

“Driving Towards a Cleaner Environment”



Spiro Kattan, Supervisor
Clean Fuels & Technologies Division

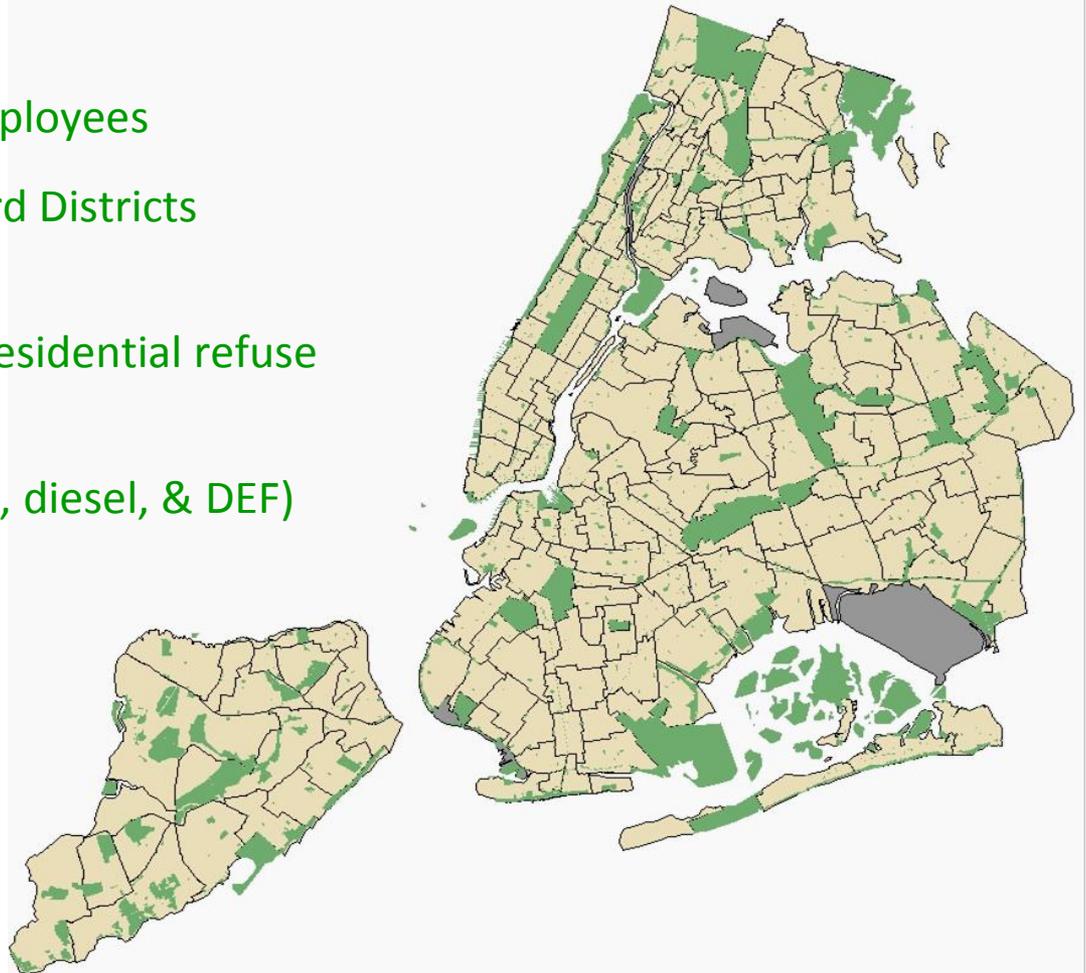
NYC Commercial Refuse Clean Truck Workshop
February 27, 2014
“Economic Solutions for Cleaner Refuse Trucks”

Overview

- About DSNY
- Environmental Laws & Initiatives
- Alternative Fuels & Advanced Technologies
- About Diesel Particulate Filters (DPF)
- Key Steps / Lessons learned

About DSNY

- Approximately 10,000 employees
- Serve 59 Community Board Districts throughout 5 Boroughs
- Collect approx. 12k tons residential refuse each day
- On-Site Fueling (unleaded, diesel, & DEF)
- **Decentralized Operation**



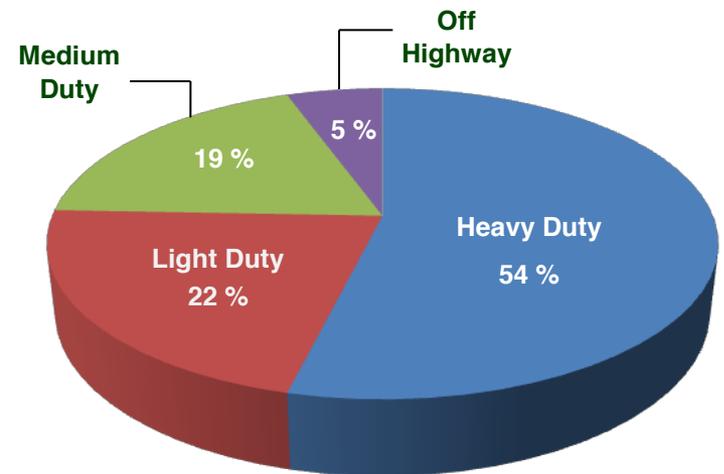
Our Responsibilities

- Street Cleaning
- Refuse Pickup & Recycling
- Snow Removal (6,000 street miles)
- Special Events Cleanup (parades, etc.)
- Freon CFC Recovery (refrigerators, A/C)
- Derelict Vehicle Removal (abandoned, stolen)
- Graffiti Removal (buildings, city property, etc.)
- **Natural Disaster Response (Hurricanes, 911, etc.)**



