Outdoor Power Equipment Institute

June 13, 2022

Via e-electronic submission: www.arb.ca.gov

RE: OPEI Comments to the California Air Resources Board's *Notice of Public Availability of Documents and Information to the Small Off-Road Engine Regulations: Transition to Zero Emissions*

The Outdoor Power Equipment Institute (OPEI) respectfully submits the following comments regarding the California Air Resources Board (CARBs) *Notice of Public Availability of Documents and Information to the Small Off-Road Engine Regulations: Transition to Zero Emissions ("15-Day Changes")*.

OPEI is an international trade association representing more than 100 manufacturers and their suppliers of gas and electric-powered outdoor power equipment, golf cars, and personal transport and utility vehicles, who are directly affected by Small Off-Road Engine (SORE) rule amendments approved for adoption by the Board in December 2021. Representing the industry, OPEI submitted comments on November 29, 2021 and April 14, 2022, opposing the amendments.

The intent and applicability of this 15-day change is unclear. For a second time, CARB has added dozens of new documents to the record unrelated to the proposed changes and without providing any context. The intent of these documents is unclear and makes it extremely difficult for stakeholders to provide meaningful comments. Furthermore, OPEI believes adding documents to the record using the "15-day change" process without any changes to the rule is prohibited by the California Administrative Procedure Act.

Nevertheless, OPEI provides the following comments. OPEI also supports the comments of the Truck and Engine Manufacturers Association (EMA).

COMMENT 1 – The 15-Day Changes do not Address OPEI Administrative or Technical Concerns Outlined in Previous Comments.

The December 9, 2021 approved for adoption Small Off-Road Engine (SORE) rule amendments set zero-emissions limits for most SORE starting in Model Year 2024. The amendments rely on unsupported and unproven data and assumptions and lack sufficient evidence of technical feasibility (the term "technical feasibility" as used throughout these comments includes cost-effectiveness). The amendment rulemaking package overestimates benchmark/baseline emissions and emission reductions expected from the amendments based on unreliable data. Rulemaking benefits, including emissions, cost and health related benefits, are directly proportional to the difference (delta) between benchmark/baseline emissions versus reductions modeled from the amendments. As a result, overestimates in benchmark/baseline emissions result in overestimates of all benefits outlined in the amendments. Please see OPEI's November 29, 2021 comments for a more detailed discussion of these points.

OPEI supports ZEE as one key emission reduction strategy where technology feasibility has been demonstrated. *However, there is currently no one-size-fits-all ZEE approach to satisfy the full range of SORE powered equipment and use cases.* The SORE amendments pose numerous technical feasibility, economic, and implementation challenges for many industry stakeholders. The ability to work all day, and in some cases days on end, without recharging and/or needing dozens of expensive batteries, as well as the cost of battery maintenance over the life the product will continue to be a technology barrier for many user categories and applications which the amendments do not consider. Collectively these challenges are currently insurmountable and will result in significant and unnecessary hardships for manufacturers, retailers and end-users, culminating in an early market shortfall of products with high consumer need and demand.

Additionally, the 15-day changes do not address lead time concerns, evaporative emission credit generation, tilt test requirements or replacement engine requirements discussed in OPEI's previous 15-day change comments. These concerns remain unresolved. Please see OPEI's April 14, 2022 comments for an in-depth discussion of these issues.

COMMENT 2 – The Rational for Additional Supporting Documents Added to the Record is Unclear. Without Discussions in the Record Supporting these Documents Stakeholders Cannot Confidently Understand the Meaning and Intent of these Documents or Respond with the Certainty Needed for Rulemaking Purposes. Additionally, OPEI believes adding documents to the record after it has been closed is prohibited by the Administrative Procedures Act.

The 15-day changes include the addition of dozens of new documents to the record not referenced in the original rulemaking documents or in these 15-day changes. The intent of these documents is unclear which makes it difficult for stakeholders to provide comments. Furthermore, OPEI believes adding documents to the record using the "15-day change" process without any changes to the rule, and after the record has been closed is prohibited by the California Administrative Procedure Act. Nevertheless, OPEI has the following comments regarding documents added to the record. Due to time constraints and uncertainty regarding the additional documents, these comments are not exhaustive of all documents added to the record.

Comment 2a – Document 9 Dr. Joe Costa 2022, "*Calculating Geometric Means*"

The applicability of the document to this rulemaking is unclear. In its April 14, 2022 comments, comment 7e discussed survey data analysis, including results of applying a geometric means to the data. Document 9 supports OPEI and EMAs suggestion that geometric means may indeed be applicable to the CSU-F dataset because the data does NOT cover a narrow range but represents several orders of magnitude for almost all product activity responses. Please see OPEI's April 14, 2022 comments.

