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COMMISSION STAFF WORKING DOCUMENT

EVALUATION

OF THE OUTDOOR NOISE DIRECTIVE 2000/14/EC

Accompanying the document

Report from the Commission to the European Parliament and the Council

on the implementation and administration of Directive 2000/14/EC of the European Parliament and of the Council of 8 May 2000 on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors

{COM(2020) 715 final} - {SWD(2020) 267 final}

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Annex 7: "NOISE Application" database – Analysis of entries

1. Approach

The "NOISE Application" database contains a large number of entries for different types of equipment falling under the OND, extracted from the EC declarations of conformity of equipment placed on the EU market, covered by Article 12 (subject to noise limits) and by Article 13 (subject to noise marking only). Among the data recorded in the database, there are the date of the DoC, the *measured* and the *guaranteed* sound power levels, which could reveal information about the noise performance of different equipment types over time.

The analysis is focused on equipment types with a relatively high number of entries in the database (more than 1000 different models), in order to increase the likelihood of still having a reasonable number of observations in different years.

It was necessary to eliminate those entries for which the sound power levels are missing or zero, as well as those containing obvious typos. For the remaining entries in the database, a year variable was created to take on the year of the date of the DoC. Then, the average sound power level of the equipment certified in a particular year was considered, trying to further break this down to different performance classes (where relevant).

One important caveat to this approach is that it does not allow drawing conclusions on the average noise performance of equipment placed on the market because the database does not contain any information on the numbers of each model. Ideally, one would calculate a sales-weighted average in order to determine the overall noise performance of sold equipment per year. As this is not feasible, it is possible only to look at a simple average across new models, which may obviously differ from the sales-weighted average. However, even a simple average can be an indication that noise performance changes over time.

2. Selected equipment types subject to noise limits (Article 12 equipment)

The analysis was carried out for:
- compaction machines (vibrating rollers, vibratory plates, vibratory rammers) (item 8),
- excavators, hydraulic or rope-operated (< 500 kW) (item 20),
- lawnmowers (item 32),
- lift trucks, combustion-engine driven, counterbalanced (excluding 'other counterbalanced lift trucks') (item 36), and
- power generators (< 400 kW) (item 45).

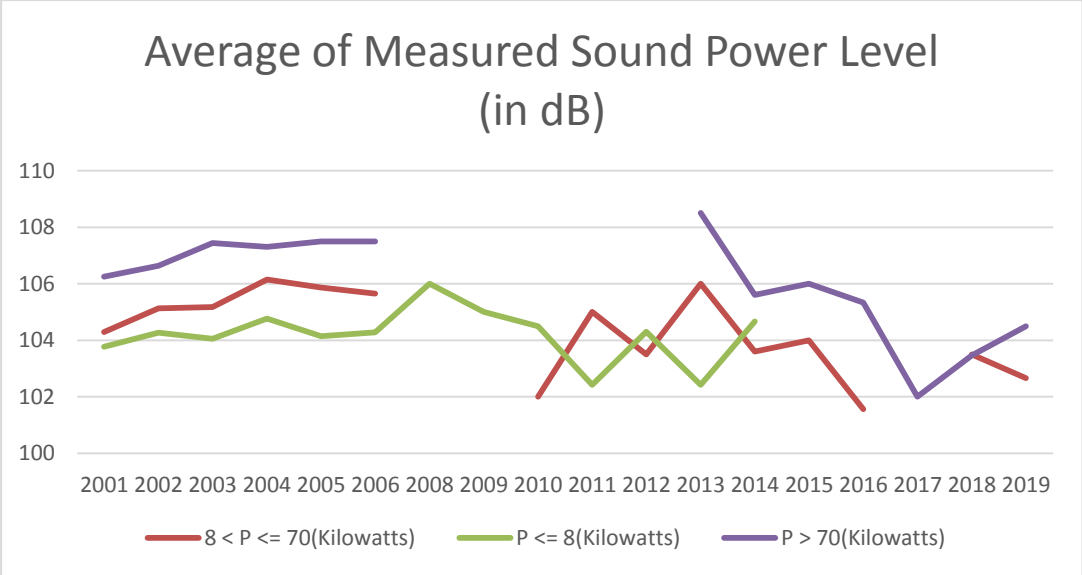
a. Compaction machines (vibrating rollers, vibratory plates, vibratory rammers)

Compaction machines are regulated in three different power classes:

Net installed power (P) [kW]	**Directive**	**Permissible sound power level** [dB/1 pW]	
		2002-2006 (stage I)	**2006- (stage II)**
P ≤ 8	2000/14/EC	108	105 (*)
8 < P ≤ 70		109	106(*)
P > 70		89+11 lgP	86+11 lgP (*)

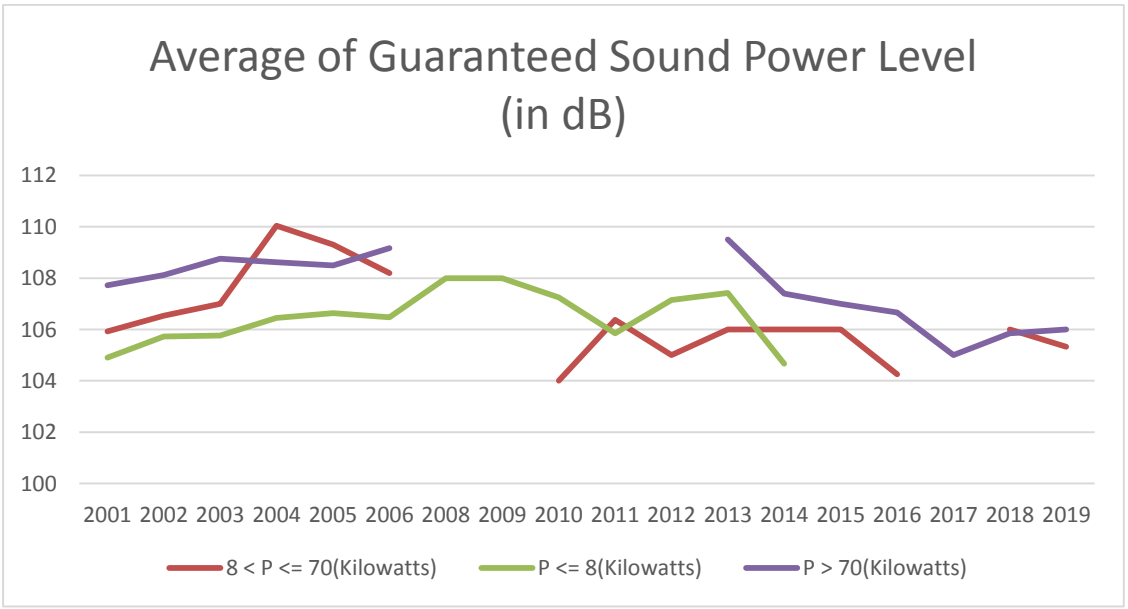
(*) indicative

The following graph shows the evolution of the *measured* sound power levels over time for the different power classes:

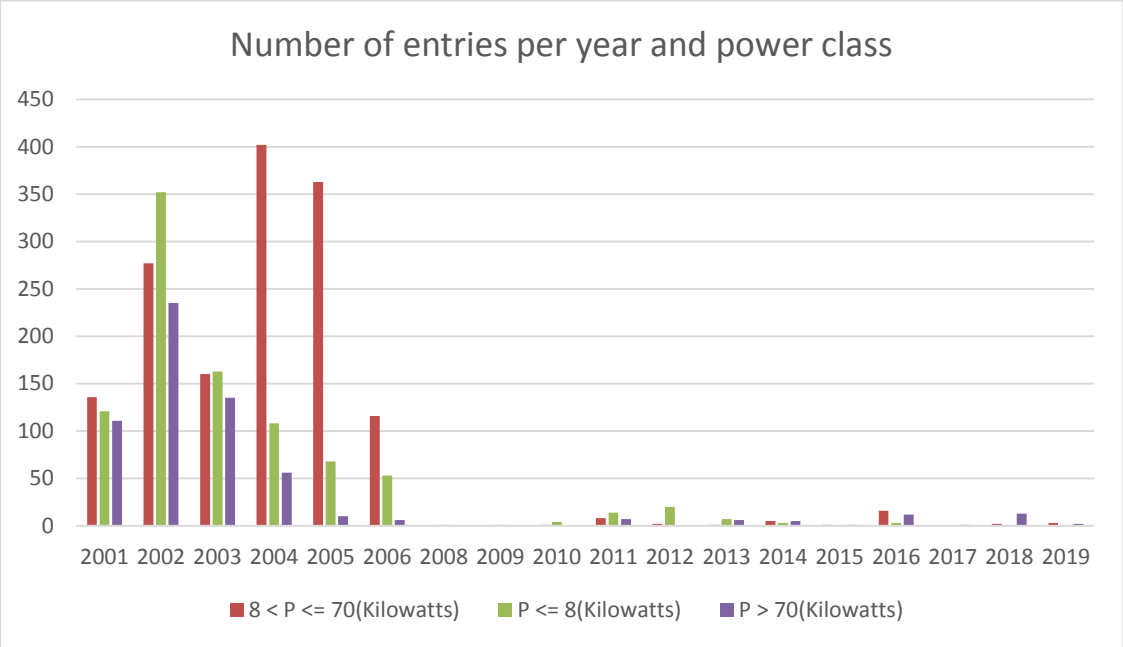


There is no clearly visible trend but we can see that there are years without any data for some power classes.

A very similar picture emerges for the *guaranteed* sound power levels:

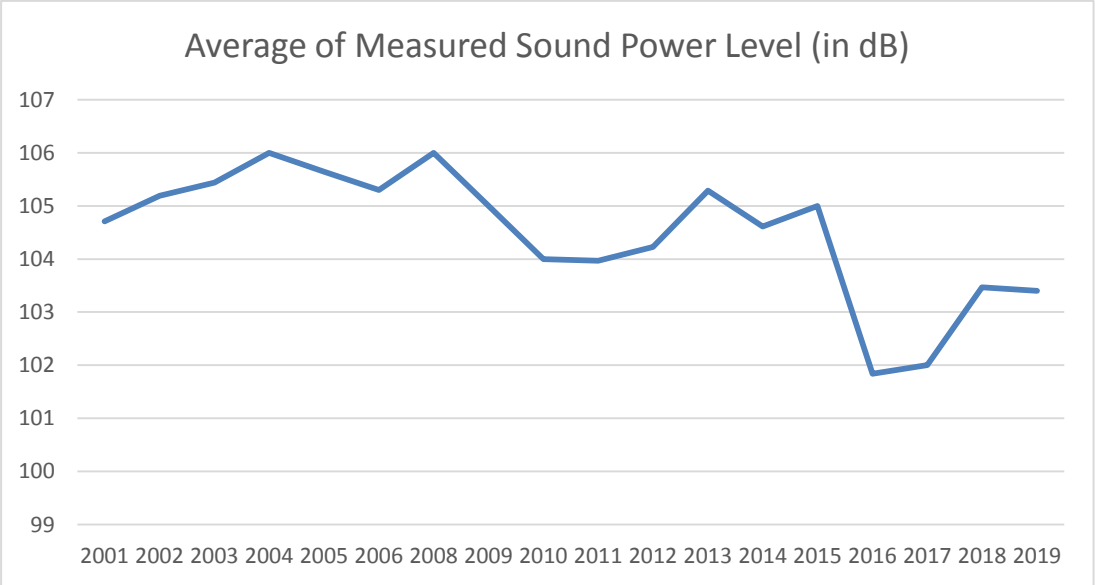


One of the reasons is that the number of new entries in the database for each power class has decreased significantly over time:

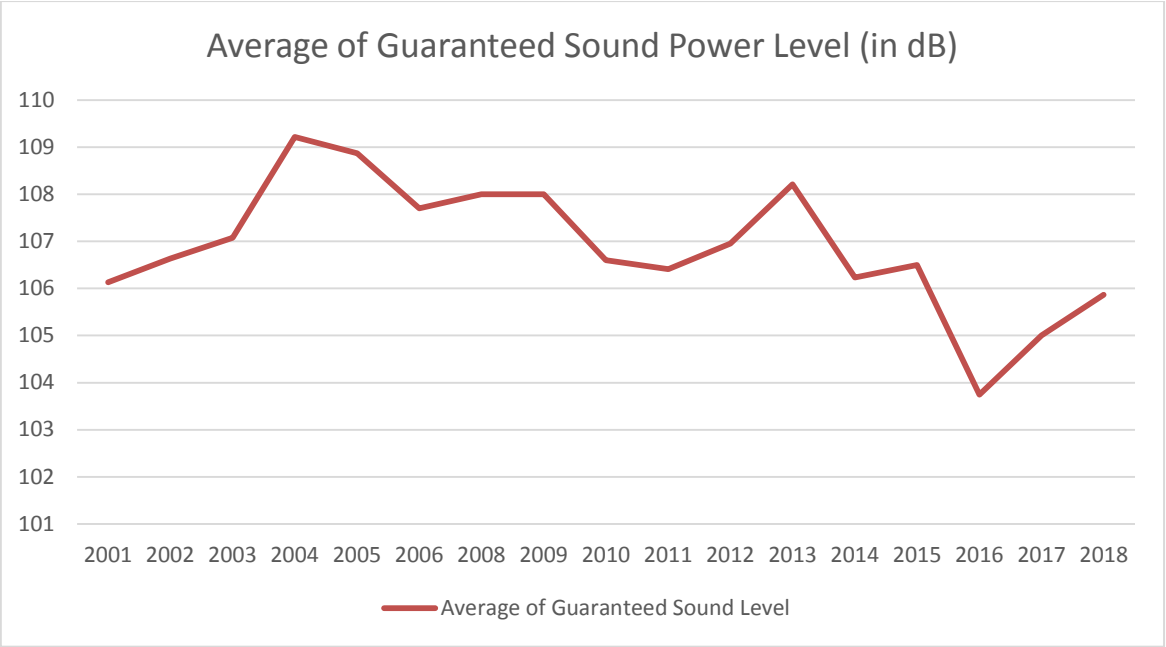


The vast majority of the equipment has been certified between 2001 and 2006, with very few new models afterwards. For this reason, post 2006 average sound levels are based on a relatively limited number of observations.

This being said, the overall average *measured* sound power levels show a decreasing trend since 2008:



This is very similar for the *guaranteed* sound power levels:



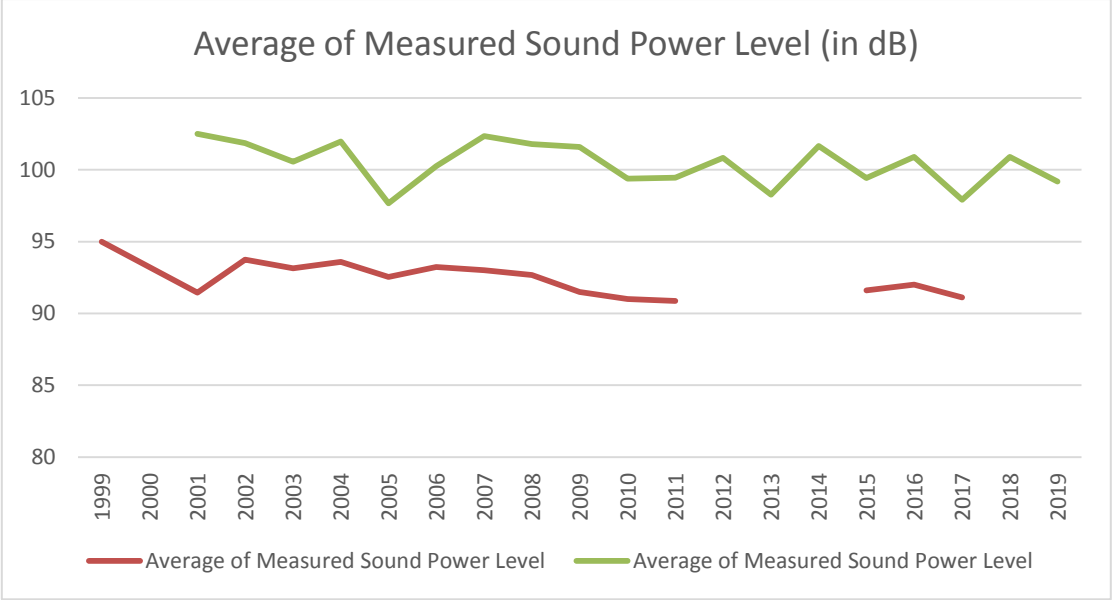
b. Excavators, hydraulic or rope-operated (< 500 kW)

Excavators are regulated in two different power classes:

Net installed power (P) [kW]	**Directive**	**Permissible sound power level** [dB/1 pW]	
		2002-2006 (stage I)	**2006- (stage II)**
P ≤ 15	2000/14/EC	96	93 (*)
P > 15		83+11 lgP	80+11 lgP (*)

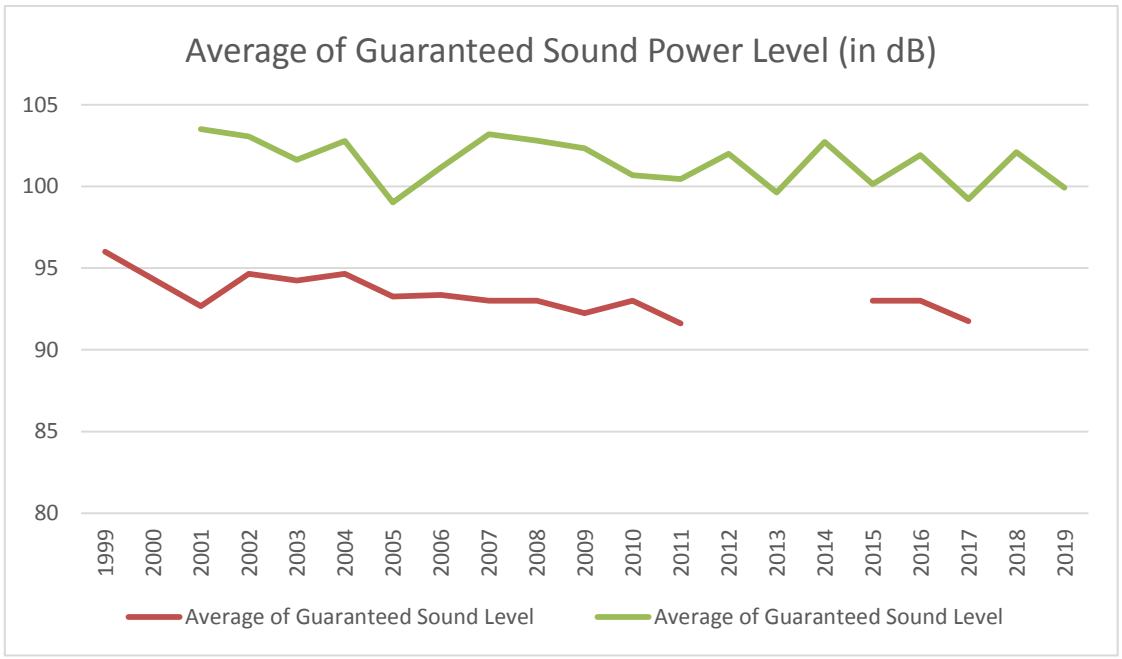
(*) indicative

The following graph shows the evolution of the *measured* sound power levels over time for the different power classes:

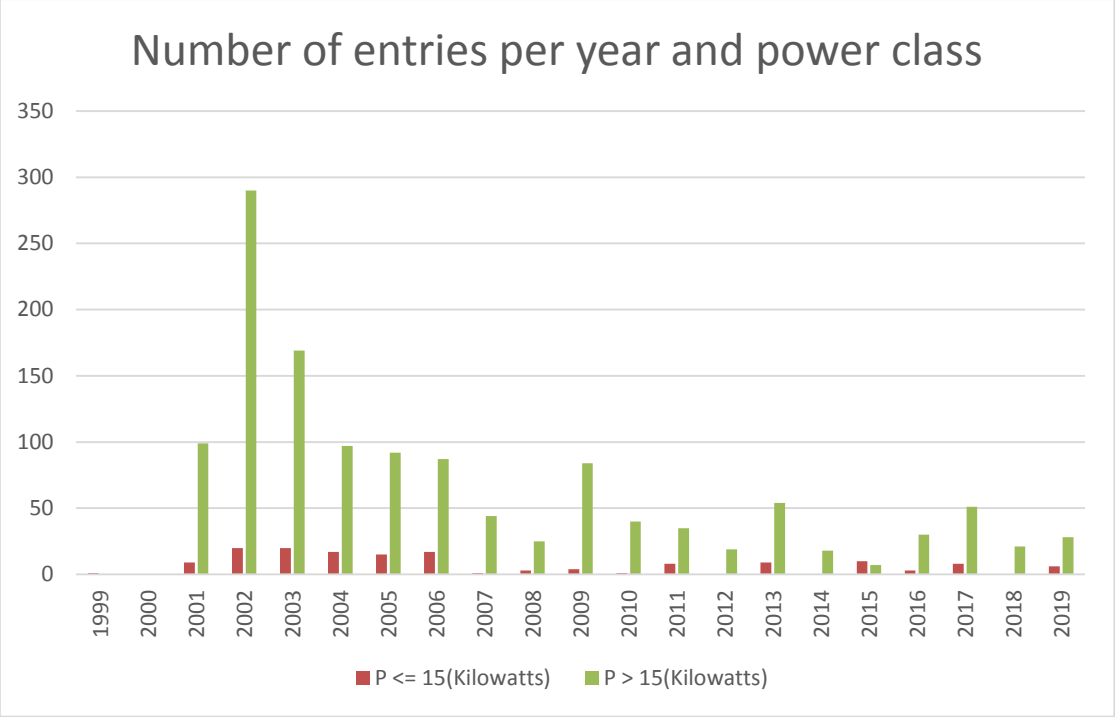


Some reduction over time can be observed. For some years, there are no data for the less powerful equipment types.

