

# MARKET SURVEILLANCE OF VEHICLE EMISSIONS: BEST-PRACTICE EXAMPLES WITH RESPECT TO THE EUROPEAN COMMISSION'S PROPOSED TYPE-APPROVAL FRAMEWORK REGULATION

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## BACKGROUND

The purpose of vehicle emission standards is to limit the amount of pollutants present in vehicle exhaust. Over recent decades, increasingly stringent emission standards have been enacted in all major world vehicle markets, radically reducing the amount of air pollution legally permitted to occur as a result of operating motor vehicles of all types. Vehicles sold in those markets are required to demonstrate that they comply with the applicable standard by passing a certification test, a procedure known in Europe as type approval.

But studies have documented significant and growing discrepancies between the amount of pollutants detected in vehicle exhaust during type-approval tests and the amount that the vehicle emits in “real-world” operation—on the road, during normal driving.<sup>1</sup> Some difference between laboratory test results and on-road performance is unavoidable, because laboratory conditions can never replicate actual conditions. However, too great a gap signals the presence of a systemic problem, such as the unanticipated but consistent failure of emission-control system components, or a deliberate attempt to cheat the certification tests. Whatever the cause, excessive in-use emissions from vehicles mean that public health is less protected, and a persistent

disparity between official and real adherence to the regulatory standard can erode public trust in both vehicle manufacturers and government. Thus, ensuring that vehicle emissions comply with pollutant limits throughout the vehicles' normal useful life and under normal operating conditions as well as on the certification test is critical to environmental policy for the transportation sector. An indispensable element of any system designed to achieve that aim is an in-use vehicle compliance program.

Any such program has, by definition, two aspects: **In-service conformity (ISC) testing** and **market surveillance**. Under the current vehicle emission regulatory framework in the European Union (EU):

» **ISC testing** refers to testing carried out by manufacturers on in-use vehicles and components to verify compliance to type-approval procedures. It is required of vehicle manufacturers throughout a vehicle's lifetime (in the United States, this is referred to as an *in-use verification program/in-use confirmatory program*, or sometimes *in-use test*). The ISC testing for light-duty vehicles (LDVs) in the EU essentially duplicates the tailpipe exhaust emission test conducted during type approval with the vehicle running on a chassis dynamometer in an emissions-testing laboratory. In 2017, the European Commission plans to bring forward a regulatory proposal that would additionally require ISC testing of LDVs in operation on the road, incorporating real-driving emissions (RDE) testing with portable emissions

<sup>1</sup> See, for example, Franco, V., Posada Sánchez, F., German, J., & Mock, P. (2014). Real-world exhaust emissions from modern diesel cars. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicct.org/real-world-exhaust-emissions-modern-diesel-cars>

measurement systems (PEMS).<sup>2</sup> For heavy-duty vehicles (HDVs), on-road ISC testing using PEMS became mandatory with the introduction of the Euro VI standard in 2013/2014.

» **Market surveillance** refers to independent verification testing and inspection carried out by regulatory authorities on in-use vehicles and components to determine whether they continue to comply with exhaust emissions standards (in the U.S., this is referred to as *in-use surveillance testing/in-use confirmatory testing or in-use surveillance*).<sup>3</sup> For purposes of market surveillance, regulators need not be bound only to repeat the test procedure used for type approval, but could put a vehicle through other tests not specified in advance, either in the laboratory (e.g., running the vehicle over alternate driving cycles) or on the road. The current EU type-approval framework does not require any regulatory authority to carry out market surveillance. Most EU member states only audit the ISC process, data, and results and decide if the ISC is satisfactory or if further information is needed from the manufacturer. Some EU member states, including Germany, the Netherlands, Sweden, and the United Kingdom, have monitored in-use vehicle compliance through testing. And in the aftermath of “dieseldgate,” a number of EU member states, including France, Germany, and the United Kingdom, have initiated or reinitiated market surveillance testing programs.

On January 27, 2016, the European Commission (EC) proposed a new motor vehicle type-approval framework that will, if adopted, make fundamental and far-reaching changes to the existing Framework Directive (Directive 2007/46/EC).<sup>4</sup> Among other improvements, the proposal requires EU member states to establish market surveillance programs.

On September 14, 2016, the European Parliament published suggested amendments to the proposal.<sup>5</sup> On May 29, 2017, the Council of the European Union proposed their amended proposal.<sup>6</sup> Negotiations on the draft are ongoing between these three EU bodies, with a final version expected in late 2017.

