

**Ronald Reagan Washington National Airport (DCA)
and
Washington Dulles International Airport (IAD)
Air Emissions from Operations
2002 – 2009
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AIR POLLUTION EMISSION INVENTORIES FOR
WASHINGTON DULLES INTERNATIONAL AIRPORT
AND
RONALD REAGAN WASHINGTON NATIONAL AIRPORT
FOR
CALENDAR YEARS 2002, 2008, AND 2009

Prepared for:

Metropolitan Washington Airports Authority
Washington, DC



Prepared by:

URS Corporation
Tampa, FL



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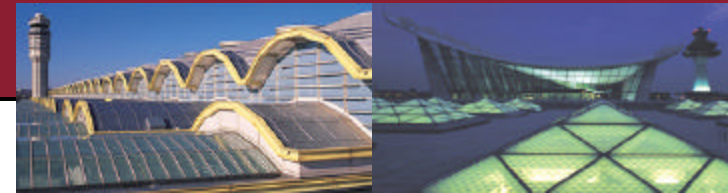
Scope: airport emissions not otherwise covered by COG

- Airports: DCA and IAD
- Sources: Area, Non-Road, and Mobile
- Years: 2002, 2008, 2009
- Average day and ozone season day emissions
- CO, VOCs, NO_x, PM-2.5, PM-10, SO₂



Sources

- Area Sources
 - Aircraft
 - Auxiliary Power Units
- Non-Road Sources
 - Ground Support Equipment
 - Mobile lounges
- Mobile Sources
 - On-site landside motor vehicles
 - Parking facilities
- Emissions inventory excludes airport point sources, construction emissions, and roads on airport property covered by COG modeling



Examples of Ground Support Equipment

Water service truck

Service truck

Lavatory truck

Hydrant truck

Fuel truck

Catering truck

Cabin Service truck

Belt loader

Baggage tractor

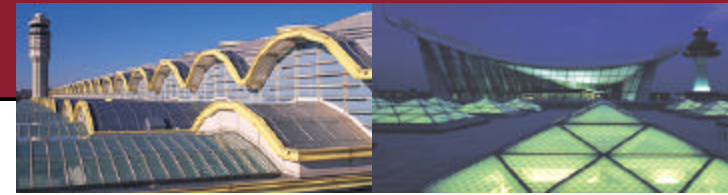
Air start

Aircraft tractor

Air conditioner

Ground power unit

Deicer



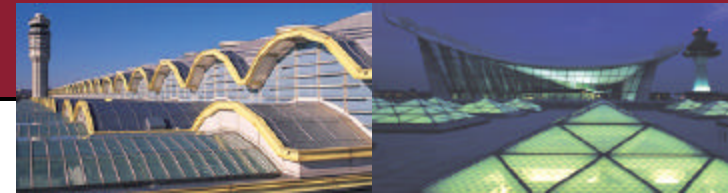
Methodology

- FAA-approved Emissions Dispersion and Modeling System model (EDMS)
- 2002 historical data for operations (OPS), passengers (PAX) and fleet mix
- Approved forecasts for OPS, PAX and fleet mix
 - IAD: Runway EIS
 - DCA: Part 150 Study



Forecast Numbers of Operations and Passengers

	2002	2008	2009	Increase 2002-2009
Operations				
DCA	215,691	283,482	284,196	31.8%
IAD	372,636	496,053	530,895	42.5%
Total	588,327	779,535	815,091	38.5%
	2002	2008	2009	Increase 2002-2009
Passengers				
DCA	12,881,602	16,673,476	16,895,070	31.2%
IAD	17,030,996	25,865,974	28,179,976	65.5%
Total	29,912,598	42,539,450	45,075,046	50.7%



EDMS is Driven by Landing and Takeoff Cycles (LTO)

