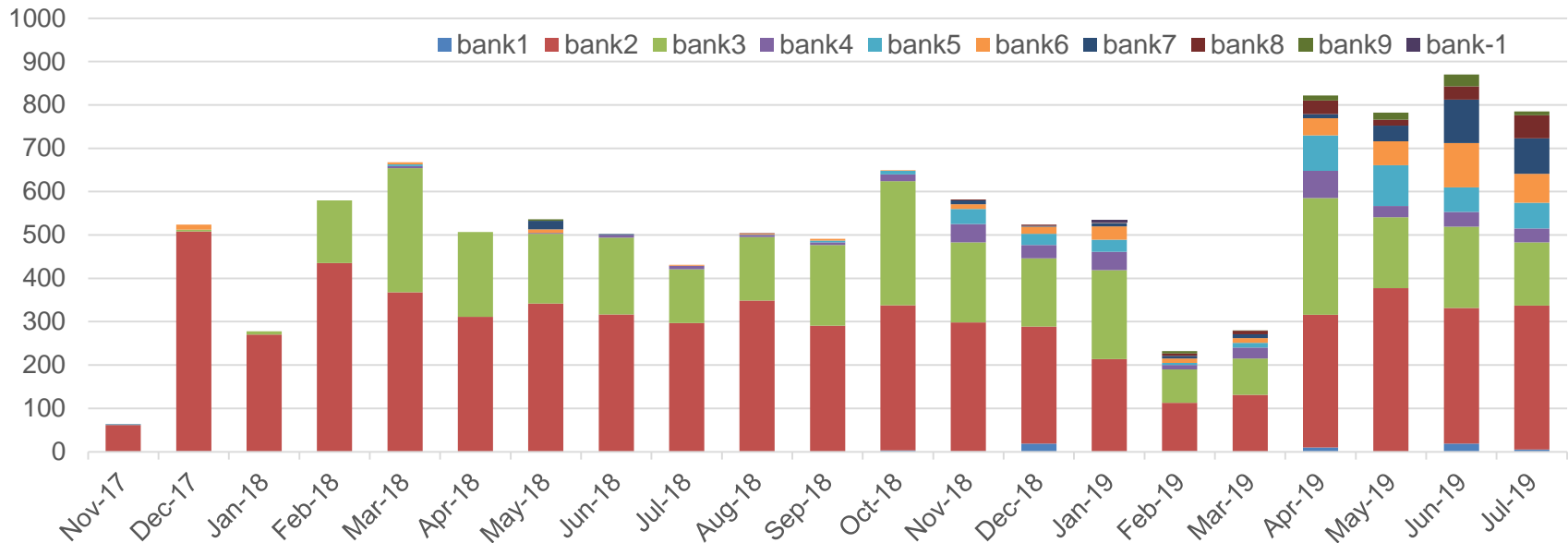


Bank 3: 2018-02-19 to 2019-07-31



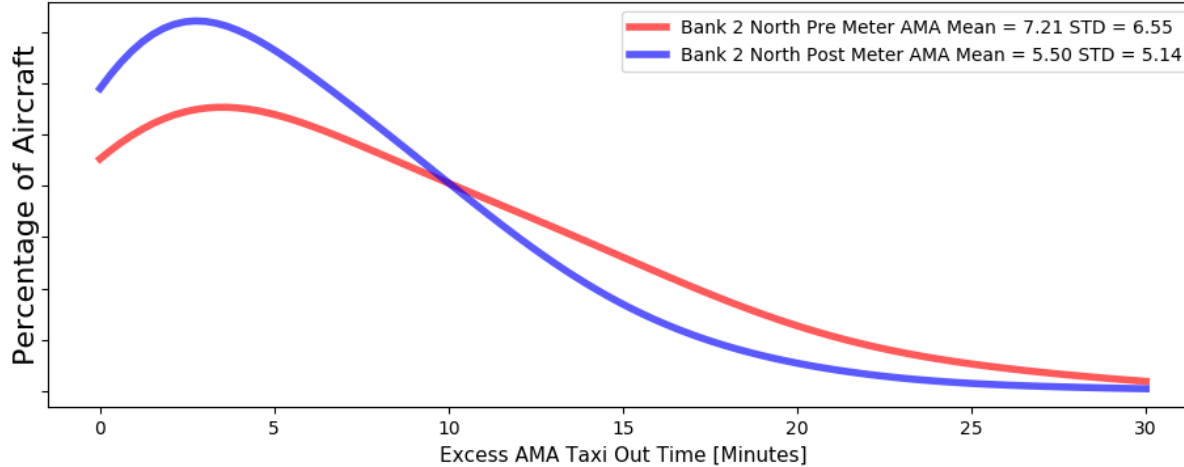
- Surface metering extended beyond Bank 2 & 3 since October 2018