In addition to a geometric means analysis, OPEI and EMA, with our vendor Air Improvement Resource, Inc. (AIR), have conducted additional central tendency analysis of the survey data. It is necessary to conduct a review of the data distribution and consider the best metric for central tendency analysis, a step which neither CSU-F nor CARB appeared to do with either the initial dataset (first presented in March 2021 without any quality control analysis, including all outliers), or with its final model dataset published in September 2021.

OPEI, EMA and AIR recently conducted a Box Cox analysis on parts of the dataset. Much like the geometric means analysis discussed in OPEI's April 14, 2022 comments, the Box Cox analysis resulted in annual use (hours) closely correlated to the geometric means previously discussed for residential and commercial lawn mowers. See Figure 1.

Household Gasoline Lawn Mower Annual Hours						
Dataset/ Method	**Count**	**Minimum**	**Maximum**	**Average**	**Median**	**Geometric Mean**
Original	308	0	780	23.4	10.0	**8.5**
Box Cox	308	-	-	**8.3**	10.0	-

Landscape Gasoline Lawn Mower Annual Hours						
Dataset/ Method	**Count**	**Minimum**	**Maximum**	**Average**	**Median**	**Geometric Mean**
Original	1174	0	4368	253.8	216.7	162.3
Box Cox	1174	-	-	**121.4**	216.7	-

Figure 1 – Results of CSU-F survey data for residential and commercial lawn mowers using various central tendency analysis techniques.

As shown, the geometric mean and Box Cox analysis result in significantly lower annual hour use than the arithmetic average. As discussed in both OPEI comment letters, higher than normal annual use values will result in overestimates in sector emissions, in rulemaking emission reductions, and cost benefits. The method and analysis are included in further detail in Annex A.

Comment 2b – Document 10 E.H. Pechan & Assoc., Inc. "*Guidance for Estimating Lawn and Garden Equipment Activity Levels*", September 1997.

The applicability of the document to this rulemaking is unclear. In previous submissions to the record, OPEI provided extensive comments regarding concerns with the accuracy, comprehension and execution of the CSU-F population survey. Document 10 reaffirms these concerns.

Section 3 of Document 10 discusses “Preparing the Survey”. The document outlines concerns with survey questions including “Typically, how many times per month do you use your lawnmower?” and “How long does it take you to mow the lawn?”. The reports notes the first question is not specific enough if seasonal estimates are of interest, as in most of the areas of the U.S. lawn mowing frequency differs by season. The report also notes that the second question may result in respondents considering the actual time a respondent spends taking care of the lawn, including, e.g., raking clippings or using an edge trimmer. Survey comprehension uncertainty, including both seasonal and run-time per use, was raised in previous OPEI comments.

Survey comprehension uncertainty remains a serious concern for OPEI. Misunderstandings of the questions, and the fact that responders have not tracked or accurately considered equipment engine run-time have led to significant overestimates in annual use, and in-turn in sector emission overestimates. Based on the CSU-F survey data, as well as OPEI’s own survey efforts, OPEI concludes that machine use and age metrics are not commonly tracked by operators for outdoor power equipment and/or that respondents do not understand the intent of the survey is to collect equipment run-time (vs. total task time), and therefore these metrics cannot be accurately assessed exclusively by a telephone survey. Based on OPEI’s close analysis of the survey data, it is apparent that CSU-F survey responses were often inaccurate guesses, misleading, based on misunderstandings of the intent of questions, incorrectly recorded, or not reflective of average product age and use (“outliers”). Without an additional study to understand the correlation of survey responses to real-world use the benefits included in the Proposed Rule must be heavily discounted.

Successful execution of the subject survey required in-depth knowledge of dozens of products by data analysts at both CSU-F and CARB, and a robust real-time quality control plan to be able to evaluate the real-world likelihood of responses. The survey datasets used to develop CSU-F’s *Survey of Small Off-Road Engines (SORE) Operating within California: Results from Surveys with Four Statewide Populations* and draft SORE2020 models suggest additional product expertise and training were needed to execute the survey and develop the SORE2020 model. As discussed in previous OPEI comment letters, the original datasets used to develop the SORE2020 draft

included residential responses of chainsaws and go-karts being used 24-hours at a time, residential lawnmowers and welders being used 7 days a week 365 days a year, schools and dentist offices using portable generators 40 hours per week, 52 weeks a year, and landscapers using outdoor power equipment more than 40 hours *per employee per week* – sometimes more than 100 hours *per employee per week*. These responses, and many others like them, are not reasonable responses.