This position brief evaluates the Commission’s version of the proposed EU type-approval framework (hereafter referred to as *proposed framework*), where it relates to market surveillance activities, and proposes specific ways in which it could be strengthened.

## MARKET SURVEILLANCE ELEMENTS OF THE TYPE-APPROVAL FRAMEWORK PROPOSAL

The proposed framework would mandate the use of market surveillance with the aim of strengthening the EU’s in-use vehicle compliance program. There are four elements of the proposal that pertain to market surveillance.

(1) *The proposed framework would require EU member states to perform market surveillance testing of vehicles.* The Commission would retain the authority to determine the scale, scope, and frequency (e.g., number of vehicles, number of test points over the useful life of a typical vehicle, means of obtaining vehicles to be tested) of the market surveillance testing that member states would be required to conduct. This implies that the market surveillance required could cover both new and registered in-use vehicles and engines. Furthermore, the Commission itself would be empowered under the proposed framework, for the first time, to organize and carry out market surveillance tests of vehicles.

2 As part of the 4th package of the RDE testing framework. For details, refer to Mock, P. (2017). Real-Driving Emissions test procedure for exhaust gas pollutant emissions of cars and light commercial vehicles in Europe. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicct.org/RDE-test-procedure-exhaust-gas-pollutant-emissions-cars-and-LCVs>

3 Note that third parties can also conduct random independent testing of in-use vehicles to hold governments and manufacturers accountable, but this briefing focuses on market surveillance by governments.

4 Franco, V. (2016). Proposed new type-approval system for motor vehicles in the European Union. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicct.org/proposed-new-type-approval-framework-eu-policy-update>

5 European Parliament, Committee on the Internal Market and Consumer Protection. (2016). Draft report on the proposal for a regulation of the European Parliament and of the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (COM (2016)0031 – C8-0015/2016 – 2016/0014 (COD)). Retrieved from [http://www.europarl.europa.eu/RegData/commissions/imco/projet\\_rapport/2016/585750/IMCO\\_PR\(2016\)585750\\_EN.pdf](http://www.europarl.europa.eu/RegData/commissions/imco/projet_rapport/2016/585750/IMCO_PR(2016)585750_EN.pdf)

6 Council of the European Union. (2017). Proposal for a regulation of the European Parliament and of the Council on the approval and market surveillance of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles (9272/17). Retrieved from <http://data.consilium.europa.eu/doc/document/ST-9272-2017-INIT/en/pdf>

(2) *The proposed framework would grant EU member states the authority to take measures against noncompliant vehicles sold in their own markets.* Under the existing framework, only the type-approval authority that certified a vehicle as complying with the exhaust emissions standard can force a recall or impose fines or take other action against a manufacturer if the vehicle is later shown to be noncompliant. For example, in 2016, the German Ministry of Transportation tested 5 vehicles from Fiat and concluded that Fiat had used an illegal defeat device. The device reduces the effectiveness of the emissions-control system of a specific vehicle model 22 minutes after the engine is turned on, resulting in a 9–15 times increase in nitrogen oxide (NOx) emissions.<sup>7</sup> Fiat’s vehicles are type-approved by the authority in Italy, who denied there was any wrongdoing. The only recourse left to the German authorities was to notify the European Commission and request that they launch infringement action against Italy. Under the proposed framework, the German government would be able to stop sales of that vehicle within its borders, recall vehicles already on the road, and/or impose financial penalties. In addition, the proposal would empower the Commission to require corrective action and/or impose fines for noncompliance discovered through its market surveillance tests.

(3) *The proposed framework would create an EU-wide advisory body called the Forum for Exchange of Information on Enforcement.* The purpose of this body would be to promote cooperation among national regulatory authorities with regard to market surveillance. Specifically, this body would act as a forum by which to exchange information, develop working methods and tools for market surveillance, evaluate harmonized projects, discuss penalties, and collaborate on joint inspections. Members of the advisory body would be appointed by the EU member states.

(4) *The proposed framework would require the EU member states to establish a national fee levied on the manufacturers that would cover the costs of market surveillance activities.* In addition to market surveillance activities, the fee would also

cover the cost of type approvals, including testing and inspections to be carried out by the technical services, in an attempt to break the financial bond between the manufacturers and the technical services. The national fee structure would also cover market surveillance testing and inspections to be carried out by the Commission.

