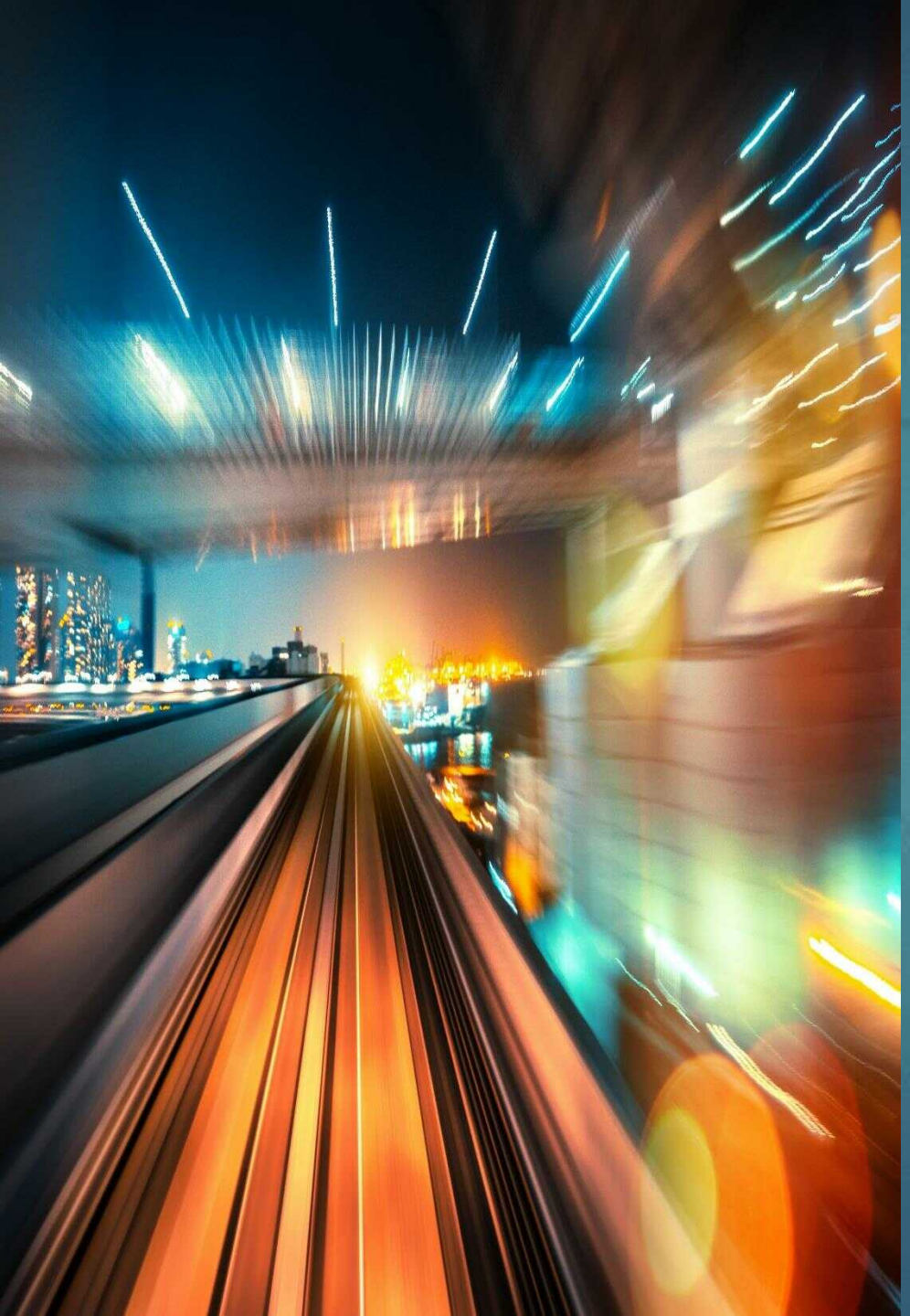

The Road to Biodiesel

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DIRECTOR OF PUBLIC WORKS
CITY OF TOPEKA

