



Air Quality Initiatives at the Dallas/Fort Worth International Airport

Faster Freight - Cleaner Air 2007
Long Beach, CA
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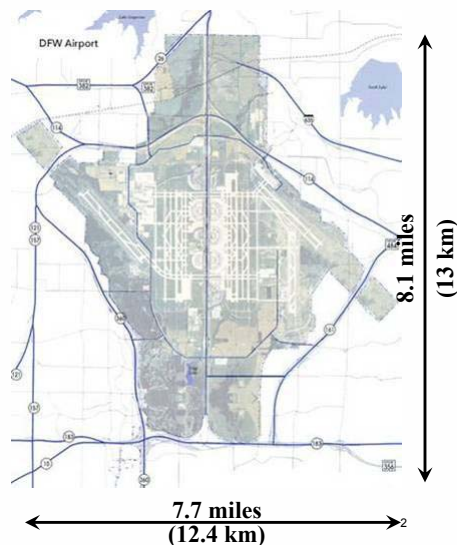


Airport Overview

DFW Airport

- Jointly owned by Cities of Dallas and Fort Worth
- Opened in 1974
- Encompasses >18,000 acres (>28 Square Miles) including 9,000 acres of natural resource areas
- Ranked third worldwide in operations totaling over 804,000 annually
- Ranked sixth worldwide in serving 59.4M passengers

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Airport Overview

DFW Airport

- Cargo Airport of the Year (Air Cargo News - 2006)
- Best Cargo Airport (Air Cargo World - 2006)
- 756,598 Metric Tonnes of cargo in 2006
- Fumigation Facility Onsite (Dual Carbon Adsorber System)
- Additional room to grow



CLEAN AIR POLICY



The Dallas/Fort Worth 9-county metropolitan area is currently classified as a Moderate Ozone Non-attainment Area under the 8-hour Standard.

DFW's Clean Air Policy (May 2000) states:

Recognizing the importance of clean air to Dallas, Fort Worth and the Region, the Dallas/Fort Worth International Airport Board is committed to improving air quality by reducing air pollution from Airport operations and increasing energy efficiency.

Strong environmental innovations driven by DFW Board's Clean Air Policy, DFW have reduced NOx emissions >90%!



Emission Reduction Strategies

- Mobile Source Reductions
- Stationary Source Reductions
- Energy Efficiency/Renewable Energy
- Travel Demand Management
- Airport Sustainability Initiative



Mobile Source Strategies

- Airport Clean Fleet Program
- Contract service provider clean fleet requirements
- Airline Ground Service Equipment (GSE) Electrification
- Refueling/recharging infrastructure development
- Traffic Circulation Modifications
- Smart Parking
- Intersection Improvements



DFW Clean Fleet Program



- 87% of DFW's Light & Medium Duty Fleet consists of vehicles which meet or exceed Super Ultra Low Emission Vehicle Standards (SULEV) as defined by EPA's National Low Emission Vehicle (NLEV) program
- DFW has converted 100% of the Bus & Shuttle Van Fleet to Alternative Fuel Vehicles
- 100% of the Light & Medium Duty Fleet and 72% of the Heavy Duty & Off-road Fleet were converted to Clean Fuel Vehicles
- DFW fleet consists of approximately 600 units
- DFW's Clean fleet program implementation exceeded regulatory requirements



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Fueling Infrastructure

Public Access CNG Refueling Station



- Highest volume public access station in America
- Multiple storage banks capable of simultaneously fueling 8 passenger buses
- Public/private partnership



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GSE Electrification

Memorandum of Agreement with TCEQ to reduce GSE NOx emission to 0.56 tpd by 2007



- Cooperative effort with DFW, AA, DL
- Over 2,150 units in service
- Over 530 electric GSE units in service at DFW, mostly operated by American Airlines



DOT/FAA ILEAV Pilot Program supporting the deployment of Electrically Powered GSE



