

Review of the Air Quality Objectives (AQO) Stakeholders Engagement Meeting

Civil Aviation

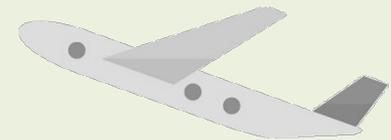
AECOM  Environmental Protection
Department

24 August 2017

Agenda

1. AQO Review – Background
2. The practicability to further reduce emissions from civil aviation in the local context
3. Any Other Business

LATEST TREND AND PREVAILING CONTROL MEASURES ON EMISSIONS FROM CIVIL AVIATION



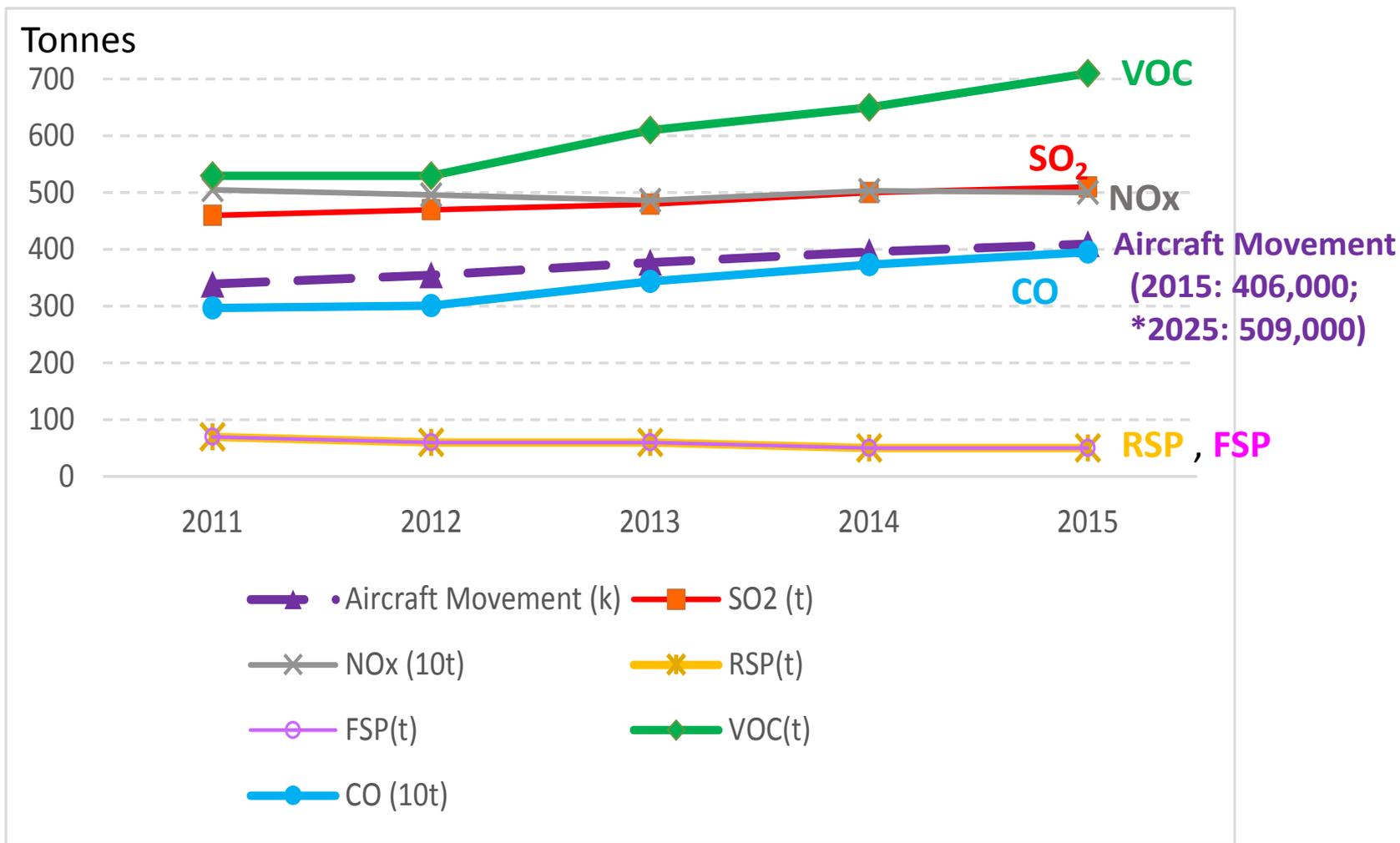
Emissions from Civil Aviation

- Aircraft engine emissions released at different phases of the landing and take-off (LTO) cycle are the major concerns of local air quality as these emissions are released below 3,000 feet.
- The various phases of the LTO cycle are as follows:

- Start-Up
- Taxi-out
- Take-off
- Climb-out
- Approach
- Taxi-in

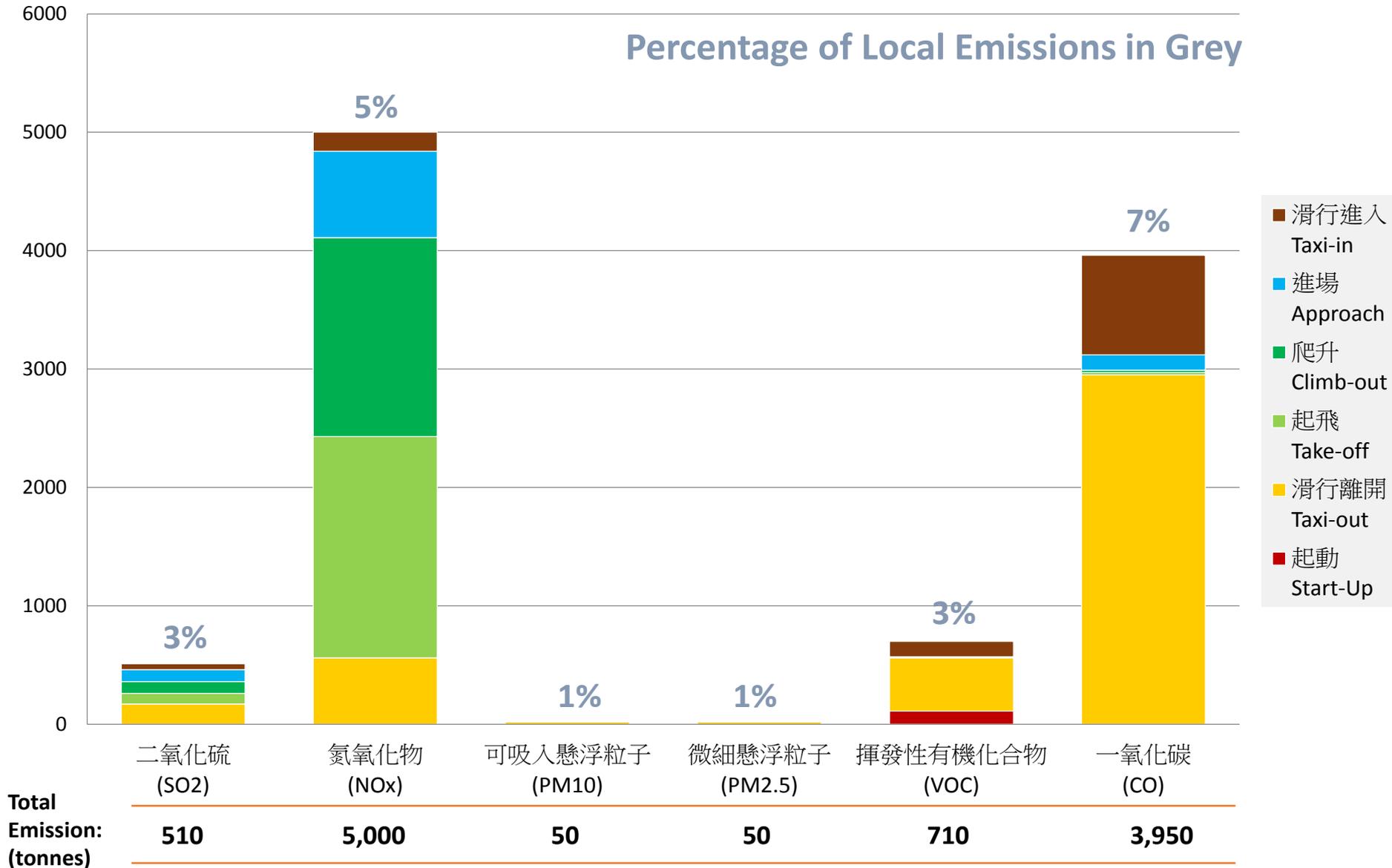


Civil Aviation Emission Trend (2011-2015)