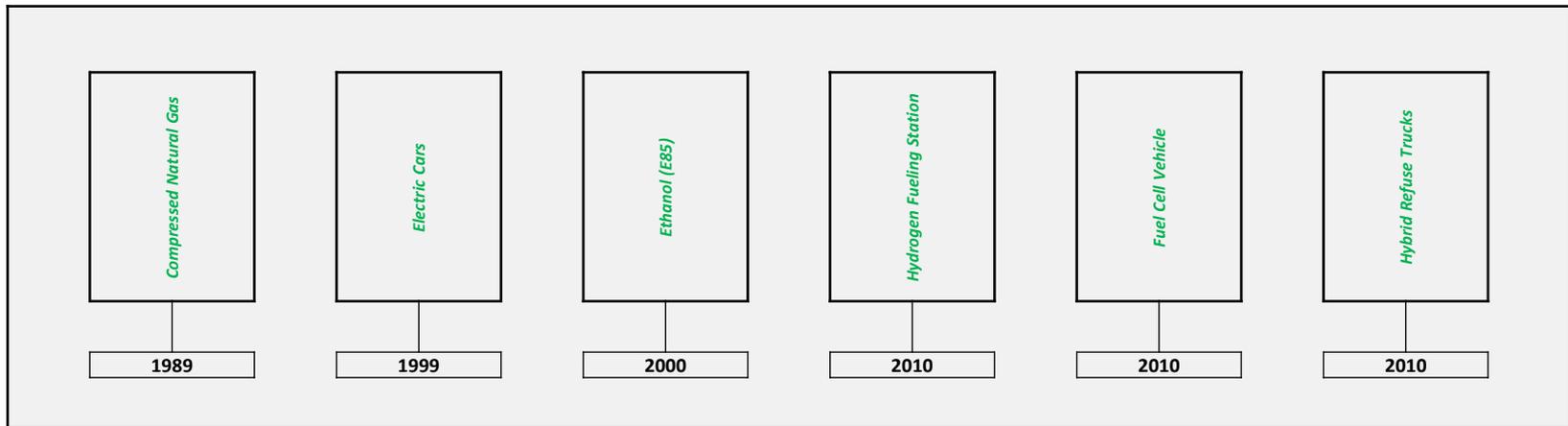
DSNY Fleet

Collection Trucks (rear-load)	1,666
Collection Trucks (Dual-bins)	405
Collection Trucks (front-load)	99
Salt Spreaders	374
Street Sweepers	440
Off-road	300
Light Duty Fleet	1,169
Other	1,004
Total	5,457



A Look Back...

Clean Vehicle Projects



Mayoral Initiative



2007 - PlaNyC Aims to reduce GHG 30% by 2017

(over 2005 baseline)

Mayoral Fleet

Light-Duty EVs & HEVs



Plug-in & HEV	
Chevy Volt	21
Ford Transit Connect	2
Navistar eStar	1
Nissan Leaf	18
Ford Escape	227
Ford Fusion	15
Ford Fusion	136
Honda Civic	18
Toyota Highlander	18
Toyota Camry	5
Toyota Prius	347
808	

