



Fuel and Emissions

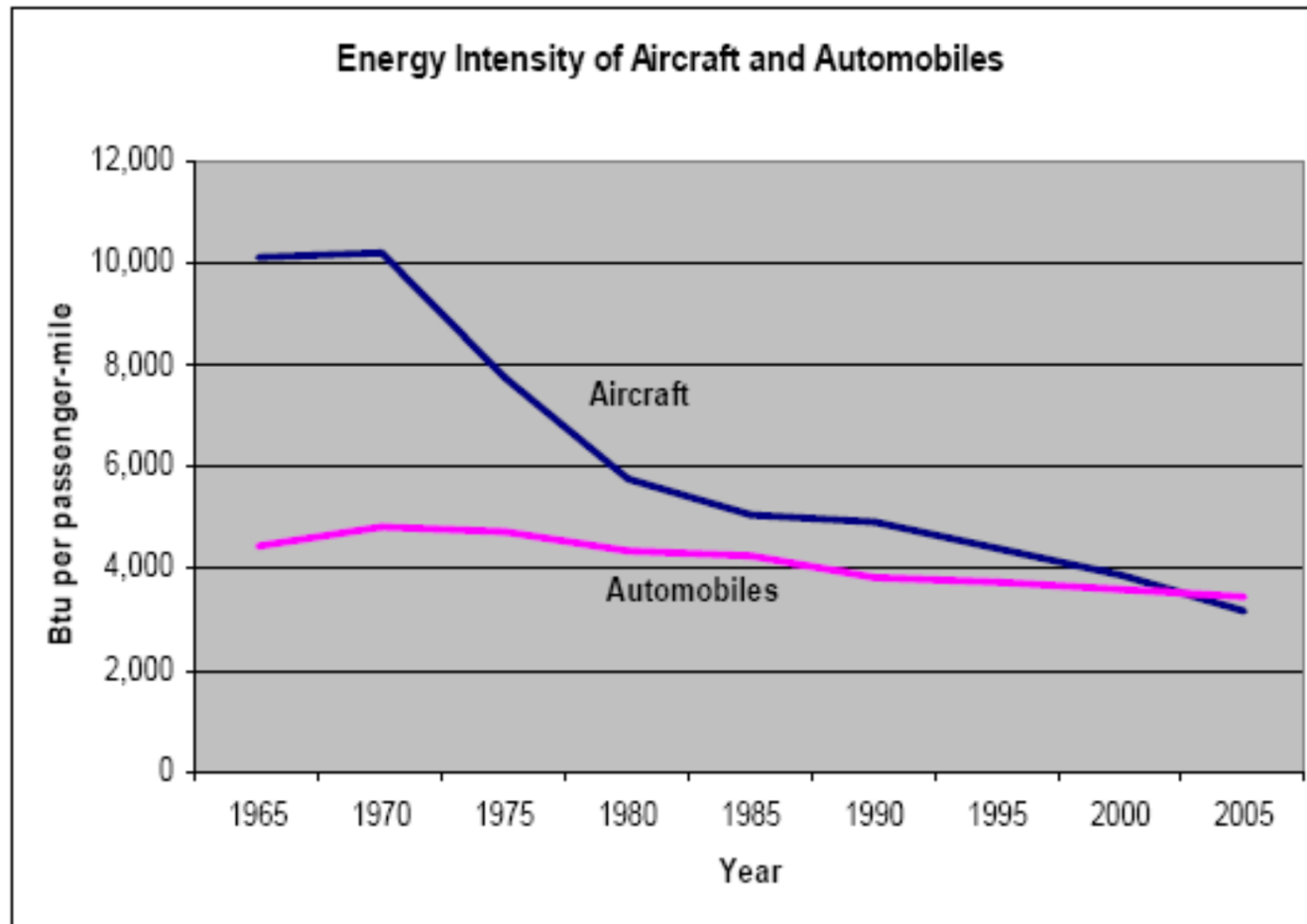
United Airlines

October 2008

Aviation – a catalyst of economic and social progress

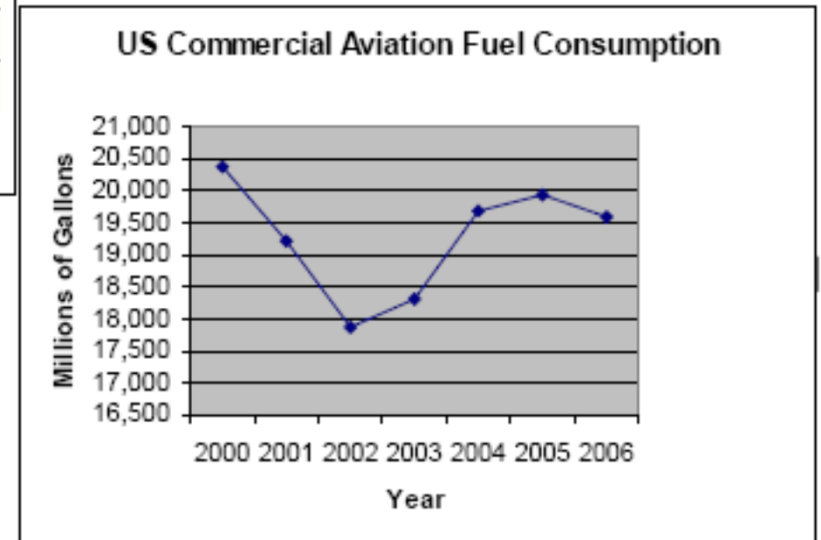
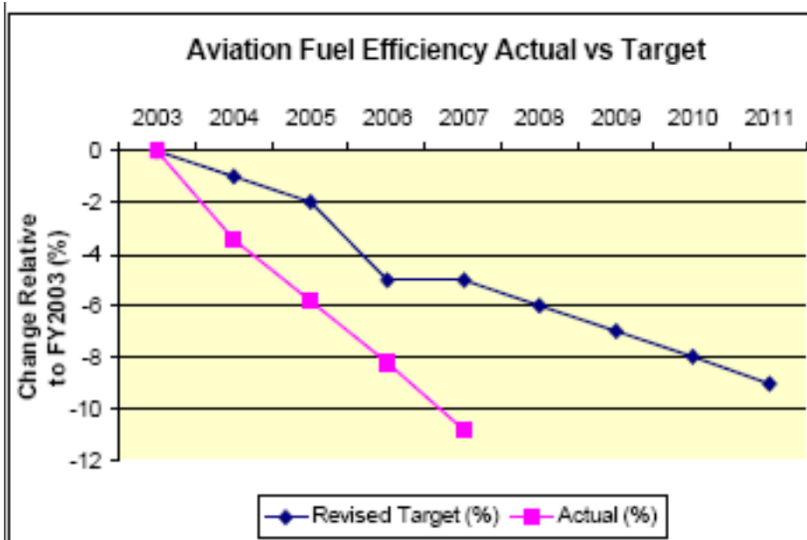
- **Aviation stimulates the economy, trade and tourism, generates business opportunities and enhances quality of life in both developed and developing regions.**
 - Aviation transports 2.2 billion passengers annually and 35% of interregional exported goods (by value). 40% of international tourists travel by air
 - Aviation generates 32 million jobs worldwide and contributes nearly 8% (or US\$ 3,557 billion) to world gross domestic product
 - Aviation largely covers its infrastructure costs, paying US\$42 billion per year in user charges.
 - Aviation is the most efficient way of traveling.
 - It can use the optimum distance between two points and minimizes land use.
 - Its occupancy rates exceed 75%, compared to 40-50% for trains and 30% for cars.
 - 80% of aviation emissions are from passenger flights exceeding 1,500 km or 900 miles, for which there is no practical alternative

