Review of Regulation 206/2012 and 626/2011

Air conditioners and comfort fans

Addendum regarding Comfort fans

Draft

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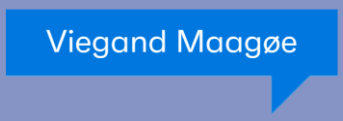

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List of Abbreviations

MEPS	Minimum Energy Performance Standard
MNPS	Minimum Noise Performance Standard
WD	Working Document
CF	Consultation Forum
SV	Service Value
IA	Impact Assessment

1 Introduction

Comfort fans are in scope of the Ecodesign regulation (EU no. 206/2012) and are proposed to be included in the Energy Labelling Regulation (EU no. 626/2011). The purpose of this Annex to the Review study is to:

- Give an overview of existing data for comfort fans;
- Gather new data;
- Evaluate previous proposals for requirements (from preparatory study, review study and at the Consultation Forum for Air conditioners) as well as current Chinese requirements;
- Evaluate different energy labelling scales, taking into account stakeholders' comments put forward during the consultation forum[1];
- Provide policy recommendations for the setting of MEPS and MNPS and appropriate energy label classes for comfort fans.

The potential energy savings for comfort fans are rather limited compared to the energy saving potentials for air conditioners, but still significant from a societal point of view (between 1 and 2 TWh/ year in 2030[2]). The need for this annex arises from the lack of data and analyses of various policy options in the review study[3].

2 Definition of types of comfort fans

This analysis includes five types of comfort fans shown in Figure 1 below. These are the same five base cases analysed in the preparatory study (2008), and also the ones found to be the most dominant in the 2020 market search and on the Topten list[4] in 2020. As in the preparatory study, this annex will analyse the fans only as two groups: Ceiling fans and Other fans, where the latter comprises all of the remaining categories (table, pedestal, tower and floor standing fans). This is because the energy efficiency of the other fan types are directly comparable, and the difference of table, pedestal and floor standing fans generally only lies in the way they are placed, not in the fan unit itself (i.e. the blades). The only exception might be the tower fans (which uses a cross-flow fan), in which the blades are placed inside a tube which directs the airflow in a given direction.

This is also the case for "bladeless fans", as the one shown in Figure 2, where the fan itself of centrifugal type) is placed inside the product, which then directs the air out in a different angle. However, these fans were very poorly represented on the market at the time of the preparatory study (2008), and therefore they were not considered separately. In the data search made for this report, only 2 models were found.

[1] Air conditioners, heat pumps and comfort fans – Consultation Forum meeting on 9 September 2019 in Brussels

[2] Estimations of the savings are based on estimations made in the preparatory study and the stock estimated in the review study. Preparatory study on the environmental performance of residential room conditioning appliances (airco and ventilation), Study on comfort fans –final report October 2008, after SH comments, LOT 10, ARMINES for DG TREN 2008 and Review of Regulation 206/2012 and 626/2011 Air conditioners and comfort fans, VM and ARMINES for DG ENER May 2018.

[3] Review of Regulation 206/2012 and 626/2011 Air conditioners and comfort fans, VM and ARMINES for DG ENER May 2018.

[4] https://www.topten.eu/private/products/comfort_fans

Type	Typical characteristics	Example
Table fan – Desk fan	Propeller diameter: 250-400 mm Air flow: 1300-3600 m^3/h Electrical supply: 35-60W	 Delhongi
Pedestal fans	Propeller diameter: 250-450 mm Air flow: 2000-4500 m^3/h Electrical supply: 40-70 W	 Alpatec
Ceiling fans	Propeller diameter: 900-2000 mm Number of blade: 3-5 Electrical supply: 50-150W (without lights)	 Coolandwarm
Tower fans	Height: 350-1400 mm Air flow: 400-2200 m^3/h Electrical supply: 35-50W	 Alpatec
Floor standing fans	Propeller diameter: 300-500 mm Air flow: 3000-6000 m^3/h Electrical supply: 40-120W	 Alpatec

Figure 1: Different types of comfort fans and their technical characteristics [Ecodesign LOT 10, Preparatory study on the environmental performance of residential room conditioning appliances (aircon and ventilation), ARMINES, October 2008]

Figure 2: Bladeless fan of the type Dyson Cool

3 Proposed Ecodesign requirements and energy labelling requirements from the review study and working document

This section describes the review study's findings and the working document's proposals according to MEPSs and energy labelling scale for comfort fans. Furthermore, a comparison is made between the data from the review study and the new data gathered in this IA.

The energy efficiency is expressed in a Service Value (SV), which has the unit $(m^3/min)/W$, i.e. the amount of air moved by the fan per minute, per watt power input. Therefore, the higher the SV, the more efficient the fan. It should be noted that in China the energy efficiencies are measured according to standard GB12021.9-2008, whereas in the EU the energy efficiencies are based on standard EN IEC60879 :2019. However, a comparison between the two test standards shows that there is no difference in testing except for tower fans and bladeless fans.

3.1 Ecodesign requirements in the review study

In the review study it was concluded that there is a lack of data for comfort fans on the market in Europe, due to manufacturers and importers not providing the information and data required according to the Ecodesign regulation. No new MEPS thresholds were therefore suggested in the review study, but in the preparatory study MEPS were suggested as a policy option:

1. *Setting minimum energy efficiency requirements on comfort fans with the proposed requirements (from the preparatory study) with the risk of banning many comfort fans on the European market (expected savings in the preparatory study was slightly below 1 TWh).*

Furthermore, in order to improve the compliance with the information requirement, increased market surveillance was suggested as a policy option:

2. *Enforcing better market surveillance on the current information requirement and gathering accurate information on comfort fan efficiency and test methods through a complementary study/efficiency tests with corresponding costs.*

The ecodesign information requirement has been in force for 8 years and the data search shows that the compliance rate for the information requirement has been low during this time, and it is questionable whether the suggested policy option for enforced market surveillance is enough to change this. But that being said, the need for better market surveillance is obvious, and this option should be promoted along with other policy options, even though it cannot stand alone.

3.2 Ecodesign requirements - proposed in working documents

After the Review study, a Consultation Forum was held, where working documents for a draft updated regulation were presented. The proposed MEPSs from the working documents are shown in Table 1. After the Consultation Forum the working documents were updated with new MEPS based on stakeholder inputs, these values are also shown in Table 1. Lastly, the Chinese MEPS are shown for comparison.

It should be noted that the MEPS proposed at the CF are almost, but not completely, the same as proposed in the preparatory study, except for ceiling fans, where the requirements proposed in the preparatory study were lower (i.e. not as strict). In the preparatory study[5] the proposal for MEPSs

[5] Preparatory study on the environmental performance of residential room conditioning appliances (airco and ventilation), Study on comfort fans –final report October 2008, after SH comments, LOT 10, ARMINES for DG TREN 2008

for other fans was based on Chinese MEPS (from 2008) and for ceiling fans the proposal was based on Taiwanese MEPS, which was considerably less strict than the Chinese MEPS. In April 2021 stricter Chinese MEPSs have been notified at WTO. These MEPSs are for other fans in general stricter than the MEPS proposed during the CF and less strict or at the same levels as the MEPSs proposed for ceiling fans during the CF.

Diameter		**Chinese MEPS, Capacitive type**	**Chinese MEPS, shaded poles**	**MEPS Proposed in WD at CF**	**MEPS Proposed in WD after CF**	**MEPS proposed in the prepatory study**
From	**to**	SV (m^3/min)/W	SV (m^3/min)/W	SV (m^3/min)/W	SV (m^3/min)/W	SV (m^3/min)/W
Tower fans		0.12	0.12	0.5/0.65*	0.65*	0.54
Other fans						
0	20				0.65	0.54
20	23			0.5	0.65	0.54
23	25			0.5	0.65	0.64
25	30	0.67	0.49	0.65	0.65	0.74
30	35	0.75		0.75	0.65	0.81
35	40	0.9		0.75	1.08	0.9
40	45	1		1.08	1.08	1
45	50	1.1		1.08	1.08	1.1
50	60	1.3		1	1.08	1.13
60	220			1.1	1.3	1.3
Ceiling fans						
0	60			1.4	2.6	0.54
60	90			2.6	2.6	0.87
90	105	2.75	1.9	3.1	3.6	1.15
105	120	2.79	2.16	3.1	3.6	1.15
120	140	2.93	2.47	4	3.6	1.45/1.46
140	150	3.15	2.55	4.1	3.6	1.45
150	180	3.33	2.7	4.3	4.3	1.47
180	-	3.47	2.77	4.3	4.3	

*Table 1: MEPSs proposed during Consultation Forum and the Chinese MEPS in test standard GB/T 13380-2018. *no specific MEPS is set for tower fans, but it is assumed that the diameter of the tower fans would be below 30 cm, therefore, these MEPS would be imposed on the tower fans.*

Mexico also has a fan regulation with MEPS defined as Service values, which are shown in Table 2. However, it is unclear if the measurement standard is similar to the standards used in EU and in China. The requirements are less ambitious than those of China and those suggested in the CF working document. These requirements are therefore not considered further.

Type of fans	**Blade diameter (m)**	**Minimum Energy Efficiency Value (m3/min)/W**
Wall, pedestal, floor and table fans	Greater than 0.1016 (4 in) and less than or equal to 0.3048 (12 in)	0.30

	Greater than 0.3048 (12 in) and less than or equal to 1.52 (60 in)	0.65
Ceiling fans	Greater than 0.9144 (36 in) and less than or equal to 2.130 (84 in)	1.80

Table 2: MEPS values from Mexican regulation on fans[6].

In Figure 3 and Figure 4 below, the service values as a function of diameter is shown for Ceiling fans (Figure 3) and other fans (Figure 4). In each graph the lines represent the MEPS proposed in working documents at the Consultation Forum, the updated values after the Consultation Forum, and the Chinese MEPS (the values from Table 1). The dots represent data points for service values for fans collected for this study and in the review study (see more in Section 7: Method for data collection).

The service values shown in Figure 3 and Figure 4, come with some uncertainties, because limited information on service value of comfort fans is available. The uncertainties are described further in section 6 'Method for data collection'. However, it is believed that the data are providing a decent indication of the market, as service value is a function of max air flow and max power input, and even though the international test standard (EN IEC60879 :2019) sets requirements as to how max air flow should be measured, it is believed that it cannot differentiate much from the method used by manufacturers, even when they have not stated that they have used this standard.

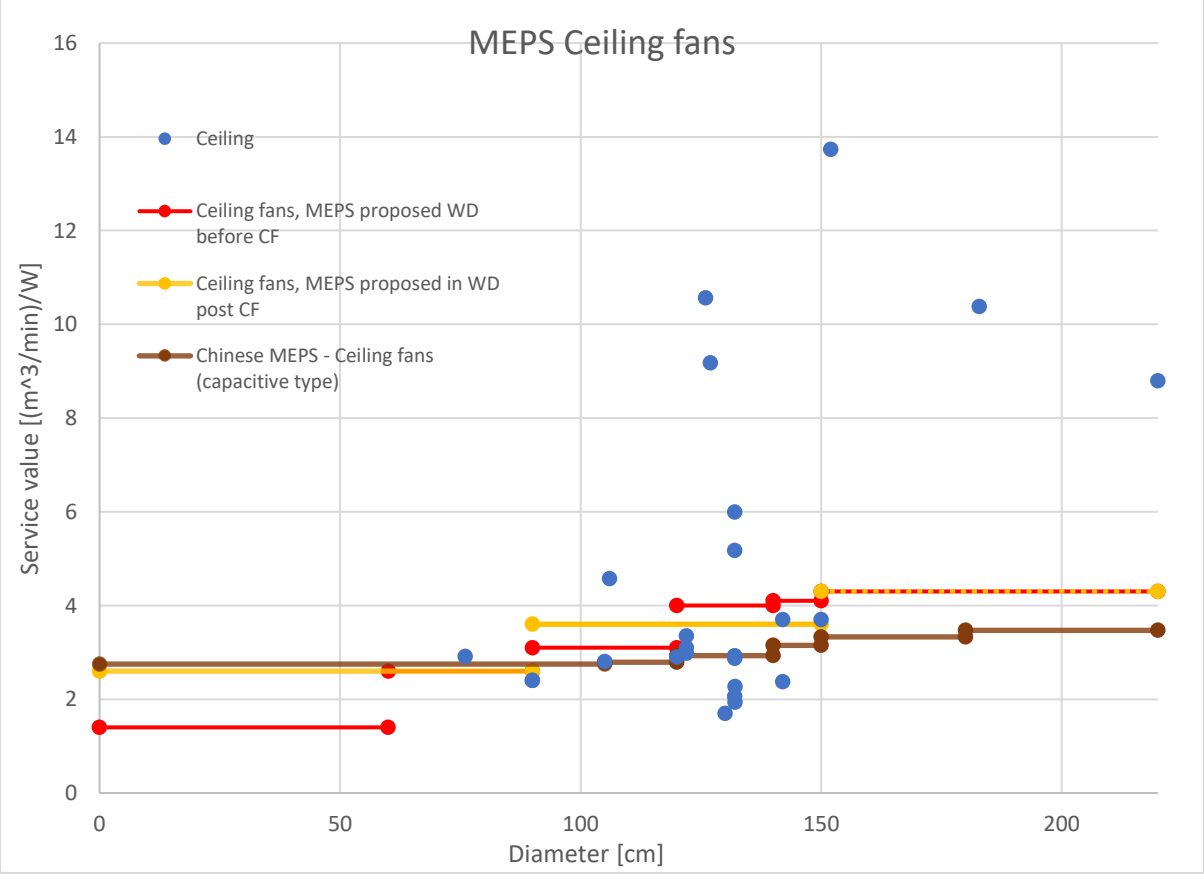

Figure 3: Data for ceiling fans collected in this study (including data from review study). Solid lines are MEPSs from working document presented at consultation forum, the revised MEPS from after consultation forum and Chinese MEPS according to standard GB/T 13380-2018.