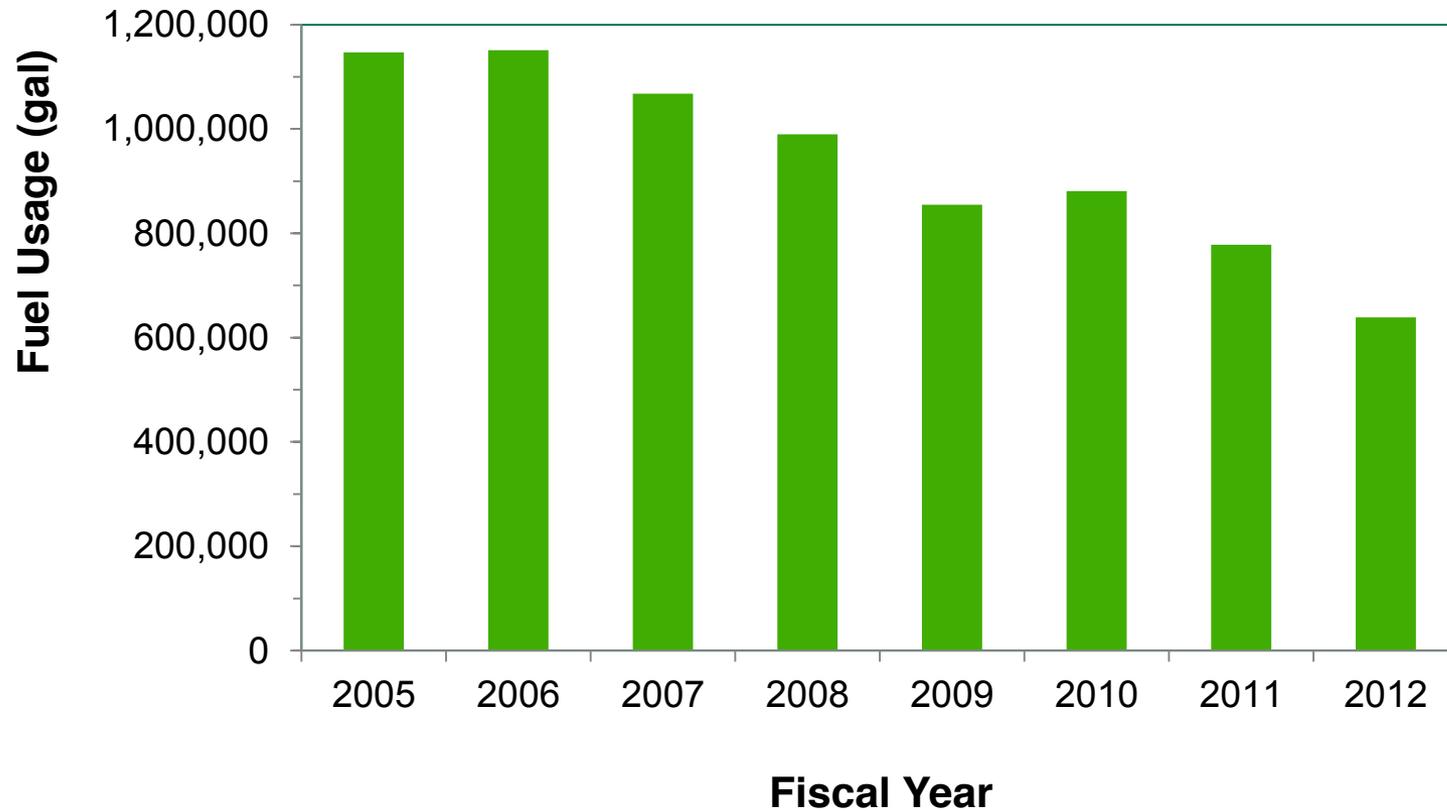


49 Level II EV Charging Stations Citywide



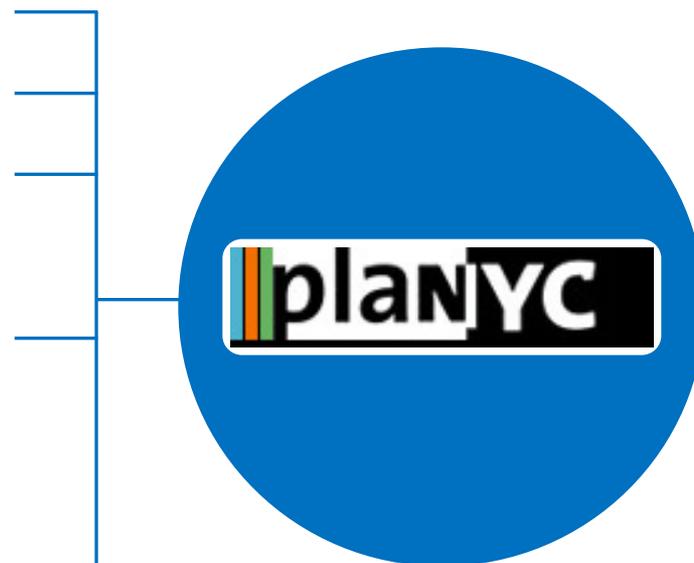
Unleaded Fuel Usage

Dramatic Reduction



Heavy-Duty GHG Reduction Plan

Collection Trucks (rear-load)	1,666
Collection Trucks (Dual-bins)	405
Collection Trucks (front-load)	99
Salt Spreaders	374
Street Sweepers	440
Off-road	300
Light Duty Fleet	1,169
Other	1,004
Total	5,457