- Aircraft: engine emission factors and time-in-mode for landing, taxi/idle, takeoff, climbout
- GSE: default or user specified
 - Equipment items assigned by aircraft
 - Equipment operating time per LTO
 - Fuel type
- On-road vehicle emissions based on EPA road model (Mobile 6.2)
- EDMS generates annual emissions estimates for CO, VOCs, NO_x, PM-2.5, PM-10 and SO₂



Dulles Air Emissions (tons/day)

	VOCs			NOx			PM-2.5		
	2002	2008	2009	2002	2008	2009	2002	2008	2009
Daily Average									
Aircraft	0.70	1.05	1.13	2.37	3.77	4.03	0.06	0.07	0.07
GSE	0.37	0.46	0.49	0.57	0.56	0.60	0.02	0.03	0.04
APUs	0.01	0.01	0.02	0.13	0.23	0.25	<0.01	<0.01	<0.01
Mobile Lounges	0.02	0.02	0.02	0.34	0.34	0.34	0.01	0.01	0.01
Onsite Motor Vehicles	0.08	0.07	0.07	0.28	0.19	0.18	0.01	<0.01	<0.01
Parking Facilities	0.03	0.02	0.02	0.04	0.03	0.03	<0.01	<0.01	<0.01
Total	1.21	1.63	1.75	3.73	5.12	5.43	0.10	0.11	0.12
	VOCs			NOx			PM-2.5		
Ozone Season Day	2002	2008	2009	2002	2008	2009	2002	2008	2009
Aircraft	0.70	1.05	1.12	2.24	3.56	3.81	0.06	0.07	0.07
GSE	0.37	0.46	0.48	0.57	0.56	0.60	0.02	0.04	0.04
APUs	0.01	0.01	0.02	0.13	0.23	0.25	<0.01	<0.01	<0.01
Mobile Lounges	0.02	0.02	0.02	0.34	0.34	0.34	0.01	0.01	0.01
Onsite Motor Vehicles	0.09	0.08	0.08	0.28	0.18	0.18	<0.01	0.01	0.01
Parking Facilities	0.03	0.02	0.02	0.04	0.03	0.03	<0.01	<0.01	<0.01
Total	1.22	1.64	1.74	3.60	4.90	5.21	0.09	0.13	0.13