In response to Industry outlier concerns, CSU-F and CARB conducted limited survey quality control investigations (years after the original survey). In July 2020 CSU-F attempted to contact *just three* of more than 3000 respondents, and more than 200 Industry-identified potential outlier respondents. CSU-F was able to discuss responses *with just one respondent*. This single follow-up resulted in CARB reporting "With the assistance of SSRC from CSUF, staff was able to clearly understand those responses with relatively high usages. For instance, SSRC discovered that respondent R555 owns a large, 3-acre farming property, which correlated with the high annual activity for the various equipment reported." Offering that CSU-F and CARB staff "clearly understand responses with relatively high usages"[1] after publishing reports and draft models suggesting minimal product understanding and expertise is concerning.

In August 2020 OPEI staff initiated an effort to better understand survey comprehension, responses, and real-world use correlation. To achieve this, OPEI approached landscapers in the field and asked them to participate in a brief survey about their equipment use. Staff identified itself as OPEI, noting that it was collecting product information to better understand equipment use. Respondents were given a $20 fast food gift certificate for their participation. OPEI asked landscapers the same CSU-F survey use and age questions for commercial riding and walk-behind mowers. OPEI focused exclusively on these equipment types because they are typically instrumented with hour meters. OPEI was able to follow-up with most landscapers several times and gather additional hour meter readings. Based on reported and confirmed equipment age and hour meter readings, and follow-up readings, OPEI was able to calculate and compare response age-hours and weekly use (hours) to survey responses to gauge respondents' understanding of the survey questions and real-world use correlation. The

[1] *CARB 2020 Emissions Model for Small Off-Road Engines – SORE2020, pg 112*

results are clear, respondents grossly overestimated equipment use. Given this, SORE2020 significantly overestimates the sectors emissions and the benefits of the Proposed Rule.

OPEI surveyed 7 landscaping crews in Grand Rapids, MI and 2 municipalities / landscapers in California. In total, OPEI surveyed 22 commercial riding and walk-behind mowers, for which OPEI was able to conduct at least one follow-up visit for 17 of these mowers. Of the 20 units surveyed for which the hour meter was operational, the survey response age-hours (frequency of use x length of use x age) exceeded the hour meter reading on 18 units. The reported age-hours exceeded the real-world hour meter readings by ***thousands*** of hours in many cases. In the 2 cases where the hour meter readings exceeded the reported age-hours, both operators noted the units were used less frequently before providing responses, and minimally understated the use. For the 17 units for which OPEI was able to conduct follow-up inspections, where an accurate weekly use estimate could be calculated based on hour-meter readings, OPEI calculates that on average ***the respondents overestimated use by 135-150%,[2] or more than double the actual use hours***. See OPEI Survey Results in Annex D.

It is difficult to say why use responses are so grossly overestimated. Based on the response, OPEI speculates respondents do not discern time spent between jobs, and/or on breaks, and/or time using other equipment when considering responses. In many cases, it appears they respond as if they ***run*** the subject piece of equipment the entire day, without consideration of breaks, yard preparation/clean up time, or time using other equipment. OPEI believes this could be true for respondents of all categories considering the responses and overall high average Annual Use factors in SORE2020. A homeowner may not discern the time a lawnmower is ***running*** versus the time they are working outdoors on yardwork. This conclusion could explain why several landscaper respondents in both the OPEI and CUS-F surveys reported using equipment 5-6 days/week for 6-8 hours a day. In reality, OPEI found these units were used just 5-

[2] OPEI provides a range here because 2 units were observed being used by different crews (of the same respective companies). As discussed in the comments, surveying separate users for the same units resulted in significantly different survey response. As a result, OPEI calculated the average use considering responses for the same machine in separate calculations, using the high responses to calculate the high average of 1042 hr/year, or 152% above the hour meter average of 414 hr/year, and the low response to calculate the low average or 972 hr/year, or of 135% above the hour meter average of 414 hr/year.

10 hours/week. For example, survey Landscaper1 reports using a walk-behind mower 5-6 days/week for 10 hours/day, for a calculated total of *55 hours/week*. However, based on five hour meter readings between August and October 2020, the unit averaged *20.5 hours/week* (the highest weekly average of all units tracked), overestimating use by almost triple. The landscaping crew that maintains municipal property in South Pasadena reports to use its ZEE ZTR a calculated total 17.5 hours/week, but based on four hour meter readings between August 2020 and September 2021, the unit averages at maximum 10.5 hours/week, overestimating use by almost double versus its survey responses.