Compressed Natural Gas Fleet

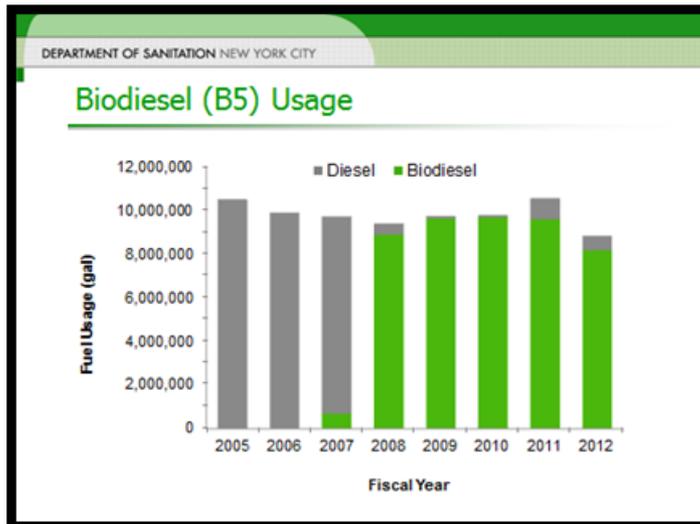


CNG Refuse w/Snowplow

CNG Stations	
DSNY	
Clean Energy	
Con Ed	
CNG Fleet	
Street Sweepers	20
Refuse Trucks	44

Biodiesel

- B5 Pilot testing in 2007
- B20 April – October
- B5 November to March
- Displaced ~ 2,000,000 gallons of Fossil Fuels (petroleum) to date