Actually Held Departures by Bank

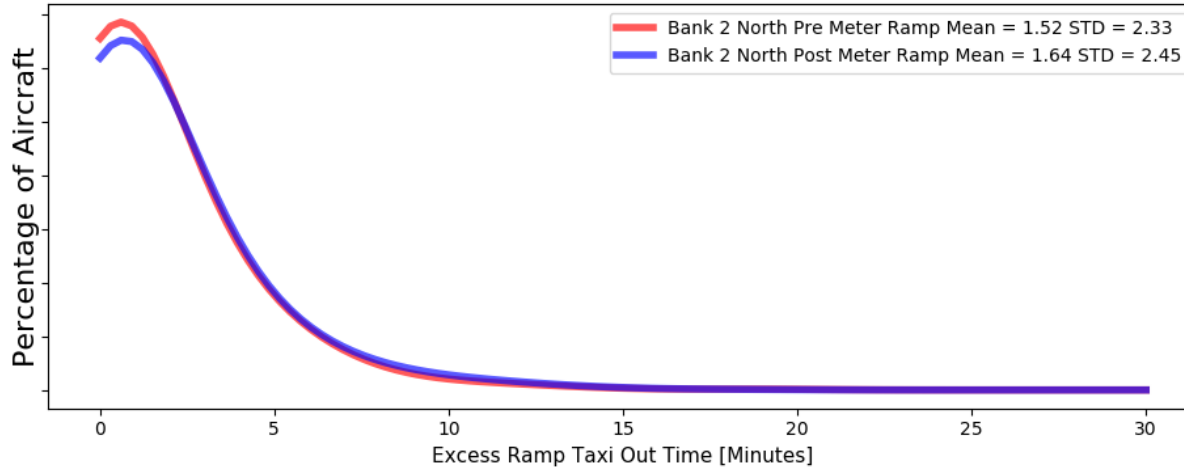




Excess AMA Taxi Out Average Before Metering: 7.214, After Metering: 5.505



Excess Ramp Taxi Out Average Before Metering: 1.526, After Metering: 1.649



By reducing the percentage of flights with AMA excess taxi out greater than 10 minutes we reduce average taxi time

1. **Collaborative surface metering**
  - Reduced engine run time
  - Reduced fuel consumption and emissions
  
2. **Overhead stream operational integration**
  - a. Scheduling controlled flights at the gate
    - Reduced engine run time
    - Reduced fuel consumption and emissions
  - b. APREQ renegotiating for an earlier slot
    - Reduced total delay
    - Passenger value of time and crew costs
    - Reduced engine run time
    - Reduced fuel consumption and emissions

Benefits (1) and (2a) achieved through tactical gate holds

Benefit (2b) achieved through APREQ renegotiation process described below

Step 1: APREQ flight has a release time but is capable of taking off earlier

Step 2: FAA TMC uses the IDAC green space / red space to identify and request an *earlier* slot in the overhead stream

Step 3: Aircraft receives *earlier* release time and the difference between the release times is the reduction in delay

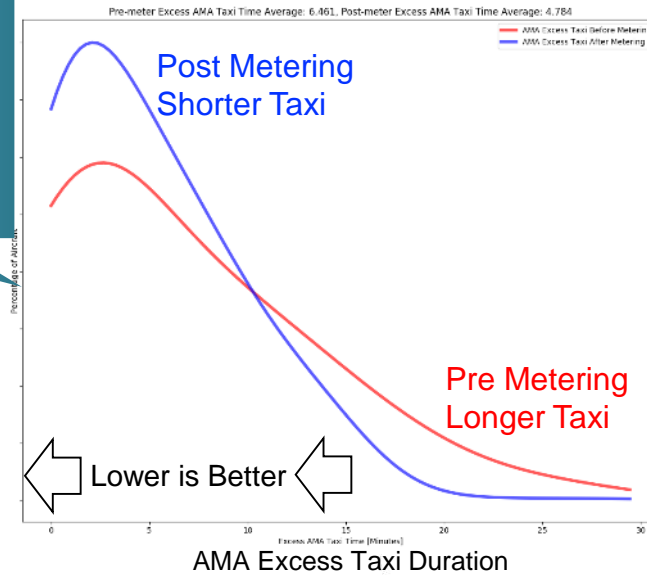
# Collaborative Surface Metering Benefits

