



Schweizerische Eidgenossenschaft
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Swiss Confederation

Federal Department of the Environment,
Transport, Energy and Communications DETEC

Federal Office for the Environment FOEN
Air Pollution Control Division

Swiss, European and Joint Efforts to Prevent Ultrafine Particle Emissions

20th ETH-Conference, June 14th 2016

Giovanni D'Urbano

Swiss Federal Office for the Environment (FOEN)



Two Key Principles of Environmental Protection in Switzerland

Polluter pays principle:

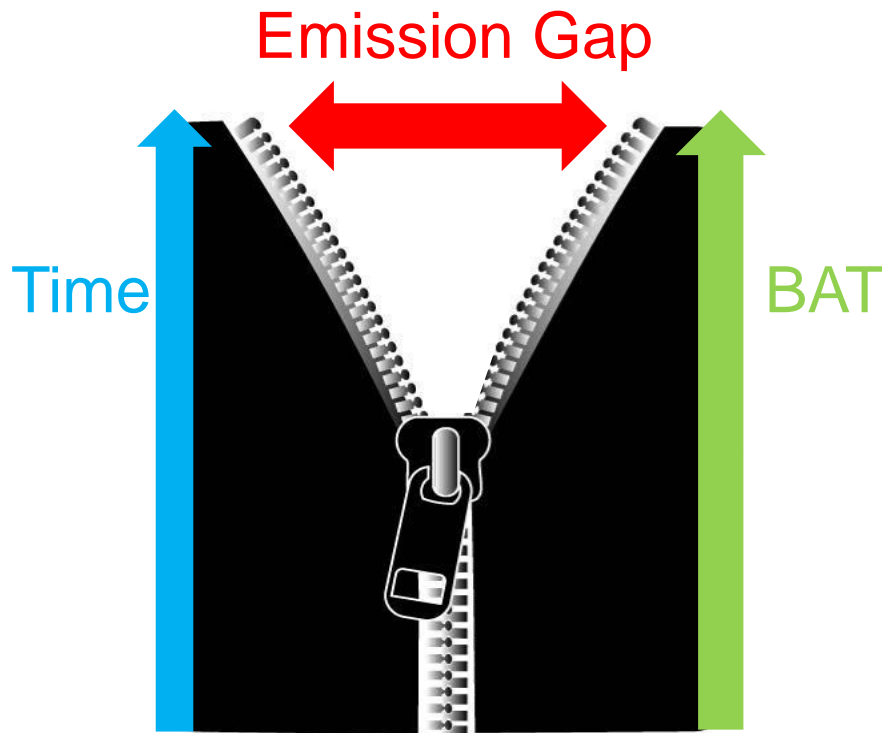
Anyone who causes measures to be taken under the provisions of this law shall bear the costs.

Precautionary principle:

Irrespective of existing pollution, emissions shall be limited by early preventive measures as much as technology and operating conditions will allow, provided that this is economically acceptable.



Swiss Environmental Legislation calls for Best Available Technology!



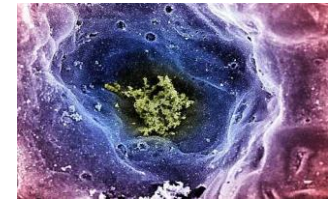
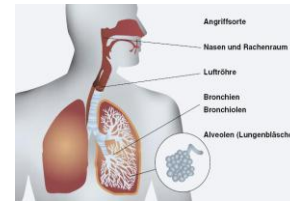
The Federal Council stipulates by ordinance the **air quality and emission limit values** for assessing harmful effects or nuisances.
→ Ordinance on Air Pollution Control ([OAPC](#))



Diesel Soot as Carcinogen

International Agency for Research on Cancer (IARC) classified diesel engine exhaust as **carcinogenic to humans (12 June 2012)**.

Diesel soot is classified as carcinogen in the Swiss Ordinance on Air Pollution Control (OAPC) since 1998.