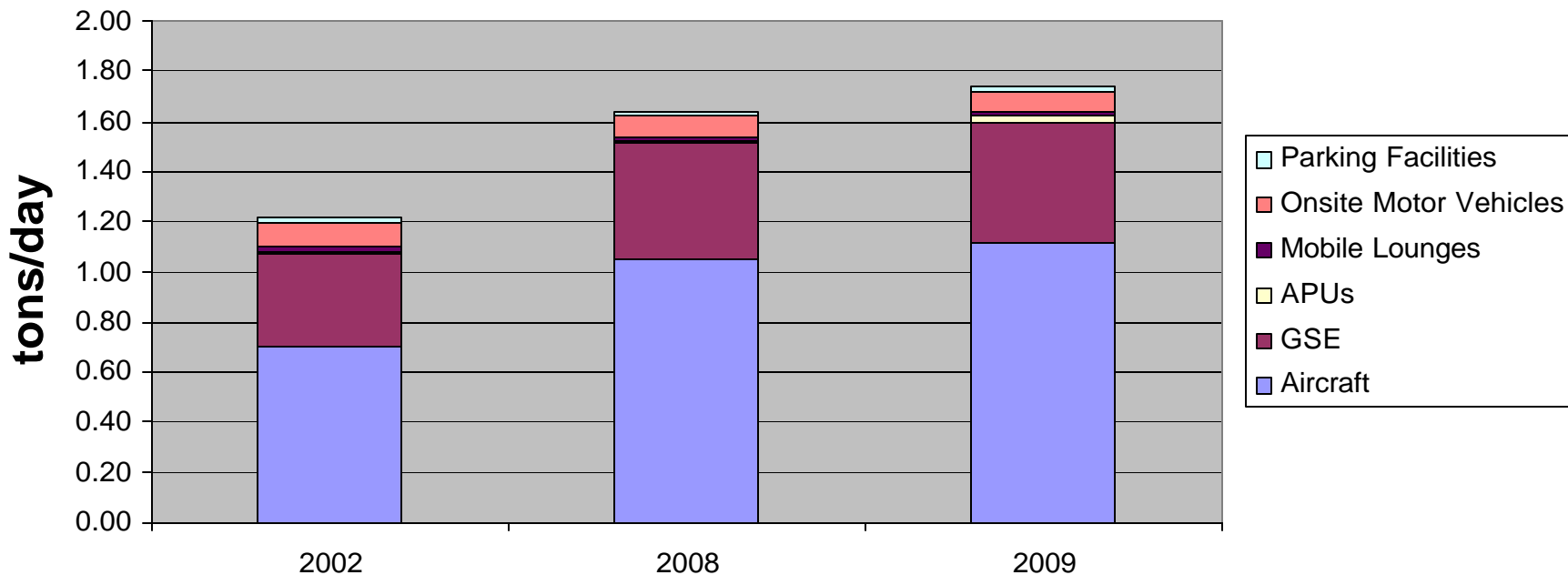


Reagan National Air Emissions (tons/day)

Daily Average	VOCs			NOx			PM-2.5		
	2002	2008	2009	2002	2008	2009	2002	2008	2009
Aircraft	0.15	0.22	0.22	1.31	1.74	1.74	0.02	0.03	0.03
GSE	0.04	0.04	0.04	0.37	0.30	0.30	0.03	0.03	0.04
APUs	<0.01	<0.01	<0.01	0.02	0.02	0.02	<0.01	<0.01	<0.01
Onsite Motor Vehicles	0.04	0.03	0.03	0.10	0.07	0.06	<0.01	<0.01	<0.01
Parking Facilities	0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total	0.24	0.30	0.29	1.81	2.13	2.12	0.05	0.06	0.07
Ozone Season Day	VOCs			NOx			PM-2.5		
	2002	2008	2009	2002	2008	2009	2002	2008	2009
Aircraft	0.15	0.22	0.22	1.25	1.65	1.66	0.02	0.03	0.03
GSE	0.04	0.04	0.04	0.37	0.30	0.30	0.03	0.03	0.03
APUs	<0.01	<0.01	<0.01	0.02	0.02	0.02	<0.01	<0.01	<0.01
Onsite Motor Vehicles	0.04	0.03	0.03	0.10	0.07	0.06	<0.01	<0.01	<0.01
Parking Facilities	0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total	0.24	0.29	0.29	1.75	2.04	2.04	0.05	0.06	0.06