## 2017-11-29 through 2019-07-31

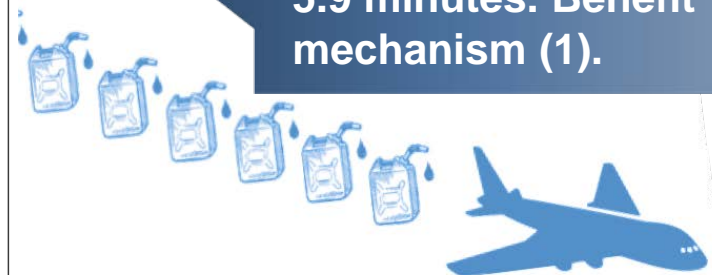


Initial benefits observed from S-CDM surface metering at CLT

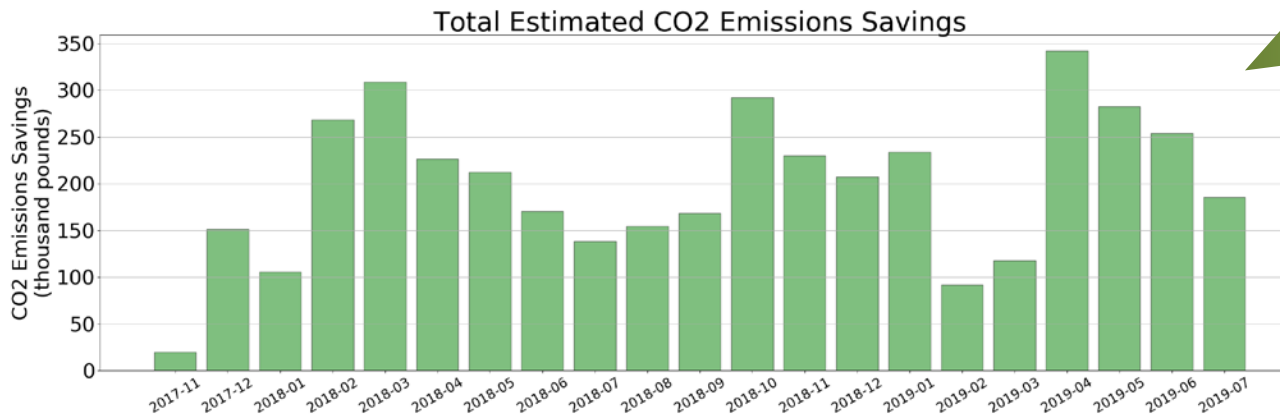
Reduced AMA taxi out times during its use via small holds at gate



Saved approximately 1,351,286 lbs of fuel by holding 13.8% of departures with average gate hold of 5.9 minutes. Benefit mechanism (1).



Saved approximately 4,161,962 lbs of CO<sub>2</sub>, equivalent to planting 30,948\* urban trees



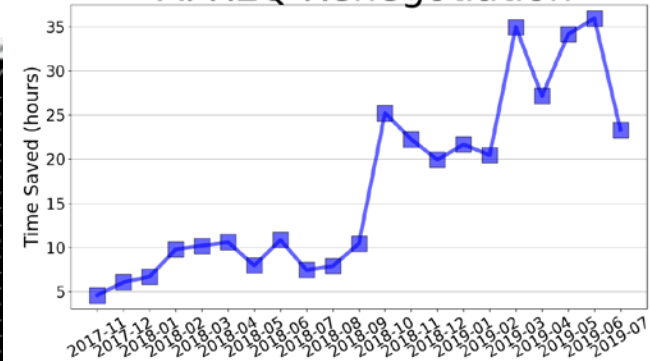
\* Based on the updated equivalency factor (0.061 metric tons CO<sub>2</sub> per urban tree planted)

# Overhead Stream Operational Integration Benefits 2017-11-01 through 2019-07-31

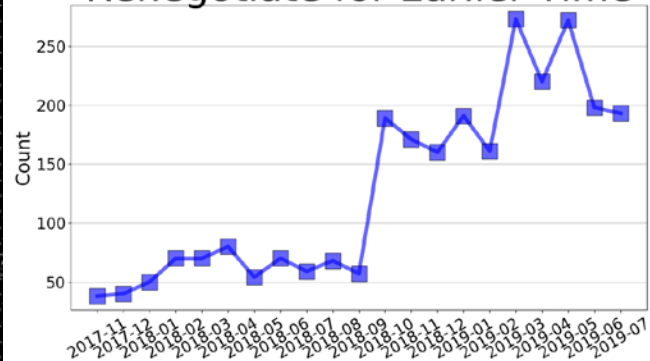


357.4 hours of delay saved by electronically renegotiating a better overhead stream time for 2,684 flights. Benefit mechanism (2b).