[6] According to WTO notification G/TBT/N/MEX/493, March 2021

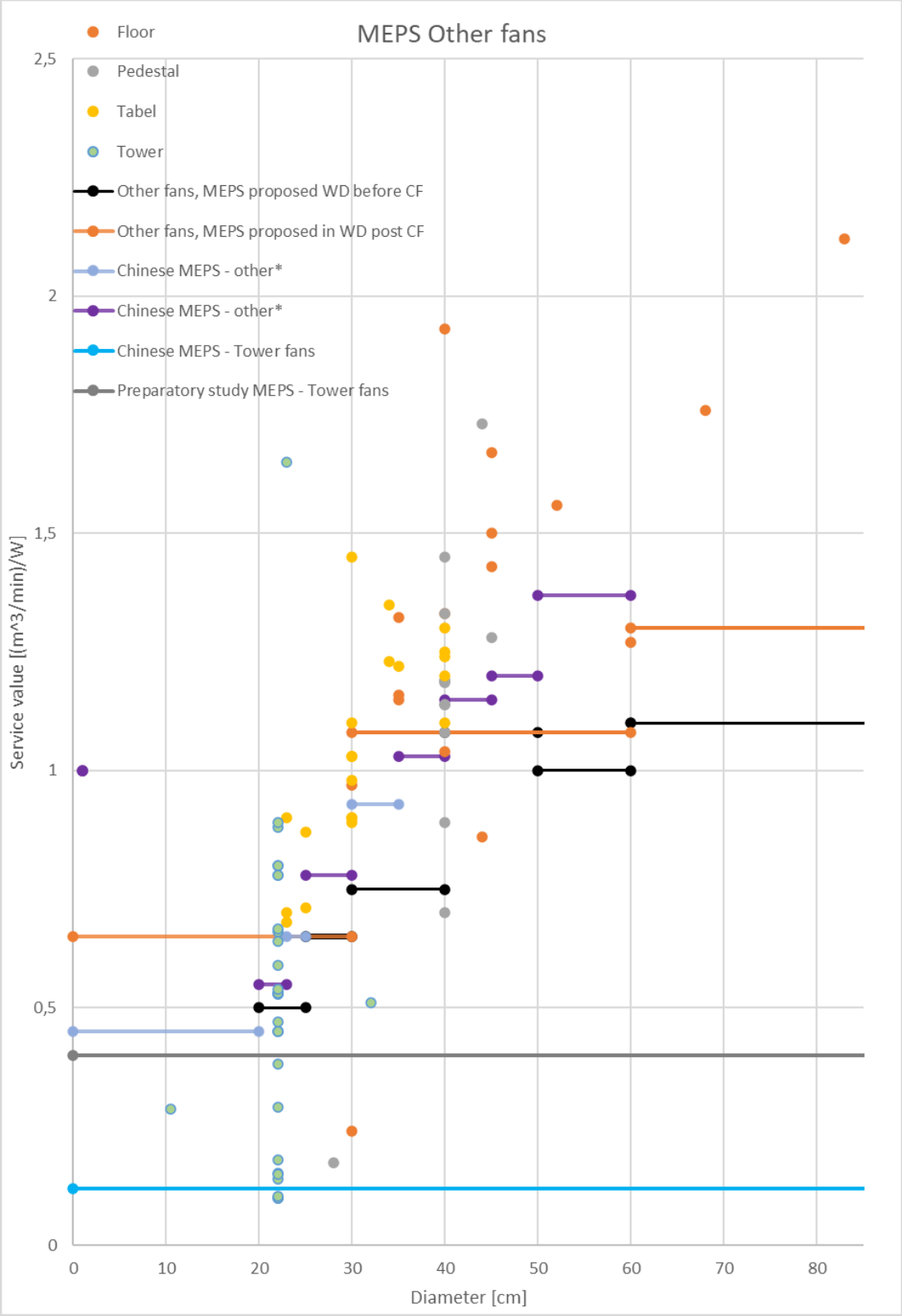

Figure 4: Data of other comfort fans collected in this study (including data from review study)[7]. Solid lines are MEPSs from working document presented at the consultation forum, the revised MEPS from after consultation forum and Chinese MEPS according to standard GB/T 13380-2018.

[7]The diameter of tower fans is estimated to 22 cm, because manufacturers did not submit data on the diameter. 22 cm was found the be the average of those tower fans that do submit a diameter of the rotor fan.

As seen in Figure 3 the MEPS proposed at the CF has many incremental steps, i.e. there are many different requirements based on different fan sizes. The same approach is used for the Chinese MEPS. In the updated MEPS after the Consultation Forum, the variation in MEPS with size has been decreased, so there are only three different MEPS.

The MEPS depend on the diameter of the fan, except for the MEPS for tower fans in both the Chinese regulation and proposal for EU MEPS in the preparatory study. When plotting the data points for the tower fans in the figures the diameter was assumed to be 22 cm (because in our data collection, information on diameter was only available for very few of the tower fans). If the diameter is actually higher, a higher share of tower fans would be non-compliant, and on the contrary if the diameter is actually lower, all tower fans for which data was found, would be compliant.

Consequences of implementing MEPSs suggested at the CF:

- More than half of the ceiling fans will not be compliant with the MEPS, but there are compliant ceiling fans of almost all sizes.
- Only very few 'Other' fans will be non-compliant, except for tower fans.
- Around half of the tower fans will be non-compliant, however if lowering MEPS to 0.45 for tower fans specifically, as suggested in preparatory study, the compliance rate will increase to around two thirds of the tower fans in the data set.
- Potential loophole for tower fans if the rotor diameter is less than 20 cm. Unless a specific MEPS is set for tower fans as suggested in the preparatory study.

Consequences of implementing MEPSs suggested post CF:

- Due to lesser variation in MEPS with size, the requirements are stricter, especially for fans with the diameter 30 to 60 cm. Therefore, a larger share of these would be non-compliant than with the MEPS presented at the Consultation Forum.
- In general fans with a diameter in the high end of each incremental step would be favoured, because the MEPS does not have as many incremental steps as in the MEPS suggested before CF (or as for Chinese MEPS). E.g. for ceiling fans two fans that have a diameter between 140 and 150 cm are compliant according to the MEPS proposed after the CF but not compliant according to the MEPS suggested before CF (or if the Chinese MEPS are implemented).
- Due to the few incremental steps in the MEPS thresholds, manufacturers might only be producing fans with the diameter close to the upper boundary of the group, as it is then easier to achieve high Service Value, but the larger diameter would lead to a higher total energy consumption.

Consequences of implementing Chinese MEPS:

- The Chinese MEPS are less ambitious than the suggested EU MEPS, and therefore very few products would be non-compliant if the Chinese MEPS were implemented.
- The MEPS for tower fans is only 0.12 and is very low compared to the MEPS suggested in WD. As a result, almost no tower fans would be non-compliant.
- Due to the many incremental steps in the MEPS thresholds, manufacturers might speculate in changing the diameter, to avoid getting banned.

As mentioned, there is a difference in testing of tower fans. The IEC standard uses the same method for testing tower fans as for "other fans", measurement of air speed by anemometer in a plane at a conventional distance from the fan. Conversely, GB/T 13380-2018, connects the tower fan to an air flow measurement device, which gives an indirect air flow measurement, measured as pressure

difference in a calibrated nozzle. In practice, the air flow measured in GB/T standard might be higher, because the air flow is measured next to the unit, however, the positioning of the nozzle apparatus and the connection is not detailed enough, in the standard, to confirm.

The Chinese MEPS standard GB 12021.9-2008 and the test standard GB/T 13380-2018 does not consider bladeless fans. However, bladeless fans are included in the international test standard EN IEC 60879:2019 and bladeless fans can therefore be tested. In the search for data, only data for two bladeless fans were found on Topten's website. Topten classifies bladeless fans as tower fans and bladeless fans are therefore represented in the figures as tower fans. The service value of the two bladeless fans is 0.54 and 0.45.

It can also be specified in the scope of the regulation, that bladeless fans are considered tower fans, and set common MEPS for the two types, as the two types are very similar.

3.3 Potential energy savings based on MEPS from CF

This section estimates the potential energy savings that can be achieved with the proposed Ecodesign requirements for comfort fans put forward in the working documents presented at the consultation forum for air-to-air air conditioners, air-to-air heat pumps and comfort fans.

In the preparatory study (2008) it was estimated that the electricity consumption for fans in the BAU scenario would be 3.2 TWh/y in 2025 (EU25). However, this was based on the assumption that the stock would decrease by 25% from 2011 to 2025. In the review study (2018) it was found, based on newer PRODCOM data, that the annual sales increased with around 5% p.a. from 2009 to 2015. However, sales fluctuated, and it was concluded that the sale is dependent on the temperature in the summer. Therefore, in this analysis the sale is assumed to be constant from 2015 and onwards and is set to the average of 2009-2015. The stock is estimated assuming that the average lifetime is 10 years. Thus, the annual consumption in the BAU scenario is estimated to be 3.8 TWh/y in 2040 (EU 27), when assuming no change in operating pattern nor capacity of fans[8].

Preparatory study, EU25	**2025**	
Sale	17,000	000 units/year
Stock	190,000	000 units
Electricity savings consumption	3.2	TWh/year
Electricity savings	1.2	TWh/year
Extrapolated values based on the stock in RS, EU27	**2040**	
Sale	22,000	000 units/year
Stock	224,000	000 units
Electricity savings consumption	3.8	TWh/year
Electricity savings	1.4	TWh/year

Table 3: calculating baseline based on data from preparatory study and review study

In the preparatory study it was estimated that application of MEPS would result in an annual saving of 1.2 TWh per year (EU25) when fully implemented in 2025, which is equal 38% reduction of the annual electricity consumption in 2025.

[8] weighted average number of full load equivalent hours is 320 hours per year.

The MEPSs in the preparatory study are very similar to those presented after the Consultation Forum[9], and thus the percentage savings at full implementation in 2040 have been assumed to be the same percentage(38%) reduced by default improvement and effect of TopTen Europe from 2005 to 2025 and taking into account the high compliance rate for other fans in the data set. This is resulting in a assumed savings corresponding to 25% reduction in the total electricity consumption in 2040. This assumption have been made although that the compliance rate for the appliances in the data set is high, given that the compliance rate is assumed low for the many comfort fans on the marked for which no information about the service value or not sufficient information to calculate the service value is found. Based on lifetimes of fans of up to 10 years, full implementation can be expected in 2040. Hence a 25% energy saving can be expected by 2040, and with the stock trend from the review study[10], this yields around 1.1 TWh/y[11] by 2040.

The energy savings resulting from energy labelling of comfort fans are not estimated in the review study nor in the preparatory study. We assume that if implementing both MEPS and Energy labelling at the same time, the MEPS will yield much higher energy savings in the short term, because many poor performing products are removed from the market, and the energy labelling will lead to larger savings in the long run[12].

4 Analysis of different Energy labelling scales

Comfort fans have until now not been included in the scope of the energy labelling regulation[13], but were included in the scope in the working document presented during the consultation forum as a possible way forward. In the working documents it was suggested to place the comfort fans in one common scale for all fan types, and to make this scale independent of fan diameter. However, based on the data analysis it was found to be relevant to look into three further Energy Labelling options:

1. Common energy labelling scale for all types of comfort fans:
    a. Different sizes of labelling classes
    b. Dependent on the diameter
2. Separate energy labelling scales for ceiling fans and for other comfort fans (includes floor, pedestal, tower, bladeless and table) and dependent on the diameter.

4.1 Energy labelling thresholds – proposed in working documents

Comfort fans are included in scope of the draft working document for energy labelling. It was suggested to place all fan types on one common scale, independent of diameter and with all classes having similar width, as shown in Figure 5. Here these labelling classes are shown along with data collected as part of this report.