IAD VOCs - Ozone Season Day



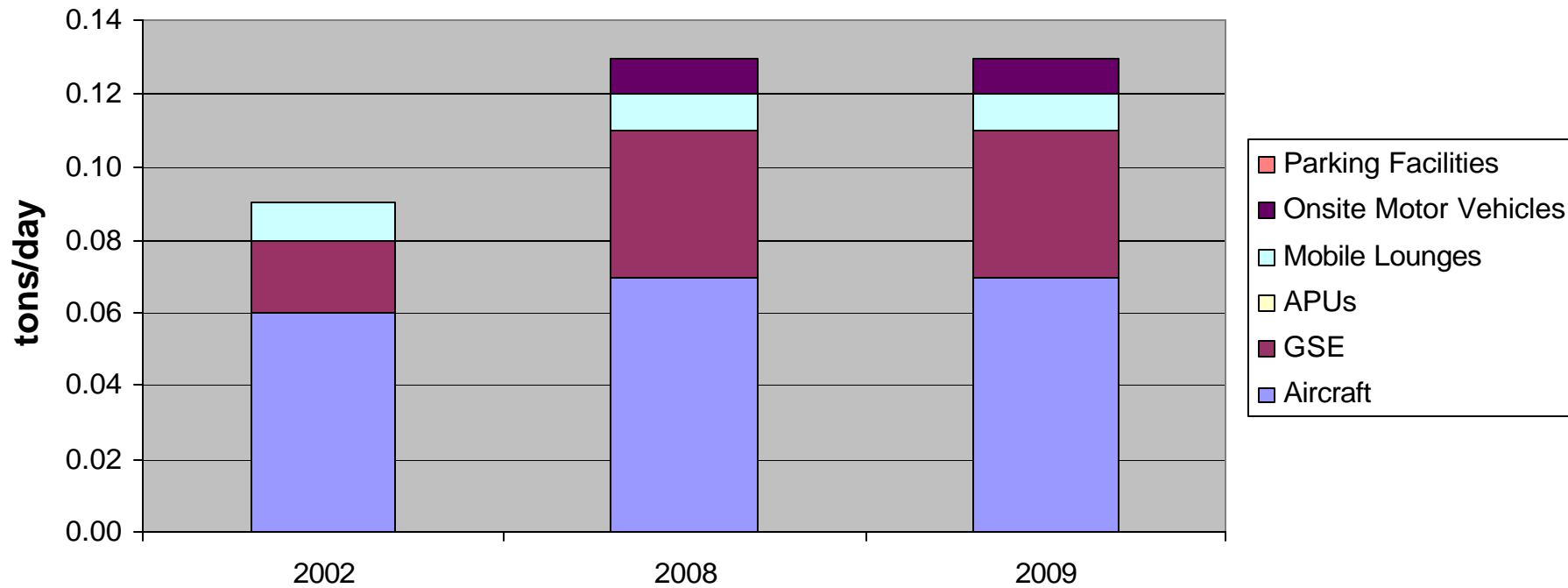


IAD NOx - Ozone Season Day



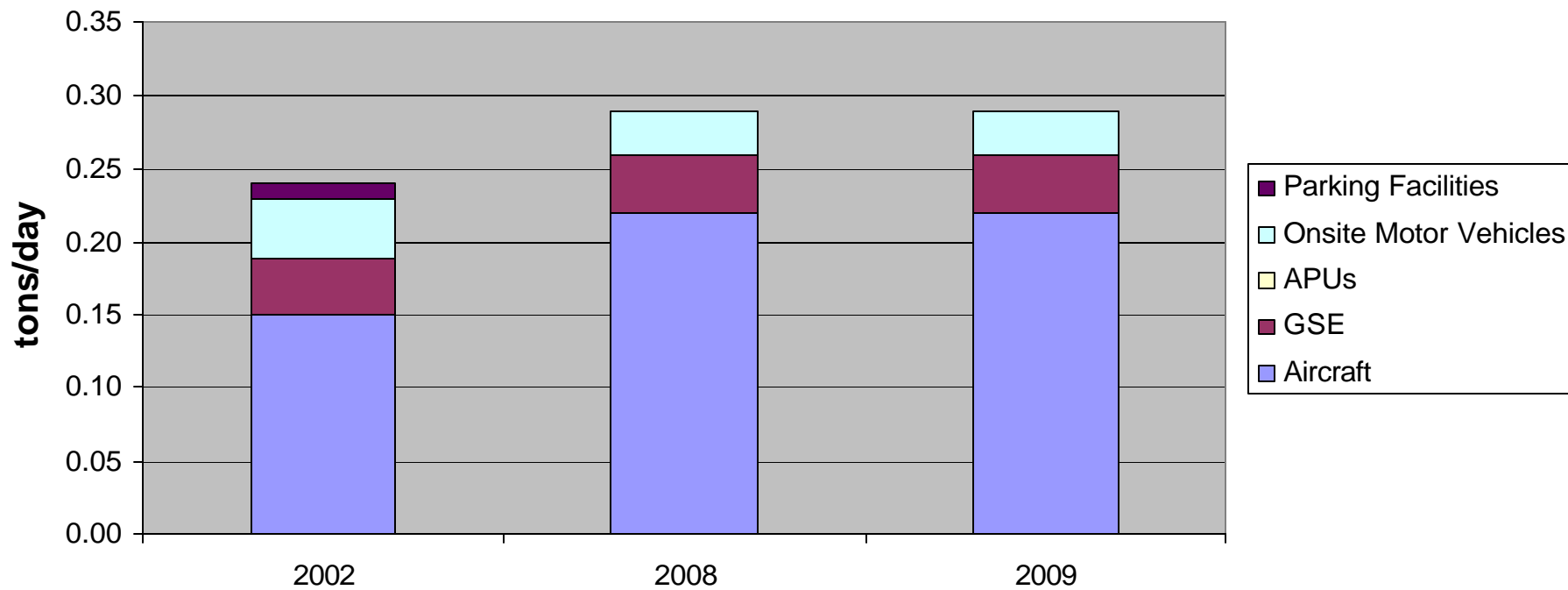


IAD PM-2.5 - Ozone Season Day



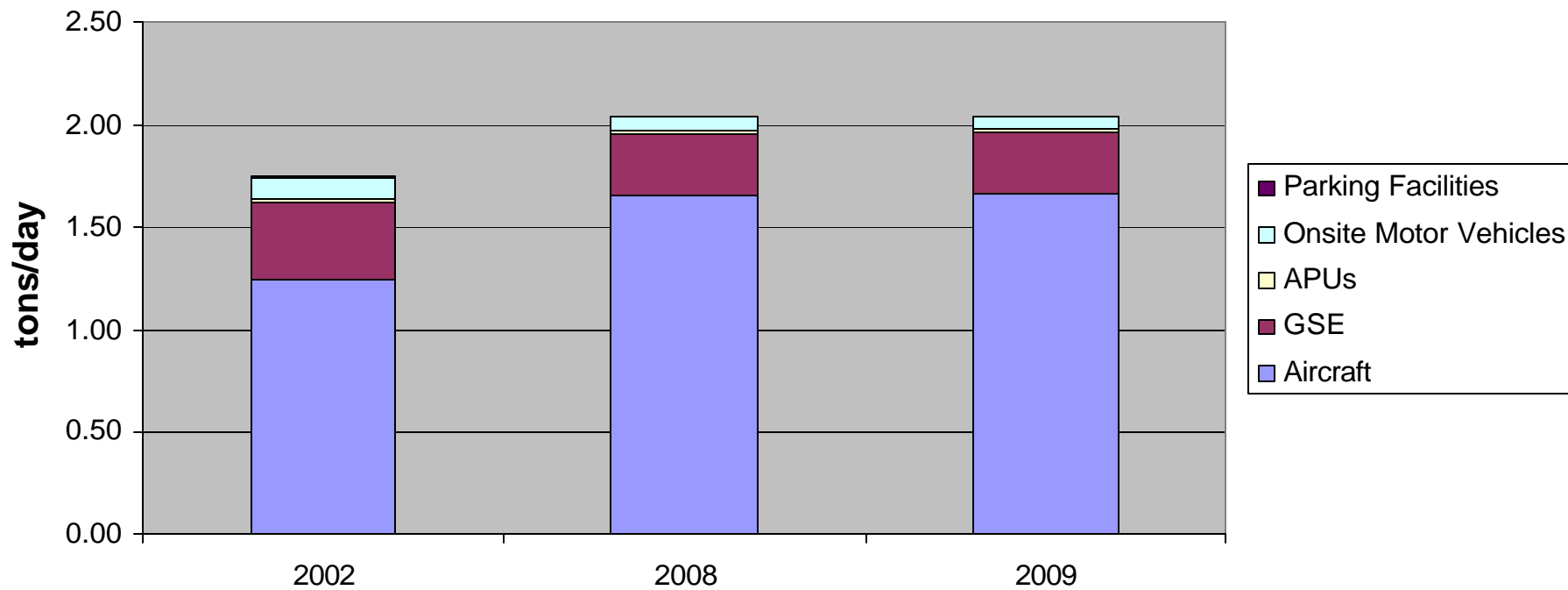


DCA VOCs - Ozone Season Day



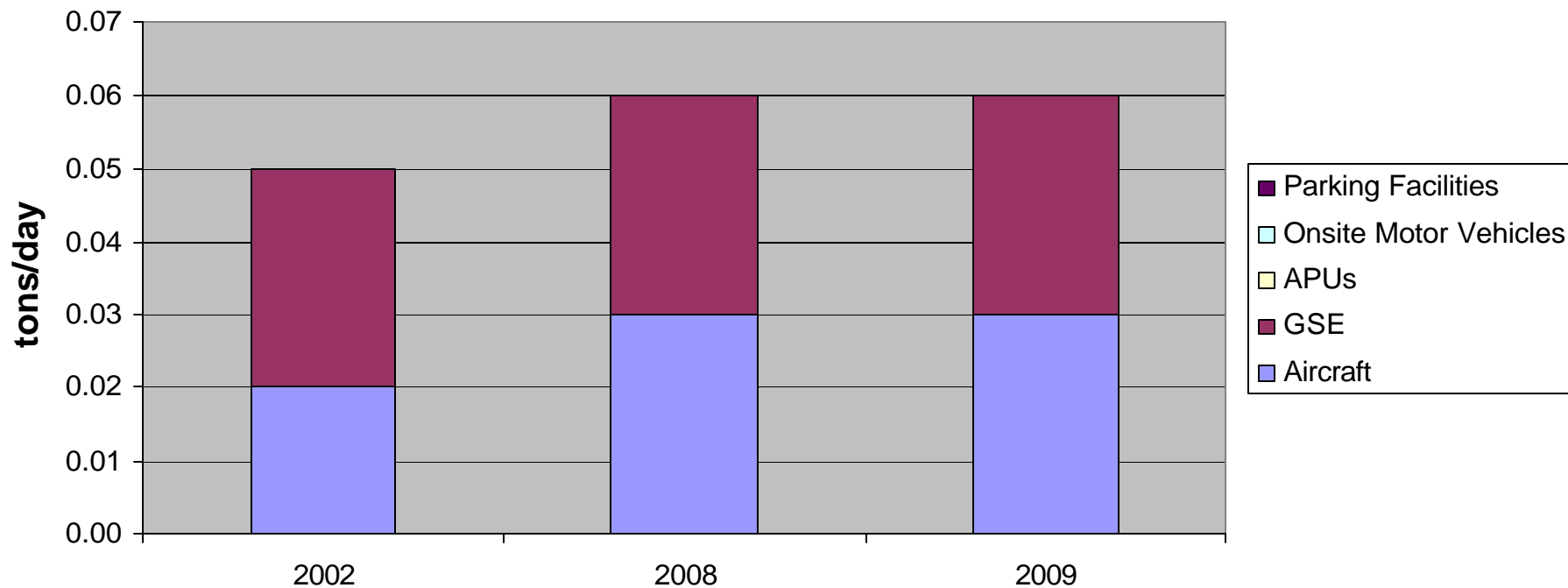


DCA NOx - Ozone Season Day





DCA PM-2.5 - Ozone Season Day





Conclusions

1. Number of passengers and number of operations at IAD and DCA will increase between 2002 and 2009 (50.7% for PAX and 38.5 for OPS).
2. Ozone season day operational emissions during this time will increase by 39% for VOC, 36% for NO_x, and 36% for PM-2.5.
3. IAD and DCA operational emissions (2.0 tons VOC per ozone season day, and 7.3 tons NO_x per ozone season day in 2009) represent a relatively small part of the regional emissions.
4. Aircraft and GSE account for 73% to 94% of the total airport emissions for VOC and NO_x. Aircraft and GSE are both owned by the airlines, not by the Airports Authority.

Note: the foregoing does not include IAD and DCA point source emissions, or IAD construction emissions.