

# VERT Roadmap

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Created to eliminate particle emissions  
from internal combustion engines (ICE)  
by means of best available technology

## VERT Association Road Map

### Mission

Facilitation and boost of BAT<sup>1)</sup> to eliminate harmful substances from internal combustion engines. Efficient standards and procedures to achieve sustainable results with verified and reliable products. Focus on PN<sup>2)</sup> with effective measurements to support legislations with best cost-effectiveness.

Verification of technical equipment and products. Global recognition of these products.  
(e.g. filter listing)

Collaboration with institutes and public authorities to develop efficient rules to minimize emissions.

Development of markets for BAT suppliers. Introduction of technologies and quality control concepts

Raising of awareness in general public thru pilot projects, public statements and high reputation in technical competence

Broad industrial membership of OEMs, engines, systems and technology suppliers. Vital international network which covers a broad range of technologies from medicine to aerosol physics to comprise intensive knowledge exchange.

# VERT Association Road Map

VERT Support for legislation with BAT

**Present**

**China, Bogotá,  
Tehran, Tel Aviv...**  
Demonstration of DPF  
efficiency, pilot tests, public  
authority support,  
guidelines for Air Quality



**Euro 6**  
Regulation bei PN



**Chile**

DPF regulation for Euro III  
buses



**USA/California**

CARB Show Case  
New York City

**Switzerland**  
PM Legislation for  
construction equipment



**Past**

## VERT ww recognition

Switzerland: BAFU, SUVA, ASTRA  
Austria: AUVA; Tyrol construction  
Germany: BG Bau; UBA; TRGS 554  
USA: MSHA; NY City; CARB partly  
Netherlands: VROM  
Italy: alto Adige  
Canada: Mining  
UK: London TFL and LEZ  
Denmark: for all applications  
Chile: Santiago Bus, Gensets  
China: Hong Kong busses; Beijing  
UN-ECE

## VERT Influences on International Legislation

- **2002:** CARB -support of VERT -retrofit show case in California leads to a filter legislation
- **2005:** retrofit legislation for Euro1+2 buses in Santiago de Chile
- **2006:** EU adopted VERT principles for solid particle number - PMP-Protocol
- **2007:** EU introduces PN-Limit for LDV
- **2008:** retrofit Euro 3 buses in Santiago de Chile
- **2009:** EU introduces PN-Limit for HDV
- **2010:** UNECE-GRPE starts Working Group for on-road and off-road retrofit
- **2011:** EU parliament decides for PN for NRMM
- **2014:** PN limits in the Iranian Diesel Engine legislation