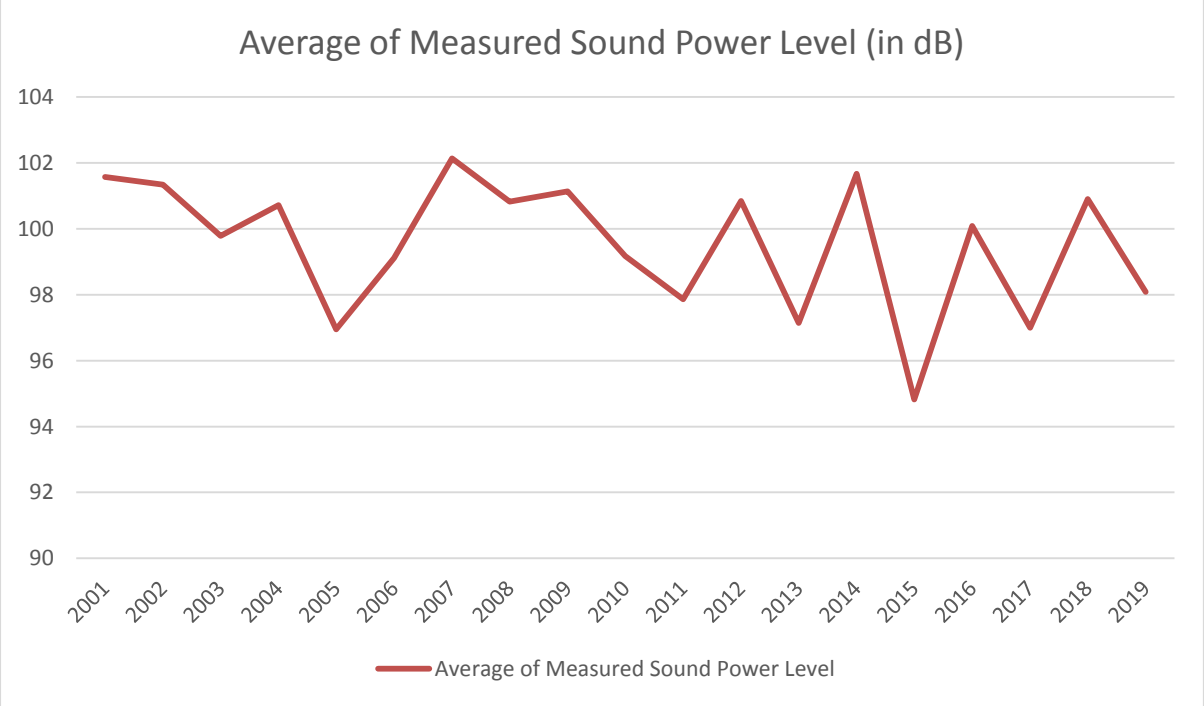
A similar picture emerges for the *guaranteed* sound power levels:



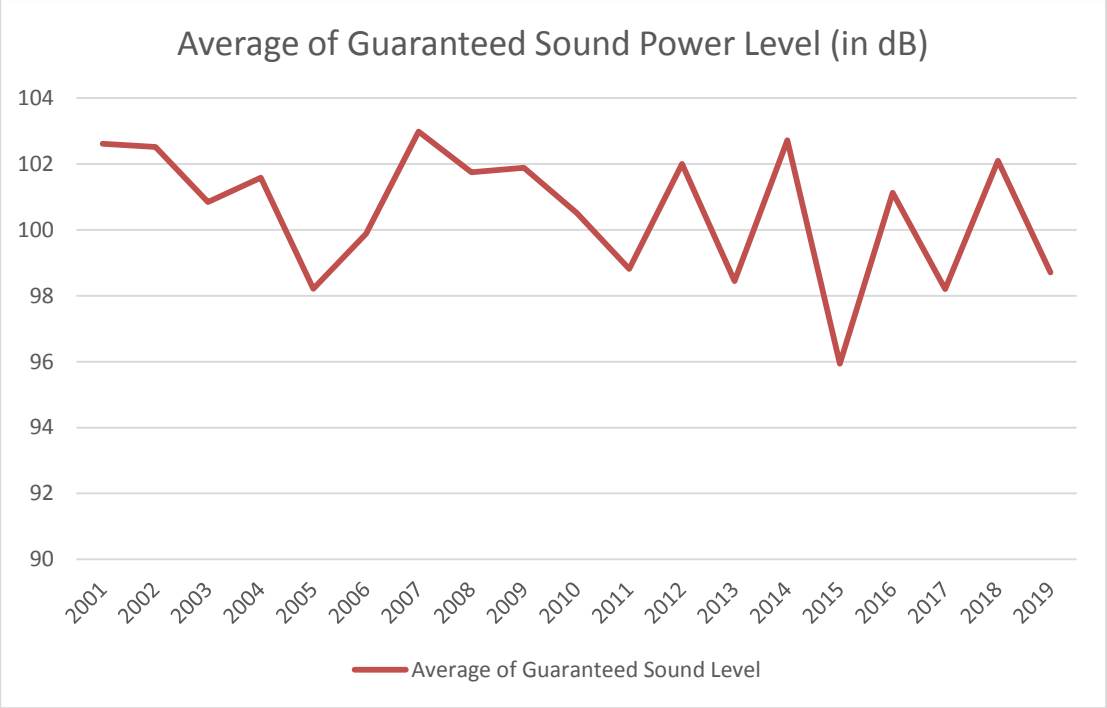
The number of equipment certified peaks in 2002 and then decreases. For the less powerful equipment types, the number of observations is limited.



This being said, the overall average *measured* sound power levels show a slightly decreasing trend since 2007 but with quite some variation between different years (which can be explained by the limited number of observations):



A similar trend can be seen for the *guaranteed* sound power levels:



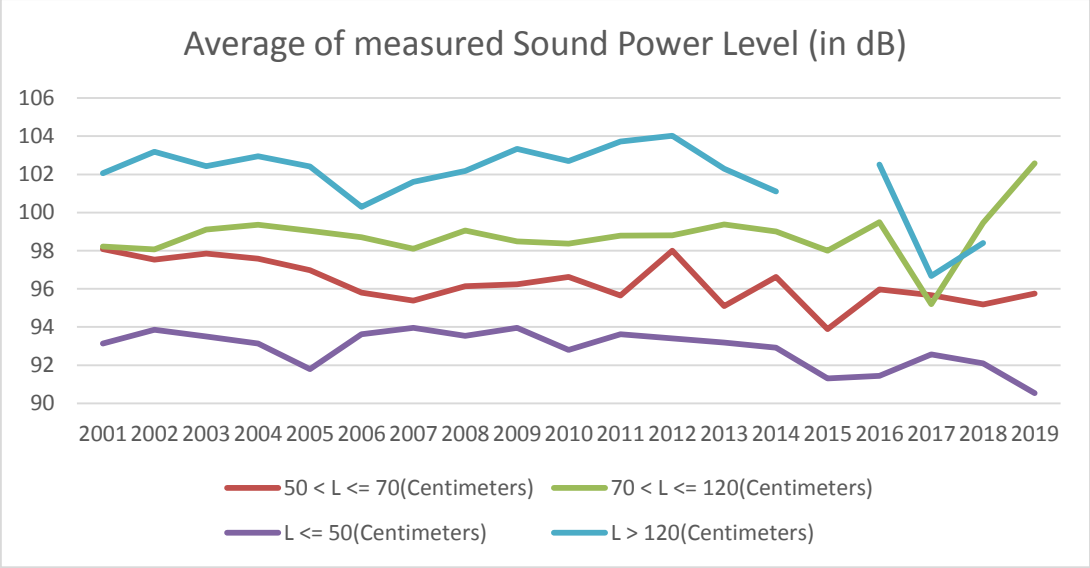
c. Lawnmowers

Lawnmowers are regulated in three different classes, depending on the cutting width (L, in cm). The respective limits have been tightened over time as follows:

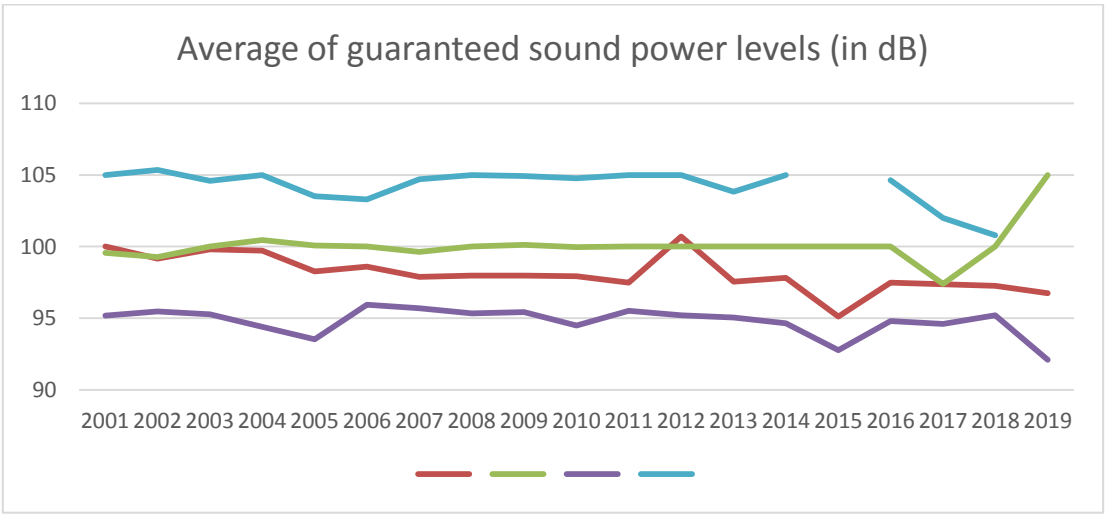
Cutting width (L) [cm]	**Directive**	**Permissible sound power level** [dB/1 pW]		
		1986-2001	**2002-2006 (stage I)**	**2006- (stage II)**
L ≤ 50	84/538/EEC 2000/14/EC	96	96	94 (*)
50 < L ≤ 120		100	100	98 (*)
L > 120		105	105	103 (*)

(*) indicative

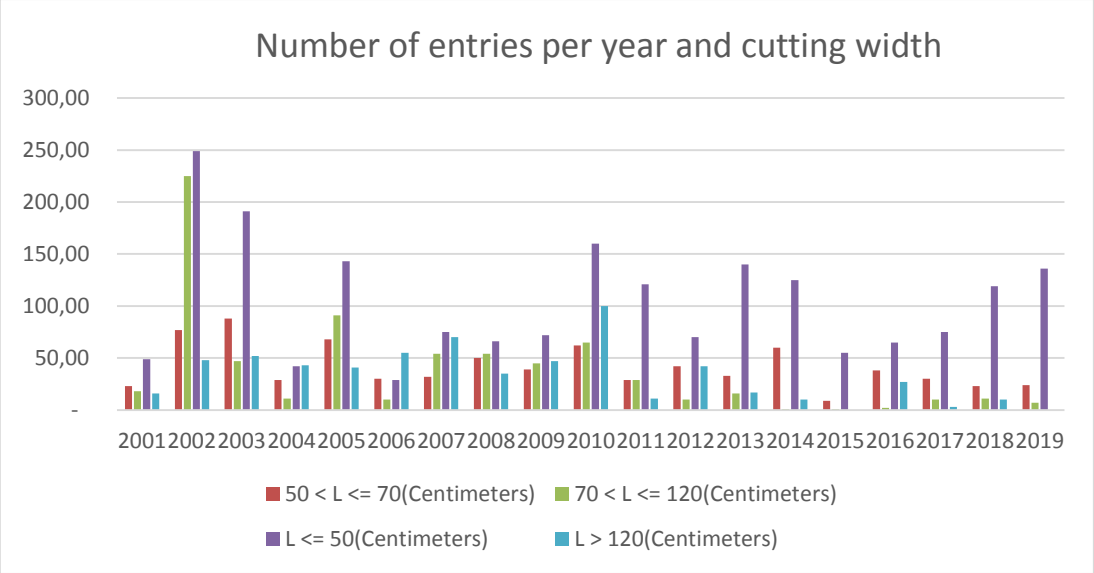
The following graph shows the evolution of the *measured* sound power levels over time for the different performance classes:



A similar picture emerges for the *guaranteed* sound power levels:

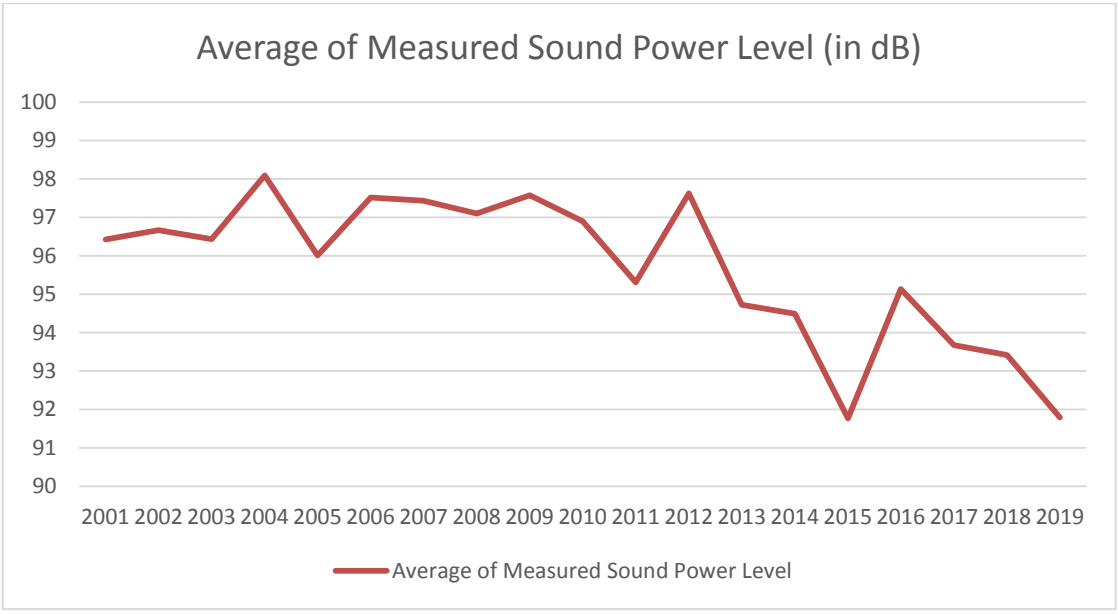


There is a different evolution for different classes of cutting width: while those with less than 70 cm cutting width show a clear reduction in noise levels, this is less clear for the broader models. This can be explained by the large divergence in the number of entries in the database for each category:

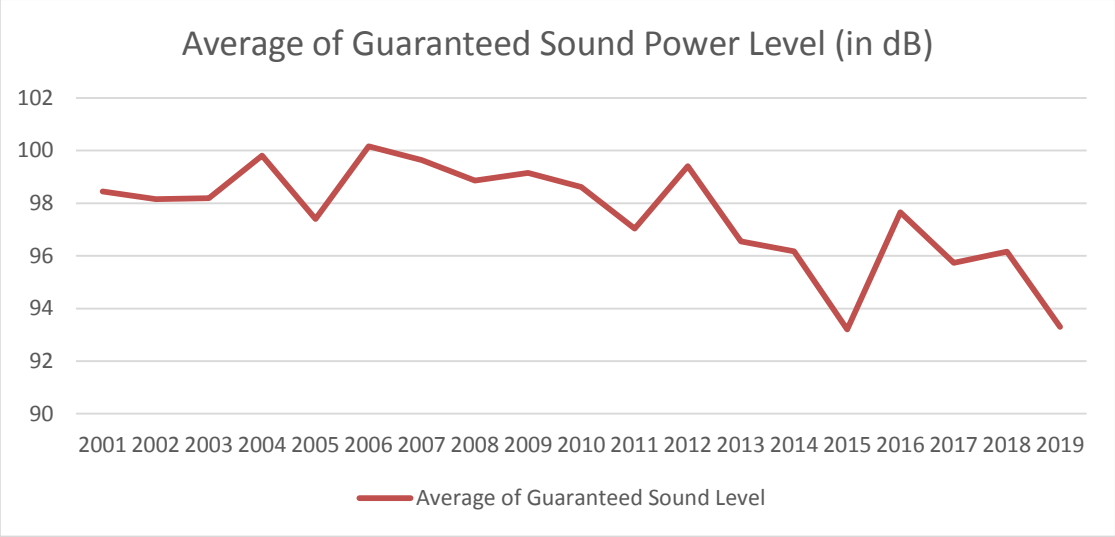


After 2010, there are only a limited number of entries for models above 70 cm cutting width, which implies that the averages in those classes are driven by a small number of entries. Finally, there is a general trend towards narrower models, which also tend to be less noisy.

When looking at all models together, there is a clear trend towards less noisy models from 2006 onwards. Between 2006 and 2019, the average *measured* sound power levels of the models in the database have been reduced from more than 98 dB in 2004 to less than 92 dB in 2019.



The same can be seen for the average *guaranteed* sound power levels: between 2006 and 2019, the average sound power levels of the models in the database have been reduced from more than 100 dB in 2006 to less than 94 dB in 2019.



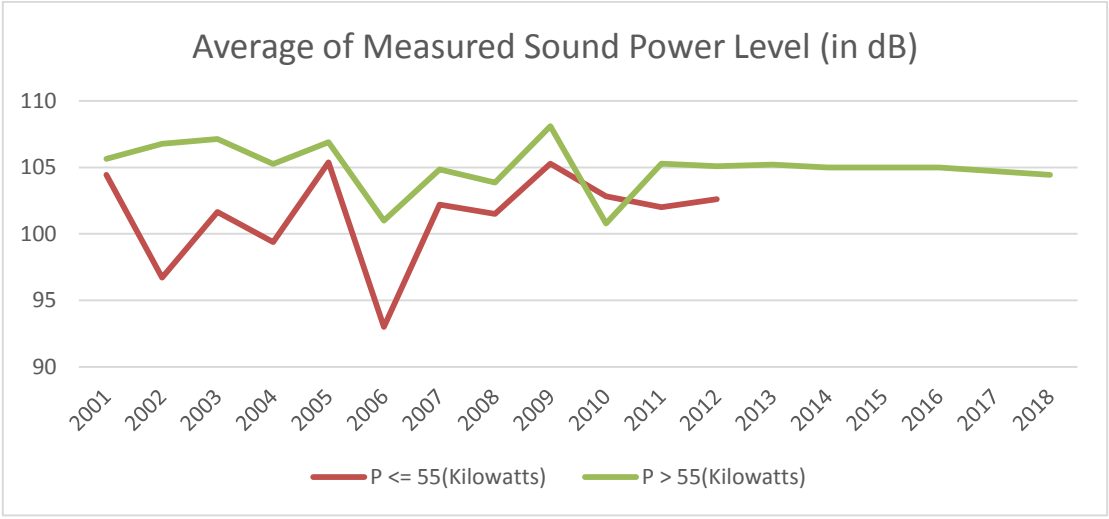
d. Lift trucks, combustion-engine driven, counterbalanced (excluding 'other counterbalanced lift trucks')

This type of equipment is regulated in two different power classes:

Net installed power (P) [kW]	**Directive**	**Permissible sound power level** [dB/1 pW]	
		2002-2006 (stage I)	**2006- (stage II)**
P ≤ 55	2000/14/EC	104	101 (*)
P > 55		85+11 lgP	82+11 lgP (*)

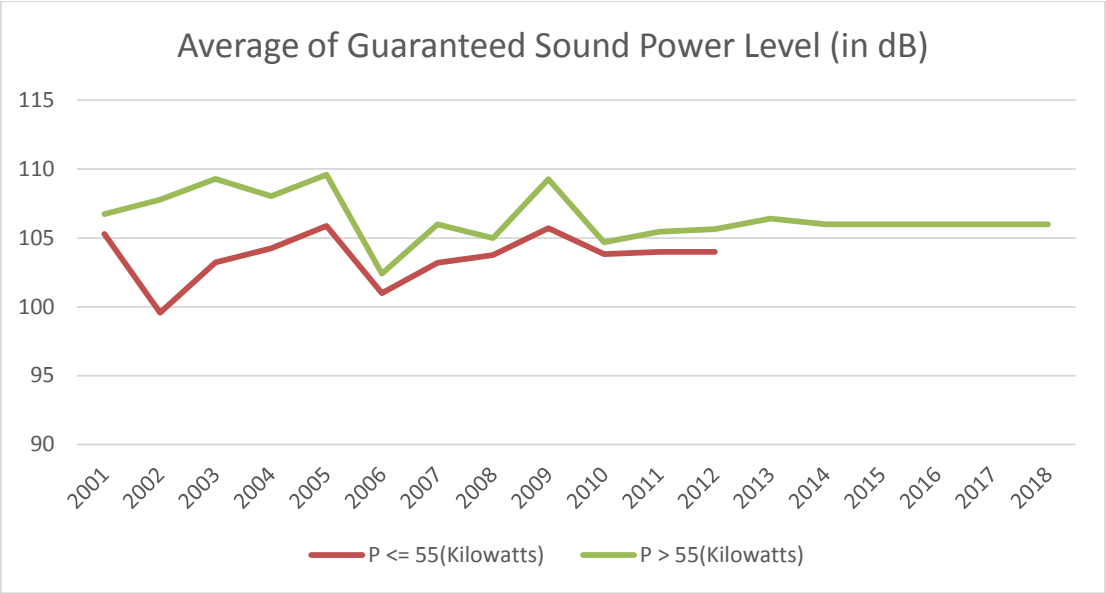
(*) indicative

The following graph shows the evolution of the *measured* sound power levels over time for the different power classes:

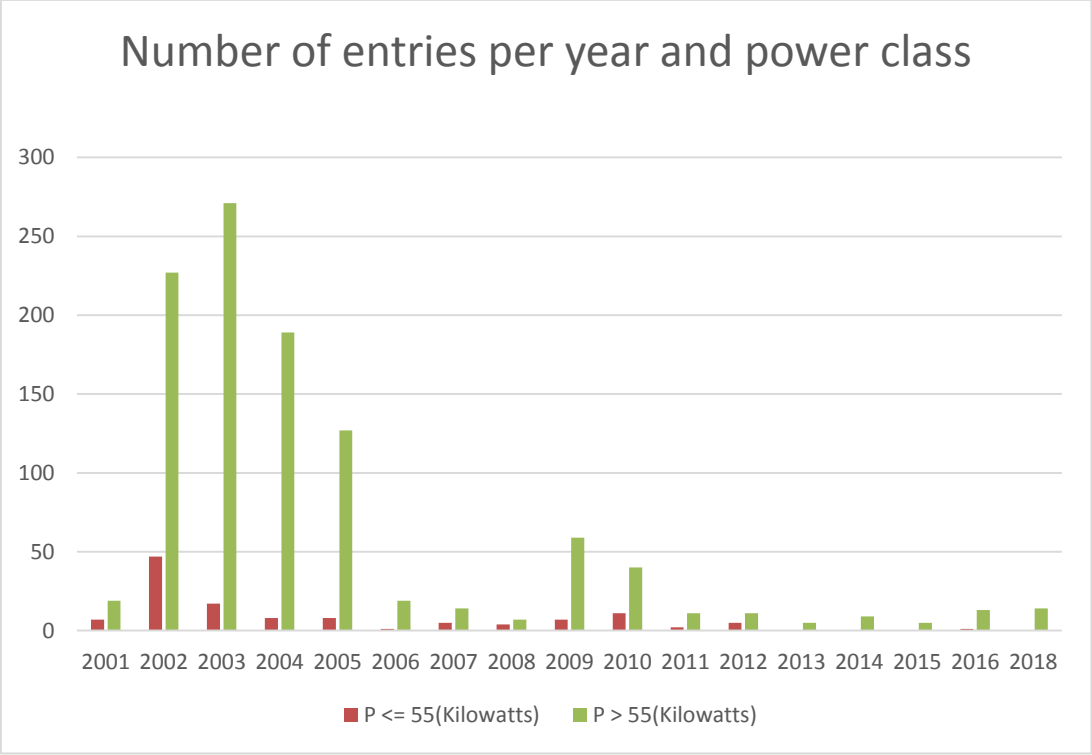


A slight reduction can be observed over time. After 2012, there are no data for the less powerful equipment types.

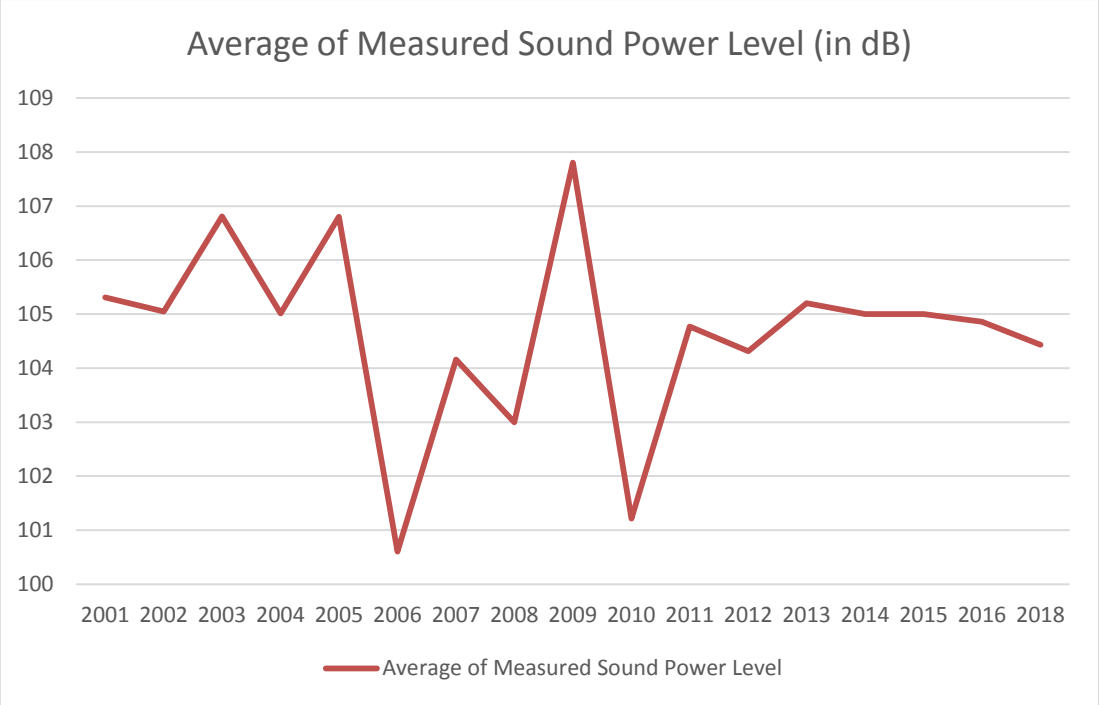
A similar picture emerges for the *guaranteed* sound power levels:



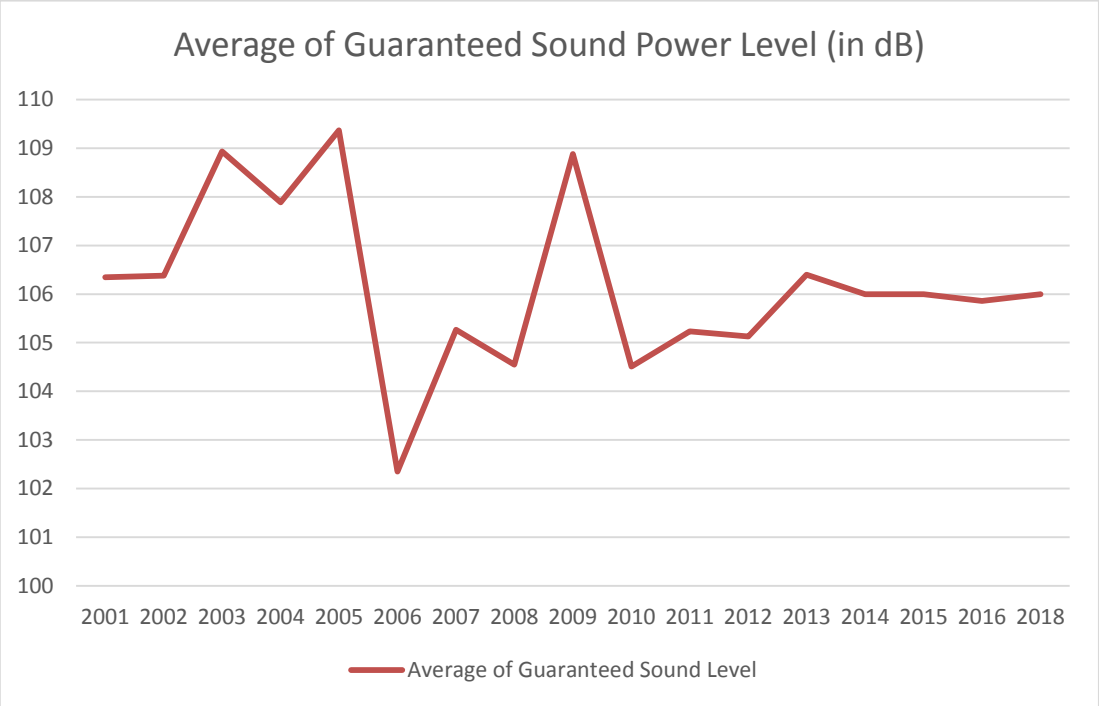
The number of equipment certified peaks in 2003 and then decreases. For the less powerful equipment types, the number of observations is very limited.



The overall average *measured* sound power levels show a decreasing trend since 2005 but with considerable variation between different years and a spike in 2009:



A similar trend can be observed for the *guaranteed* sound power levels:

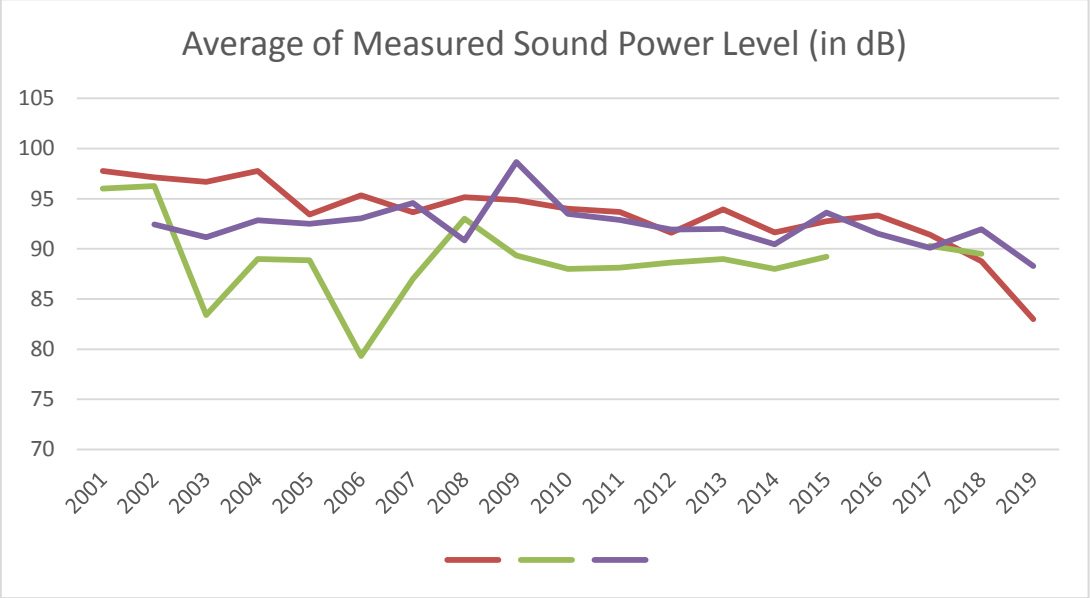


e. Power generators (< 400 kW)

Power generators below 400 kW are regulated in four different power classes (three in the OND):

