District Secretariat of Environment

Bogota´s Diesel Particulate Filters Program

BDPF

Bogotá D.C., March 2015

ALCALDIA MAYOR
DE BOGOTA D.C.
SECRETARÍA DISTRITAL DE AMBIENTE

BOGOTÁ HUMANA

Program
Schedule

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  - Local approval
  - Technical guidelines

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- Monitoring and control
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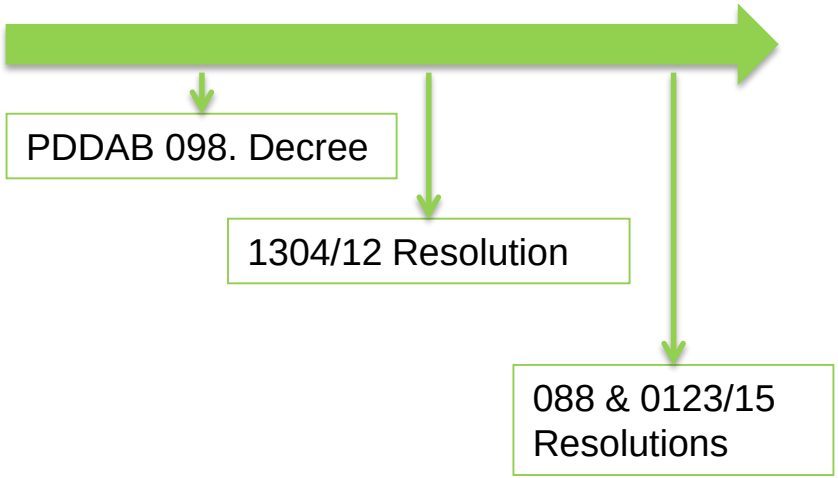
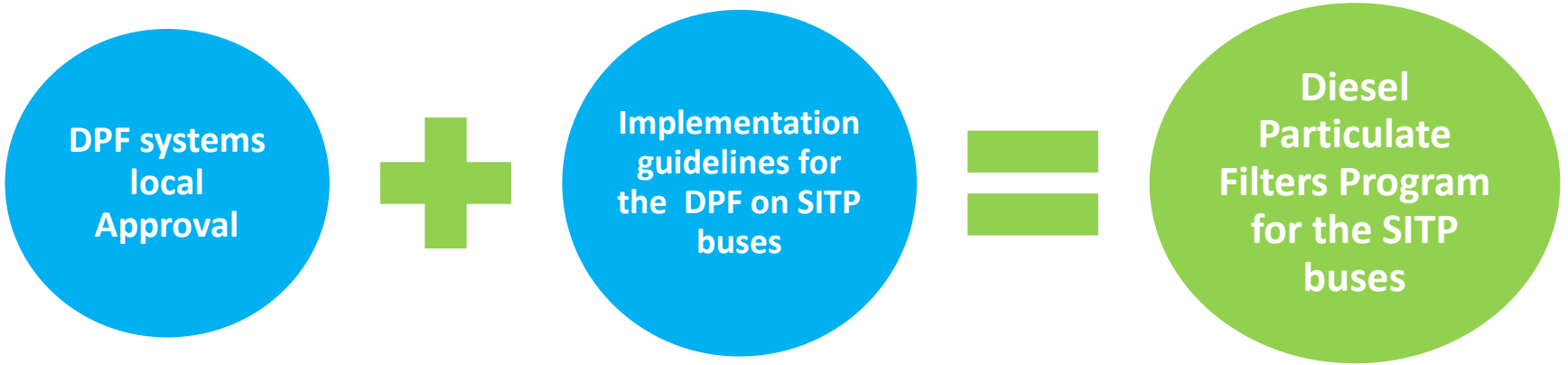