* Note: Projected aircraft movement in 2025 is adopted from the "Hong Kong International Airport Master Plan 2030"

Emissions during different phases of LTO cycle (2015)



Local and International Regulation

- HK:
 - ✓ adopted ICAO emission certification standards related to fuel venting, smoke and gaseous emissions
- ICAO:
 - ✓ Four types of emission regulated: HC, CO, NO_x, and smoke
 - ✓ NO_x limits kept updated in 1993, 1999, 2005 and 2011
 - ✓ New standards for non-volatile PM recommended in 2016
 - ✓ New CO₂ standard adopted in Mar. 2017
 - ✓ ICAO Technology Goals for NO_x
 - Medium-term: 45% (+/-2.5%) by 2016
 - Long-term: 60% (+/-5%) by 2026

Operational Measures by CAD/AA

- **CAD**

- ✓ **Adjusted and shortened the flight routes** for aircraft arriving from the west and the north of Hong Kong since 2009;
- ✓ **Reduced spacing requirement** between flights on air routes transiting from the Hong Kong and Taipei Flight Information Regions bound for Korea since July 2011

- **Airport Authority Hong Kong (AA)**

- ✓ **Provided fixed ground power (FGP) and pre-conditioned air (PCA) systems** powered by electricity for aircraft at parking stands;
- ✓ **Banned the use of auxiliary power units (APU)** for all aircrafts at frontal stands from December 2014;
- ✓ Potential to reduce emission during taxiing by **reduced-engine taxiing or new technologies** such as TaxiBot or electric aircraft tractors

Green Initiatives of Airline Operators at HKIA

- To retire and replace old aircraft fleet with more fuel-efficient models
- To use biofuel
- Regular engine core washing, reduced engine taxi-in, use of real-time wind data and flexible routes for dynamic flight planning

Measures discussed in the Three-Runway System EIA study (1)

- Engine continuous improvement:
 - new model to be released every 2-4yrs
- Engine technology breakthrough:
 - new engine families to be designed
- Alternative fuels:
 - no concrete plan yet

Measures discussed in the Three-Runway System EIA study (2)

- Other significant measures (mainly on ground support equipment/vehicles) :
 - Banned all idling vehicle engines on the airside since 2008, except for certain vehicles that are exempted (This measure has already been incorporated in the model for 2031 3RS scenario simulation);
 - Requiring all saloon vehicles as electric vehicles by end 2017 (This measure has already been incorporated in the model for 2031 3RS scenario simulation);
 - Increasing charging stations for Electric Vehicles (EVs) and electric Ground Service Equipment (GSE) to a total of 290 by end 2018;
 - Conducting review on existing GSE emission performance and explore measures to further control air emissions;
 - Exploring with franchisees feasibility of expediting replacement of old airside vehicles and GSE with cleaner ones during tender or renewal of contracts;
 - Requiring all new airside vehicles to be fuel-efficient and making it a prerequisite for the licensing process;
 - Providing the cleanest diesel and gasoline at the airfield;
 - Requiring all of the AA's diesel vehicles to use biodiesel (B5);
 - Promoting increased use of electric vehicles and electric ground service equipment at HKIA by provision of charging infrastructure; and
 - Providing a liquefied petroleum gas (LPG) fuelling point for airside vehicles and GSE.

Overseas Latest Development and Global Trend

- Alternative Jet Fuel (AJF)
 - Five types approved, but further R&D is needed
- Operational and market-based measures
 - US FAA: five-pillar approach
 - PILLAR 1: Improved Scientific Knowledge and Integrated Modeling
 - PILLAR 2: Air Traffic Management Modernization
 - PILLAR 3: New Aircraft and Airport Technologies
 - PILLAR 4: Sustainable Alternative Aviation Fuels
 - PILLAR 5: Policies, Environmental Standards, and Market-Based Measures
 - Market-based measures: emission charging scheme (Zurich Airport)

Thank You

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