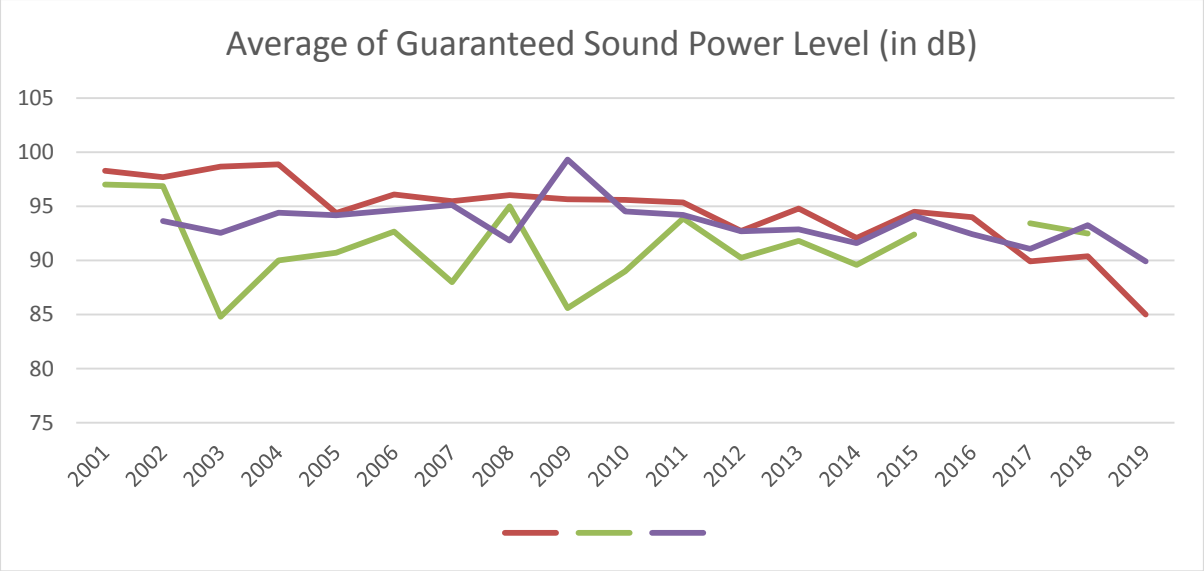
Electric power (P_{el}) [kW]	**Directive**	**Permissible sound power level** [dB/1 pW]			
		1986-1989	**1989-2001**	**2002-2006 (stage I)**	**2006- (stage II)**
$P_{el} \leq 2$	84/536/EEC 2000/14/EC	104	102	$97+\lg P_{el}$	$95+\lg P_{el}$
$2 < P_{el} \leq 8$			100	$98+\lg P_{el}$	$96+\lg P_{el}$
$8 < P_{el} \leq 240$		103		$97+\lg P_{el}$	$95+\lg P_{el}$
$P_{el} > 240$		105			

The following graph shows the evolution of the *measured* sound power levels over time for the different power classes:

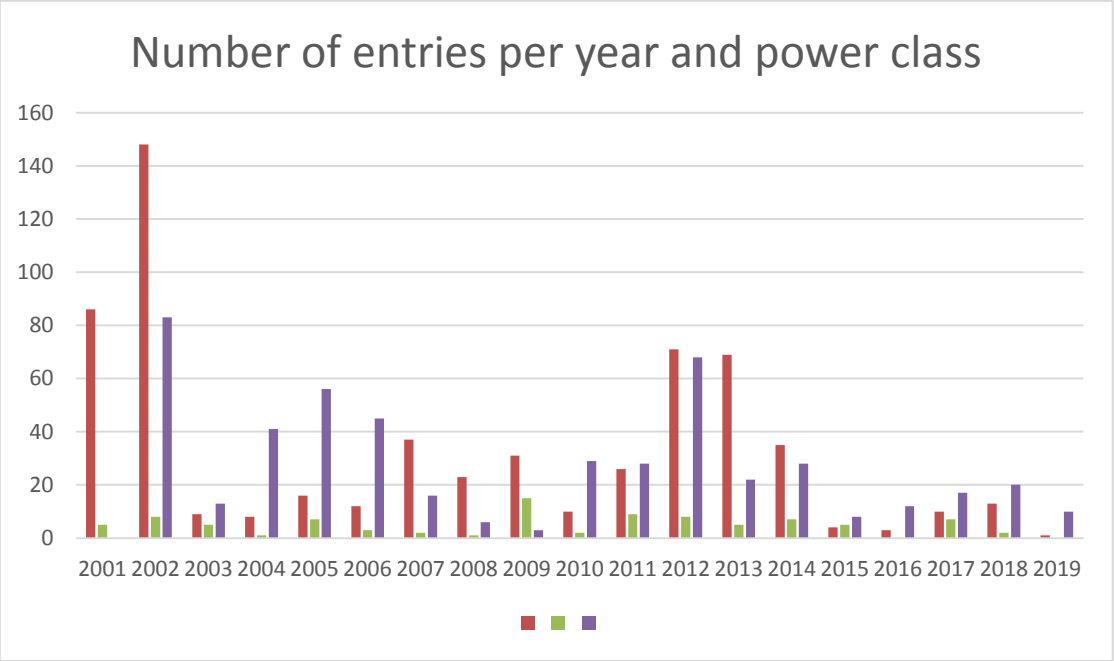


It can be observed a clearly downward sloping trend for the equipment with 2 to 10 kW, which is a bit less pronounced for the two other categories but still visible.

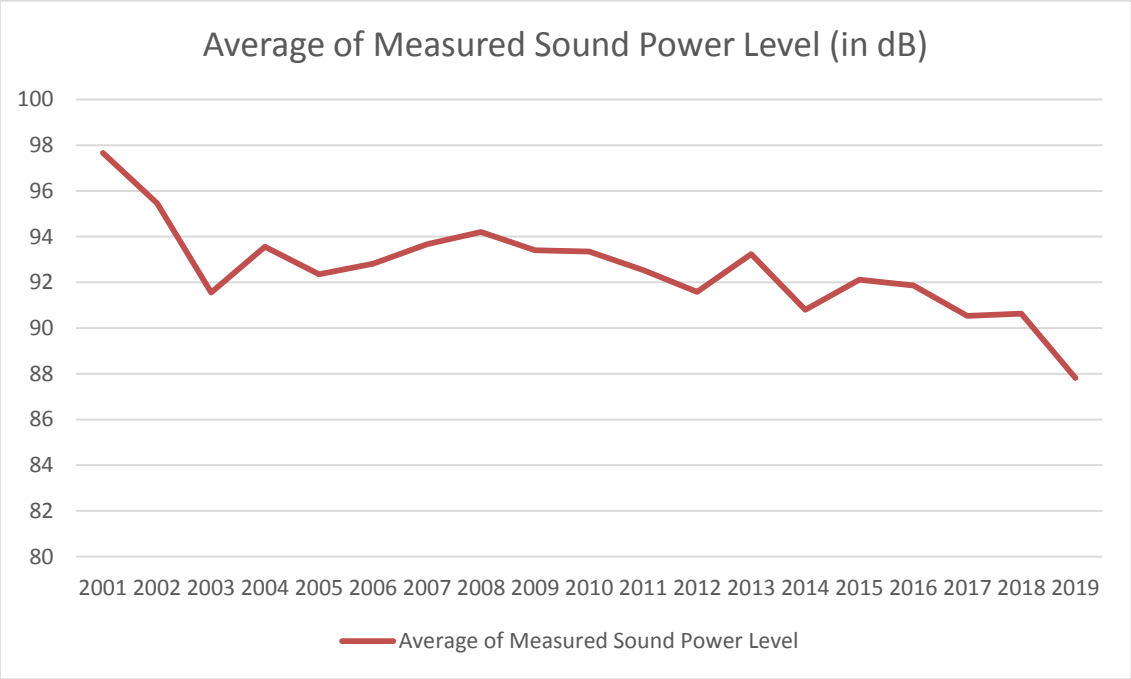
A very similar picture emerges for the *guaranteed* sound power levels:



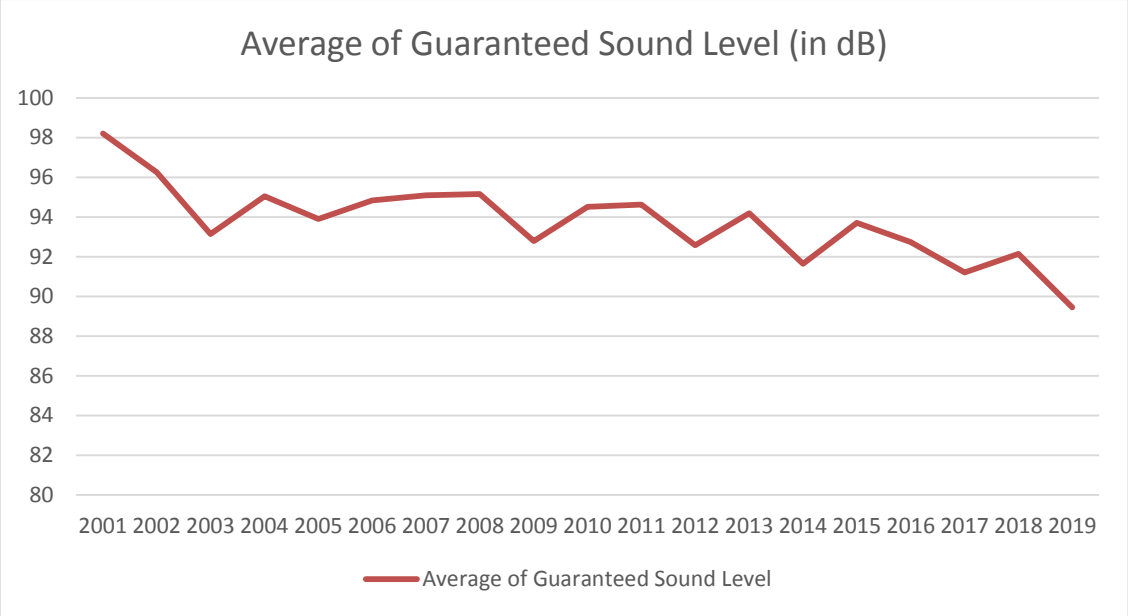
From the above graph it can be seen that for some years there is no data for the least powerful category (< 10 kW). More generally, there are considerably fewer data for this power class throughout the years:



Looking across power classes, it can be observed a clear downward trend in *measured* sound power levels, going from almost 98 dB in 2001 to less than 90 dB in 2019:



The same can also be observed for the *guaranteed* sound power levels:

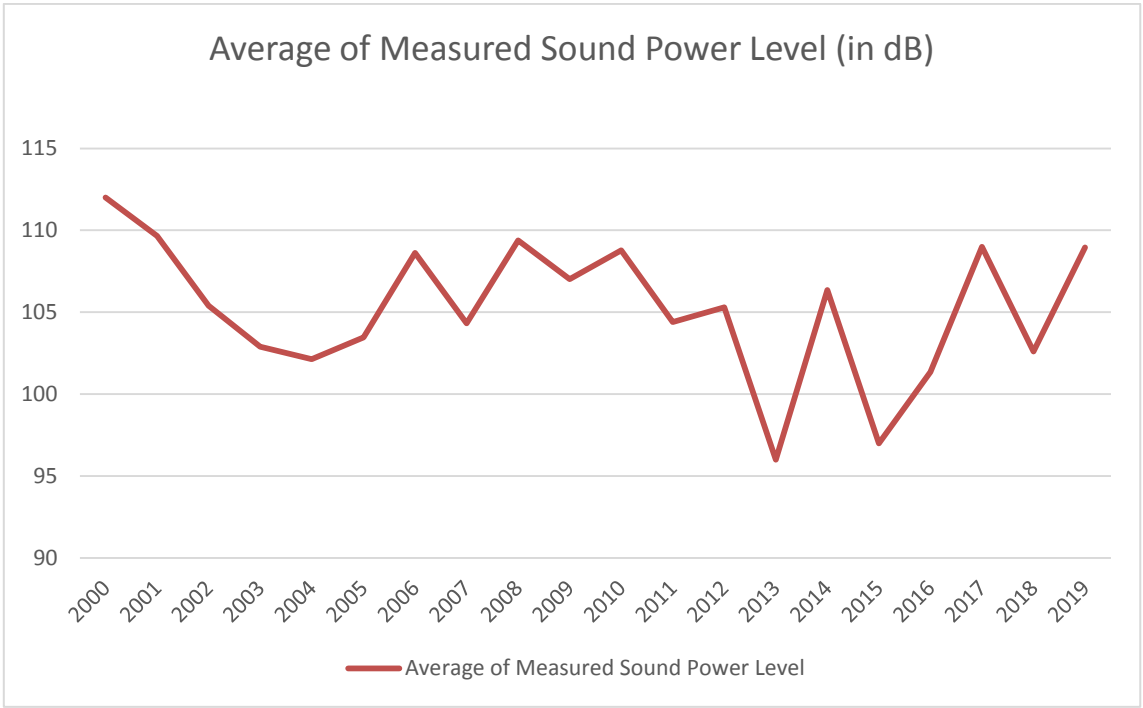


3. Selected equipment types subject to noise marking only (Article 13 equipment)

The analysis was carried out for:
- chain saws, portable (item 6),
- hedge trimmers (item 25), and
- high pressure water jet machines (item 27).