BDPF Program

Description -0123/2015 Resolution



Manufacters and local technology representatives

Monitoring and control

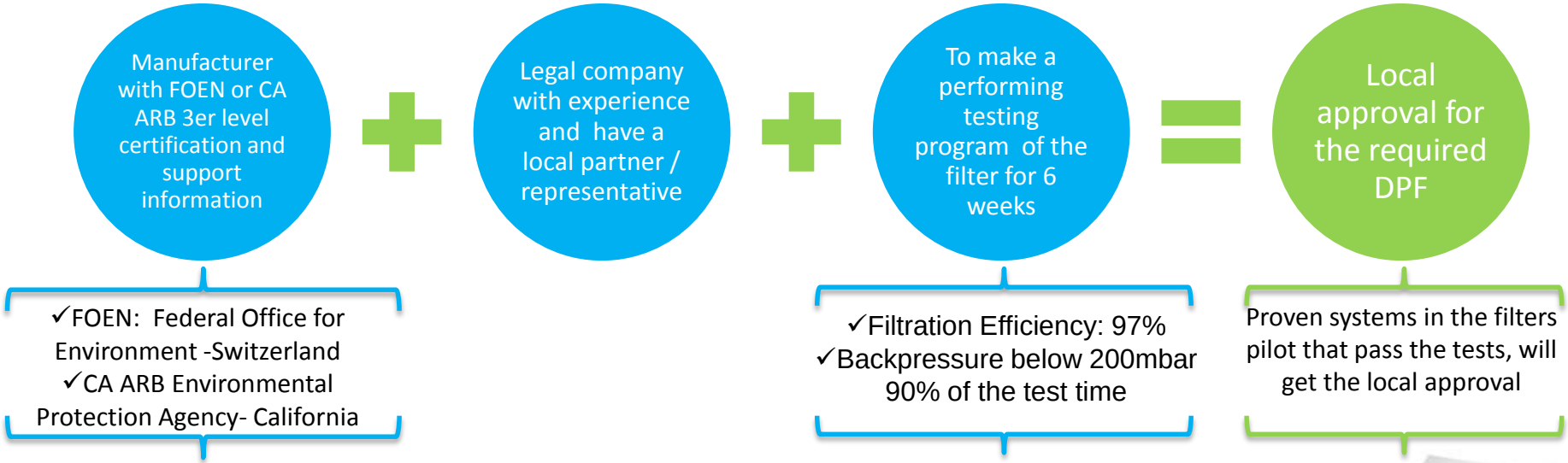
SITP Operators

Monitoring and control

Successful evaluation factors

Filters Local Approval
Next Steps

The local approval is granted to the local manufacturer/ representative of the technology that has successfully met the defined requirements by the SDA:



Approved systems will be publish on the **DPF systems approved list by the SDA** for use in Bogotá.

Application Scope
Technical Guidelines

The SITP operators in its *troncal* and *zonal* components, must install Diesel Particulate Filters to:

1. Buses whose engines do not meet the required limit emission in dynamic testing in the 2604 Mines and Energy Ministry resolution of Social and Environmental Protection, housing and Territorial Development, and
2. All **core component Buses which in December 31st of 2014 have crossed one million fifty thousand (1.050.000) kilometers or less.**

3. All zonal component buses which meet with the establish on the paragraph 1 and that **are model year equal to or higher than 2009**.

Vehicles categorized as mini bus type are excepted for the fulfillment of the current program.

Graduality
Technical Guidelines

Each operator must set the overhaul fleet size (retrofit) with DPF, according to the conditions laid down in the application scope and install the filters according to their retrofit overhaul fleet size:

Tamaño de la flota objeto de retrofit. (Cantidad de vehículos)	Componente	Plazos						
		30-sep-15	31-dic-15	31-mar-16	30-jun-16	30-sep-16	31-dic-16	31-mar-17
≤90	Troncal	100%						
Entre 91 y 180	Troncal	40%	80%	100%				
>180	Troncal	28%	56%	84%	100%			

Tamaño de la flota objeto de retrofit. (Cantidad de vehículos)	Componente	Plazos						
		30-sep-15	31-dic-15	31-mar-16	30-jun-16	30-sep-16	31-dic-16	31-mar-17
≤90	Zonal		15%	36%	100%			
Entre 91 y 180	Zonal		6%	16%	50%	85%	100%	
>180	Zonal		3%	8%	30%	53%	75%	100%