## EVALUATING THE PROPOSED EU MARKET-SURVEILLANCE PROGRAM

The above changes in the proposed framework are critical steps to introducing mandatory market surveillance. However, the relevant provisions define few details of a market-surveillance program, so, in practice, implementation could vary widely across the member states. Because it is important to ensure a level playing field for all vehicle manufacturers, regardless of where their vehicles are type approved, the market surveillance requirements in any new type-approval framework should be explicit enough to ensure a full and comparable implementation in all member states.

Figure 1 summarizes notable weaknesses in the proposed framework, as it relates to market surveillance, as well as suggested improvements that could heighten its effectiveness. These suggested improvements, which are based on a set of compliance and enforcement best practices developed by the ICCT (see Appendix I), are discussed in more detail below.

### 1. Implement fleet screening to identify potentially noncompliant vehicle models

Under the current framework, neither the European Commission nor the EU member states have established systematic information sources to identify potential high emitting in-use vehicles—that is, to screen the vehicle fleet for potentially noncompliant vehicles. The proposed framework does not mandate any improvements in this area.

A number of screening methods exist. These include emissions warranty reports, emissions system defect reports, inspection and maintenance (I/M) program data, on-board diagnostic (OBD) system records, remote sensing (or other nonintrusive emissions measurements), and consumer complaint records. Table 1 identifies requirements and practices under the current framework and lists areas for improvement.

7 Campbell, P. (2016, May 23). Fiat hits back at German transport body over emissions tests. Retrieved from <https://www.ft.com/content/dc9e10d4-20fb-11e6-9d4d-c11776a5124d?mhq5j=e1>

Current challenge	Suggested improvement	Responsible party	
		ISC (vehicle manufacturer)	Market surveillance (Regulatory agency)
No systematic information source to identify potentially high emitting in-use vehicles	Require member states to set minimum emission warranty and collect warranty-based emission defect reports Require member states to set up permanent remote-sensing measurement campaigns in major cities Require or encourage member states to leverage multiple in-use emission data sources for analysis	Collect information and submit reports	Regulatory agency to collect, review, and analyze information and data
Lack of detailed market surveillance test scale and protocol	Specify minimum market surveillance testing requirement: test scale and detailed test protocol Market surveillance testing of in-use vehicles for up to 160,000 km	Ensure emission control durability	Have experts design test, review results, and communicate with vehicle manufacturers
Challenging to determine compliance failure and initiate corrective actions	Simplify decision procedure for market surveillance tests Clarify decisions that trigger remedial measures Require member states to record test process and results and share across member state and Commission	Ensure conformity	Test to verify in-use compliance or detect defeat device; share results across regulatory entities
Insecure budget to carry out market surveillance testing	Require member states to levy tax/fee on vehicle sold in their markets to fund market surveillance programs Break financial link between OEM and technical services	Manufacturers share the cost burden	Collect and allocate tax/fee to support surveillance activities
Lack of power to take actions against noncompliant vehicles across the EU	Allow noncompliant vehicle identified by one EU member state to be deemed noncompliant in all member states Empower the Commission to take integrated actions against non-compliant vehicles across the EU		Take actions against noncompliance identified by other member states

**Figure 1.** Compliance and enforcement in the EU vehicle emission type-approval framework

To establish information channels aimed at identification of potential noncompliance with emission standards, several improvements could be made to the proposed framework.

The framework should include the adoption of a mandatory warranty program for vehicle emissions-control systems. The regulatory authorities of EU member states would ideally mandate manufacturers to provide such a warranty. In addition, the authorities should be authorized to collect defect reports, based on emission warranty records, from manufacturers. China, South Korea, and the U.S. all have emissions-control warranty programs, as summarized in Table 2. Such a program would allow the European Commission and the EU member states to identify vehicles with potentially defective emission controls. Ideally, a defect-reporting

program would require a recall or other remedial action whenever the reported number of warranty claims exceeds a specified threshold, as is currently being done in South Korea.<sup>8</sup> This avoids extended negotiations between the vehicle manufacturer and government officials and the need to perform time-consuming market surveillance testing to verify noncompliance. Defect reporting programs can be operated at low cost to the regulatory agencies and can also help manufacturers identify emission-control parts with high failure rates. Manufacturers can be given the opportunity to carry out corrective actions voluntarily.