Hybrid Sweepers & Rack Trucks

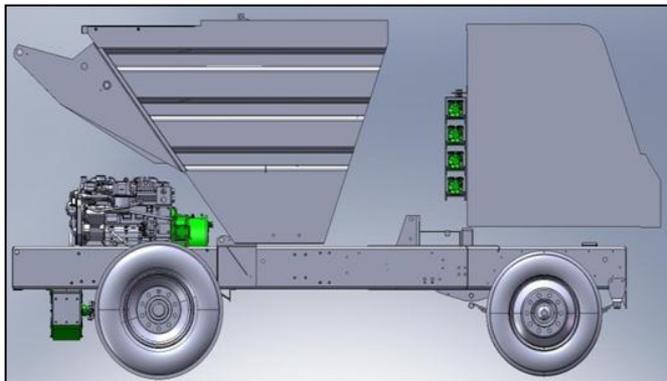
Hybrid Electric Sweeper



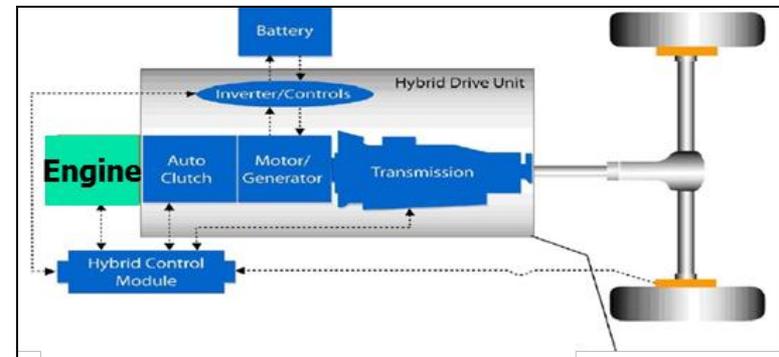
Hybrid Electric Rack



Series design



Parallel design



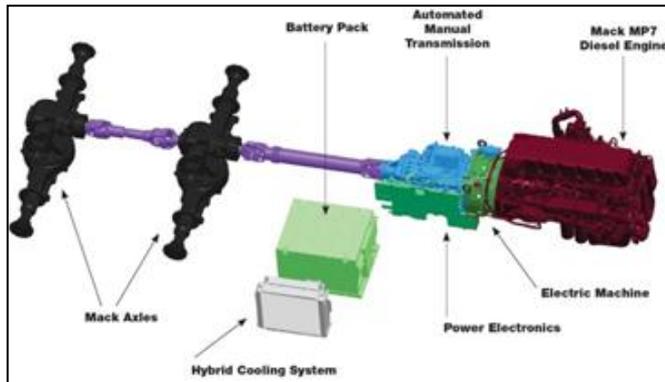
Hybrid Refuse Trucks

Hybrid Electric Refuse

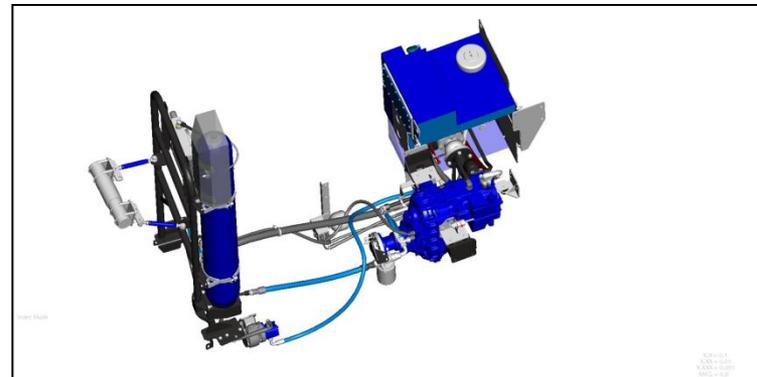
Hybrid Hydraulic Refuse



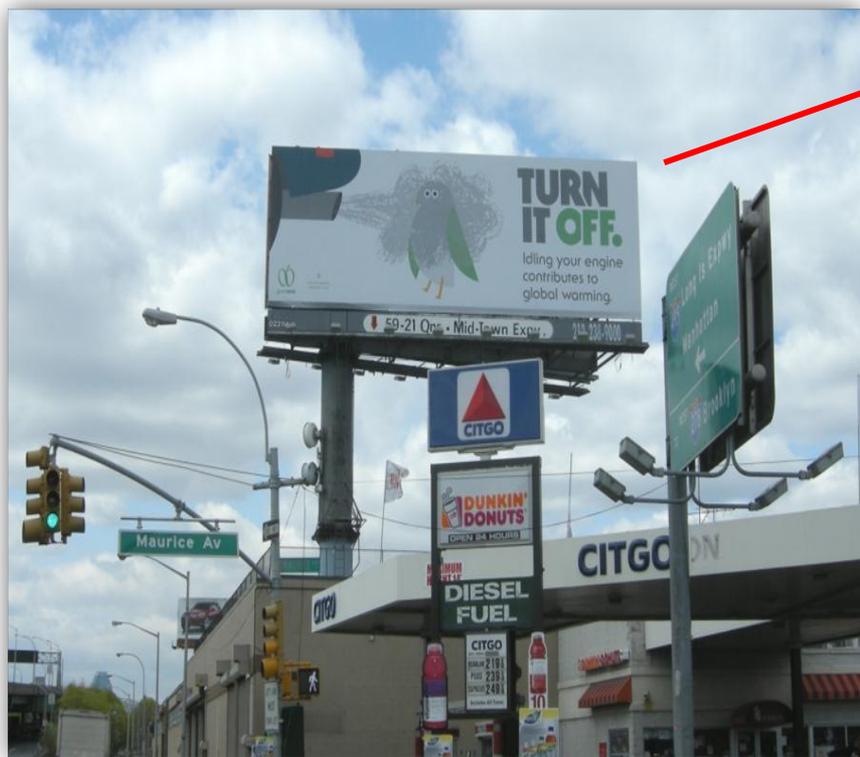
Parallel Design



Parallel design



Achieving PlaNYC Goals



- Less idling
- Alternative fuels
- Hybrid vehicles
- Pure & Plug-in electric
- Fleet down-sizing
- Vehicle right-sizing (smart-spec'ing)
- Reduce travel miles

NYC Local Laws



- 2003 – LL #77 Requires BART on all Off-highway diesels
 - Pre Tier 4 or Tier 4i
- 2005 – LL #39 Requires BART on all On-highway diesels
 - Pre 2007 engine

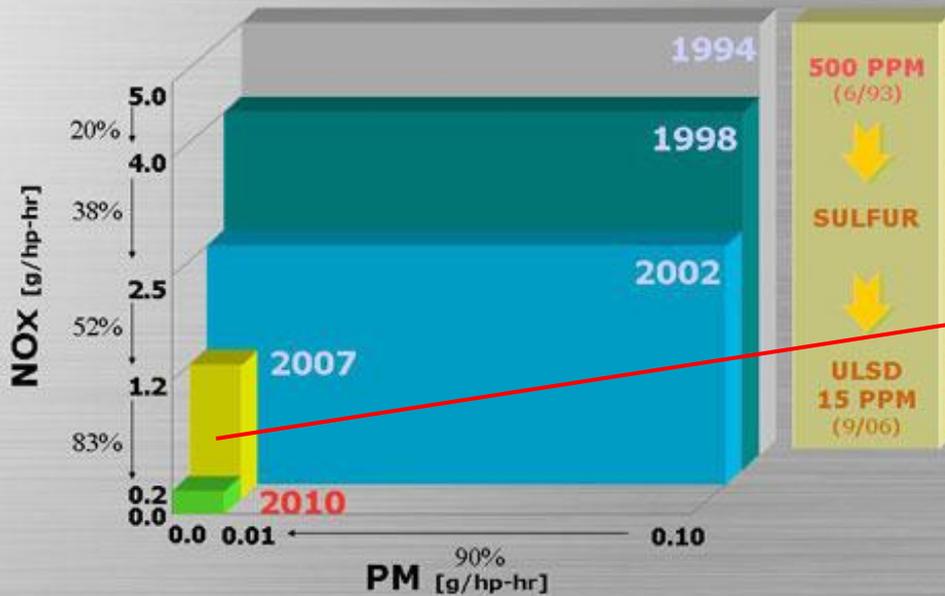
Mayoral Fleet

Primarily to reduce PM/Soot emissions

Federal Regulations

U.S. EPA On-Highway Regulations

Emission Regulations



Diesel Particulate Filter (DPF)

Diesel Particulate Filter (DPF)