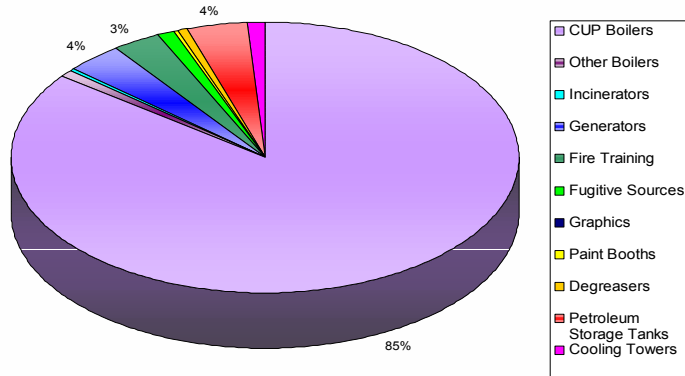
Stationary Source Strategies

- International waste disposal
- Centralized Pre-Conditioned Air (PCA) and Ground Power (400Hz) systems for gated aircraft
- Thermal energy production
 - Electrification of Chillers
 - Low NOx combustion technologies



DFW Stationary Emission Sources

District Energy Plant Boilers make up 85% of Stationary Emission Sources (pre-upgrade)



Stationary Source Reductions

District Energy Plant Upgrade Project

Chiller Repowering

- Remove existing steam driven equipment (22,000 tons)
- Install 6 - 5,500 ton electric drive centrifugal chillers (33,000 tons)



Carter-Burgess
DFW AIRPORT
DISTRICT ENERGY PLANT

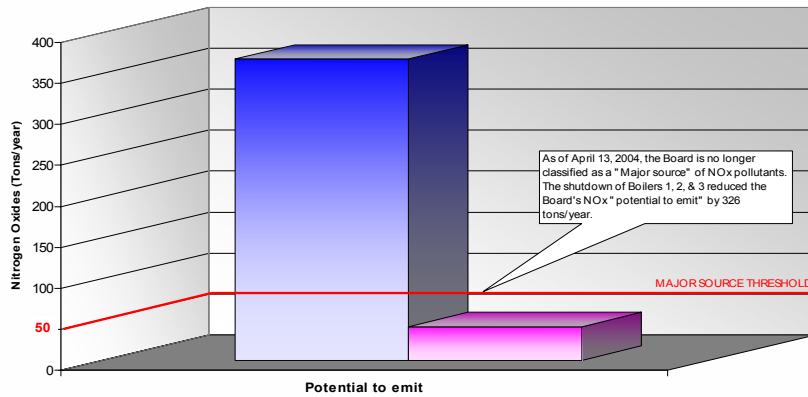
Boiler Replacement

- Remove existing equipment - 405,000 lbs/hr (~100 PPM NO_x)
- Install 5 new boilers - 222,000 lbs/hr @ 125 psig (~9 PPM NO_x)
- >90% Reductions in NO_x Emissions



Potential NO_x Emissions District Energy Plant Upgrades Project

■ Pre-CUP Upgrades ■ Post-CUP Upgrades



EE/RE Strategies

- Energy Efficiency program
 - Operations & Maintenance processes
 - Retrofit applications
 - New construction
- Renewable energy
- Technology development
 - Research partnership with Energy Systems Laboratory
 - ESL Emissions Calculator



EE in New Construction

Terminal D

- Complies with 2001 IEEC (ASHRAE 90.1 - 1999)
- Heating & cooling from state-of-the-art district energy system
- HVAC design uses stratification in large open areas
- Extensive use of VFDs on fans and pumps
- Integrated energy management system monitoring all HVAC, lighting and conveyance equipment



EE in New Construction

Terminal D

- Innovative envelope measures to reduce heat gain and infiltration
- Employs latest in fluorescent, MH and LED lighting technologies (1.3 w/ft²)
- Extensive use of daylighting, daylight responsive controls and occupancy sensors
- PCA and Ground Power to service aircraft integrated at each gate





EE in New Construction



District Energy Plant Upgrade Project

- Innovative technology included thermal energy storage & state-of-the-art boilers and chillers.
- Yields a projected avoided future energy use of 25 million MMBTUs over the useful life of the facilities.
- **Thermal Energy Storage Tank**
 - 6 million gallons
 - 90,000 ton-hours
 - Ability to shift a minimum of 5 MW off-peak
- **Centralized Pre-Conditioned Air System**
 - 12,000 tons Cooling
 - 51 MMBtu Heating