8 Cackette, T. (2016). Improving emission standards compliance with a defect reporting system for in-use passenger vehicles. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicc.org/compliance-defect-reporting-system-for-in-use-PVs>

**Table 1.** Potential screening practices and issues in EU

Screening method	Practices under current framework	Issue
Warranty/ defect report	Manufacturers are not required to provide a warranty for vehicle emission controls, or to regularly report emissions-related warranty and repair claims or emission defects. <sup>9</sup> The type-approval authority can access vehicle warranty data.	In the absence of a mandatory defect/warranty reporting system, it is difficult and expensive for regulatory agencies to build up a comprehensive in-use vehicle database.
I/M and OBD	There are I/M programs, commonly referred to as periodic technical inspections, in all EU member states, as well as OBD requirements to store and report in-use performance.	The I/M programs and OBD information are used only to identify and diagnose specific issues of individual vehicles. The data collected by these programs are not combined to identify larger scale compliance issues.
Remote sensing	Remote-sensing programs have been carried out in some cities. For example, London is carrying out a pilot remote sensing program for city buses and taxis to supplement its I/M program. <sup>10</sup> Austria has run a remote-sensing project to check in-use emission of city buses. <sup>11</sup>	The practice of remote sensing is not widespread in the EU, and data generated from these programs have not been used for identifying potential OEM compliance issues.

**Table 2.** Warranty coverage in China, South Korea, California (U.S.), and the rest of the U.S. for LDVs<sup>12</sup>

Region	Emission warranty coverage	Emission-related repair	Warranty for listed parts
China	Gasoline		3 years/60,000 km
	Diesel LDV (proposed)		5 years/80,000 km
	Diesel HDV (proposed)		5 years/160,000 km
South Korea	Gasoline LDV		15 years/240,000 km
	Diesel LDV <sup>a</sup>		10 years/160,000 km
	Gasoline HDV		2 years/160,000 km
California and 13 states <sup>b</sup>	LDV and medium-duty vehicle and engine	3 years/50,000 miles	7 years/70,000 miles <sup>c</sup> (Cover a few dozen parts)
	Gasoline HDV		5 years/50,000 miles
	Diesel HDV		5 years/100,000 miles
Rest of the U.S.	LDV and medium-duty vehicle and engine	2 years/24,000 miles <sup>d</sup>	8 years/80,000 miles <sup>c</sup> (Cover 3 parts)

<sup>a</sup> South Korea has a complicated warranty requirement for diesel HDVs that is not listed here.<sup>13</sup>

<sup>b</sup> Arizona, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington.

<sup>c</sup> Definition of major parts varies by regions. California's warranty covers any emission-control parts above \$600, including hardware and labor costs, and the list varies by manufacturer (the warranty typically covers a few dozen parts). U.S. EPA's warranty covers the catalyst, engine control computer, and OBD.

<sup>d</sup> 2 years or 24,000 miles, whichever comes first.

9 Only manufacturers with annual sales below 5,000 across the EU provide the type-approval authority with a report of any emissions related warranty and repair claims and OBD faults, because they are not obligated to conduct ISC tests.

10 Carslaw, D. (2014, June). Recent findings from comprehensive vehicle emission remote sensing measurements. MRC-PHE Centre for Environment & Health. Retrieved from [https://www.londonair.org.uk/london/asp/LAQNSeminar/pdf/June2014/David\\_Carslaw\\_Recent\\_findings\\_from\\_comprehensive\\_vehicle\\_emission\\_remote\\_sensing\\_measurements.pdf](https://www.londonair.org.uk/london/asp/LAQNSeminar/pdf/June2014/David_Carslaw_Recent_findings_from_comprehensive_vehicle_emission_remote_sensing_measurements.pdf)

11 de la Fuente, J., López, M., & Toudert, J. (2014). Real emissions from the city and public bus fleets in Graz. 20th International Transport and Air Pollution Conference 2014.

12 Yang, Z., Bandivadekar, A., & Muncrief, R. (2017). Global baseline assessment of compliance and enforcement programs for vehicle emissions and energy efficiency. Washington, D.C.: International Council on Clean Transportation (in production).

13 Ministry of Environment (MOE). (2016). Enhancement of management of vehicle exhaust flaws correction. Retrieved from <http://www.me.go.kr/home/web/board/read.do?boardMasterId=1&boardId=639250&menuId=286>

The proposed framework would ideally require EU member states to build up databases of in-use vehicle emission defects and emissions performance and use these data to determine which vehicle models are tested as part of their market surveillance work. Member states should leverage multiple data sources to monitor all regulated pollutants from as large a sample of the in-use fleet as possible. These databases should be shared with the European Commission and other member states.