[9] The MEPSs proposed in the preparatory study are comparable to MEPSs proposed in the working document for “other fans”. For ceiling fans, the MEPS proposed at the consultation forum are more stringent than the MEPSs in the preparatory study, but since ceiling fans are less than 3% of the total stock, they have only very little influence on the energy consumption

[10] In the review study no estimation of potential energy savings was made.

[11] The potential savings derived in the preparatory study are increased with the increased stock (compared to the expectations in the PS) reported in the review study.

[12] In accordance with the assumptions for AC in the review study.

[13] EU 626/2011 EU COM delegated regulation of energy labeling of air conditioners.

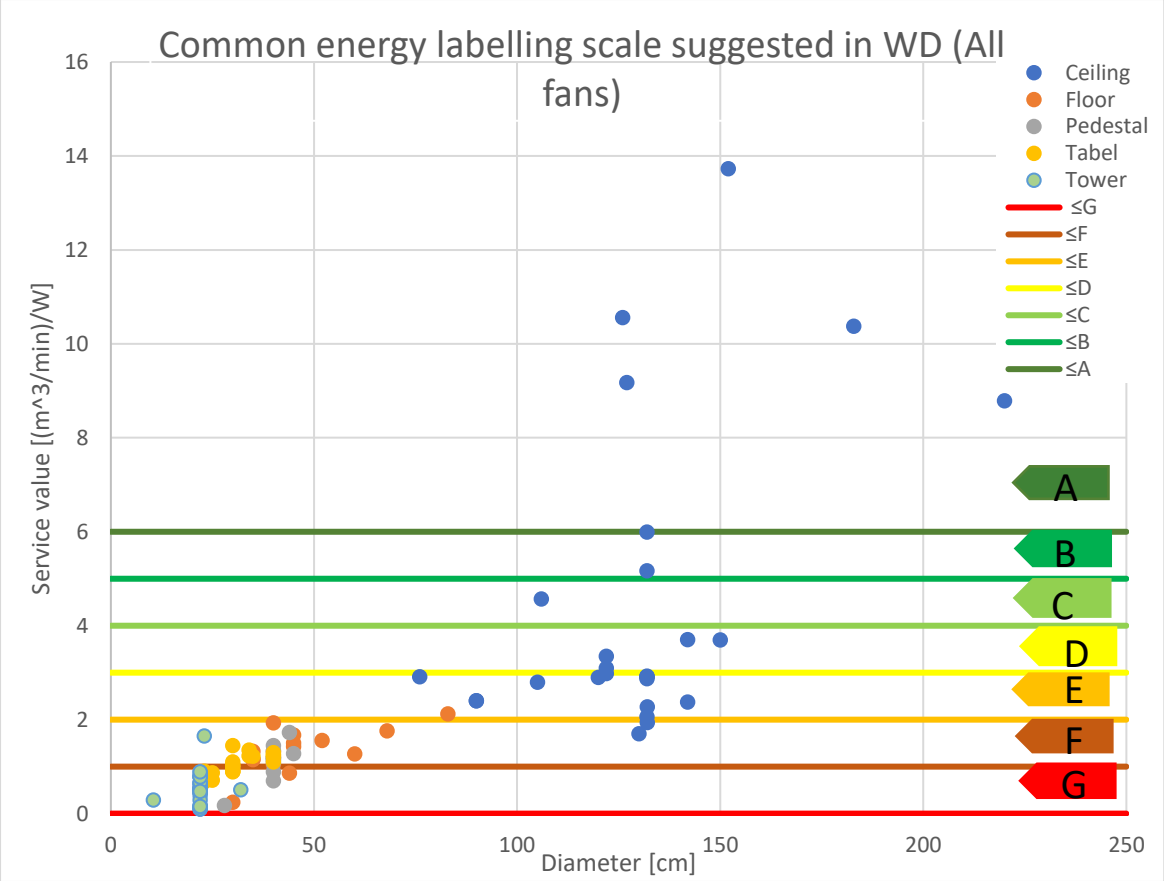

Figure 5: Energy label classes suggested in the working document

In Figure 5 it can be seen that class A is populated by a considerable number of celling fans. Therefore, the proposed scale does not comply with the provisions of the framework regulation for energy labelling[14], stating that class A should be empty at the time of implementation. Furthermore, Figure 5 also shows that all fans of "other types", except one, are in class F or G. Thus, the proposed scale only to a very limited extent allows end-users to distinguish between the "other types" fans on the market according to their energy efficiency. Therefore, alternative suggestions for energy labelling classes are analysed in the following section.

4.1.1 The Chinese labelling scale

In Table 4 the Chinese energy efficiency scale and the EU labelling scale proposed at the CF in 2019 is shown. For the Chinese scale, grade 3 is the threshold for the lowest labelling class and grade 1 is the threshold for the best labelling class. The Chinese energy scale is dependent on the diameter. The differences between the classes are small compared to the labelling scale proposed in the WD. The thresholds for all the Chinese classes for ceiling fans, are in class E and D of the labelling scale proposed in the WD. For other fans, the thresholds for the all classes are in class G, F and E of the labelling scale proposed in the WD. Therefore, it is assessed that the Chinese scale does not allow the end-users to distinguish between fans according to their energy efficiency level to an acceptable extent.

Diameter	**Chinese, WTO 2021, lower thresholds for the classes**	**Labelling scale proposed in WD at CF, lower thresholds for the classes**

[14] According to article 11 paragraph 8 of the energy labeling frame work regulation[14]
https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1369&from=EN

		Gr. 3	Gr. 2	Gr. 1	G	F	E	D	C	B	A
From	**to**	**SV (m³/min)/W**			**SV (m³/min)/W**						
Tower fans		0.12	0.12	0.12	-	***1***	**2**	3	4	5	6
Other fans											
0	20	0.45	0.7	1	-	***1***	2	3	4	5	6
20	23	0.55	0.84	1.1	-	***1***	2	3	4	5	6
23	25	0.65	0.95	1.3	-	***1***	2	3	4	5	6
25	30	0.78	1.05	1.5	-	***1***	2	3	4	5	6
30	35	0.93	1.15	1.65	-	***1***	2	3	4	5	6
35	40	1.03	1.35	1.85	-	***1***	2	3	4	5	6
40	45	1.15	1.5	2.15	-	***1***	***2***	3	4	5	6
45	50	1.2	1.55	2.4	-	***1***	***2***	3	4	5	6
50	60	1.37	1.7	2.65	-	***1***	***2***	3	4	5	6
60	220				-	***1***	***2***	3	4	5	6
Ceiling fans											
0	60	2.75	2.87	2.95	-	1	***2***	3	4	5	6
60	90	2.75	2.87	2.95	-	1	***2***	3	4	5	6
90	105	2.79	2.93	3.1	-	1	***2***	3	4	5	6
105	120	2.93	3.08	3.22	-	1	***2***	**3**	4	5	6
120	140	3.15	3.32	3.45	-	1	2	***3***	4	5	6
140	150	3.33	3.52	3.68	-	1	2	***3***	4	5	6
150	180	3.47	3.67	3.81	-	1	2	***3***	4	5	6
180	-				-	1	2	***3***	4	5	6

Table 4: EU energy labelling scales suggested in working document at CF 2019 and Chinese energy label grades, GB 12021.9-202X WTO notification G/TBT/N/CHN/1578 April 2021. Bold and italic indicate in which EU class the Chinese grades are for the specific diameter interval.

4.2 Common energy labelling scale for all fans

4.2.1 Common labelling scale independent of the diameter – differentiated classes

An alternative distribution of energy efficiency classes is shown in Figure 6 and Figure 7, where the width of the classes varies along the scale. The scale is based on the collected data and set up to ensure that class A is empty, and that "other fans" are distributed across more classes, making it easier for consumers to differentiate between them according to their energy efficiency. This will also make it possible for manufacturers of "other fans" to improve the energy class of their product, thus creating more of an incentive to do so.

Even though this suggestion helps differentiate the "other fans" from each other, they are still all placed in the 4 worst classes (Figure 7), whereas ceiling fans are distributed in the three classes B, C, and D.

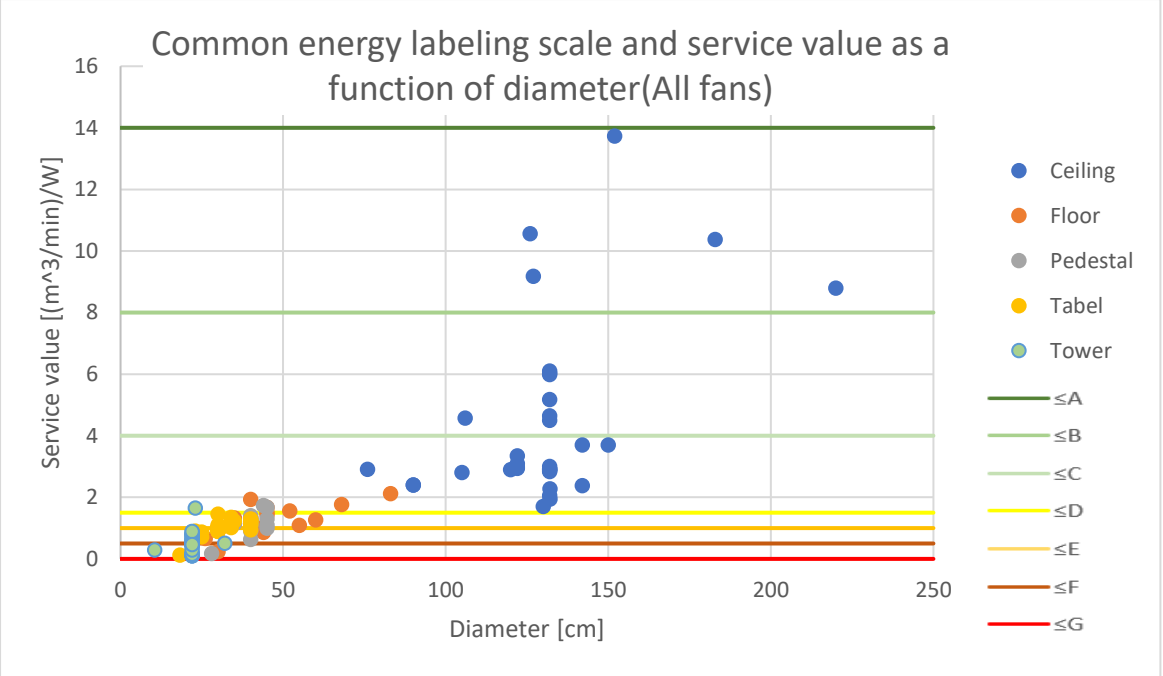

Figure 6: Suggestion for common energy label scale set independent of diameter and with uneven distribution of classes

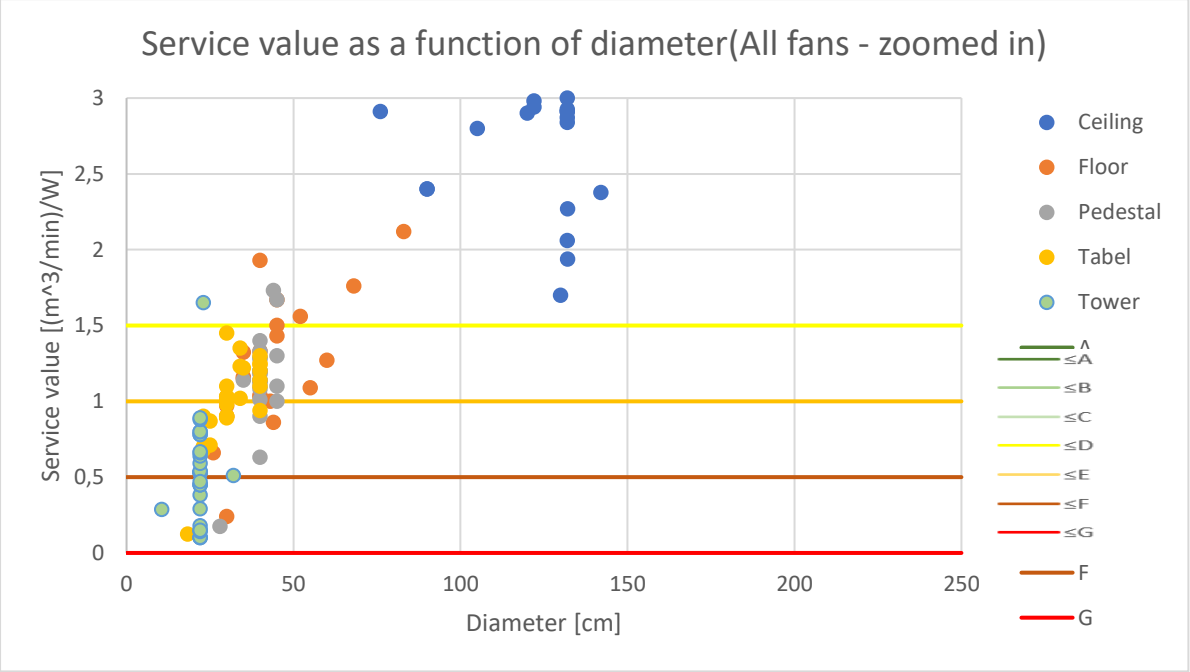

Figure 7: Suggestion for common energy label scale set independent of diameter and with uneven distribution of classes (zoomed in on 'other fans')

4.2.2 Common labelling scale dependent on the diameter

In all figures shown in the previous sections of this document, the service values for the data are shown as a function of the diameter. These figures show that the service value is increasing with an increasing diameter of the fan. In conclusion, it becomes easier to attain a high service value with increasing diameters of the fans. Thus there is a risk that a labelling scale which is independent of the diameter would promote the sales of larger fans (better energy label), but even though these have higher service values, they could consume more energy in absolute terms. Hence by promoting

larger fans as more energy efficient, there might actually be an increase in total energy consumption.