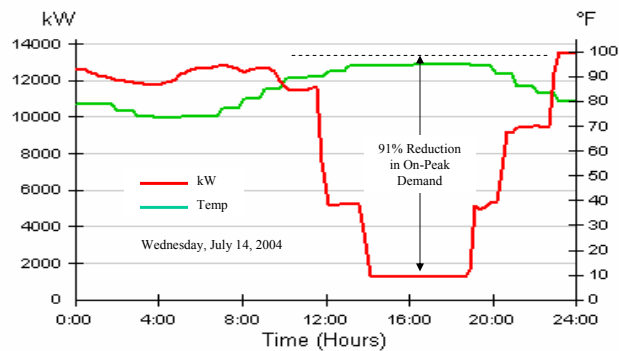
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EE in New Construction

District Energy Plant Upgrade Project Thermal storage system performance



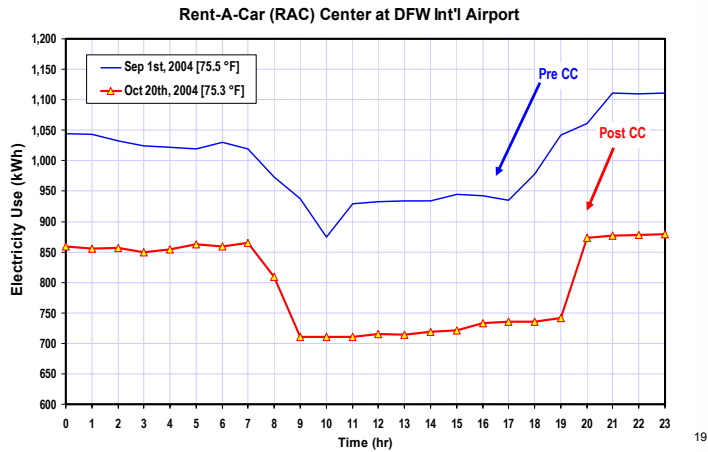
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Building Optimization

Energy Savings - 1 million (kWh) / yr (11%)



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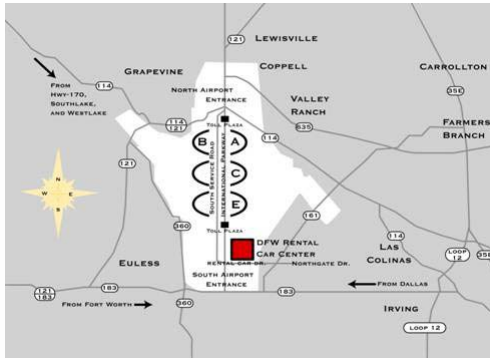
Travel Demand Mgt Strategies

- Trip reduction
- Idle reduction
- Aircraft traffic management

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Travel Demand Management



- **Consolidated Rental Car Busing Operation (initiated March 1998)**
- **One fleet of 40 buses traveling a shorter distance**
- **Reduced mileage driven by approximately 70%**
- **Estimated NOx reductions are almost 1 ton per day**
- **Multiple value streams**
 - Customer service
 - Lower cost
 - Lower emissions



Travel Demand Management



SKYLINK

- Skylink (Automated People Mover System), began operation in May 2005, and reduces dependence on Terminal Link bus system for inter-terminal transfers.
- Perimeter Taxiways and RNAV (Area Navigation) Procedures will further reduce aircraft emissions on the ground (queuing) and in flight.
- Mass Transit access under design to connect to the airport, ultimately providing direct terminal interface for efficiency and passenger convenience.



Travel Demand Management



- Easy Pass Parking (Passkey) System has reduced queue delays at parking control toll plazas by 90%, thereby reducing idle time and associated emissions.
- Smart Parking Technology System lets guest know how many available spaces are on each floor, and which floors are full (Terminal D)
- Modifications to traffic circulation to reduce congestion and unnecessary idling
- Intersection improvements to reduce congestion and delay on roadways
- Evaluating idling policy to reduce emissions from heavy duty diesel engines



Waste Minimization

Construction Material

- 2.5 million yd³ of excavated soil were reused on-airport for runway extensions & bedding material
- 355,000 tons of demolished concrete were reused on-airport for base and bedding material.
- Rigid foam roof insulation reuse during terminal re-roof project avoided 200,000 ft³ in waste.

Aircraft Deicing Waste Capture

- Discrete spent aircraft deicing/anti-icing fluid capture, storage and treatment infrastructure allows on-airport treatment or disposal via POTW.





How do you get there from here?

- Environmental Policy
- Environmental Management System
- Environmental Stewardship
- Funding Sources – Grants, Partnerships
- Regulatory Requirements



It may seem like a challenge,





**But it's really an opportunity.
Run with it!**



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Questions?

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