Industry Environmental Perspective

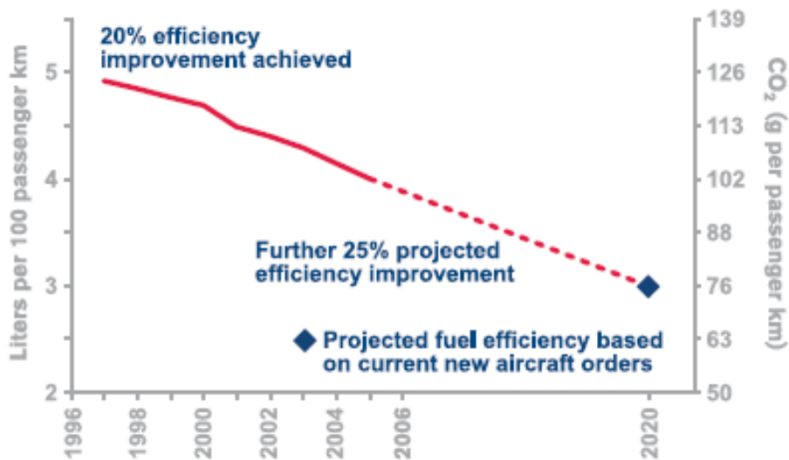


Source: U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics 2007*, Table 4-20: Energy Intensity of Passenger Modes

US Aviation emissions growth down



Source: U.S. DOT, BTS



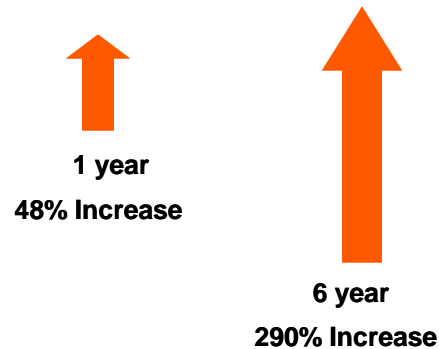
Source: IATA WATS 2007

The Fuel Crisis

- UAL consumes 2.3B gallons of jet fuel per year

- UAL fuel cost:

- 2008 = \$7.4B
- 2007 = \$5.0B
- 2003 = \$2.1B
- 2002 = \$1.9B



- Fuel today is over 40% of total operating expense

- In 2007 it was 25% and 11% in 2003

Air Transport's Environmental Track Record

- **Air transport's contribution to climate change is small**
 - 2% of global CO2 emissions, forecast to grow to 3% by 2050 (IPCC)
 - Total climate change impact (including radiative forcing and other greenhouse gases) is 3%, forecast to grow to 5% by 2050 (IPCC)
 - All modes of transport combined account for 23% of CO2 emissions of which
 - Road 74%
 - Air transport 12%
- **Air transport is fuel efficient**
 - Average new aircraft consumes 1 gallon per 60 passenger miles
 - Fuel burn necessary to carry a passenger 1 mile
 - Target fuel consumption for the Airbus A380 and Boeing 787 compares with a small family car (gals/passenger mile)
- **Air transport has a track record of continuous improvement**
 - 70% less fuel and CO2 emissions compared to 1970s

Industry Environmental Perspective

Industry's Vision – Building a greener future

- **For our industry to become carbon free in the future.**
 - Complete solutions are not available today, but building blocks, such as alternative fuels, already exist.
 - This vision is supported by a four-pillar strategy based on technological progress, infrastructure enhancements, operational improvements and suitable economic instruments.
- **Working with the whole industry to turn this vision into reality, putting aviation on a path towards carbon neutral growth in the medium term**
 - Airlines have improved fuel efficiency and CO2 by almost 20% over the past 10 years. They will continue to improve, by investing in new aircraft and enhancing operations.