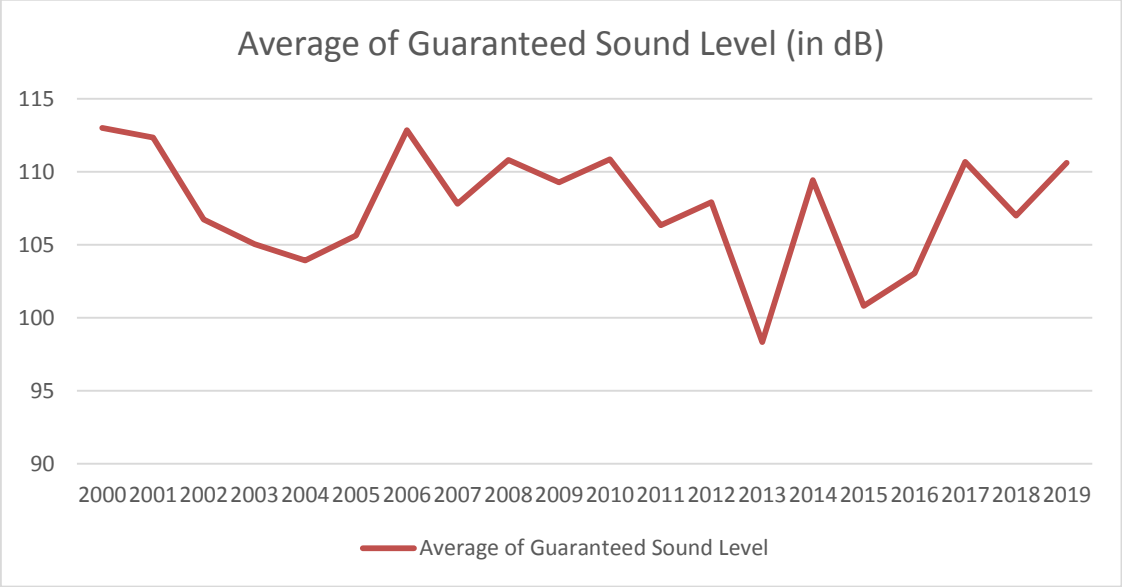
a. Chain saws, portable

The following graph shows the evolution of *measured* sound power levels over time:

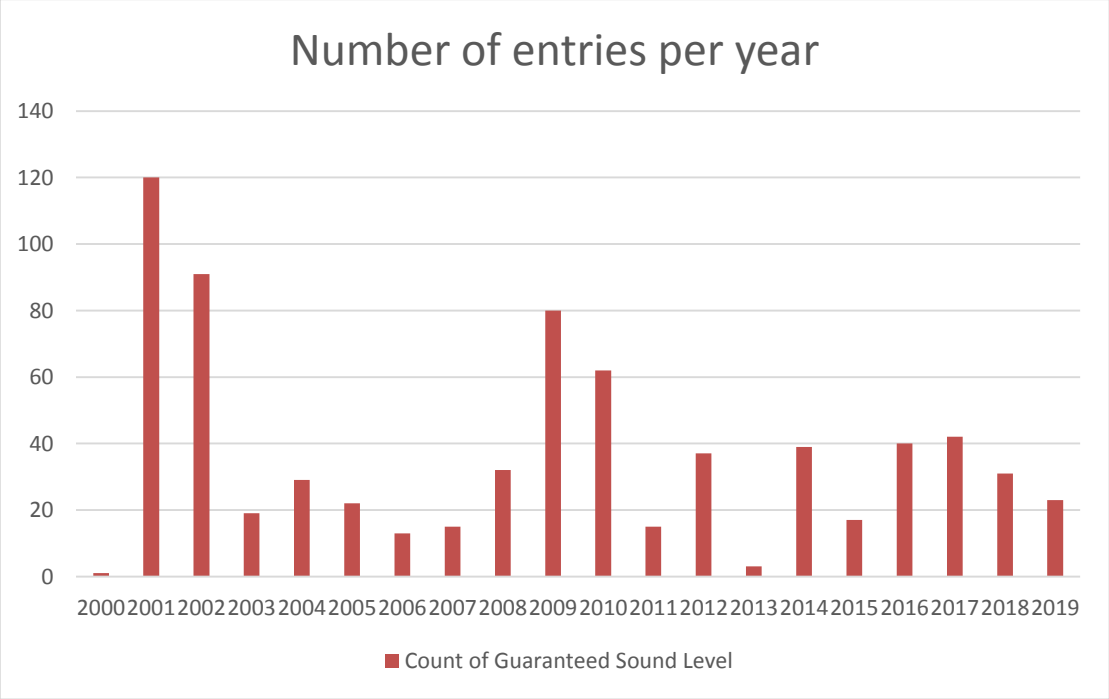


The noise levels have practically not changed much over the entire period. Some years show lower noise levels but these also tend to be years with relatively few entries in the database and these are therefore less meaningful.

A similar picture emerges for the *guaranteed* sound power levels:

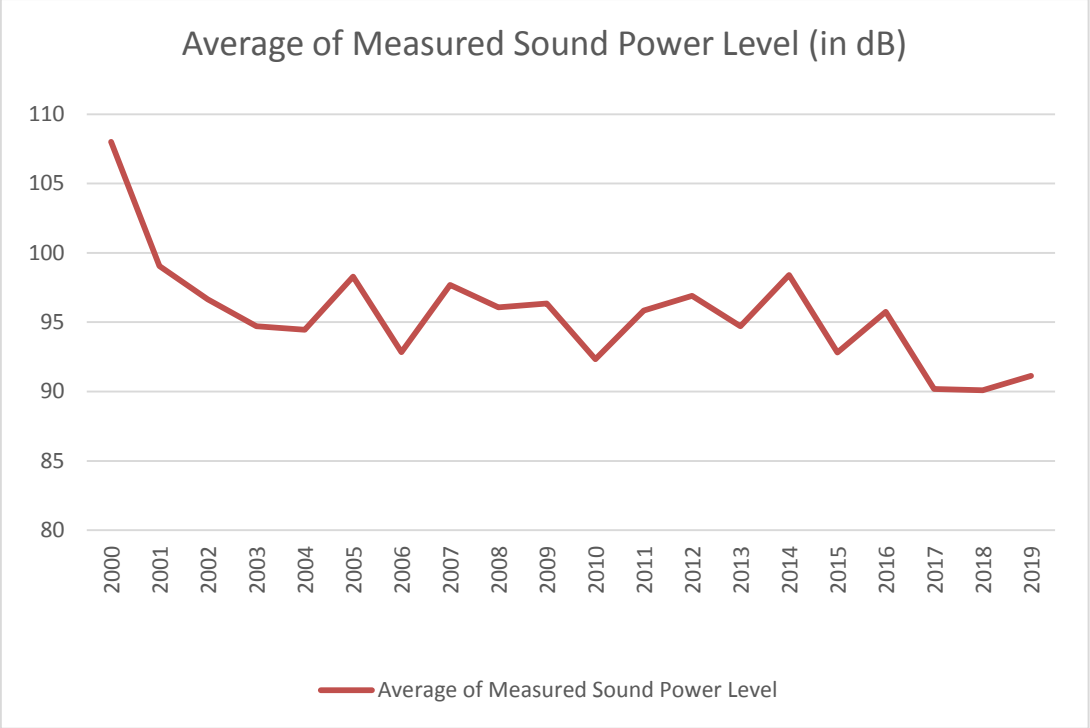


Finally, the number of entries in the database per year is shown below:



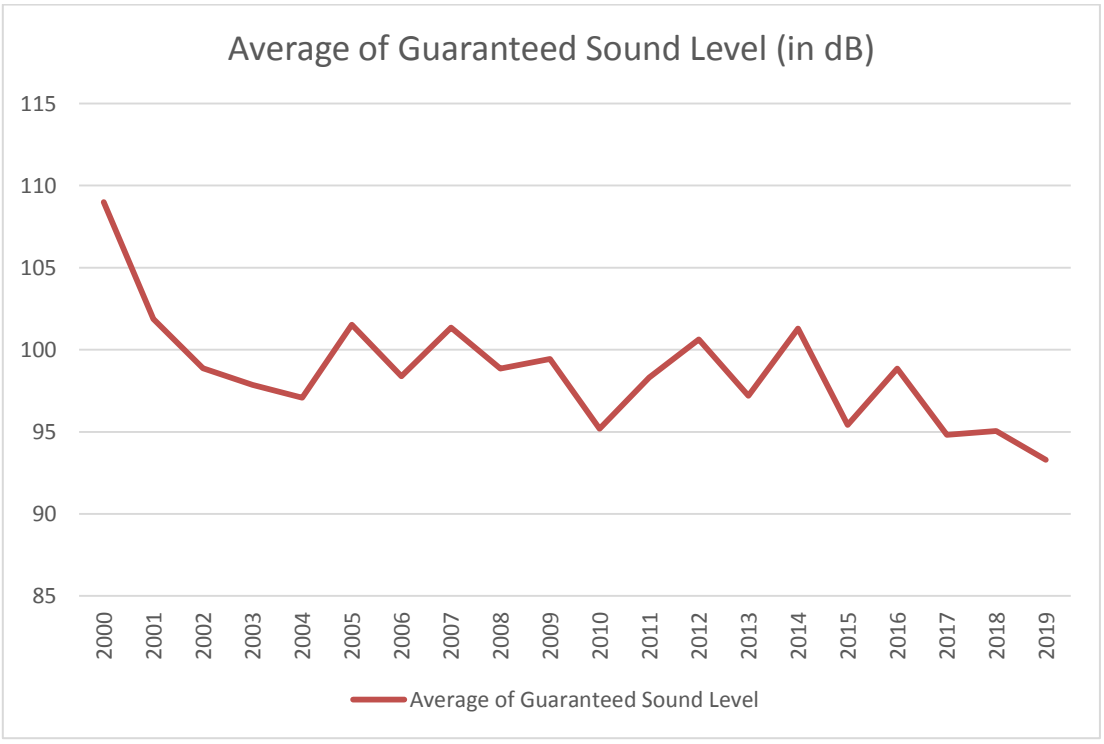
b. Hedge trimmers

The following graph shows the evolution of *measured* sound power levels over time:

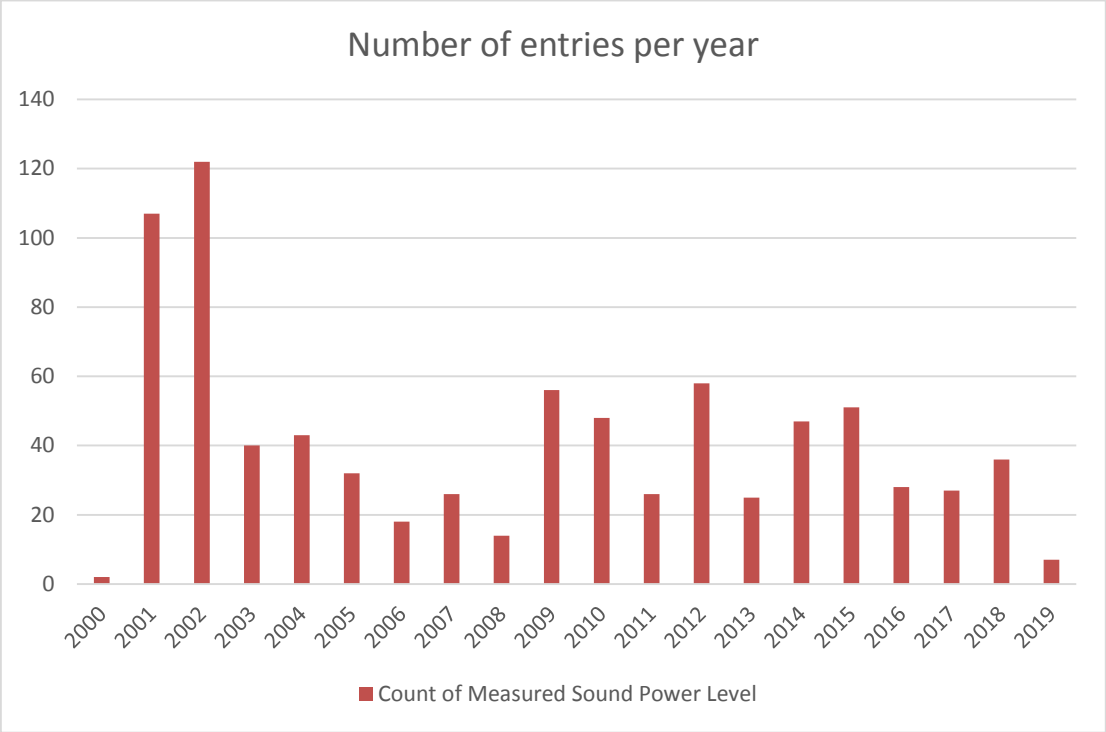


There is a downward trend in sound power levels between 2001 (the first year with a significant number of entries) and 2018 (last year with considerable number of data points). The reduction in measured sound power levels is considerable in that timeframe (from 99 dB to 90 dB).

A very similar picture emerges for *guaranteed* sound power levels:

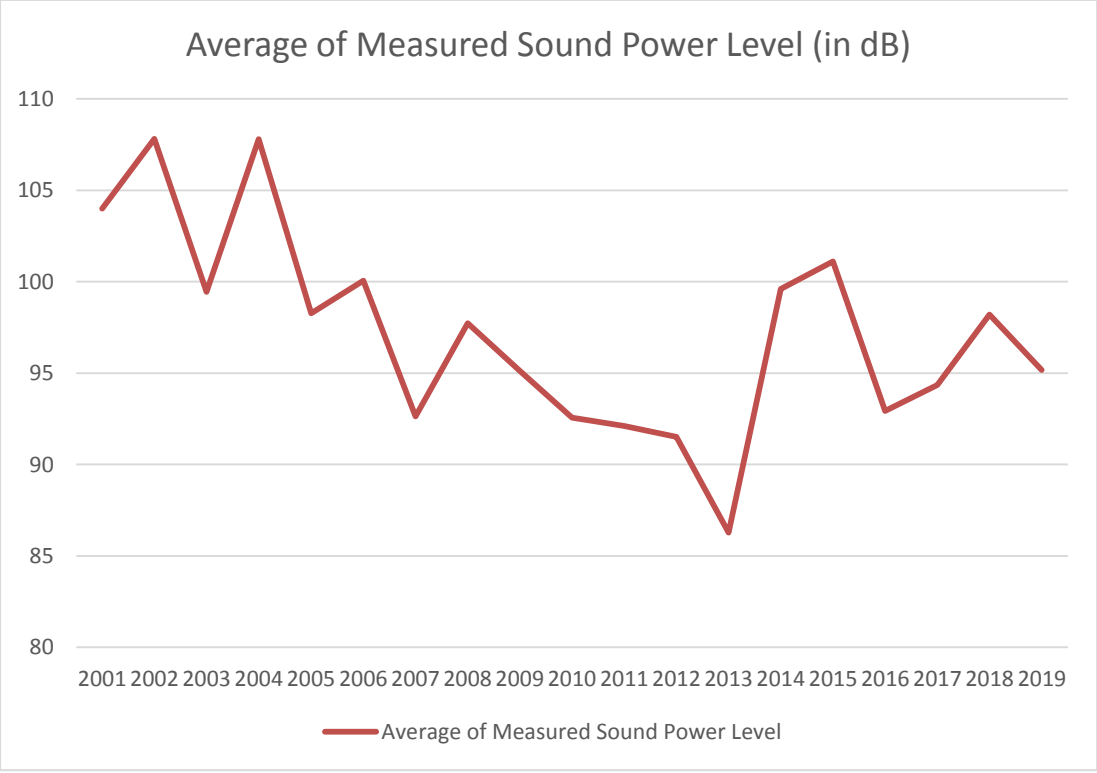


It should be noted that for the years 2000 and 2019, there are just very few entries in the database:



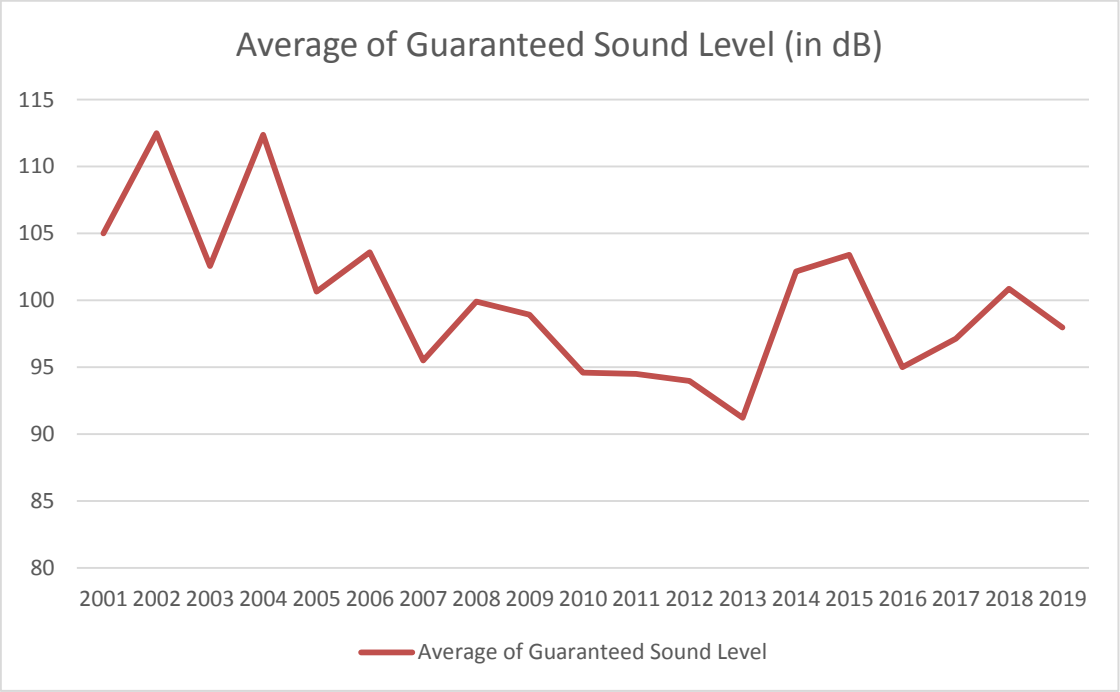
c. High pressure water jet machines

The following graph shows the evolution of *measured* sound power levels over time:

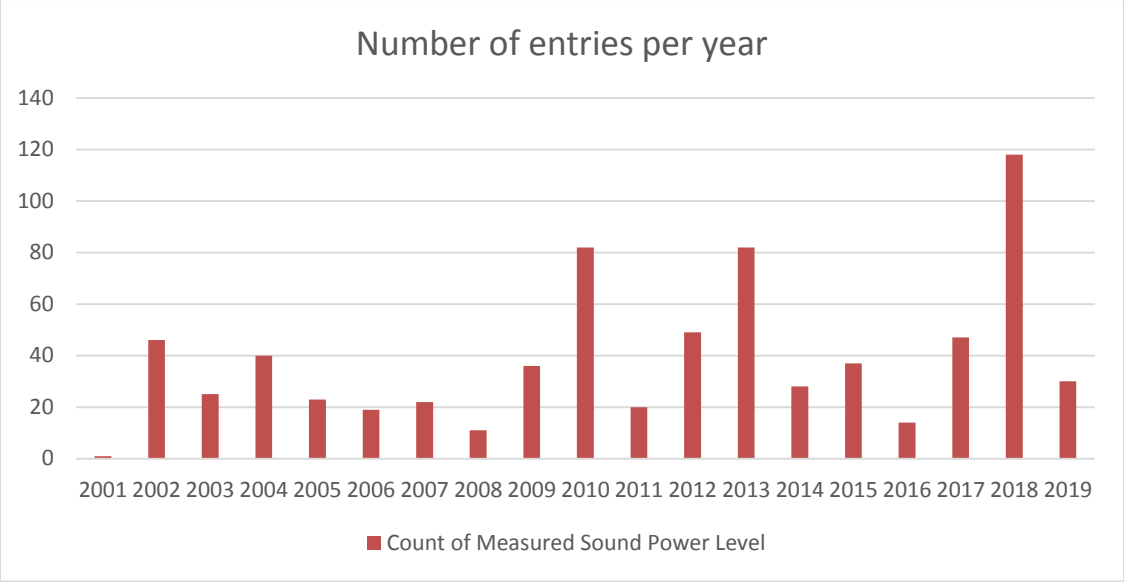


It can be observed a clearly downward sloping trend in sound power levels between 2002 (first year with significant number of data points) and 2013. The average *measured* sound power levels have gone from almost 108 dB in 2002 to 95 dB in 2019. But it can be also noted that the lowest noise levels have been reached in 2013 (below 90 dB) and then increased again. This cannot be explained by a limited number of data points for particular years, as both 2013 and 2018 have a relatively high number of observations (see below).

A similar picture can be observed for *guaranteed* sound power levels:



Finally, the number of entries in the database per year is shown below:


Number of entries per year
140
120
100
80
60
40
20
0
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
Count of Measured Sound Power Level