Likewise, stakeholders at the CF meeting pointed out that comfort fans with the highest diameter will score the highest service value, because the service value is a function of air flow which is depending on the diameter of the comfort fans[15]. Furthermore, a Member State (Germany) in their comments during the CF proposed making the thresholds for the energy efficiency classes dependent on the diameter[16]. Therefore, a proposal taking the dependence on the diameter into consideration is analysed and shown in Table 5, Figure 8 and Figure 9 (Figure 8 but zoomed in on the lowest service values).

[15] Stated by e.g. Applia and DE

[16] German proposal in their comments: Thresholds for the energy labelling classes

	Ceiling fans; Other fans
A	≥ 1 + d*0,031;	≥ 0,4 + d*0,018
B	≥ 0,9 + d*0,028;	≥ 0,35 + d*0,016
C	≥ 0,8 + d*0,025;	≥ 0,3 + d*0,015
D	≥ 0,7 + d*0,023;	≥ 0,25 + d*0,013

Common scale energy efficiency classes of comfort fans

Energy Efficiency Class	Service value (SV) ((m³/min)/W)
A (most efficient)	SV >= 9 + 0.033 * d
B	3 + 0.029 * d =< SV < 9 + 0.033 * d
C	1.4 + 0.024 * d =< SV < 3 + 0.029 * d
D	0.7 + 0.021 * d =< SV < 1.4 + 0.024 * d
E	0.55 + 0.018 * d =< SV < 0.7 + 0.021 * d
F	0.25 + 0.016 * d =< SV < 0.55 + 0.018 * d
G (least efficient)	SV < 0.25 + 0.016 *d

Table 5: Common energy labelling scale for all fans, threshold as function of diameter

Figure 8 and Figure 9 shows that "Other fans" are still only placed in the 4 worst classes, but now ceiling fans are distributed in all classes, but class A. Thus, this proposal within a large extent allows end-users to differentiate between the ceiling fans on the market. But for the ceiling fans there is a large difference between the thresholds for class D and C and even larger between class B and A. The large difference between the classes makes it more difficult for manufacturers to improve from one class to another. Furthermore, a survey carried out for the EU commission in 2020[17] showed that a high energy label granularity is more efficient than information about energy efficiency and energy consumption in getting more consumers to choose the more efficient products.

[17] Study on consumer understanding of the energy label for space heaters and air conditioners, CentERdata for EU Commission, March 2021.

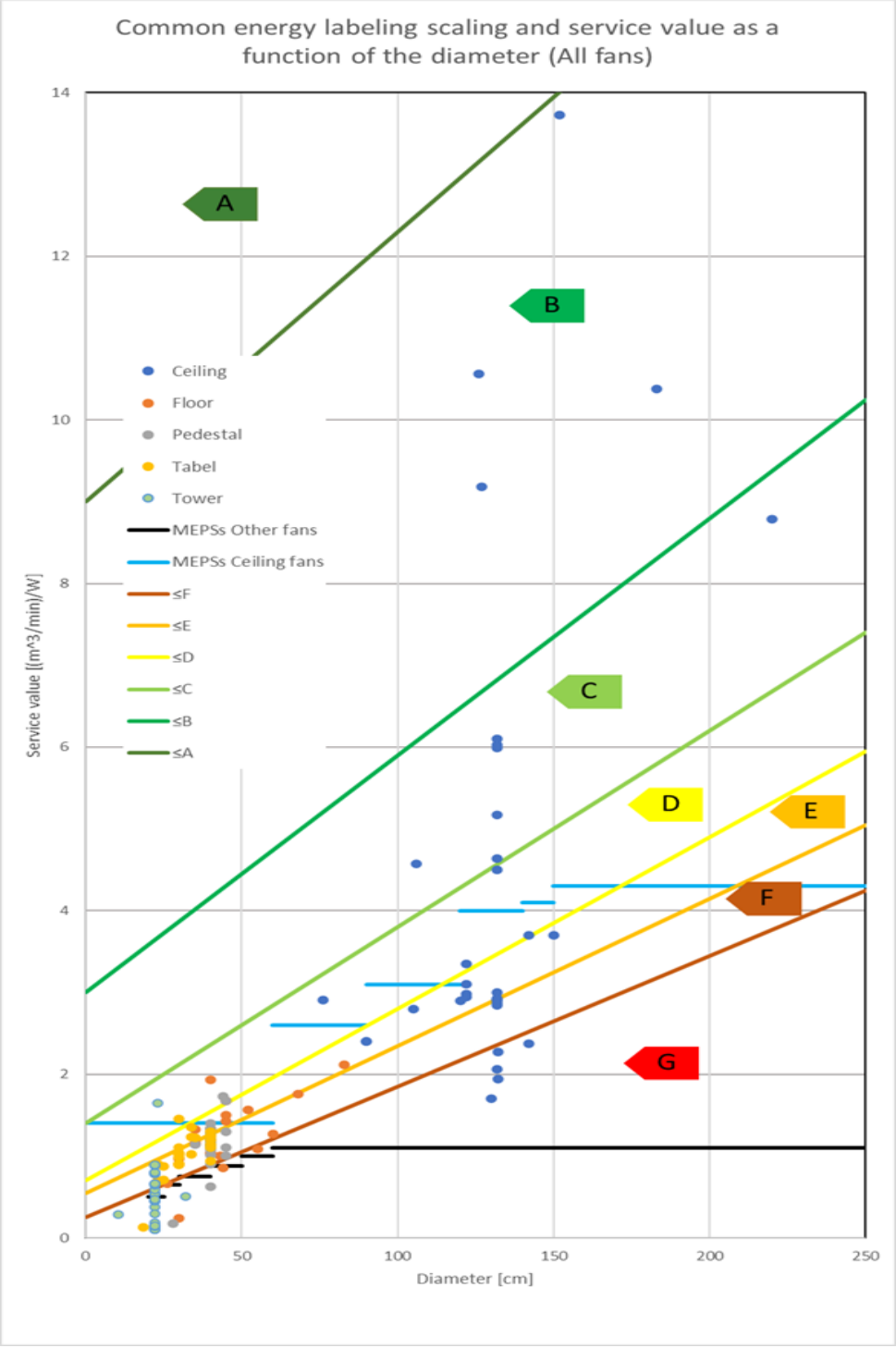

Figure 8: Suggestion for a common energy label. Thresholds for energy labelling class as a function of the diameter, uneven difference between the thresholds, same energy labelling scale for all fans

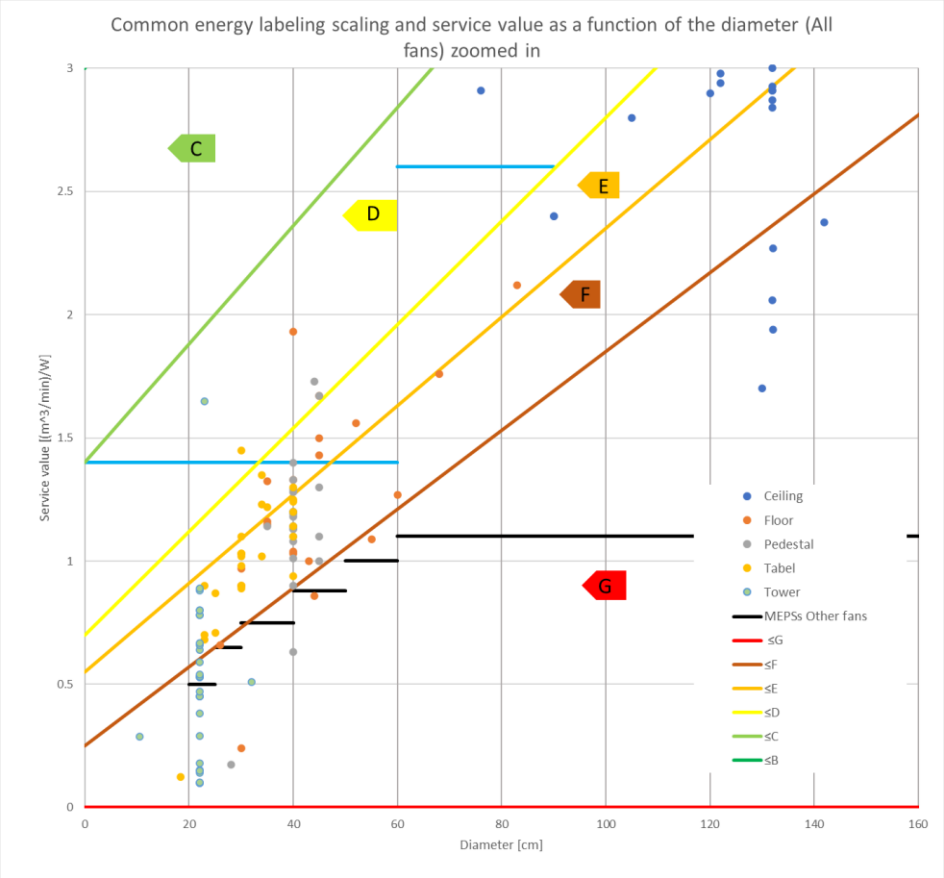

Figure 9: Suggestion for a common energy label. Thresholds for energy labelling class as a function of the diameter, uneven difference between the thresholds, same energy labelling scale for all fans, zoomed in to analyse other fans.

The common scale has pros and cons. Figure 8 and Figure 9 clearly show that ceiling fans in general have better service values than other fans. If a common label gives the customer an incentive to buy a ceiling fan instead of an "other type" fan, then the common label is successful. But as mentioned above there is a risk that the absolute energy consumption is larger because the fans are larger. Additionally, the common label also comes with the risk of customers not choosing the most efficient product within the classes for other fans, because all other fans are labelled in the bottom of the scale (G-E), as mentioned above this was shown in the survey[18].

Figure 10 shows that the ceiling fans constitute a small share of sales of the comfort fans[19]. If the energy label scale becomes less effective for "other type" fans, because the consumer can only buy "other type" fans in the lower classes, then the common scale comes with the risk of not improving the majority of the products on the market.

[18] Study on consumer understanding of the energy label for space heaters and air conditioners, CentERdata for EU Commission, March 2021.
[19] The data is from the preparatory study 2008.

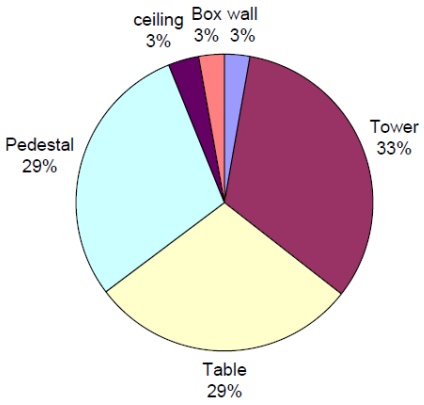

Figure 10: Sales distribution of comfort fans, representation of categories in %
Source: Preparatory study comfort fans 2008

To conclude, implementing the common scale shown in Figure 8 will ensure that class A will not be populated as according to EU regulation framework for energy labelling[20]. However, due to the uncertainty behind the data, it might also include a risk of all "other fans" ending up in the 4 worst classes with almost no chance of improving to the top classes.

4.3 Separate energy labelling scales for ceiling fans and for other comfort fans dependent on the diameter

It is questionable if the buying behaviour is the same when purchasing ceiling fans or "other fans". "Other fans" are characterized as "plug and play" solutions, that can be bought easily and used "in the next minute" on a hot summer day. In contrast, ceiling fans are not "plug and play", the installation is comprehensive as it requires mounting on the ceiling and an electrical installation. Therefore, it is questionable if the labelling class of the fans is a decisive factor in consumers' choice between ceiling fan or "other fan" type. Furthermore, it is important to take into account the risk that the ceiling fan which is purchased instead of an "other fan" to (fulfil the same demand for cooling) would have a larger diameter and will be used for more hours, and even though it is more efficient would lead to a larger total consumption.