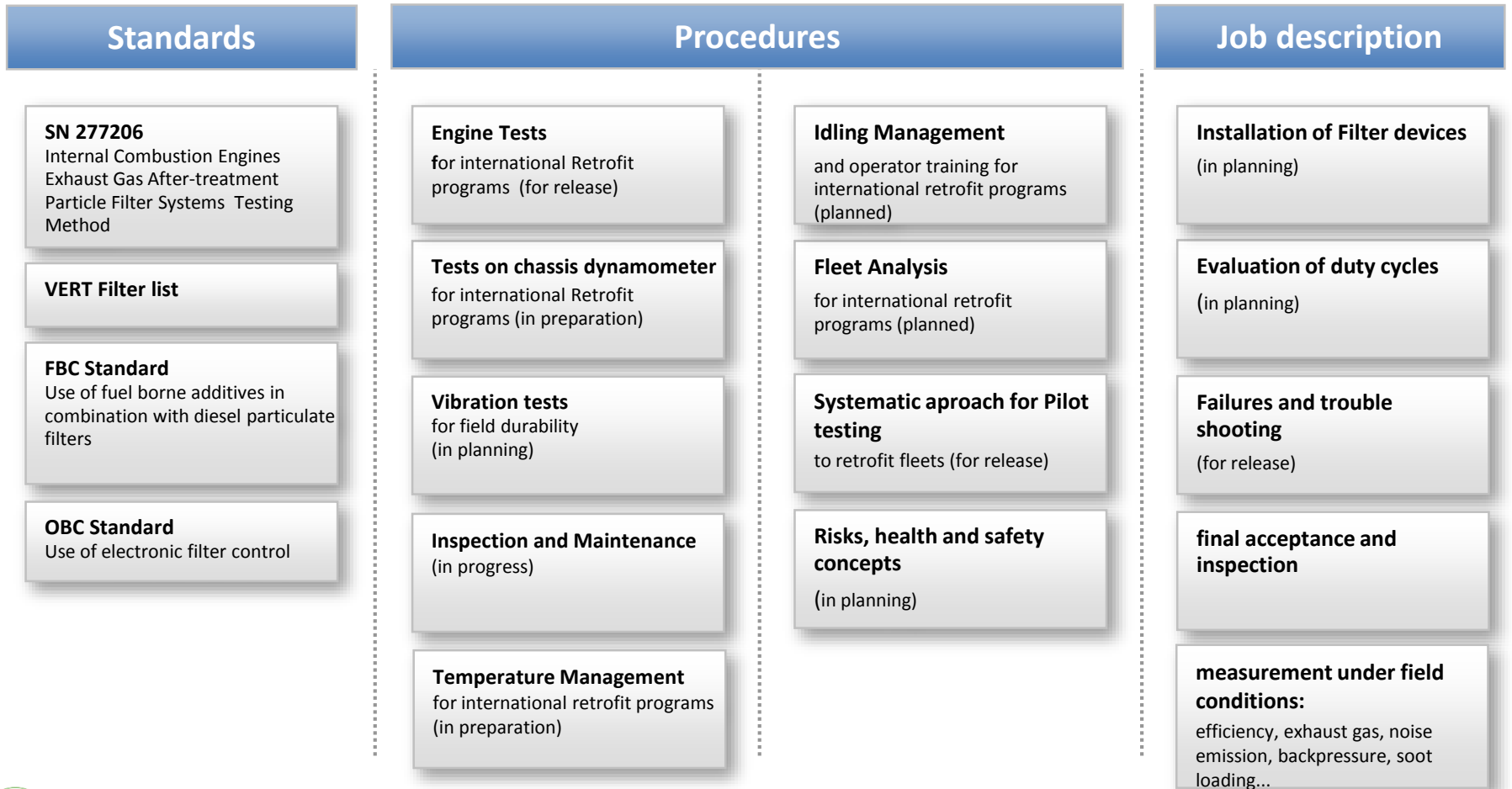
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*EU= European Union | PMP= Particle number Measurement Protocol | PN= Particle number | HDV= Heavy Duty Vehicle | LDV= Light Duty Vehicles  
UNECE = United Nations Economic commission for Europe | GRPE= Working Party on Pollution and Energy / CARB= California Air Research Board*

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## Work on Standards and procedures



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## New Application fields

VERT will take his role and experience in technology and execution of retrofit programs to reduce emission from all engine driven sources, e.g. marine application



## BAT für First Fit

Fast adaption is need from European technology to local conditions in countries with hughe pollution problems like India, China, Latin America ...  
Challenges are: high altitude, high sulfur in diesel, low maintenance support,

## DPF-Diesel Retrofit

Enforce retrofit programs in emerging markets to support faster emission reduction products, especially n Megacites in Iran, Israel, Mexico ...

## Gasoline Engines

Roll out standards in interantional legislation  
Internationalisation of VERT test centres  
Start VERT support offices  
Introduction of Safety features  
Particle filtration for gasoline engines  
Research for basic emission technologies

## NPTI and Aftersale

The pioneer work of VERT between 1993-2007 was the basis for PN limints and the introduction in the legislation. It turned in more then 100 Mio sold particle filters. It is now time to enforce the right periodical inspection to secure the efficiency over live time.

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## ○ Conclusion

**Supporting and initiating pollution reduction programs in Mega Cities**

**Enforcement of BAT** – Health research, technology, Inspection

**Need of broad membership** of system and component suppliers, equipment and engine manufacturers, measurement device manufacturers

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