Inlet

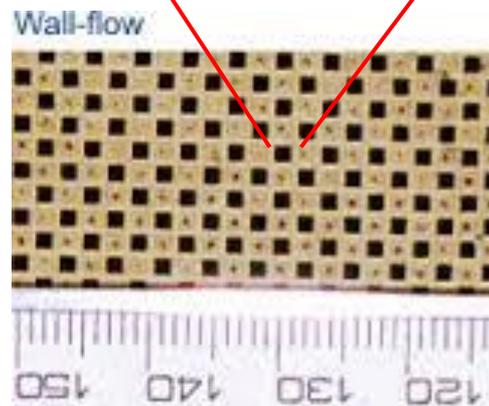
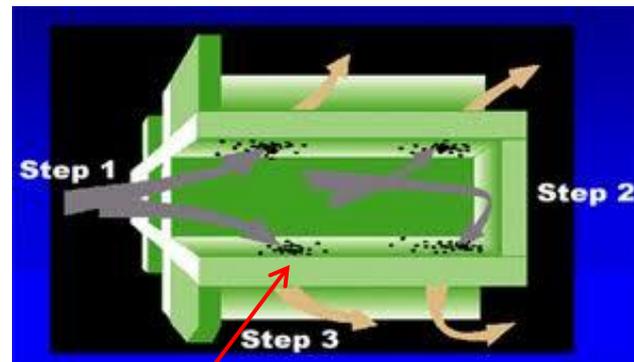
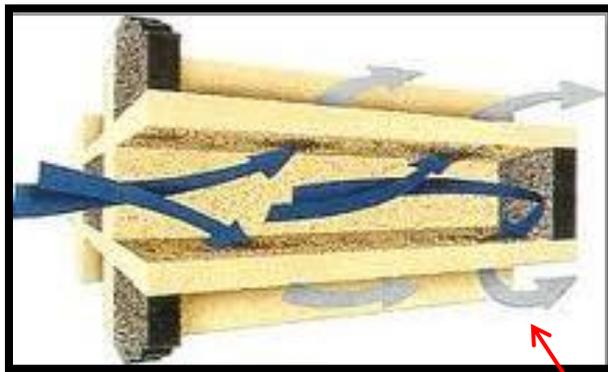


Outlet



Wall-flow Design

Diesel Particulate Filter (DPF)



DPF Filter Regeneration

Passive Regeneration:

- Lower temperature (200 -300° C)
- Less complexity
- Lower cost



Active Regeneration:

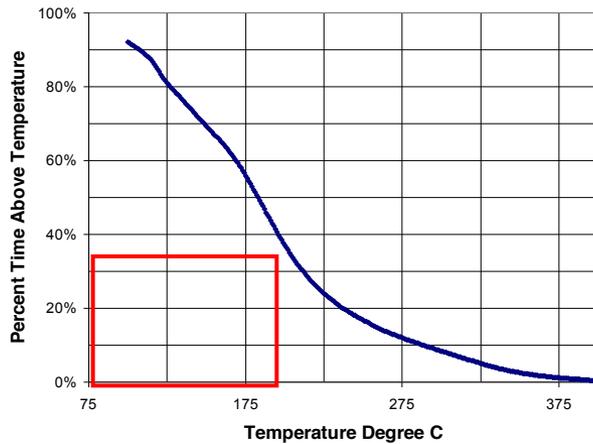
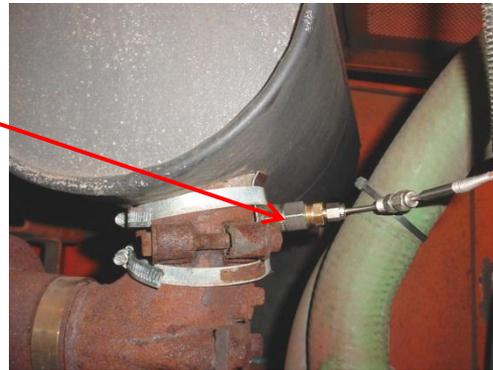
- High-temperature (600° C)
- More complexity
- Higher cost



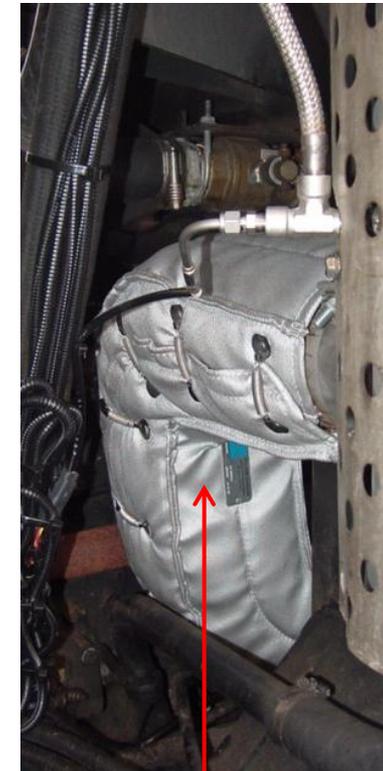
Data-log Exhaust Gas Temperature

Will the duty-cycle support a Passive or Active DPF?