And as mentioned before, a survey carried out for the EU commission in 2020[21] has shown that when different types of products are on a common energy labelling scale, the consumers will choose products which are less efficient than if the products had been on separate scales.

Therefore, the option of separate labels as a function of diameter for ceilings fans and "other fans" is analysed.

Proposals are shown in Table 6 and Figure 11 for ceiling fans and Table 7 and Figure 12 for "other fans". In the proposal shown in Table 6 and Figure 11 compared to the proposal shown in Figure 8 (above) the difference between classes have increased for the lowest classes and decreased for the best classes. This could increase the manufacturers motivation to improve fans moving them from

[20] Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU
[21] Study on consumer understanding of the energy label for space heaters and air conditioners, CentERdata for EU Commission, March 2021.

class C to class B and from B to A. At the same time, it will make it easier for end-users to differentiate between the most efficient ceilings fans on the market.

However, a survey carried out for air conditioners and heat pumps[22] concludes that consumers in general are not aware of the fact that energy labelling scales for products delivering the same service could differ. Therefore, there is a risk that consumers might choose a class A "other fan" in the belief that it is as efficient as a class A ceiling fan.

Separate scale, energy efficiency classes of comfort fans, ceiling fans

Energy Efficiency Class	Service value (SV) ((m³/min)/W)
A (most efficient)	SV >= 9+ 0.033 * d
B	5 + 0.031 * d =< SV < 9 + 0.033 * d
C	2.4 + 0.028 * d =< SV < 5 + 0.031 * d
D	1.4 + 0.026 * d =< SV < 2.4 + 0.028 * d
E	0.9 + 0.023 * d =< SV < 1.4 + 0.026 * d
F	0.5 + 0.02 * d =< SV < 0.9 + 0.023 * d
G (least efficient)	SV < 0.5 + 0.02 * d

Table 6: Separate energy labelling scale for ceiling fans, threshold as function of diameter

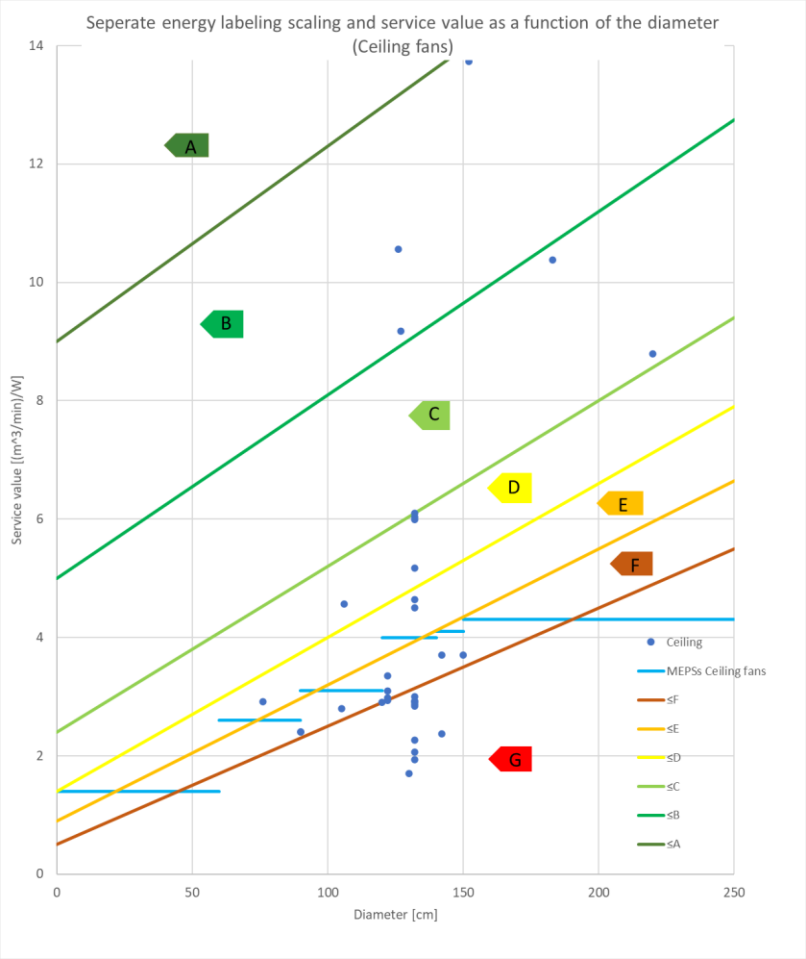

Figure 11: Suggestion for separate energy labelling scale and MEPS for ceiling fans, dependent on the diameter.

[22] Study on consumer understanding of the energy label for space heaters and air conditioners, CentERdata for EU Commission, March 2021.

In the proposal for “other fans” shown in Table 7 and Figure 12 the data for “other fans “are distributed over 6 classes (class A empty). Thereby, allowing consumers also to differentiate between the most efficient “other fans” on the market.

Separate scale, energy efficiency classes of comfort fans, other fans

Energy Efficiency Class	Service value (SV) ((m³/min)/W)
A (most efficient)	SV >= 1+ 0.028 * d
B	0.55+ 0.024 * d =< SV < 1 + 0.028 * d
C	0.5 + 0.022 * d =< SV < 0.55 + 0.024 * d
D	0.45 + 0.02 * d =<SV< 0.5 + 0.022 * d
E	0.32 + 0.019 * d =< SV < 0.45 + 0.02 * d
F	0.25 + 0.016 * d =< SV < 0.32 + 0.019 * d
G (least efficient)	SV < 0.25+0.016 d

Table 7: Separate energy labelling scale for “other fans”, threshold as function of diameter

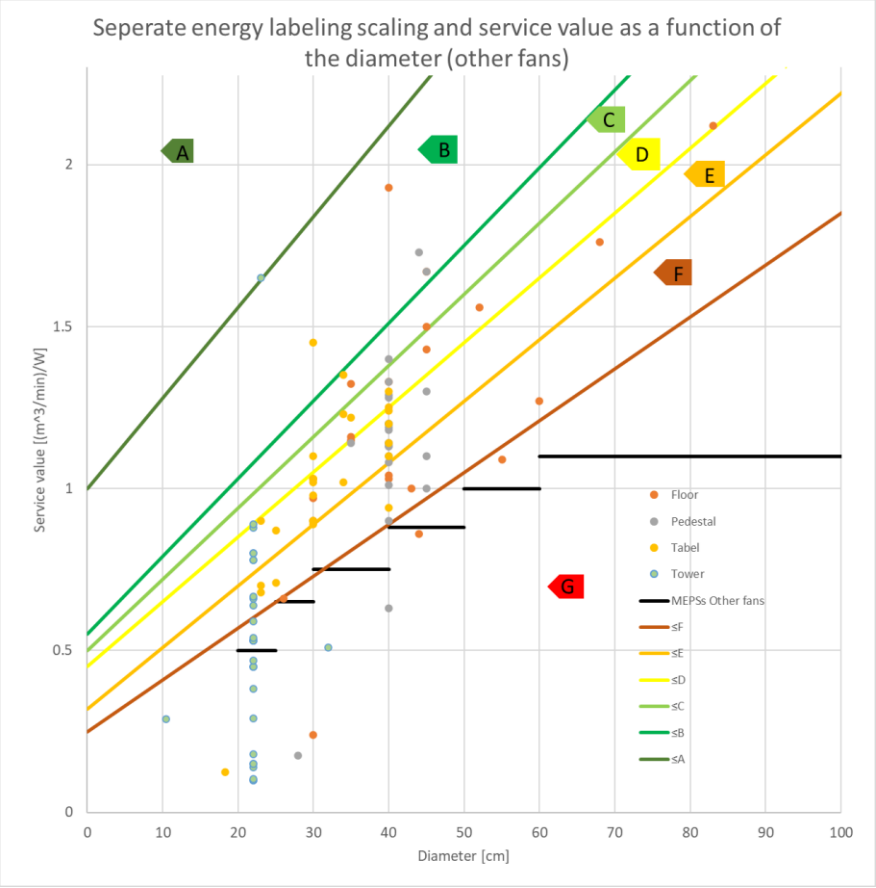

Figure 12: Suggestion for separate energy labelling scale and MEPS for "other fans", dependent on the diameter.

5 Sound power

This section describes the review study's findings and the working documents proposals according to sound power requirements (MNPS) and noise labelling scale for comfort fans and compare them with the data collected in this IA.

5.1 Sound power requirements

5.1.1 Evaluation of the proposal in the working documents

Figure 13 shows the data collected for sound power level in this study as a function of the fan diameter and the MNPSs proposed in the working document. The figure shows that the relation between sound power and diameter is weak for all types of fans but floor fans. Furthermore, it shows that none of the ceiling fans will be affected by the MNPS and only very few of the "other fans" would be banned if these MNPSs are implemented. The exemptions are large floor fans and tower fans. For floor fans, all the larger floor fans (d>60 cm) in the data set will be banned and for tower fans 40% of the tower fans in the data set would be banned. For tower fans the diameter for most models is based on an assumption. Contrary to the case for the MEPS, fewer tower fans will be banned if the diameter is larger than assumed, and there is no effect if the diameter is smaller than assumed. Some floor fans are designed to provide a lot of air movement in a room with no people or people working, and noise may not be of concern. This might be the reason why they are available on the market despite being noisy.

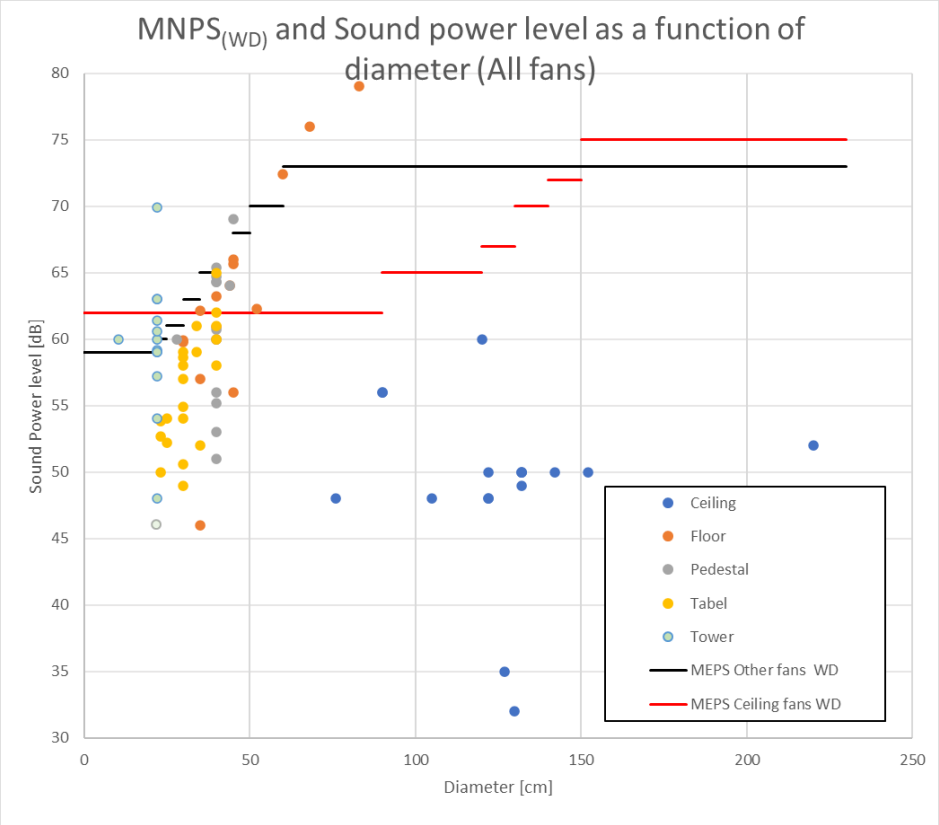

Figure 13: Sound power level as function of the diameter for the data collected in this study and in the review study. Solid lines are the MNPS proposed in the working document.

5.1.2 Relation between energy efficiency and sound power level

Concern has been raised that limiting the sound power level would lead to a decrease in the energy efficiency of the comfort fans. Figure 14 shows the data collected for the sound power in this study as a function of the service value. It is seen that an increase in service value does not necessarily come with an increase in sound power level. This is especially obvious for ceiling fans, but it is also the case for "other fans". For "other fans" there are examples of a difference in sound power level of 15 to 20 dB for fans with same service value. E.g., for floor fans in all sizes there are examples of fans with difference in sound power level at around 20 dB.