## 2. Specify market surveillance testing scale and protocol

The proposed regulatory framework requires the market-surveillance authorities, which would be appointed by each member state, to perform checks “on an adequate scale, by means of documentary checks and real-drive and laboratory tests.” But it does not clearly define “adequate scale,” nor does it specify how many vehicles and engines should be tested per year in addition to the documentary checks (i.e., review ISC testing results reported by manufacturers).

Moreover, the proposed framework does not provide detailed guidance regarding how to carry out the tests in order to generate solid evidence to prove compliance or noncompliance of the vehicle. After Volkswagen’s use of a defeat device was exposed in the U.S. in 2015, a series of defeat-device testing campaigns in EU member states highlighted the consequences of weak testing protocol: the in-use testing protocols carried out by France, Germany, and the United Kingdom could suffice as screening tests to identify likely offenders, but not to conclusively either demonstrate or rule out the presence of a defeat device.<sup>14</sup>

The framework should specify the percentage of vehicles and engines that should be tested per year. For reference, the U.S. regulatory agency tests 25 to 33 in-use vehicles types (at least 3 vehicles per type).<sup>15</sup> Note that the U.S. regulatory agency also tests 15% of new LDVs of all test groups every year. South Korea tests about 30–40 in-use vehicle types (3 to 4 vehicles per type) every year.

The revised type-approval framework should require EU member states to carry out market surveillance

testing to identify issues that can be detected through replicating the type-approval tests (e.g., defective or worn-out components and failed conformity of production) as well as issues that can only be detected through testing whose specifics are not revealed to manufacturers (e.g., the presence of a defeat device).

The framework should also require EU member states to test in-use vehicles up to 160,000 km in order to verify the durability of the emissions-control system during the vehicle’s useful life. The current regulation includes a durability provision that requires vehicles to comply with all emission standards during a useful life of 160,000 km. However, under the current regulation, ISC testing (conducted by manufacturers) does not require testing of vehicles with over 100,000 km. In lieu of testing, emission-control system durability from 100,000–160,000 km is estimated using data from test bench aging.

## 3. Clarify the threshold for failure and requirements for remedial actions

The proposed framework requires EU member states to conduct market surveillance tests, but does not specify how to determine when a vehicle fails the market surveillance test and what will trigger remedial actions and potential penalties.

Under the current framework, the regulatory authority can only make a conclusion of failure based on statistical methodology required in the existing ISC testing procedure, which, as mentioned above, is different from market surveillance testing. To legally determine a compliance failure under ISC testing guidelines, a regulatory authority may be required to test up to 20 vehicles. Such a testing program is expensive, and, to date, no EU member state has successfully used this approach to determine an ISC failure. In addition, under the current regulation, even if compliance failure is legally determined, this does not necessarily trigger remedial actions.

The proposed framework would ideally implement streamlined guidance for regulatory authorities to determine failure of a market surveillance test. In contrast to the EU, agencies in South Korea and the U.S. have determined noncompliance and have made recall decisions based their testing results. A comparison of how noncompliance determination is reached in South Korea, the U.S., and the EU is shown in Table 3. South Korea and the U.S. require testing of fewer vehicles

<sup>14</sup> Muncrief, R. (2016). Defeat device testing in the EU: So far, not so good. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicct.org/blogs/staff/defeat-device-testing-eu-so-far-not-so-good>.

<sup>15</sup> Based on test numbers in 2012 and 2013.

**Table 3.** Comparison of South Korea, the U.S., and EU noncompliance determination

	South Korea	US	EU
Number of test vehicles	5-10	Up to 10	Up to 20
Determine noncompliance that triggers remedial measure	On average exceed emission standards	Substantial number higher than applicable limit value	Two vehicles emit 1.5-2.5 times the pollutant limit due to same cause (manufacturer/ authority agree) Two vehicles emit >2.5 times the pollutant limit due to same cause (authority determine)
Other noncompliance determination			Statistically meet failure procedure (e.g., minimum of 12 out of 20 vehicles fail the test)
Previous practice	Successfully identified noncompliant vehicles	Successfully identified many noncompliant vehicles	Never identified any noncompliant vehicles through the process

to determine the failure of an in-use compliance test compared with the EU. In the U.S., the determination of noncompliance is largely left to the regulatory agency’s best judgment. The agency may determine if the testing results or other information (e.g., defect reports) indicate that a substantial number of vehicles are likely to be noncompliant and take action based on this judgment. Perhaps the strongest indication of a problem with this aspect of the European regulation comes from China, which used to follow the EU statistical procedure to determine pass/fail in ISC testing, but, in its recently released new emission standards for LDVs and proposed emission standards for HDVs, has simplified the statistical methods and reduced the number of test vehicles required to 10.