JANUARY 12, 2022

Public Works Executive Program

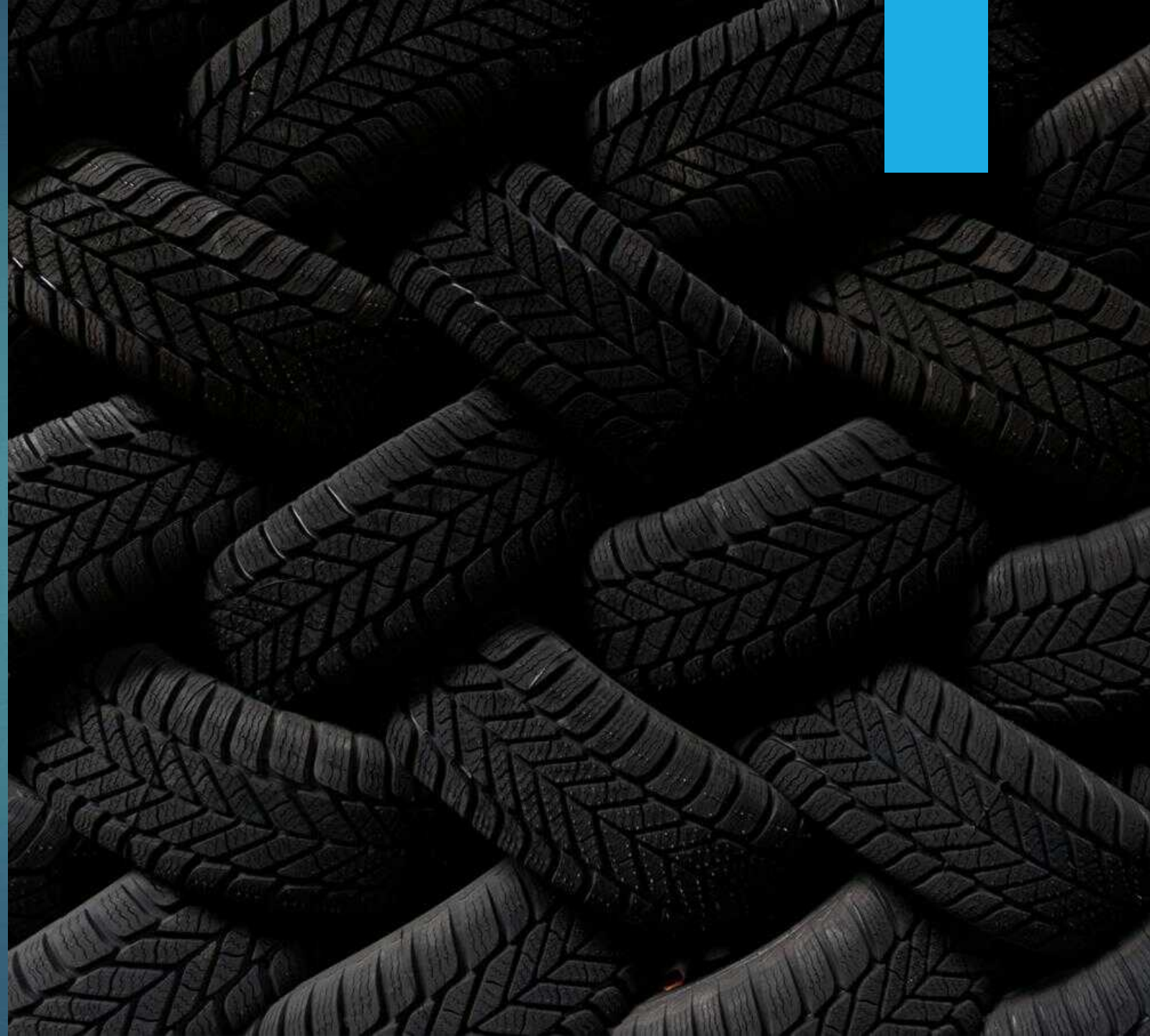
APWA Minneapolis PWX

August 29, 2016

Development and Implementation of a Sound Fleet Replacement

Statement of Issue

- Currently, DPW incurs excessive fleet repair activity on its primary fleet
- Situation stems from the absence of a planned fleet replacement program
- Severe impact on every area of operation within the department



Policy Issue

- Establishment of a sustainable funding program to institute a programmed fleet replacement plan.

Scope of the Issue

- Constant challenge to deliver services for which it is responsible
- Mid and Frontline supervisors request for additional personnel
  - Excessive Overtime
  - Daily shortage in equipment
  - No replacements, exceeding optimal service life
- Direct correlation between the absence of a programmed fleet replacement plan and excessive maintenance and overtime costs
- Has not met the priority criteria for higher levels within organization
- Establishment of a sustainable funding program to institute a programmed fleet replacement plan.

