Is There A Tier 5 Diesel Regulation In Our Future?

Mike Osenga, publisher, Diesel Progress
Diesel Progress

Diesel Progress
North American

Diesel Progress
International
1. The Global Emissions Landscape

2. What Would Tier 5 Mean For Us. Manufacturers?
Global Diesel Emissions Regulations-At-A-Glance

**U.S.**
- Tier 4
- EPA 2010
- Greenhouse gas standards 2014-2017

**CANADA**
- USA Tier 4
- EPA 2010

**EUROPEAN UNION**
- EU Stage 4
- EU Stage 5 ≤8 kW, ≤8 to <19 kW, ≤19 to ≤37 kW, ≤37 to ≤56 kW, 130c to ≤560 kW and >560 kW compression ignition effective 2019; all 56s to ≤130 effective 2020*

**CHINA**
- China National Standard 4 (equivalent to Euro 4)
- China National Standard 5 (equivalent to Euro 5) in largest cities, nationwide in 2017*

**HONG KONG**
- Euro 5

**TURKEY**
- Faz 4 (equivalent to EU Stage 4) for 56 to <130 kW and 130 to ≤560 kW
- Euro 6

**ISRAEL**
- Current EU/US EPA standard (based on origin)
- Euro 6

**MEXICO**

**VENEZUELA**
- Euro 1

**COLOMBIA**
- Euro 4

**BOLIVIA**
- Euro 1

**BRAZIL**
- Proconve Mar-1 (equivalent to EU Stage 3a) effective 2015-2019
- Proconve P7 (equivalent to Euro 5)

**URUGUAY**
- Euro 3

**SOUTH AFRICA**
- Euro 5*

**INDIA**
- Bharat Stage 3a (equivalent to EU Stage 3a)
- Bharat Stage 3b (equivalent to EU Stage 3b) in 2016*
- Bharat 3 (equivalent to Euro 3)
- Bharat 4 (equivalent to Euro 4) in 12 largest cities
- Bharat 4/5 (equivalent to Euro 4/5) 2016*

**SAUDI ARABIA**
- US Tier 1
- Euro 2

**JAPAN**
- Tier 4a (equivalent to EPA Tier 4i/EU Stage 3b)
- Tier 4b (equivalent to EPA Tier 4 final/EU Stage 4 from 2015-2016)
- Post New Long Term (PNLT, similar to EPA 2010)

**SOUTH KOREA**
- Korean Tier 4 (equivalent to EPA Tier 4 final)
- Euro 5

**VIETNAM**
- Euro 2
- Euro 4 2017*

**PHILIPPINES**
- Euro 2

**MALAYSIA**
- Euro 4

**SINGAPORE**
- EU Stage 2
- Euro 5*

**THAILAND**
- Euro 4

**INDONESIA**
- Euro 2
- Euro 4 in largest cities

**AUSTRALIA**
- Tier 4 final 2018*
- EPA 2007
- EPA 2010 in 2017*

* proposed or under consideration

For more information on specific emissions levels and the various standards, visit the Emissionsguide.net at Dieselandgasurbineguide.net. For the most current global emissions information, visit DieselNet.com. Emissions information drawn from government and industry sources. Diesel Progress is not responsible for the accuracy of the data as presented.
Global Diesel Emissions Regulations—At-A-Glance

**EUROPEAN UNION**
- **U.S.**
  - Tier 4
  - EPA 2010
- **EU**
  - Stage 4
  - Stage 5 (<8 kW, <8 to <19 kW, <19 to <37 kW, 37 ≤ <56 kW, 130 ≤ ≤560 kW and >560 kW)
  - Compression ignition effective 2019; all 56s: <130 effective 2020
- **Canada**
  - USA Tier 4
  - EPA 2010

**TURKEY**
- Faz 4 (equivalent to EU Stage 5) for 56 to <130 kW and 130 to 560 kW
  - Euro 5

**ISRAEL**
- Current EU/US standard (based on Euro 6)

**MEXICO**
- EPA 2004/Euro 4 (EPA 2010/Euro 6 in 2018)*
- **COLOMBIA**
  - Euro 4
- **PERU**
  - Euro 3
- **BOLIVIA**
  - Euro 1
- **BRAZIL**
  - Proconve Mar-1 (equivalent to EU Stage 3a) effective 2015-2019
  - Proconve P7 (equivalent to Euro 5)
- **VENEZUELA**
  - Euro 1
- **ARGENTINA**
  - Euro 5*°
- **URUGUAY**
  - Euro 3
- **CHILE**
  - Euro 2
  - Euro 4 in Santiago Metro Region

*proposed or under consideration

For more information on specific emissions levels and the various standards, visit the Emissionsguide.net at Diesellandgasturbineguide.net. For the most current global emissions information, visit DieselNet.com. Emissions information drawn from government and industry sources. Diesel Progress is not responsible for the accuracy of the data as presented.
The Point Being...

1. The 75% rule.
2. It’s all about ULSD.
3. Who’s going to enforce all this?
Engine Realities…

1. Engines for every place, every price.
2. Cost savings?
3. No harmony here.
4. Tier 5 makes sense?
EMISSIONS TECHNOLOGY PATHWAYS

With the implementation of global diesel engine emissions regulations, engine manufacturers have utilized a range of technologies to meet clean air goals. And while many of the technologies are familiar, it is how they are combined that can differentiate one manufacturer from another.

Here is a graphic look at how engine manufacturers are mixing and matching emissions technologies to meet the EPA's Tier 4 final off-highway emissions standards, as well as on-highway emissions regulations.

GLOSSARY OF TERMS
EGR — Exhaust Gas Recirculation
DOC — Diesel Oxidation Catalyst
SCR — Selective Catalytic Reduction
NRS — NO, Reduction System
DFP — Diesel Particulate Filter

All information provided by the manufacturers.
In the implementation of global engine emissions regulations, engine manufacturers have utilized a range of technologies to meet their goals. And while many of the technologies and how they are combined that can differentiate one manufacturer from another.

Let's look at how engine manufacturers are mixing emissions technologies to meet the EPA's Tier 4 highway emissions standards, as well as highway emissions regulations.
So Tier 5?

1. The U.S. will not be first.
2. California.
3. PM are Public Enemy #1.
Impact For Equipment Manufacturers

1. Skid-mounted machines - less affected.
2. The smaller the machine, the more impact.
3. Regen, torque curves et al will change
Thank You!

For More Information

• Mike Osenga
• mosenga@dieselpub.com
• www.dieselprogress.com