Emissions of carcinogens as diesel soot **have to be minimized** (imperative to minimize) using the best available technology.

Main sources:

On- and non-road diesel engines.



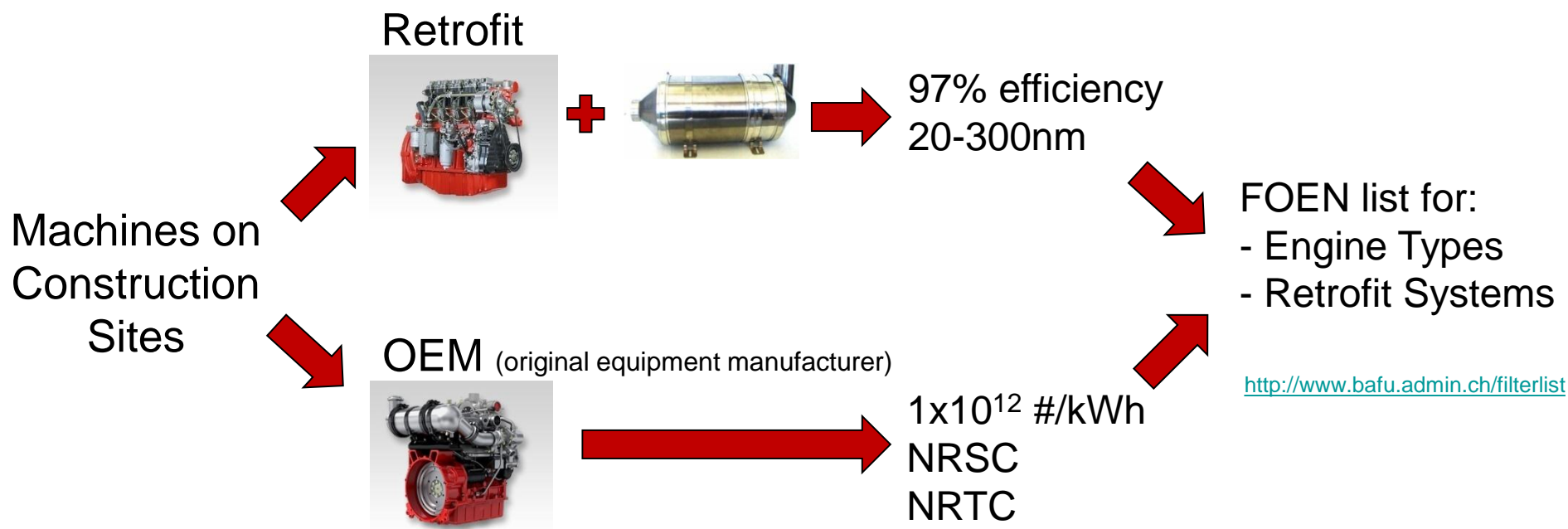


VERT Project – Pioneer Phase in DPF-Retrofit of Construction Machines



1994: Start of a pilot and research project of Suva, together with FOEN and accident insurances of Germany and Austria.

Swiss Air Pollution Control Requirements for Construction Machinery - From Retrofit to OEM



Particle Number (PN) Testing to Date:

10 accredited (ISO/IEC 17025) testing laboratories recognised by FOEN.
98 engine families (927 engine types) covering 21 to 446 kW.