between 1.600 -2.000 buses

Emission Levels
Technical Guidelines

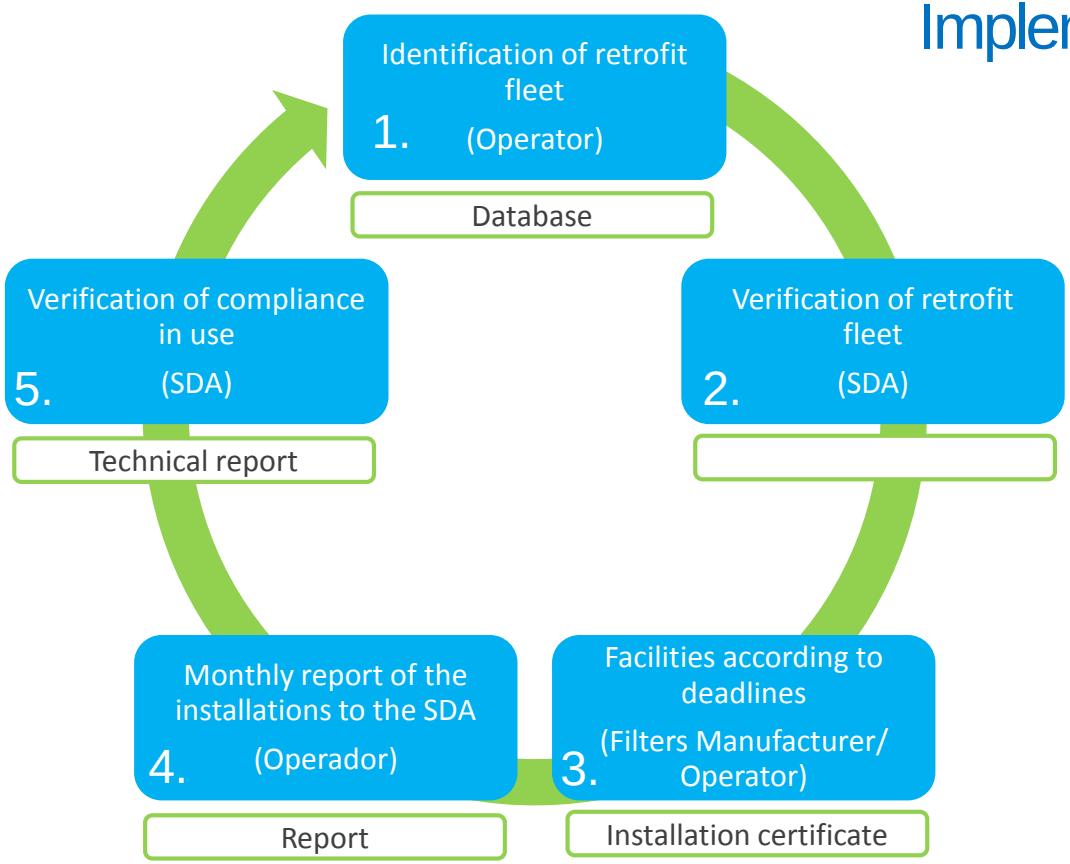
There are two CONTROL PARAMETERS limits to which the operator must comply:

1. Efficiency in the removal of number of ultra-fine particles (NP)
2. Opacity

Particulate number efficiency	97% Minimum	Concentration in (NP/cm3) before the filter against concentration (NP/cm3) after the filter.
Opacity limits	9,8% Maximum Length to = 430 mm	Or equivalent value of K light extinction coefficient = 0.24m^{-1}

Next Steps
Implementation

Step	Product
1. Identification of retrofit fleet (Operator)	Database
2. Verification of retrofit fleet (SDA)	
3. Facilities according to deadlines (Filters Manufacturer/ Operator)	Installation certificate
4. Monthly report of the installations to the SDA (Operador)	Report
5. Verification of compliance in use (SDA)	Technical report



Monitoring Mechanisms

Monitoring & Control

When Installing the Filter

Compliance in use

Manufacturer/supplier responsabilities

Instalation minutes, visual inspection, opacity before and after and filter effciency are checked.

Manufacturer loses approval

When the filter is in operation

Ramdom Control

Operator responsabilities

Document review, visual inspection, opacity limit compliance

Operator with penalty for non-compliance

Lessons learned
Problems & Solutions

1. Proper maintenance and specific city conditions:
   - The 1th CRT installed fail due to an unfavorable PM to NO_2 ratio for the vehicle
   - Pressure variation
   - High opacity
   - Refuse to use low ash lubricating oil

1.
- Strict maintenance before DPF's installation, calibration of valves, change the turbo, injectors and air filter
- ** use a FBC product

- Maintenance and De-installation of the DOC, select a bigger DOC and filter
- Change of the bus of the pilot fleet

- Developed of meetings with stakeholders

Lessons learned
Problems & Solutions

2.Delays in signing of agreements between Operator and manufacturer and communication problems	2. Developed of meetings with stakeholders
3. Fortuitous events	3. Suspend some operations until have a new bus in the pilot fleet and have the *dyno* in good conditions

Bogota as Latin-American example

Climate and Clean air

•Bogota seeks a gradual separation of fossil fuel use, looking for better bus technologies for the city: less PM emission and other pollutants, and less fuel consumption.

• Technological ascent Plan for the SITP –PAT-: 4 action lines

- ✓Bogota position as laboratory test of clean transportation technologies
- ✓Green corridor of 7th -10th avenue
- ✓Renovation of buses of the *zonal* SITP component by buses of less carbon emissions: 25 pioneer routes
- ✓Renovation of buses of *troncal* SITP component by buses of less carbon emissions