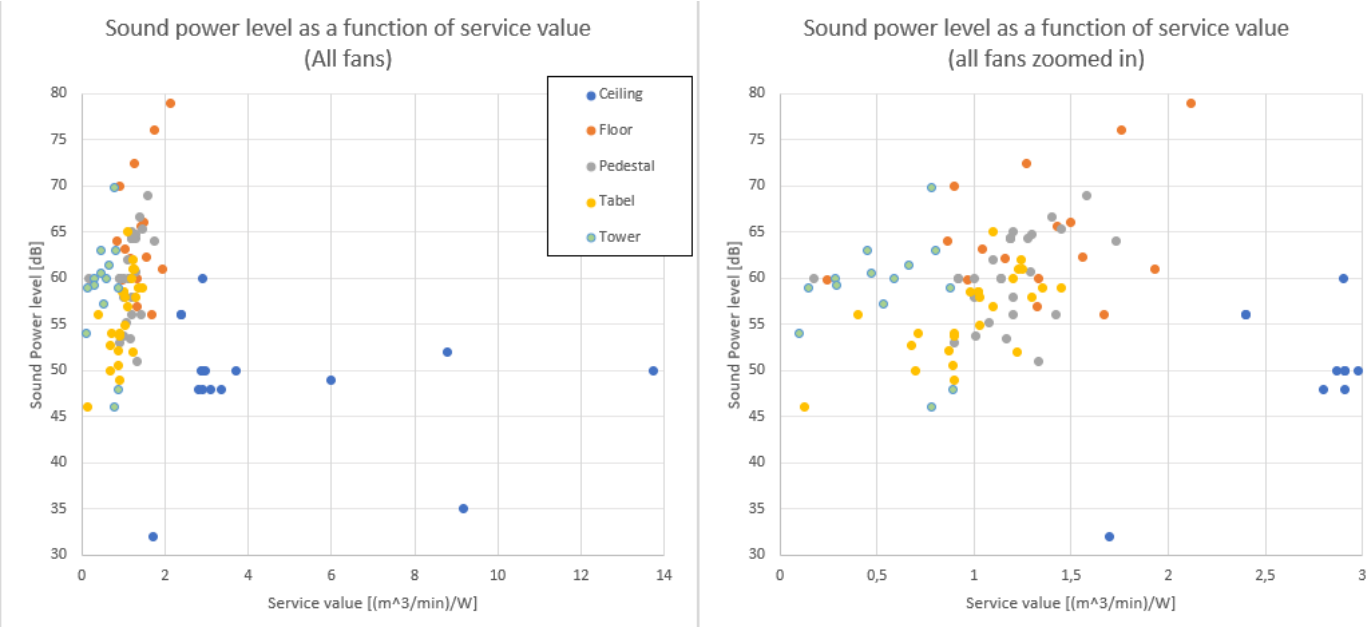

Figure 14: Sound power level as a function of the service value for the data collected in this IA study and in the review study. In the right diagram is zoomed in on the lower service values. The solid lines are the labelling classes for the sound power proposed in the working document.

5.2 New proposal for MNPS

From the above it is concluded that for all fans the MNPSs could be stricter without any risk for promoting lower energy efficiency. Unfortunately, no analysis has been made of the significance of the sound power level for the price.

Therefore, an updated proposal for MNPS is put forward in the proposal shown in Figure 15.

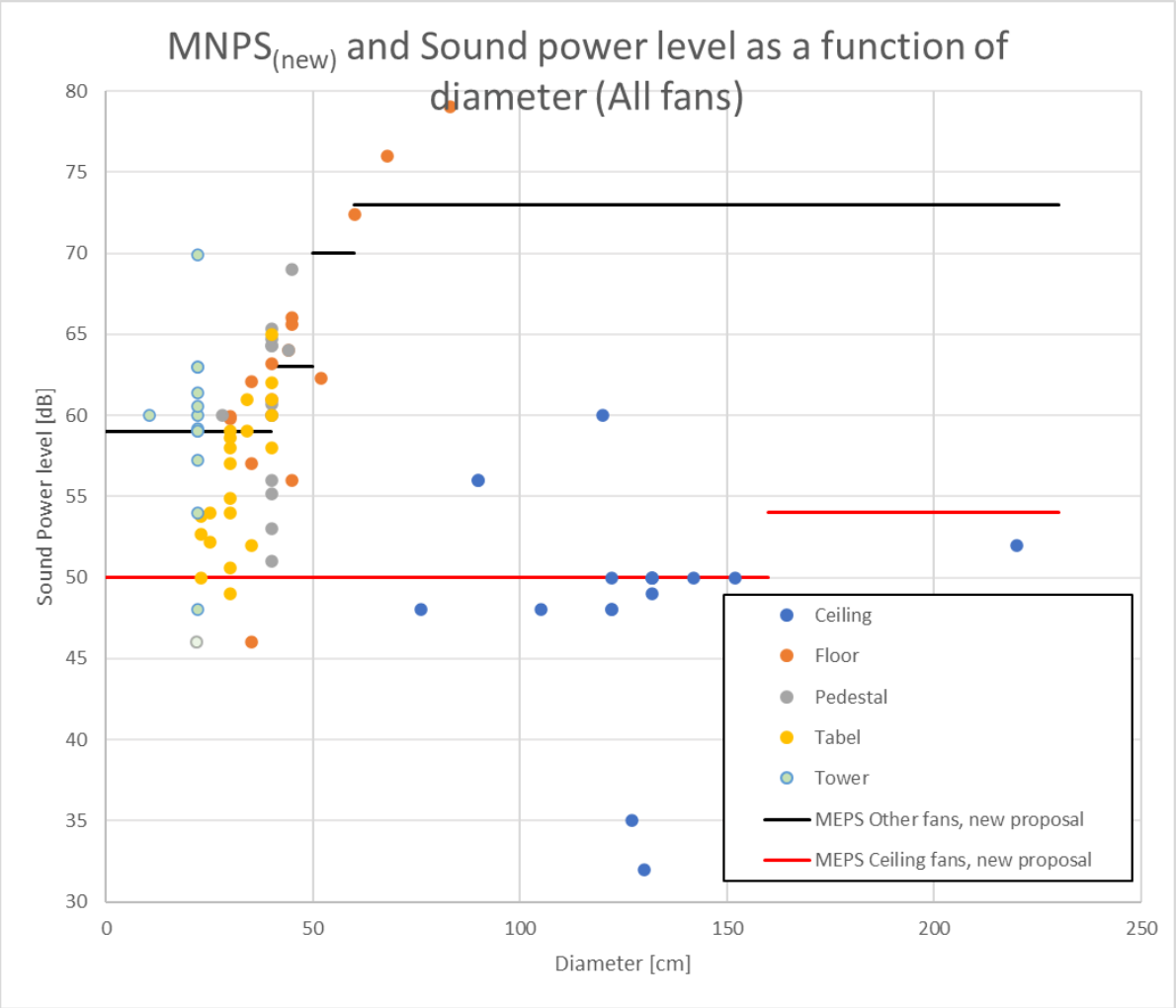

Figure 15: Updated proposal for MNPSs as a function of diameter

For the ceiling fans the updated proposal sets the MNPS at 50 dB for ceiling fans with diameter ≤160 cm, and to 54 dB for the ceiling fans with diameter >160 cm. This will only ban very few of the ceiling fans in the data set and there are still compliant ceiling fans in all sizes. Probably this will not have a large effect on the market today, but it could prevent noisy ceiling fans from being introduced to the market, thereby, ensuring that the manufacturers do not produce loud noise fans.

The proposal for MNPSs for all small "other fans" with diameter ≤40 cm is ≤59 dB, and for 40-50 cm a diameter of ≤63 dB. For larger "other fans" with diameter >50 cm the same MNPSs as in the working document are proposed. This will only ban a few more fans than the proposal in the working document and there are still compliant "other fans" in all sizes. At the same time, the threshold for the MNPS level is reduced by up to 9 dB. The updated proposals do not solve the problem that there is a risk that very large floor fans will be banned from the market.

5.3 Sound power labelling

5.3.1 Evaluation of the proposal in the working documents

In the working document it is proposed to introduce a sound power labelling for comfort fans. The sound power labelling scale is common for comfort fans and to air-to-air air conditioners.

The proposed sound power labelling thresholds and the data for sound power level collected in this study as a function of the service value are shown in Figure 16. It appears that the distribution over the classes is acceptable for “other fans”, but that almost all the ceiling fans in the data set are in class B. This limits the end-user’s ability to distinguish between ceiling fans according to the noise level.

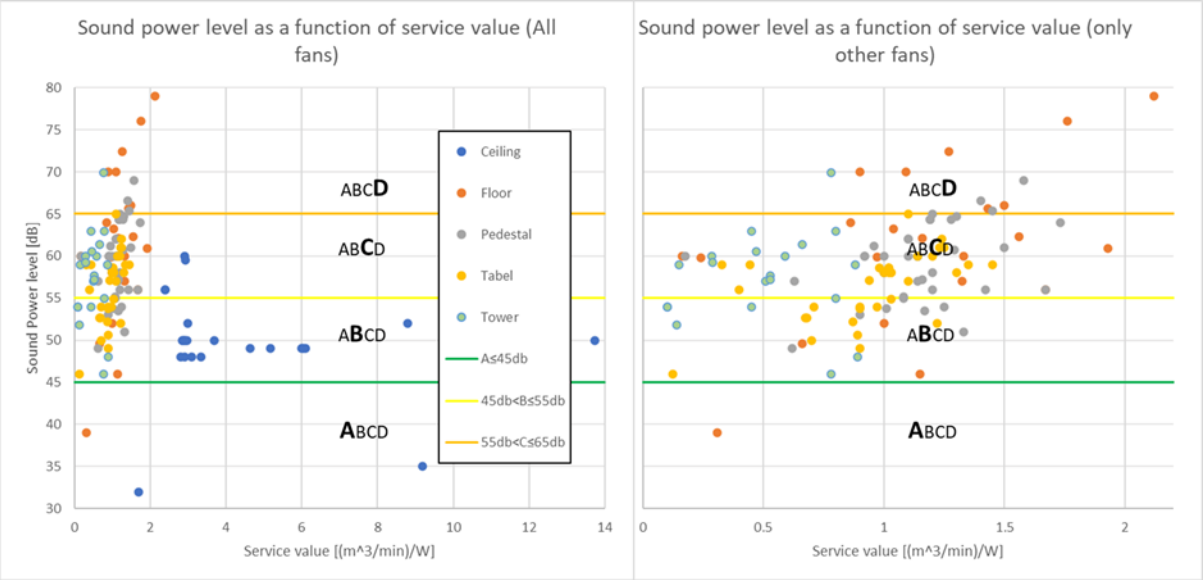

Figure 16 Sound power level as a function of the service value for the data collected for this report and in the review study. In the right diagram is zoomed in on the lower service values and only other fans are included. The solid lines are the labelling classes for the sound power propose.

5.3.2 Revised proposal for a sound power scale

A revised proposal that is intended to improve the effect of the sound power labelling is shown in Figure 17. It is a common scale for all fans but not for air-to-air air conditioners. In the revised proposal, the sound power scale has 5 sound power classes. It is concluded that this scale allows the end-users to distinguish between fans according to their noise level to an acceptable extent. Therefore, no analyses were done of separate labelling for different types of comfort fans, nor any analyses of making the noise labelling for ceiling fans and for other fans dependent of the diameter.

If the scale should be common for comfort fans and air-to-air air conditioners it should be considered to add extra classes.

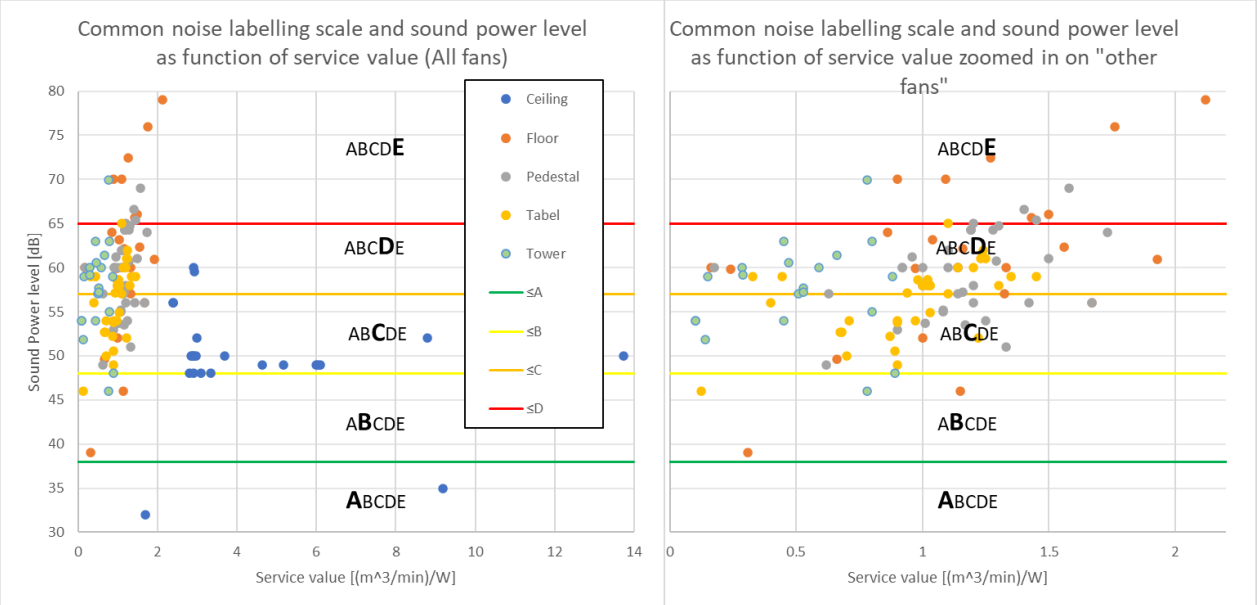

Figure 17: Revised proposal for a common sound power labelling scale for all comfort fans independent of the diameter, the graph at the right side is zoomed in on the "other fans".