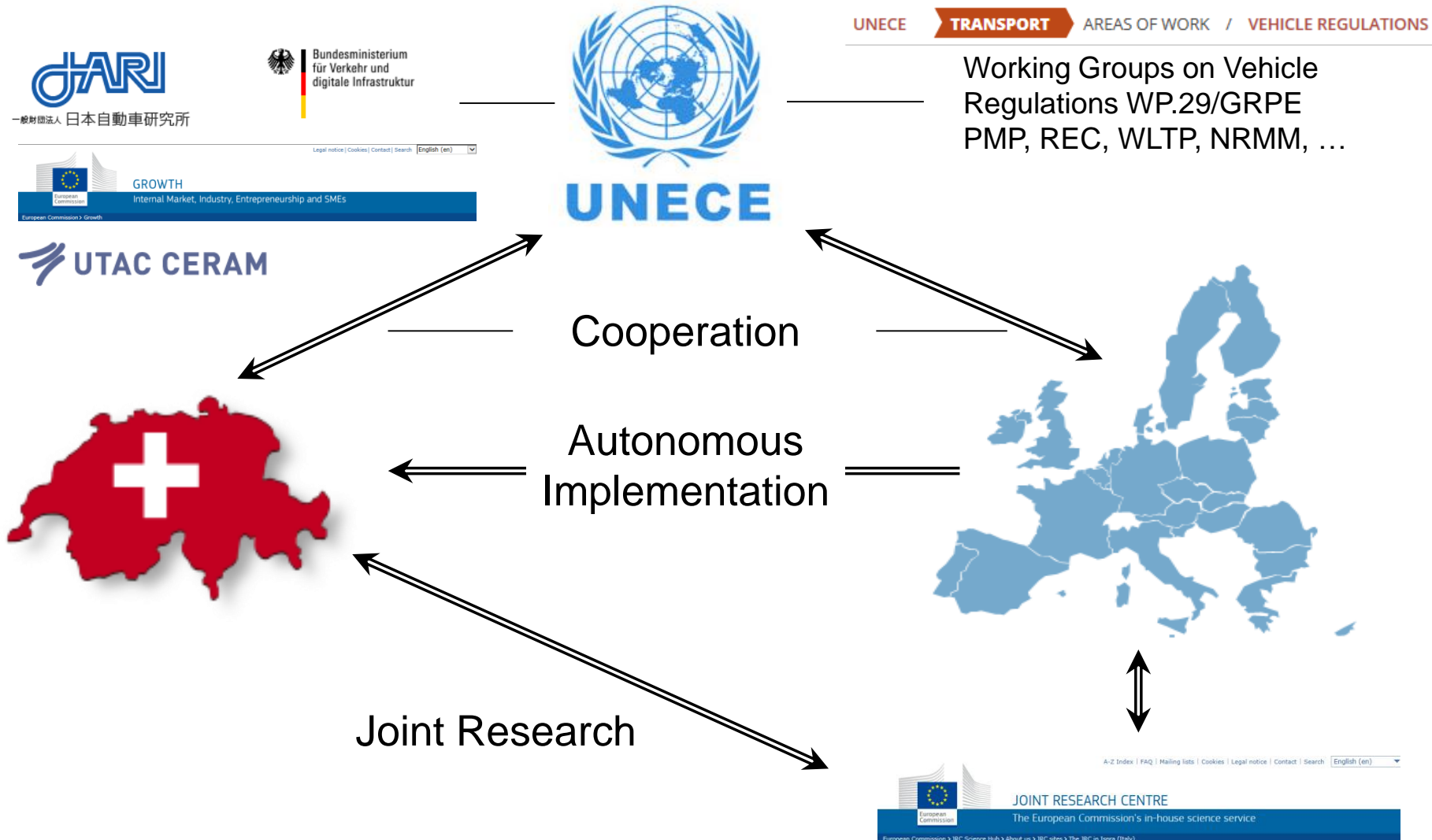
Action Plan 2006: Measures

For several diesel source categories (passenger cars, buses of public transport, construction machinery, ships, locomotives, heavy duty vehicles) solutions to limit diesel particle emissions with efficient filters are already implemented or envisaged.