Time Saved by IDAC-related APREQ Renegotiation



Count of Departures that Renegotiate for Earlier Time



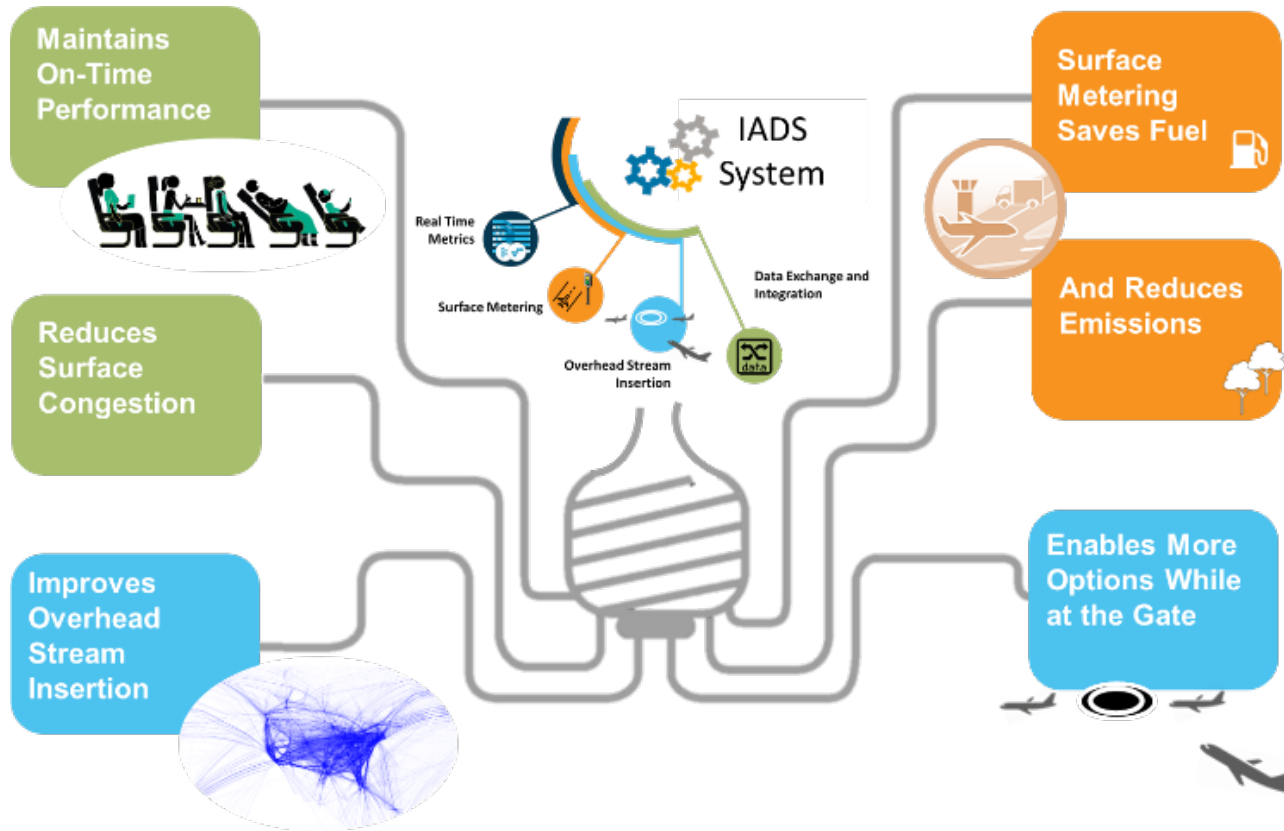
Flight ID	Dest	Dep Fix	Swap	AC Type	Gate	EOBT	AOBT	Flight Status	APREQ Reqs.	APREQ	EDCT
RPA2565	EWB	KILNG		E170	A10	09/13 54		Scheduled_Out		1407	
AG05570	LGA	BARMY		CRJ7	A1			Scheduled_Out		APREQ	
AA1625	DCA	KILNG		A320	C4	09/14 20		Scheduled_Out		APREQ	
BA992B	DCA	KILNG		CRJ2	E11	09/14 20		Scheduled_Out		APREQ	