6 Policy recommendations

MEPS

Based on the analyses of data in this annex, it is recommended to implement the MEPS which is a combination of the Chinese MEPS and MEPS proposed in the two working documents during the consultation forum except for the MEPS for tower fans. MEPS for tower fans is as proposed in the preparatory study, shown in Table 8.

Diameter		**Proposal**
From	**to**	
cm	cm	SV (m³/min)/W
Other fans		
0	20	0,45
20	23	0,50
23	25	0,50
25	30	0,65
30	35	0,75
35	40	0,90
40	45	1,00
45	50	1,10
50	60	1,30
60	220	1.37

Diameter		**Proposal**
From	**To**	
cm	Cm	SV (m³/min)/W
Tower fans		0,45
Ceiling fans		
0	60	1,40
60	90	2,60
90	120	3,10
120	140	4,00
140	150	4,10
150	-	4,30

Table 8: Recommended MEPS

It is highly recommended to introduce MEPS for comfort fans, as this will remove the poorest performing products from the market and yield significant energy savings (25%). Furthermore, since

China has implemented MEPS, and most comfort fans in Europe are imported from China, setting MEPS in the EU as well could prevent “dumping” of low efficiency fans on the EU market that are banned from the market in China.

Energy labelling

It is recommended to implement energy labelling for comfort fans with **separate scales** for ceiling and other fans, with classes that are **dependent** on the diameter that is **variable** in width.

Implementing energy labelling will not only allow users to choose the more efficient products but will also help to improve market surveillance as the manufacturers or importers are obliged to register their products including energy data in the EPREL-database. The data in the EPREL-database can then also provide the foundation for tightening of the ecodesign requirements in the next revision of the ecodesign regulation.

It is recommended to apply separate scales for ceiling and other fans, in order to have the different fan types appropriately distributed among classes, and ceiling fans are consuming more energy even if more energy efficient and presently they have a very low market share so that a single scale could be counterproductive in terms of energy consumption .

Energy Efficiency Class	Ceiling fans	Other fans
A (most efficient)	SV ≥ 9+ 0.033 * d	SV ≥ 1+ 0.028 * d
B	5 + 0.031 * d ≤ SV < 9 + 0.033 * d	0.55+ 0.024 * d ≤ SV < 1 + 0.028 * d
C	2.4 + 0.028 * d ≤ SV < 5 + 0.031 * d	0.5 + 0.022 * d ≤ SV < 0.55 + 0.024 * d
D	1.4 + 0.026 * d ≤ SV < 2.4 + 0.028 * d	0.45 + 0.02 * d ≤SV< 0.5 + 0.022 * d
E	0.9 + 0.023 * d ≤ SV < 1.4 + 0.026 * d	0.32 + 0.019 * d ≤ SV < 0.45 + 0.02 * d
F	0.5 + 0.02 * d ≤ SV < 0.9 + 0.023 * d	0.25 + 0.016 * d ≤ SV < 0.32 + 0.019 * d
G (least efficient)	SV < 0.5 + 0.02 * d	SV < 0.25+0.016 d

Table 9: Separate energy labelling scale for ceiling fans and other fans, threshold as function of diameter. Service value (SV) in (m^3/min)/W

Sound power

It is recommended to introduce MNPS for comfort fans according to the proposal in Figure 15 shown in Table 10 and sound power labeling for comfort fans according to the proposal in Figure 17 shown in Table 11. If the labeling scale should be common for Air-to-air air conditioners and comfort fans, it is recommended to introduce more sound power classes.

New Proposal	**Sound power level**
	dB(A)
MNPS Other fans	
All comfort fans, except ceiling fans, with a fan diameter < 40 cm	59
All comfort fans, except ceiling fans, with a fan diameter ≥ 40 and < 50 cm	63
All comfort fans, except ceiling fans, with a fan diameter ≥ 50 and < 60 cm	70
All comfort fans, except ceiling fans, with a fan diameter ≥ 60 cm	73
MNPS Ceiling fans	
Ceiling fans, with a fan diameter and < 160 cm	50
Ceiling fans, with a fan diameter ≥ 160	54

Table 10: Updated proposal for MNPS

Sound Power level	
	dB(A)
A	≤38
B	≤48
C	≤57
D	≤65
E	>65

Table 11: Updated proposal for sound power level labelling.

7 Method for data collection

In the first half of 2020, data for comfort fans has been collected from online search on webshops and on websites of individual manufacturers, from Topten.eu[23] and the Review study.

In this Annex, the possibility for getting access to data via cooperation with market surveillance authorities has been explored. Unfortunately, it has not been possible to get any data from the market surveillance authorities. Therefore, the fall-back option, i.e. the collection of data from manufacturers websites, has been applied.

7.1 Data collected for the analysis

In total, data (service value, sound power level, power draw etc.)[24] was collected for 225[25] comfort fans which was used in the analysis. The origin of the data is described below and illustrated in Figure 18.

For 217 out of the 225 comfort fans, the service values, or the data required to calculate the service value (max air supply [m^3/min] and power input [W]) were available. For the remaining 8 comfort fans, only data for the sound power level were available. For 120 comfort fans (out of the 217) data for the diameter were available and for 141 (of the 225) data for sound power were available.

7.1.1 Data sources

The data are collected from three different sources; from the review study, from the Topten website 2020 and from website searches.

7.1.2 Review study (2018)

In the data surveys made during the review study data on comfort fans regarding service value, the fan diameter, and the sound power level, etc. were not available from manufacturers' websites even though this is required in the ecodesign regulation for air conditioners and comfort fans.

The review study included service value data for 54 comfort fans[26]. The data used in the review study originate from Topten who have collected data from a wide range of comfort fans to be able

[23] Topten is a consumer-oriented online search tool, which presents the best models in various product categories. Topten's key selection criteria are energy efficiency and consumption, while other quality aspects like resource efficiency and health are also considered.
[24] According to Commission Regulation (EU) No 206/2012 manufacturers and importers of comfort fans have to provide ecodesign information data of the products they are placing on the marked in EU. See information requirements in **Error! Reference source not found.**.
[25] Topten had data for additional 69 comfort fans in 2017 which have been used in the review study, but only the maximum power output was provided for these models and where therefore not considered in this analysis.
[26] The data set from the review study did originally include more data points, but because of duplicates with data from Topten.eu, data points have been removed from the Review study.

to establish a threshold (a minimum performance level that the products must perform in order to be listed on Topten's website) for their website. Originally, Topten provided data for an additional 69 comfort fans, however, these were not included in the analysis, because it was not possible to determine the service value or sound power level from these data, as only data on power input were provided for these fans.

The data set from the review study did not include any data of diameter and only 7 comfort fans were provided with data on sound power level.

7.1.3 Topten website 2020

Since Topten provided data for the review study they have had an active website where data for comfort fans that fulfil Topten Europe requirements for the service value can be found.

For this report, data for service value have been collected for 92 comfort fans from Topten's website in 2020. Out of the 92 comfort fans 65 were provided with a diameter and 75 with a sound power level.

7.1.4 Website search

In addition to the new Topten data, data were also collected for 79 comfort fans of which 71 were provided with service value, 55 with a diameter and 59 with sound power level.

These data are primarily found through large electronic webshops e.g. unieuro.it, bauhaus.eu and henleyfan.com. Data on comfort fans have also been found through searches on Google e.g. manufacturer names from the preparatory study have been looked up or searches on keywords have been used to find unknown manufacturers. Furthermore, ENERGY STAR data have been used to find manufacturers of comfort fans and it has been checked that the products are available in EU. During the search for comfort fans, only the comfort fans with sufficient data available for calculating service values have been included in the data set and in the overview in Figure 18. However, many more models not fulfilling the ecodesign information requirement were found but it would be too comprehensive and time consuming to document. Therefore, all these comfort fans not fulfilling the ecodesign information requirements are not included in the data set tables nor in Figure 18. The lack of reported ecodesign information on models found during the search is also mentioned in section 7.2.6.

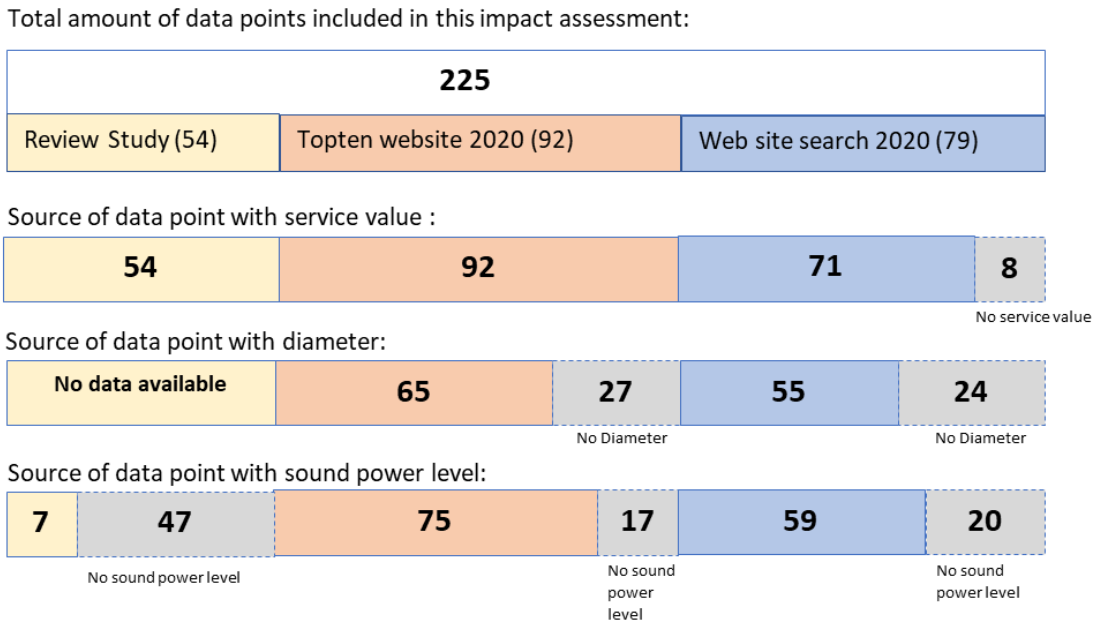

Figure 18: Illustration of origin of data

Even though the data represented in the figures are supported by many data points, there are still uncertainties influencing the service values. The issues are discussed in the section below.

7.2 Data uncertainties

The following section describes the uncertainties of the collected data.

7.2.1 Not providing all the information required according to the ecodesign regulation

In the current ecodesign regulation it is stated which information shall be provided by the manufacturer, see Table 12. It has not been possible to get information about how large a share of the manufacturers that provided the full ecodesign information data set to Topten. It is therefore also unknown, if the stated service value has been calculated or tested and which test standard the manufacturers have used to determine the service value. This uncertainty accounts for all the Topten data, which is 146 out of the 225 data points.

For the remaining data, which was collected for this IA, the test standard was registered, if stated by the manufacturer. It was found that 31 out of the 79 comfort fans were tested by a version of the international test standard IEC 60879. Additionally, 3 comfort fans were tested by the industry standard ISO 5801-2007[27] or the American standard ANSI/AMCA 210[28]. For 11 comfort fans, the manufacturers stated that they tested the comfort fan according to the ecodesign regulation 206/2012 (which is not a standard) and 5 manufacturers stated they tested according to ENERGY STAR. For the remaining 29 data points collected for this report no test standard was stated. According to the ecodesign regulation 206/2012, the used test method has to be stated, but the regulation does not specify a certain test standard.

All of the manufacturers that have stated that their comfort fans were tested according to IEC 60879 are from Europe. The manufacturers from outside Europe (and manufacturers that did not state a

[27] https://www.iso.org/standard/39542.html
[28] https://www.amca.org/publications-and-standards/standards/amca-%EF%BB%BFstandard-210-07-laboratory-methods-of-testing-fans-for-certified-aerodynamic-performance-rating.html

country of origin) either did not provide information about the used test standard or they stated that the comfort fan was tested according to ENERGY STAR.

If fans are included in the labelling regulation, data for the fans should then be inserted in the EPREL database, which would make it easier to control if the documents are fulfilling the ecodesign and energy label requirements, and to conduct market surveillance in general.