The framework should clarify the procedure to determine failure in market surveillance tests and reduce the maximum test vehicles. Such a procedure should be established both for tests that replicate the type-approval testing procedure and tests that check for defeat devices (e.g., PEMS tests). The framework should also clarify how failure decisions made through market surveillance will trigger remedial measures.

The framework should guide EU member states to establish testing records that are able to sufficiently prove the existence of a compliance issue and that can be used to back up technical discussions with manufacturers. Without well-designed, in-depth testing, the market surveillance tests may not be able to build up the necessary evidence base for enforcement. The European Commission recently released a short

document<sup>16</sup> meant to give member state authorities high-level guidance on how to technically evaluate an alternative emissions strategy and how to test vehicles for the presence of a defeat device. This guidance document could be used to assist member states in the development of their compliance testing protocols, although it should be noted that there is no one-size-fits-all test that covers all defeat devices.

The advisory body that the proposed framework would create to coordinate the network of national authorities can play a stronger role by requiring EU member states to share their market surveillance activities and testing results with other member states and the European Commission. If the framework allows the regulatory authorities to determine noncompliance based on testing results from market-surveillance programs led by other member states, verification testing across the EU could be more cost-effective and successful.

#### 4. Enhance financial sustainability of market surveillance programs

Insufficient funding is one of the major obstacles to building up an effective market surveillance program in the EU. The termination of previous market surveillance programs in Germany and the UK demonstrates the importance of having a sustainable plan and budget available to support such activities.

Funding for market surveillance should cover the cost of staff time for reviewing manufacturer’s reports, data analysis, and communicating with manufacturers; costs

<sup>16</sup> European Commission. (2017). Commission Notice of 26.1.2017—Guidance on the evaluation of auxiliary emission strategies and the presence of defeat devices. Retrieved from <http://ec.europa.eu/DocsRoom/documents/21151>

of laboratories and measurement instruments and systems; and administrative overhead.

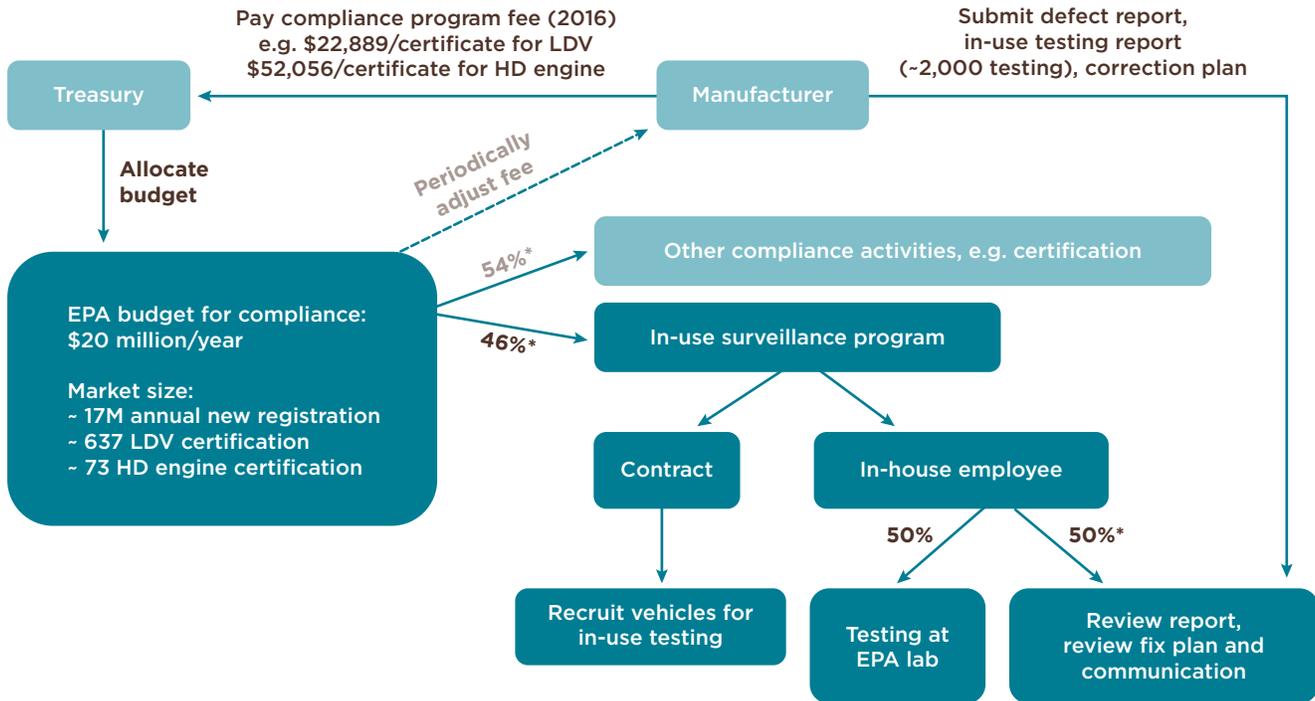
Stable sources of revenue are essential. These could include fees paid by manufacturers at the time of vehicle certification, sales tax, fiscal penalties collected from noncompliant vehicles, or other revenue that is dedicated to transportation or clean air issues.