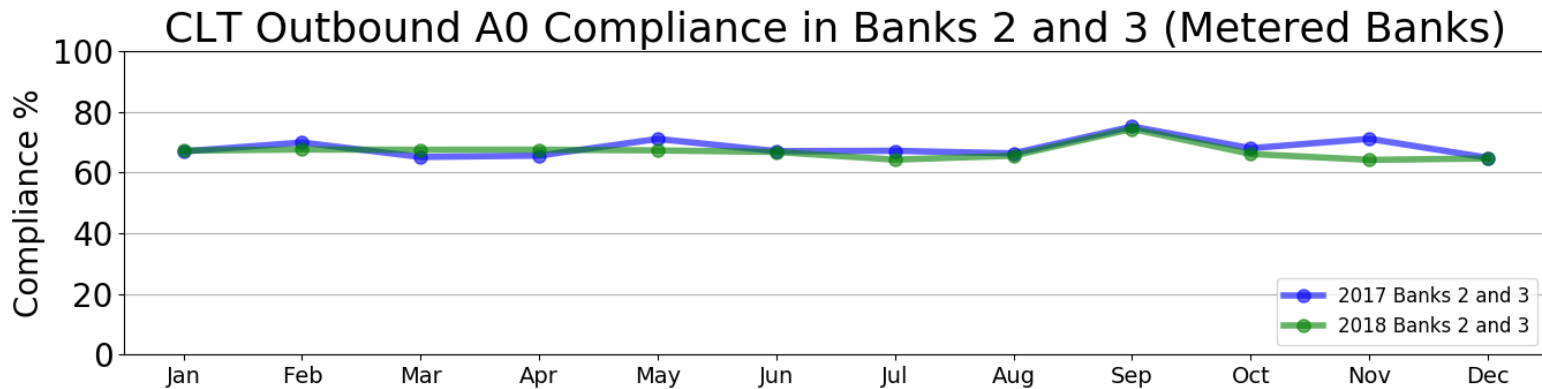
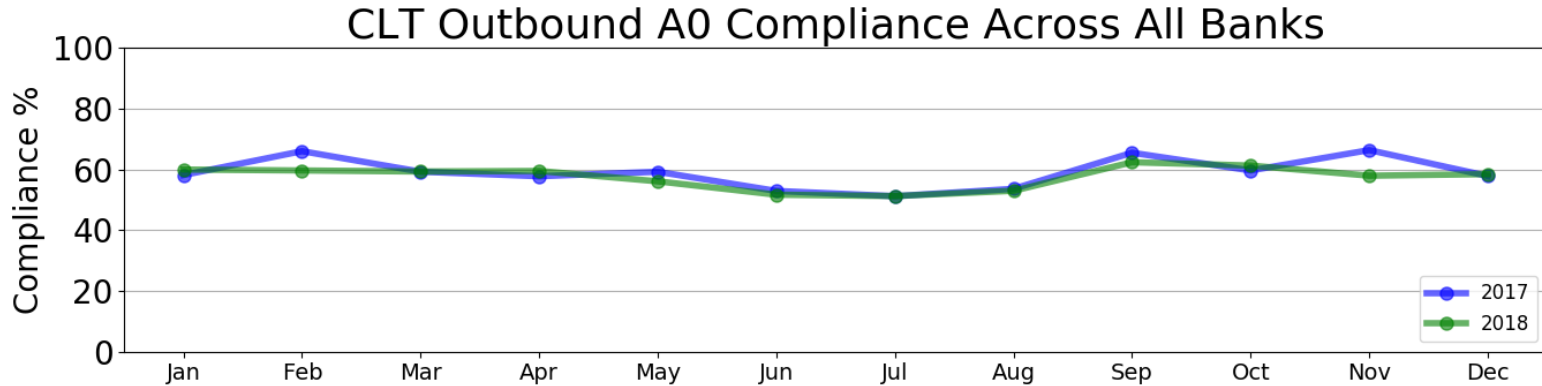
- The benefits described here are associated with better use of existing capacity in the overhead stream, and technology to reduce surface delay.
- These benefits are in addition to (distinct from) surface metering savings.