Temp Probe



Data Logger



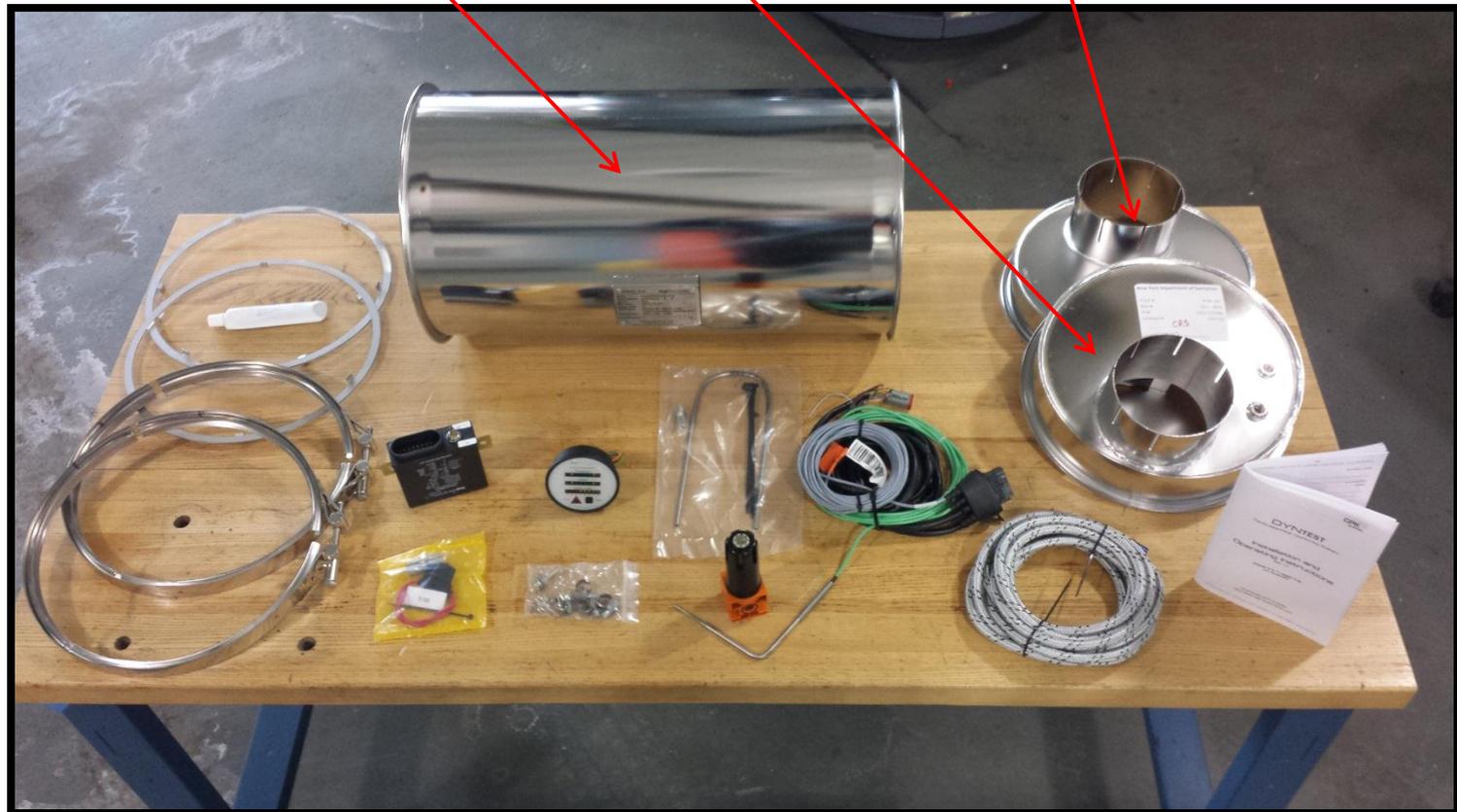
Insulation

Passive DPF Kit

Filter Section

Inlet

Outlet



Dump Truck with DPF

Before Retrofit

Muffler



After Retrofit

DPF



DPF On-Board Monitoring (passive or active)



Dash Mounted Display



Exhaust Temperature Sensor

Exhaust Backpressure Sensor

1,000+ Diesel Exhaust Retrofits

Local Law #39 On-road



Local Law #77 Off-road



CARB / EPA Verified Manufacturers



DPF Maintenance /Cleaning

- Routine maintenance
- Remove in-organic ash
- Clean filter substrate
- Must be done annually or when backpressure increases
- Specialized equipment is required



What you Need to Know

- Properly tuned engine (low opacity)
- Data-log exhaust temperature
- Need ULSD (available today)
- Need CJ-4 (low ash / backwards compatible)
- Utilize verified DPF (CARB / EPA)
- Properly sized DPF (consult with Mfg.)

What you Need to Know (cont.)

- Make ,MY and HP of engine?
- What verified DPF are available?
(CARB) <http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm#>
(EPA) <http://www.epa.gov/cleandiesel/verification/verif-list.htm#retrofit>
- Exhaust gas temperature?
- Who is the local distributor?
- Who is the local installer?
- Where the filters can be cleaned?