United's Vision

***As part of our corporate responsibility,
United's vision is to be an environmentally conscious airline.***

Environmental Commitments

- Incorporate environmental considerations into our business decisions;
- Increase the fuel efficiency of our aircraft and vehicles
- Minimize and dispose responsibly of wastes generated by our business activities;
- Work with our business partners, suppliers, the industry and governments to promote environmental responsibility and find solutions and develop common standards for addressing environmental problems, such as developing new technologies or improvements to air travel efficiency;
- Contribute to credible programs that conserve and protect our environment;
- Provide information on our environmental performance;
- Raise awareness in our company about environmental issues and the steps we can take as managers and individuals to reduce our impacts and continuously improve our environmental performance; and
- Continue to comply with applicable laws and regulations and with United's corporate environmental standards at all locations where we operate.

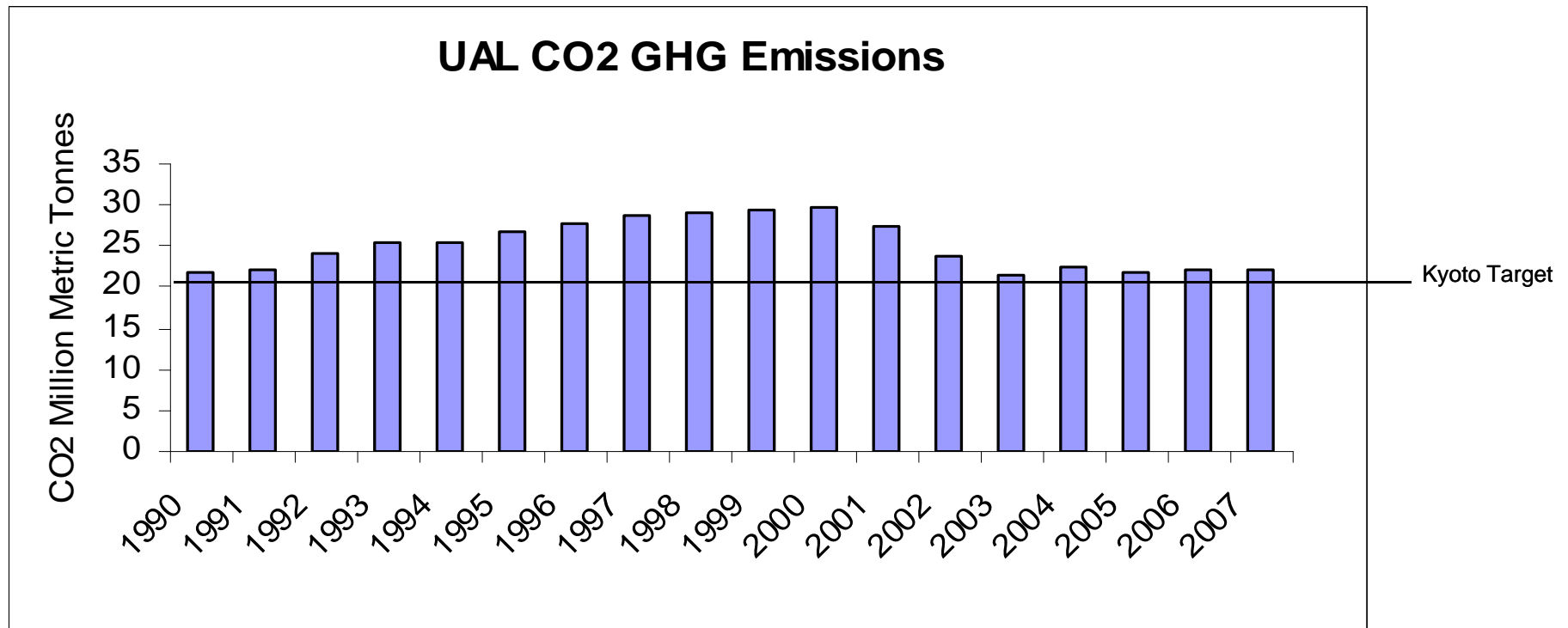
United's Top Environmental Impacts Areas