For example, Sweden charges vehicle owners a fee of SEK 600 (approximately 60 EUR<sup>17</sup>) for every new vehicle registration, which covers both roadworthiness tests and the in-use testing program run by the Swedish Transport Agency. South Korea requires manufacturers to pay for their in-use testing,<sup>18</sup> and the U.S. covers all in-use compliance activities by charging manufacturers a vehicle and engine compliance fee at the time of certification. The German Ministry of

Environment has proposed a fee of 2.85 EUR per newly registered car from manufacturers to support market-surveillance testing.<sup>19</sup>

Figure 2 shows the revenue sources and budget flow for the U.S. vehicle emissions compliance program. The fee charged per certification covers in-use compliance and other compliance activities. Based on a 2016 estimate by the U.S. Environmental Protection Agency (EPA), manufacturers pay around \$10,500 (LDV) and \$23,900 (heavy-duty engine) per certification to cover the cost of the EPA's in-use surveillance program. That translates to a per-vehicle or per-engine cost of around \$0.50 to support in-use surveillance program and \$1.10 to support the overall emission compliance program.

The fee structure proposed in Commission's proposal is critical and should not be weakened. To support market



\* Percentages only illustrate 2016 estimation of LDV in-use compliance, percentages for other vehicle modes (e.g. HD engine) maybe a little different.

Figure 2. Compliance program funding flow in the United States<sup>20</sup>

17 Currency as of June 29, 2017

18 Yang, Z., Bandivadekar, A., & Muncrief, R. (2017). Global baseline assessment of compliance and enforcement programs for vehicle emissions and energy efficiency. Washington, D.C.: International Council on Clean Transportation (in production).

19 Bundesrat. (2013, Dec.). Dritte Verordnung zur Änderung der Fahrzeug-Zulassungsverordnung und anderer straßenverkehrsrechtlicher Vorschriften. (Third Regulation amending the Vehicle Registration Regulation and other road traffic regulations.) Retrieved from <http://www.bundesrat.de/SharedDocs/drucksachen/2016/0701-0800/770-16.pdf?blob=publicationFile&v=1>

20 How much are the fees? EPA. Adjustment of the motor vehicle and engine compliance program fees for calendar year 2016. (2015). Code of Federal Regulations. 40 CFR 1027.105

surveillance programs, the proposed framework would require EU member states to establish a fee program to fund their market surveillance activities. Meanwhile, the member states would also have the responsibility to collectively support the European Commission's testing and inspection activities with these collected fees.

Details include:

- » The objectives of the charge should be the vehicles sold in the market, as opposed to vehicles that have applied for type approval in the market.
- » Regulatory authorities should be the entity that collects and allocates the charge, rather than designated technical services, to mitigate conflicts of interest.
- » Member states should provide the details of their national fee structure to the other member states and the Commission.

## 5. Harmonize noncompliance determination and enforcement actions throughout the EU

One key element in the proposed framework is the provision that empowers member states to take action against noncompliant vehicles sold in the member state's country no matter where they received type approval. Nevertheless, it would be more efficient if the Commission itself had the centralized authority to take action at the EU level to reduce negative emission impacts from noncompliant vehicles on a wider scale. Once a vehicle is identified as noncompliant by one member state, the vehicle should be automatically deemed noncompliant in all other member states. Instead of having member states take action one by one, or waiting for the original type-approval agency to react, simplifying the procedure by allowing

for the European Commission to take integrated actions, such as initiating a mandatory recall, approving a remediation plan, and imposing fines against infringement across the EU could speed up remediation and minimize the air-quality impacts of noncompliant vehicles.