Lessons Learned

- Not all kits are plug-n-play (some fabrication is required)
- Maintain engines (minimize opacity)
- Maintain DPF (remove ash)
- Utilize verified DPF (CARB / EPA)
- Mechanic training
- Operator training
- Follow best practice (past slide)

Example: Damaged Filters

- Clogged injectors
- Faulty turbo
- Oil control rings
- Low compression
- Charge air cooler
- Etc.

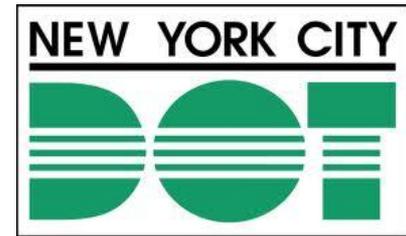


Past Funding for DSNY

- **Local** (clean air communities)
- **State** (NYSERDA)
- **Federal** (CMAQ & EPA)

Take advantage of funding available today!

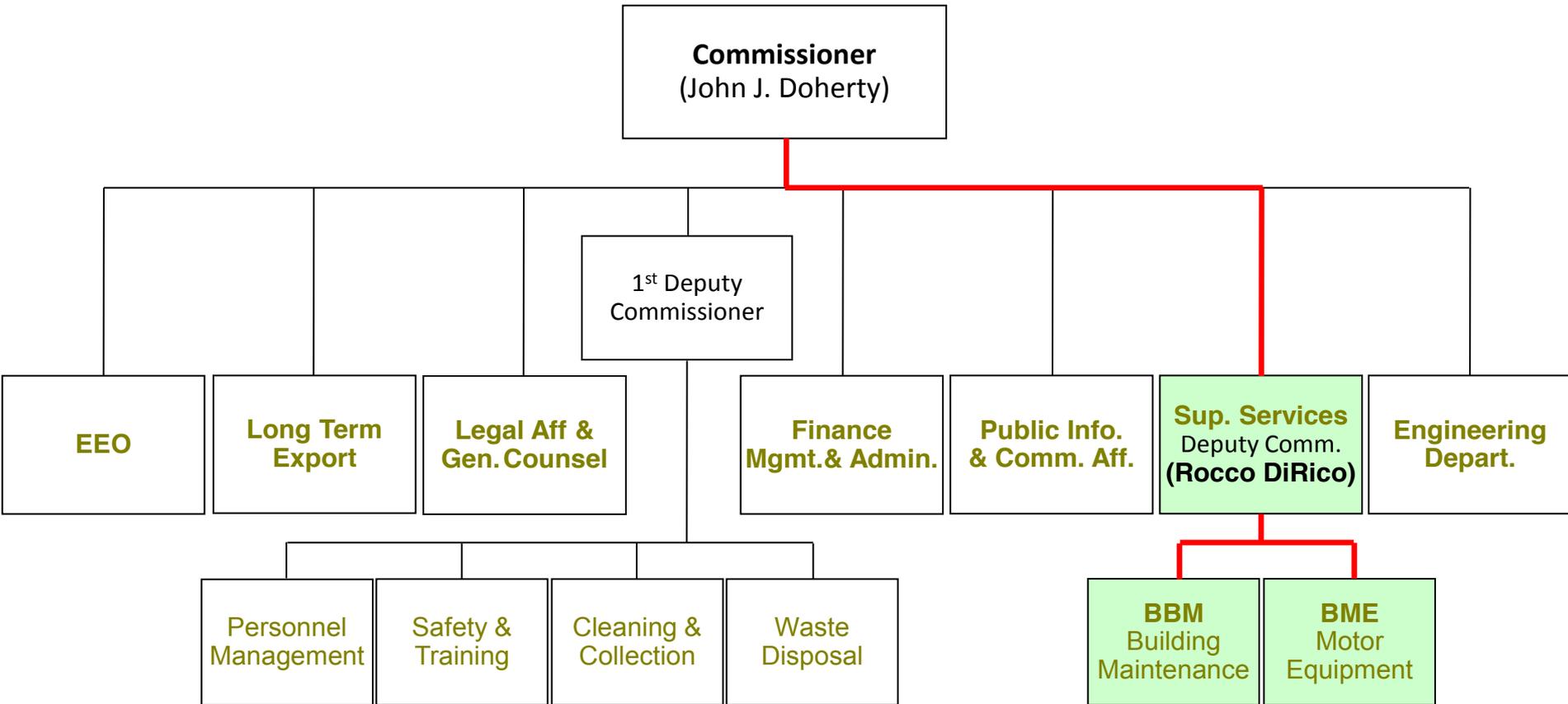
Citywide Initiative!



City of New York
Parks & Recreation



Organization Chart



THANK YOU!!

Spiro Kattan

Supervisor of Mechanics
N.Y.C. Department of Sanitation
52-07 58th Street
Woodside, NY 11377

(718) 334-9205

skatttan@d sny.nyc.gov