Best Practices

- Organizational Assessment
- Lease-to-Purchase
- **Incentivized Alternative Fuel Programs**
- Internal Fund Program

REDUCING FLEET EMISSIONS THROUGH THE USE OF B100 BIODIESEL

Current Stats

DPWs fleet emissions have gone down almost 20% since 2010 by maximizing biofuel use

Any future large scale reductions will require a significant initiative and investment to change the fleet makeup

This will need to involve diesel engines (70% of total fuel use)

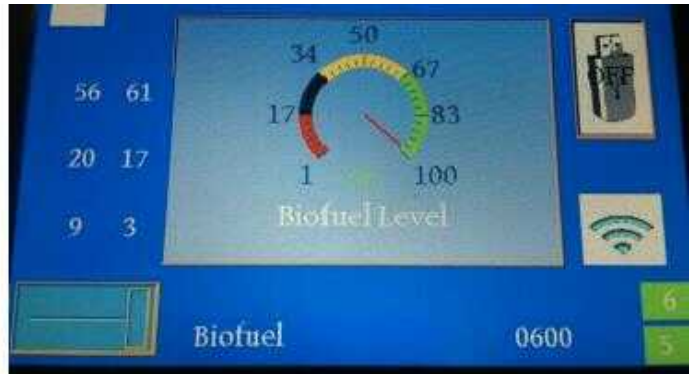
CNG will produce no net emissions reductions over existing biodiesel use (2014 DPW emissions report)

Using B100 Biodiesel

- Biodiesel blends above B20 are generally not used due to high pour point which causes it to gel in cold weather.
- Optimus technologies Vector system is the first EPA approved biofuel conversion system for medium and heavy-duty trucks.
- It allows the use of pure biodiesel (B100) through the installation of an additional fuel tank that is heated to prevent the biodiesel from gelling.

Vector System

- Starts the vehicle on diesel fuel, B5, or B20.
- Heated coolant warms the biofuel tank via exchanger
- System monitors the biofuel temp and pressure before switching to biofuel use.
- Completely automatic operation with display for driver info



Emissions Data

- Pure biodiesel (B100) reduces GHG emissions 75% on the lifecycle for every gallon of diesel displaced
- Potential GHG savings with Vector System (Source: 2015 DPW emissions update):

			Savings Against 2015 Emissions	
	Vehicles (#)	GHG Savings (Metric Tons / Year)	DPW Fleet	District Total Fleet
Optimus Pilot (Actual)	5	103	2%	0%
All DPW UDs	34	681	10%	2%
All DPW Internationals	56	318	5%	1%
All DPW Diesel Fleet	578	4,778	70%	12%

PILOT PROJECT

- Optimus has identified 5 compatible vehicles on which to install the Vector system
- DPW will test the systems for a 4-6 month period (winter months)
- Optimus will loan DPW a heated fuel tank for the duration of the pilot
- $2500 per vehicle to perform pilot
- Remainder of the system/installation cost (~$10,000) due at project completion if DPW wishes to continue the program

Washington DC Department Public Works Case Study

Washington DC has sustainability target of 50% GHG reduction by 2032 and 80% by 2050

6 refuse trucks put in service September 2018 as pilot demonstration (Cummins L9 engine)

- Displaced 17,000 gallons of petroleum diesel
- Offset 320,000 lbs. CO_2
- 85 lbs. particulate matter avoided in DPF system
- 1:1 fuel economy
- No negative operational or maintenance impact

2,500 gallon B100 tank/dispenser for pilot

Washington DC Department Public Works Case Study

May 2019

Director Chris Geldart testified to DC City Council 5/20/19 all refuse trucks moving forward to operate on B100

Dec. 2019

DPW releases first bid spec requiring Optimus B100 technology for 27 6-wheel snow removal dump trucks

- Systems to be equipped via ship-though partnership

Nov. 2019

DPW orders 17 additional Optimus systems for new refuse trucks

- Systems equipped by dealership technicians

2020

Q4 2020 - 16 additional refuse trucks to be delivered

- Systems to be equipped on factory line

Washington DC Department Public Works Case Study

- May 2020 - 12,500 gallon biodiesel tank to be installed for project expansion
  - Heated, insulated, cabinet and modular above ground tank
  - RFID technology limits refueling to only vehicle tanks equipped for B100

Federal/State Funding Availability

Federal EPA/DERA Funding

USDA High Blend Infrastructure Program

DOE

State Level Funding

VW Settlement

REG/Optimus Proposal to City of Topeka

REG/Optimus would pay all costs association with a pilot project.

Including cost to convert up to 10 vehicles

Biodiesel heated storage tank (12,000 gallons) and Dispenser ($1/year lease)

REG/Optimus/Separation by Design personnel to coordinate installation with KDOT.

City of Topeka to enter exclusive fuel supply agreement with REG to purchase biodiesel

Competitive with local #2 ULSD economics

Indexed to local #2 ULSD pricing (slight premium)

City of Topeka to enter technology agreement with Optimus.

Who else is utilizing the technology?

- Washington DC Department of Public Works
- Refuse Trucks
- City of Chicago Parks District
- Refuse Trucks
- Renewable Energy Group
- Semi / Jobber Delivery Trucks
- City of Ames
- Snowplows
- IOWA DOT
- Snowplows
- Washington DC Water
- Dump/Service Trucks
- ADM
- Semi Trucks
- Star Oil
- Combination Trucks Jobber w/Tankers