## SUMMARY

Although the proposed framework reflects a desire to improve market surveillance in the EU, in its current form, it lacks detail and offers insufficient guidance to regulators that could reduce its potential impact.

Along with tightened type approval, conformity of production, and ISC requirements, rigorous market surveillance performed by regulatory authorities could improve compliance with emissions standards. The EU needs a strong start to a market surveillance program to demonstrate to manufacturers that the authorities have the will, capacity, and means to enforce vehicle emissions standards.

Building up a comprehensive market surveillance program is a long-term effort that depends on substantial commitment from the beginning. In the U.S., where the in-use surveillance program has evolved over decades, a large fraction of the early mandatory recalls resulting from the government-led testing program were contentious, and many ended up in court.<sup>21</sup> As the regulatory agency showed it was able to prevail in these court cases, the manufacturers changed their approach and began pre-empting legal intervention in favor of voluntary action. For the EU, this new proposed framework is a critical step toward a strong compliance program led by member states and coupled with effective collaboration with the European Commission.

21 He, H. & Jin, L. (2017). A historical review of US vehicle emission compliance program, and emission recall cases. Washington, D.C.: International Council on Clean Transportation. Retrieved from <http://www.theicct.org/historical-review-US-vehicle-emission-compliance-program>

## APPENDIX I MARKET SURVEILLANCE BEST PRACTICES

A recently completed ICCT survey<sup>22</sup> of compliance and enforcement practices in 14 major vehicle markets determined that effective compliance and enforcement programs share certain characteristics:

- » Establish clear legal authority to hold manufacturers accountable for vehicle emission and efficiency performance throughout the useful life of vehicles.
- » Avoid conflicts of interest that could undermine the program's effectiveness; align the lead agency's mission with regulatory goals and break the financial link between testing agencies and manufacturers.
- » Obtain the necessary resources to continuously and properly enforce regulations.
- » Conduct reliable testing and checks at all stages of production and use on both emission and efficiency, with the strongest focus on in-use testing.
- » Use corrective actions, such as implementing mandatory recalls and fiscal penalties, to fix known issues and promote compliance.
- » Prioritize data and information transparency to foster confidence in the program and facilitate third-party participation.

Concerning market surveillance testing specifically, best-practice regimens can be identified in three areas: screening for potentially noncompliant vehicles; testing of vehicles identified by screening to determine whether there is a general problem with that vehicle type causing it to have fallen out of compliance with the emission standards; and subsequent testing to ensure that fixes intended to return vehicles to compliance are effective.<sup>23</sup> Screening should:

<sup>22</sup> A detailed summary of the results of this survey is forthcoming in Yang, Z., Bandivadekar, A., & Muncrief, R. (2017). Global baseline assessment of compliance and enforcement programs for vehicle emissions and energy efficiency. Washington, D.C.: International Council on Clean Transportation (in production).

<sup>23</sup> A full summary of best practices in these three areas is contained in a forthcoming ICCT briefing paper, "Key elements of a successful in-use surveillance program."

- » Cover as much of the fleet as possible.
- » Leverage as many different data sources and screening techniques as possible.
- » Screen for all pollutants.
- » Leverage existing sources of data to save resources (including those gathered by other government agencies).

Testing of vehicles that fleet screening has identified as potentially noncompliant, for reasons unknown, should:

- » Establish robust methods to select vehicles for testing.
- » Employ subject matter experts to design tests, review test results, and communicate with manufacturers.
- » Leverage multiple analytical techniques, including PEMS and chassis dynamometer testing.
- » Ensure that testing data quality are high enough to withstand legal challenges.
- » Require manufacturers to take on a significant share of the testing burden (e.g., ISC testing).
- » Perform testing to confirm manufacturers' claims (e.g., if a manufacturer offers a justification for high emissions found during in-use testing, conduct follow-up testing to confirm the accuracy of the claim).
- » Perform in-use vehicle testing on a regular and ongoing basis.

Testing to ensure that fixes are effective should:

- » Evaluate the impact on emissions.
- » Evaluate the impact on the durability of the vehicle components.
- » Evaluate the impact on vehicle performance and safety.