If only considering the data for which it is stated that they are provided using the international test standard IEC 60879, only few data points would be available. Figure 19 illustrates how the available data would distribute in the proposed energy label scenario described in the section "Common energy labelling scale for all fans" if only considering the data available with a recognized test standard.

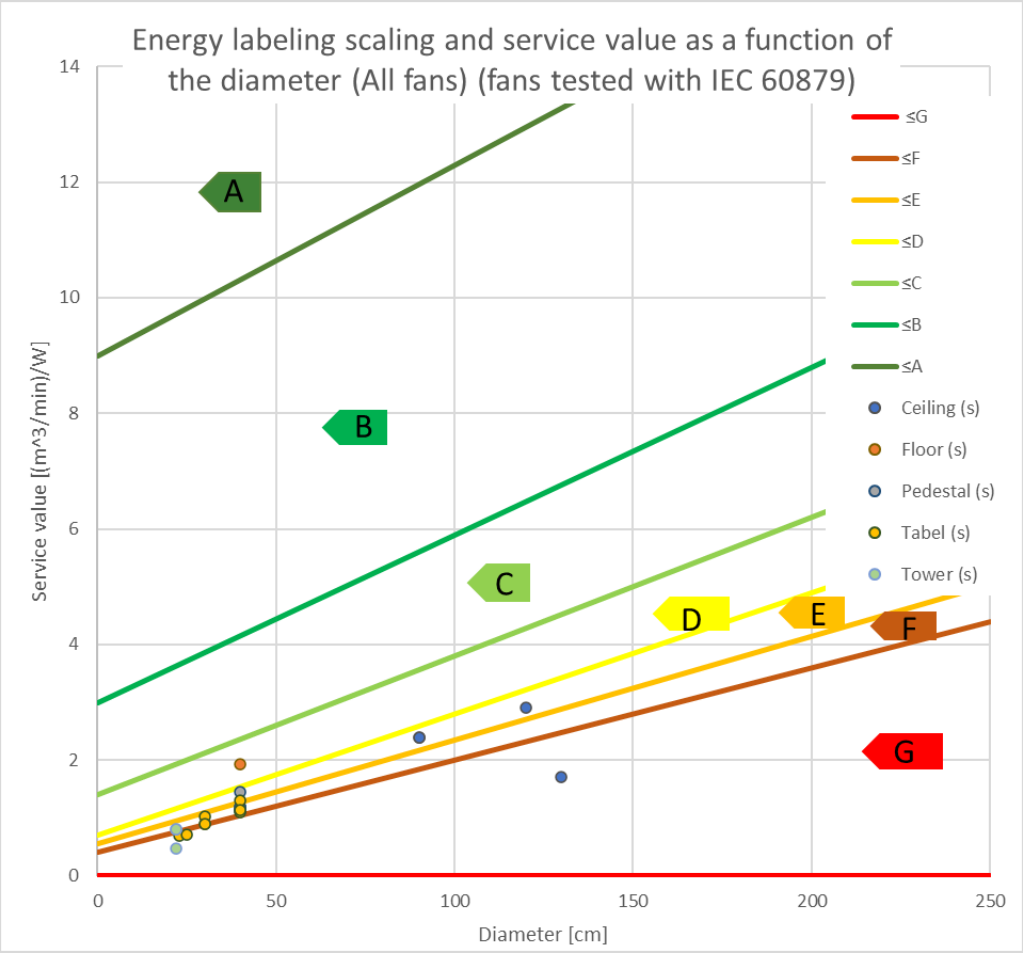

Figure 19: Distribution of comfort fans tested according to IEC 60879[29]

In this impact assessment, for some of the comfort fans, the service value was not available directly. In that case, the service value was calculated (based on maximum fan flow and fan power input). Only for 45 out of 79 data set found via the website search, all the data required by the ecodesign regulation were provided. For some of these 79 fans not even the data necessary for calculating the service value was provided (see more in Figure 18). The fans were included in this IA anyway,

[29] 10 more comfort fans are tested with IEC 60879, but it is not possible to plot them on the graph, because they are not provided with a diameter (which is not an information requirement in ecodesign regulation 206/2012). Some of the tested comfort fans have the same diameter and service value. Therefore, it was only possible to plot 15 out of the 31 comfort fans for which it was stated that IEC 60879 was the used test standard.

because e.g., data on sound power level was available. The focus in this IA was on finding data that could be used to determine the service value level and the sound power level.

Information requirements

Information to identify the model(s) to which the information relates to
[fill in as necessary]

Description	Symbol	Value	Unit
Maximum fan flow rate	F	[x,x]	m^3/min
Fan power input	P	[x,x]	W
Service value	SV	[x,x]	$(m^3/min)/W$
Standby power consumption	P_{SB}	[x,x]	W
Fan sound power level	L_{WA}	[x]	dB(A)
Maximum air velocity	c	[x,x]	meters/sec
Measurement standard for service value	[state here the reference to measurement standard used]		
Contact details for obtaining more information	Name and address of the manufacturer or of its authorised representative.		

Table 12: Copy from the ecodesign regulation 206/2012, Ecodesign information requirement in the current regulation

7.2.2 Uncertainty about test-standards for determining service values

According to the current regulation the manufacturer or importer shall state which test standard has been used to determine the service value. However, there are no requirements regarding which standard should be used. Most commonly, test standard IEC 60879[30] was used for 34 out of the 79 products. Other manufacturers simply state that their product was tested in relation to regulation 206/2012, while others tested according to the ENERGY STAR test standard. Some others do not provide information regarding test standards at all. The differences in test standards create uncertainties in service values presented in the dataset.

7.2.3 Uncertainty about test standards for determining sound power level

The lack of information about used test standard also creates uncertainties about the sound power level that manufacturer have indicated on their products.

7.2.4 White label products not included in the data set

A stakeholder informed that a large portion of the comfort fans sold in EU is sold as “White Label” products. A “White Label” product is a product produced by a large manufacturer e.g. in Asia who sells the product to e.g. a large supermarket chain, that puts its own brand on the product. Such branded products are typically imported as a batch in the spring and sold throughout the season. The required ecodesign information is typically not supplied with these products. Thus, it is difficult to determine the service value of the products. In principle, the party whose brand name is on the

[30] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.C_.2012.172.01.0001.01.ENG&toc=OJ%3AC%3A2012%3A172%3ATOC

comfort fan is responsible for conformity assessment of the products[31]. However, such information is not given. For the reasons mentioned above, it has not been possible to gather any data for "White Label" products in this study, thus the data set represented is lacking data from a part of the market.

7.2.5 Topten only representing the best products

As described, Topten have supplied most of the data used in this IA. Topten, on their website, only lists products, which have an energy efficiency above a certain threshold. Therefore, using data from Topten creates the risk of having an overrepresentation of energy efficient products. However, Topten Europe have set their requirements relatively low. Table 13 shows that the Topten Europe requirements are considerably less strict than the requirements for Topten China. Therefore, it is assumed that the Topten list represents a large part of the comfort fans sold in EU.

Construction type	Energy efficiency value (m^3/min/W)	
	Topten China	Topten Europe
Standing/Pedestal	≥ 1.31	≥ 1.00
Ceiling	≥ 3.08	≥ 2.75
Table	≥ 1.40	≥ 0.50
Floor	≥ 1.40	≥ 0.75
Tower	N/A	≥ 0.50

Table 13: Service value requirements of Topten

The solid lines of Figure 20 (below) are illustrating the thresholds for Topten Europe and the dash double dotted lines are illustrating the thresholds set by Topten China. In this IA, the Chinese test standard GBT 13380-2018 and the international standard EN IEC 60879:2019 have been compared and were found to be comparable. Furthermore, in the review study it is stated that *"Topten have informed that it seems like comfort fans in e.g. China are more efficient than in Europe"*. Therefore, it is concluded that the thresholds for Topten China in fact are higher than those for Topten Europe.

[31] Commission Notice The 'Blue Guide' on the implementation of EU products rules 2016 (2016/C 272/01), Section 3.1, p 28.

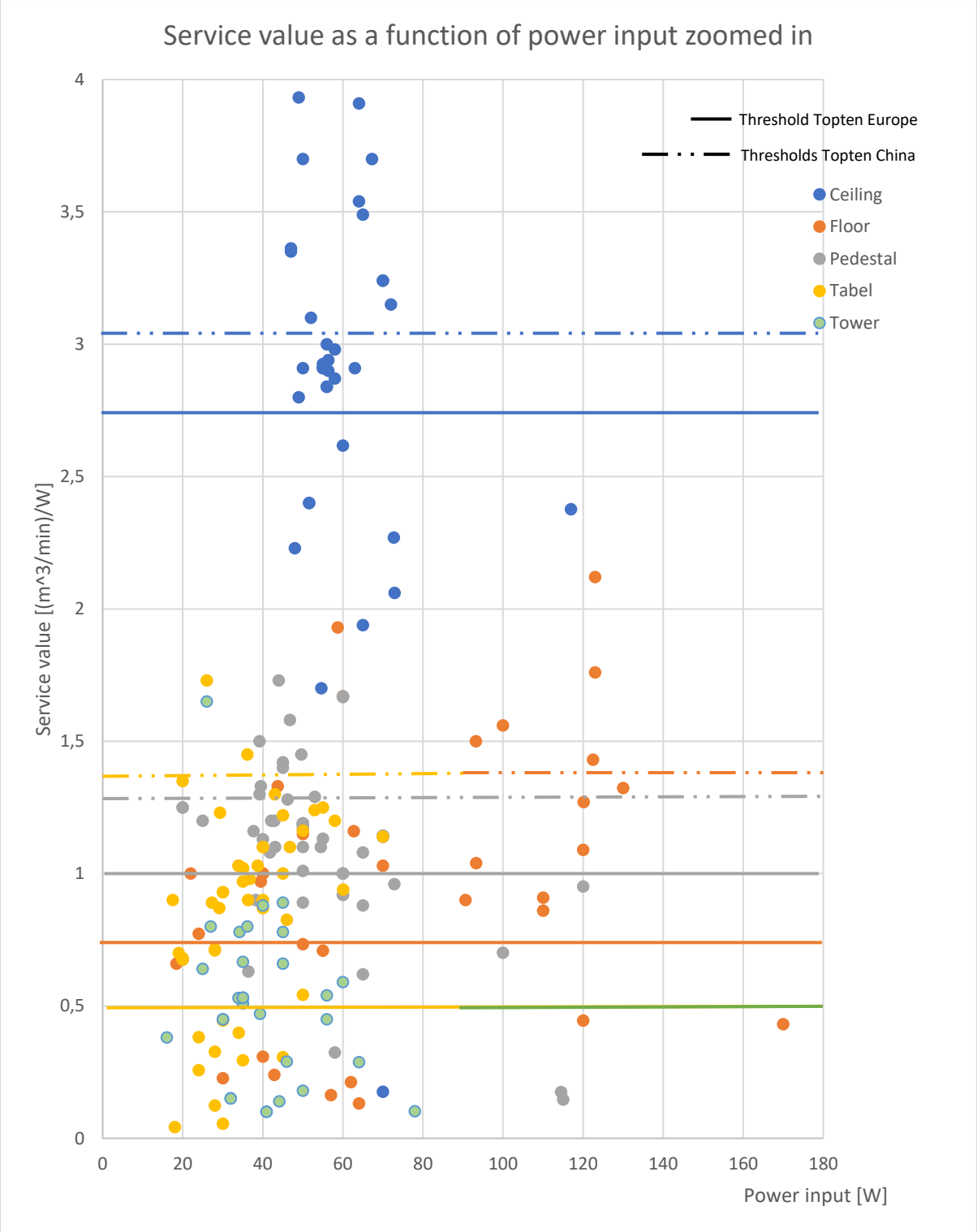

Figure 20: Data and Topten thresholds. Service value as a function of power input zoomed in on the lower service values, omitting a share of the data for celling fans.

7.2.6 Ecodesign requirements for information are often not fulfilled

The section below is used to exemplify the manufacturers' lack of fulfilling the information requirement in the ecodesign regulation.

As also mentioned in the section about data uncertainty, the search for data revealed that many importers and manufacturers do not fulfil the ecodesign information requirement. It would be too

comprehensive to document all the comfort fans not fulfilling the ecodesign requirements. The lack of reported ecodesign information is therefore exemplified through a search of comfort fans on an online webshop (see **Error! Reference source not found.**). Furthermore, Topten have confirmed[32], that in their search for comfort fans that were complying with their requirements (the data included in the review study), they have experienced that many manufacturers and importers did not provide the required ecodesign information, and many were not even aware of the obligation to report the ecodesign information. Often the manufacturers and importers did only provide the information on the request from Topten, when applying for being listed on the Topten-list. The Review Study also concluded that for fans on the European market ecodesign information requirements are to a large extent still not met.

[32] Confirmed on interview with Topten 30th of April 2020