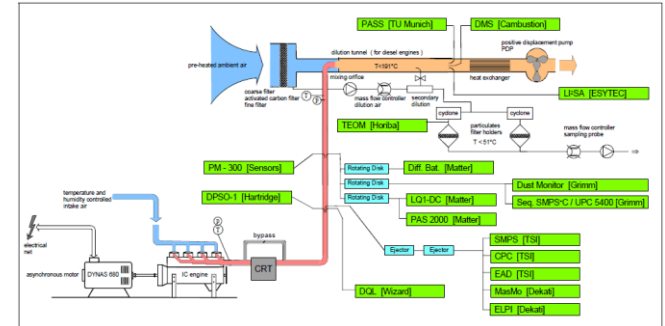


Cooperation and Harmonization



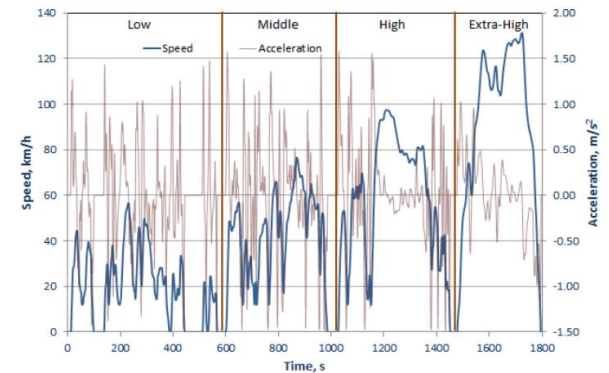


Heavy duty (Euro VI) and non-road (Stage V)



Source: EMPA

Motorcycles



20th ETH Conference | Key speech
Giovanni D'Urbano, FOEN



Future Harmonization with EU Stage V

Land-based NRMM (CI <56kW & Engines >56kW)



CI engines < 56kW & Engines >56kW		Directive 97/68						New NRMM proposal					
emissions in g/kWh		Stage	CO	NOx	HC	PM	PN	CO	NOx	HC	PM	PN	A
CI engines 0 - 8 kW	variable & constant	-	-	-	-	-	-	8	7,5	0,4/0,6	-	-	1,1
CI engines 8 - 19 kW	variable & constant	-	-	-	-	-	-	6,6	7,5	0,4	0,4	1x10 ⁻¹²	1,1
CI engines 19 - 37 kW	variable & constant	IIIA	5,5	7,5	0,6	-	-	5,0	4,7	0,05	0,05	1x10 ⁻¹²	1,1
CI engines 37 - 56 kW	variable	IIIB	5,0	4,7	0,025	-	-	5,0	4,7	0,05	0,05	1x10 ⁻¹²	1,1
	constant	IIIA	5,0	4,7	0,4	-	-	5,0	4,7	0,05	0,05	1x10 ⁻¹²	1,1
Engines 56 - 130 kW	variable	IV	5,0	0,4	0,19	0,025	-	5,0	0,4	0,19	0,05	1x10 ⁻¹²	1,1
Engines 56-75 kW	constant	IV	5,0	0,4	0,19	0,025	-	5,0	0,4	0,19	0,05	1x10 ⁻¹²	1,1
Engines 75 - 130 kW		IIIA	5,0	4,7	0,4	-	-	5,0	0,4	0,19	0,05	1x10 ⁻¹²	1,1
Engines 130 - 560 kW	variable	IV	3,5	0,4	0,19	0,025	-	3,5	0,4	0,19	0,05	1x10 ⁻¹²	1,1
	constant	IIIA	3,5	4,0	0,2	-	-	3,5	0,4	0,19	0,05	1x10 ⁻¹²	1,1
Engines P > 560 kW	variable & constant - Gen-Sets	-	-	-	-	-	-	3,5	0,67	0,19	0,035	-	6,0
	variable & constant - others	-	-	-	-	-	-	3,5	3,5	0,19	0,045	-	6,0

Internal market,
Industry,
Entrepreneurship
and SMEs

Limit values in line with US legislation

Limit values more stringent than US legislation



*Thank you for your kind attention
and we wish you all a fruitful and
successful conference.*



In case of questions:



Giovanni D'Urbano

Head of section

Swiss Federal Office for the Environment FOEN

Air Pollution Control and Chemicals Division

Traffic Section

E-Mail: giovanni.durbano@bafu.admin.ch

Phone: +41 58 422 93 40