- Multiple benefits mechanisms (2017-11-01 through 2019-07-31)
  - 2,755,166 lbs. of fuel saved
  - CO<sub>2</sub> savings equivalent to 63,101\* urban trees
  - 357.4 hours of surface delay saved
    - \$1,715,714 passenger value of time
    - \$486,170 flight crew costs
  - 2,122 hours of reduced runtime on engines

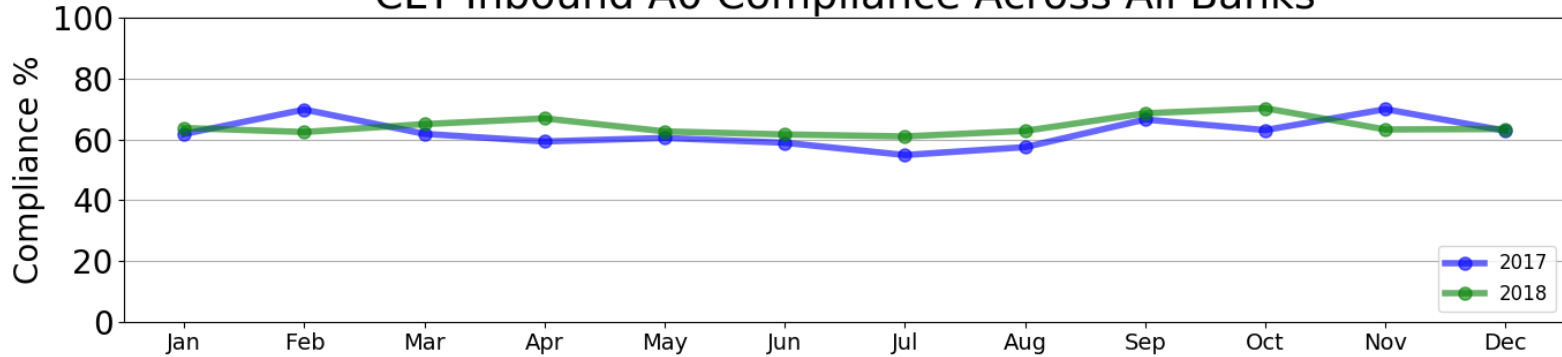
\* Based on the updated equivalency factor (0.061 metric tons CO<sub>2</sub> per urban tree planted)



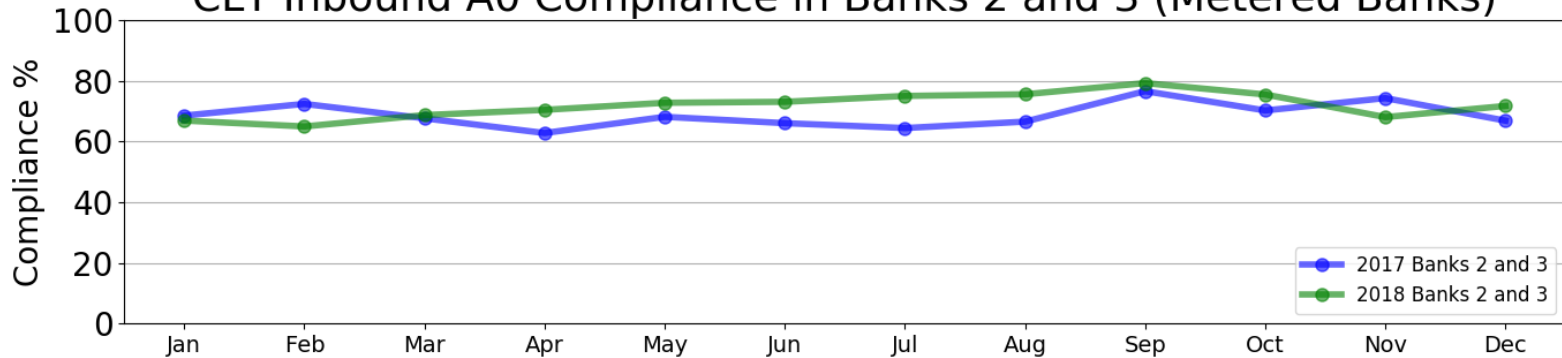


	2017 Compliance	2018 Compliance	YoY Change
Across All Banks	58.8%	57.5%	-1.3%
Banks 2 & 3	68.1%	66.8%	-1.3%

CLT Inbound A0 Compliance Across All Banks



CLT Inbound A0 Compliance in Banks 2 and 3 (Metered Banks)



	2017 Compliance	2018 Compliance	YoY Change
Across All Banks	62.1%	64.4%	+2.3%
Banks 2 & 3	68.6%	71.9%	+3.3%

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