- **Air Quality Impacts**
 - GHG Emissions (CO₂)
 - Local Air Quality Emissions (Toxics/NO_x Emissions)
- **Waste Production**
 - General/Non-Hazardous
 - Industrial/Hazardous
- **Water Use**
 - Wastewater Discharge
 - Water Consumption



Baseline Fuel and Carbon Footprint

Global Warming Emissions Profile

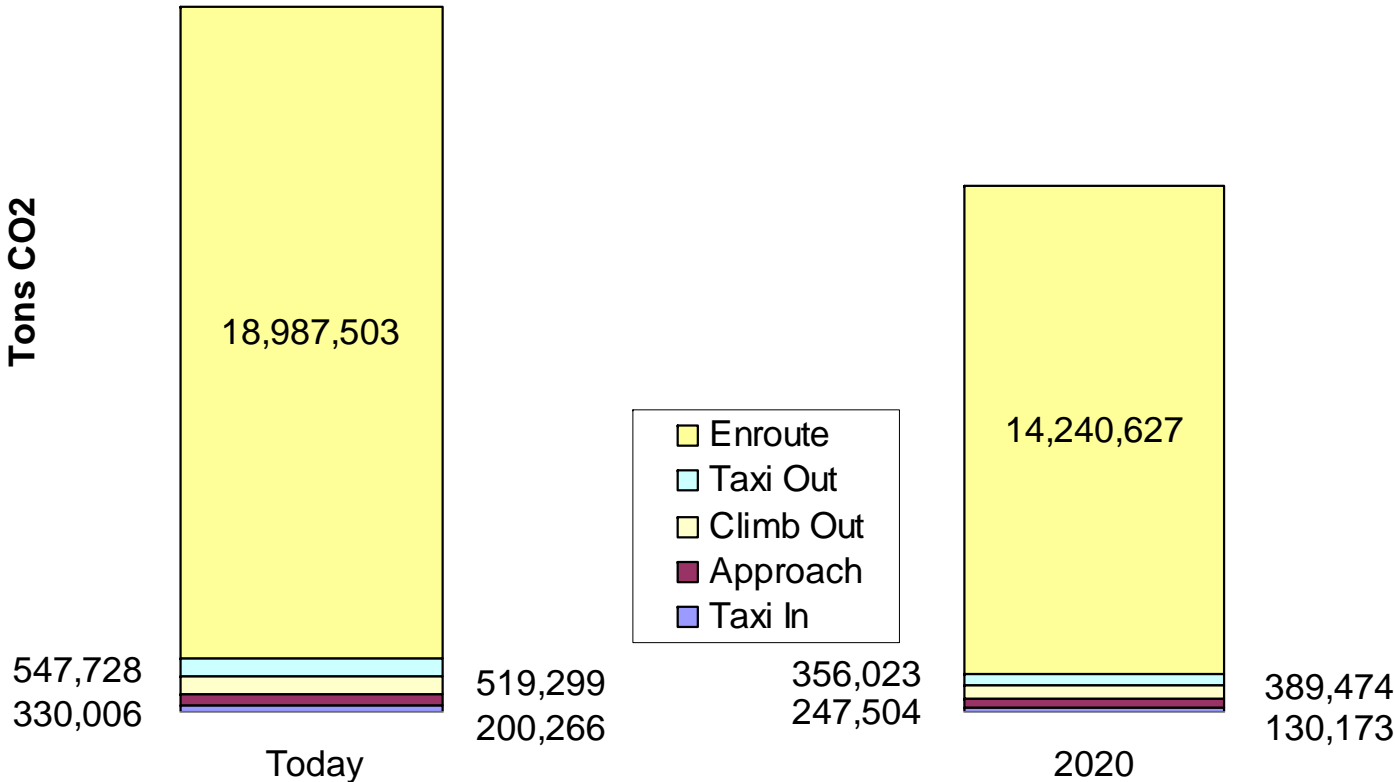


Kyoto Treaty target:

- National commitment to reduce the GHG output of a nation to a level equal to 7-10% less than the countries emissions in 1990
- Often used as a benchmark for developing emissions regulations
- In 2007, 2.29B gal of fuel resulting in 22M metric tons of CO₂

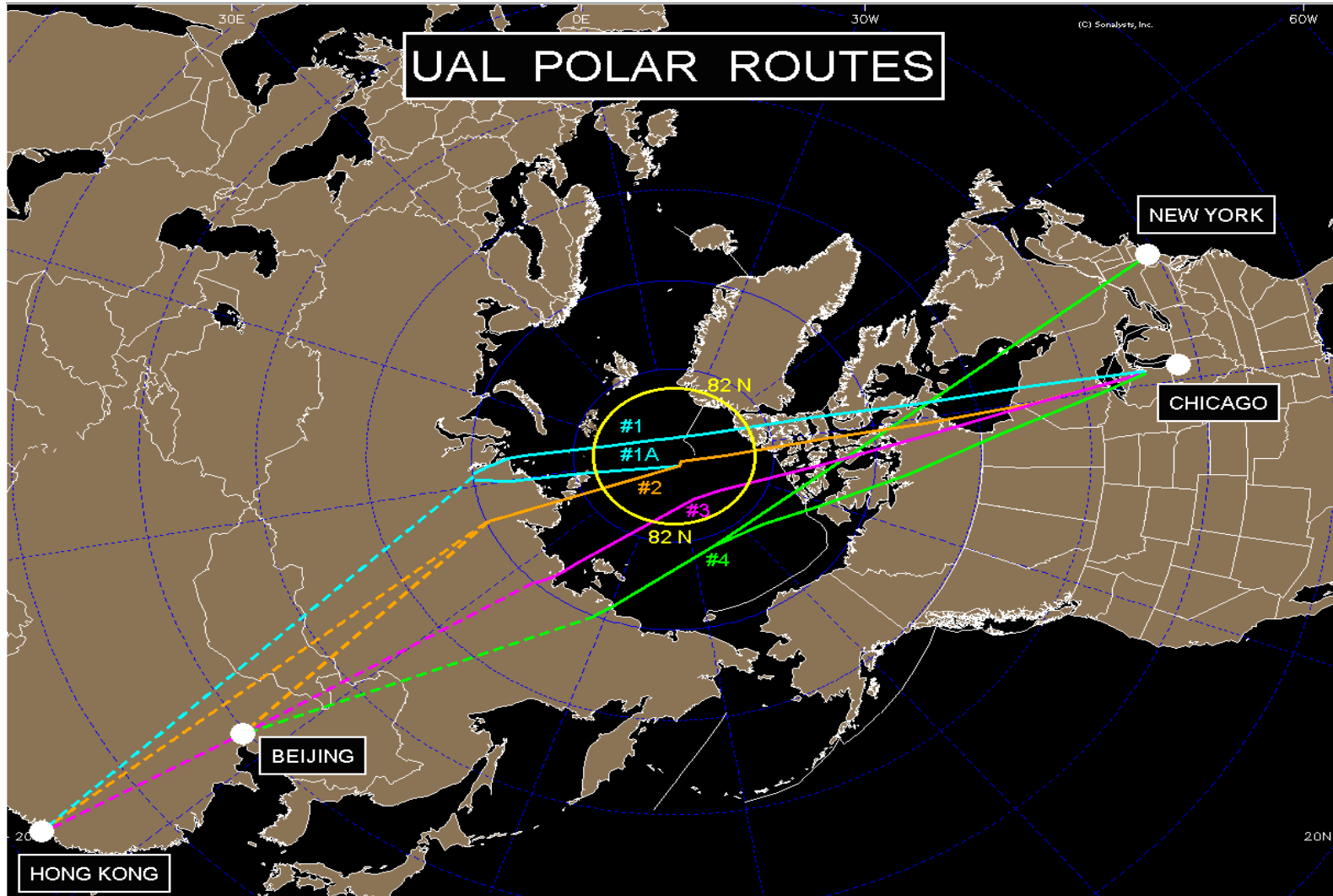
Global Air Quality: UAL GHG Footprint

Forecast for 2020: 25% Decrease from 20M to 15M Metric Tons



Initiatives

Efficiency Can Lower Emissions



UAL Initiatives

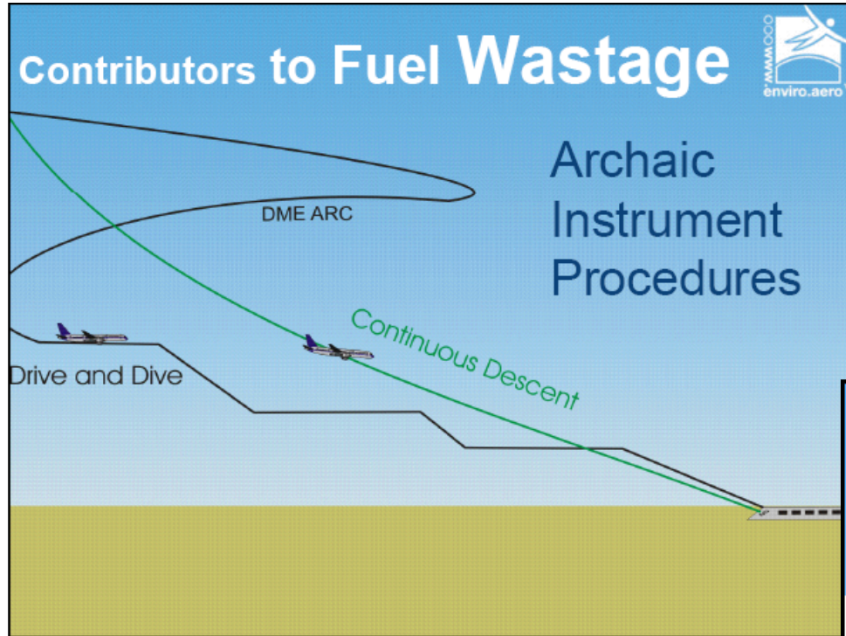
Communications, Navigation and Surveillance Systems for Air Traffic Management (CNS/ATM) infrastructure and equipage

- Shorter routes
- Optimized flight planning
- Reduced separation
- Continuous descent approach
- More efficient ground operations

Airline fuel conservation

- Minimize use of APUs
- Single engine taxi
- Weight minimization
- GSE Electrification – ~25% for System

Infrastructure



Industry Environmental Perspective

Great improvements

- Thanks to technology, today's aircraft are **50% quieter** than 10 years ago
- Local air quality around airports will benefit from new technologies, reducing nitrogen oxides by **80% by 2020**

➤ SESAR == NEXTGEN == SESAR == NEXTGEN

➤ RNP	- Single Engine Taxi
➤ RVSM	- Meters == Feet
➤ RNAV	- ETA/RTA
➤ Tailored Arrivals	- RSAT
➤ ADS-B	- SOIA
➤ ASDE-X	- MARPS
➤ CDA	- TMA
➤ EDA	- CPDLC
➤ TASAT	- FANS
➤ CDAP	- X Y Z

Whether capacity, economic or emissions driven, airspace must be integrated in order to maintain safety

Operational Measures – Global Standardization

enviro.aero

- CDA's
- Optimized Descents
- RNAV/RNP
- ADS-B in and out
- RVSM
- Steeper than Normal Approach
- Deeper Cutbacks
- Single-engine taxi