The OPEI survey correlation study yielded a few additional important findings. First, when OPEI surveyed different respondents for the same units, responses were significantly different, all drastically overestimating equipment run times. For example, when OPEI surveyed a crew from Landscaper5 on September 1, the respondent reported using a walk-behind mower 6 days/week for 8-9 hours/day (51 hours/week or 1636 hours/year), but when OPEI surveyed another crew from Landscaper5 on September 22, the respondent reported using the same walk-behind mower 5 days/week for 6-7 hours/day (985 hours/year). Both respondents significantly overestimated the use based on the hour meter readings of 374 and 423 hours at the respective interview times, and based on the calculated annual use of 643 hours by extrapolation of four hour meter readings. A unit from Landscaper6 was surveyed twice with similarly inconsistent and overestimated responses. Additionally, when OPEI first surveyed Landscaper6 on September 4, the respondent offered a specific unit was “old, 2005,” but his colleague interrupted offering the unit was “much newer, 2011 or 2012.” These inconsistencies support OPEI’s reported concerns that minutes or hours of use are not accurately tracked, and/or that the survey questions are not clear, and that as a result, the survey does not reflect real-world equipment use. Second, the responses from South Pasadena highlight concern about reported use and actual use. Specifically, the respondent stated that the ZEE riding mower (with a fixed battery system) was used 5 hours/use, but later responded that the battery lasted 3-5 hours. These responses are inconsistent and should raise questions. (For additional context, the respondent from Ojai with the same ZEE unit responded the battery lasts 2.5 hours.) This is similar to

OPEI's survey outlier investigation fuel correlation which suggested insufficient fuel for the number of hours of use reported for many respondents. Third, several of the OPEI surveyed units had engine replacements. Multiple respondents offered this information without prompting, and OPEI was able to confirm several others by inspection of the emissions label. OPEI expressed this concern to CARB both before and after the survey. It is not uncommon for professional landscapers to rebuild or replace engines, especially on lawnmowers and chain saws, which in-effect resets the engine emissions to new and must be accounted for in modeling to not overestimate the sector's emissions. CARB modeling does not account for this common landscaper practice based on its survey findings. Finally, the survey questions resulted in almost every respondent providing non-specific responses at least once, including responses such as "everyday," "almost all day," or "same." This highlights OPEI's previous concern that interviewers may have been confronted by these responses frequently and may have extrapolated their own understandings of these responses. OPEI is concerned that no CARB or CSU-F training materials addressed this, and that there was no mention of non-specific responses in the survey report, despite multiple responses having unreasonable hours of use (for example residential chain saws being used 12, 16 or 24 hours per use) and many identical responses from a respondent for the same and different equipment types. Regarding OPEI surveyed units for which respondents initially responded "same," hour meter readings ***always*** resulted in significant real-world equipment usage differences.

Unfortunately, due to the COVID pandemic, OPEI was unable to conduct additional research. However, the investigation strongly supports OPEI's concerns that respondents do not accurately track equipment use in the survey terms, and consequently grossly overestimate equipment use, and in-turn equipment emissions. At a minimum CSU-F and CARB must consider additional survey correlation to understand the accuracy of survey results and the impact of survey responses on emissions modeling before proceeding with SORE rulemaking.

To OPEI's knowledge, there is no evidence of any studies to correlate survey responses to real-world equipment use – for recent or past surveys. It is OPEI's understanding that no efforts were made to visit respondents, or otherwise seek to

correlate survey comprehension, or reliability of the responses, including for test surveys and a limited number of surveys conducted in-person. The responses were assumed as factual, despite dozens of responses that suggest misunderstandings of the survey questions, and/or uncertain or untruthful responses, and/or errors by the interviewer.

Thank you for your consideration of OPEI's comments. Please feel free to contact me if you have any questions.

Sincerely,

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ANNEX A

OPEI, EMA and AIR Box Cox Analysis Discussion

Additional 15-day Comments Based on New Resources Submitted by CARB
Air Improvement Resource, Inc.
June 13, 2022

ARB submitted a number of new statistical references to support their SORE survey and subsequent emission inventory analysis.[3] ARB's emission analysis and modeling is described in their September 2020 emission inventory report.[4] Section 4.2 of the report describes ARB's methods for estimating annual activity from different equipment types from its SORE equipment survey. The report also describes "outlier" data that were examined by CARB and eliminated prior to estimating annual equipment usage. Basically, ARB estimated annual activity by using an arithmetic average of the data that remained after the ARB-identified outliers were removed. [5]

Metric for Estimating Central Tendency (annual hours of use per year) From the Data

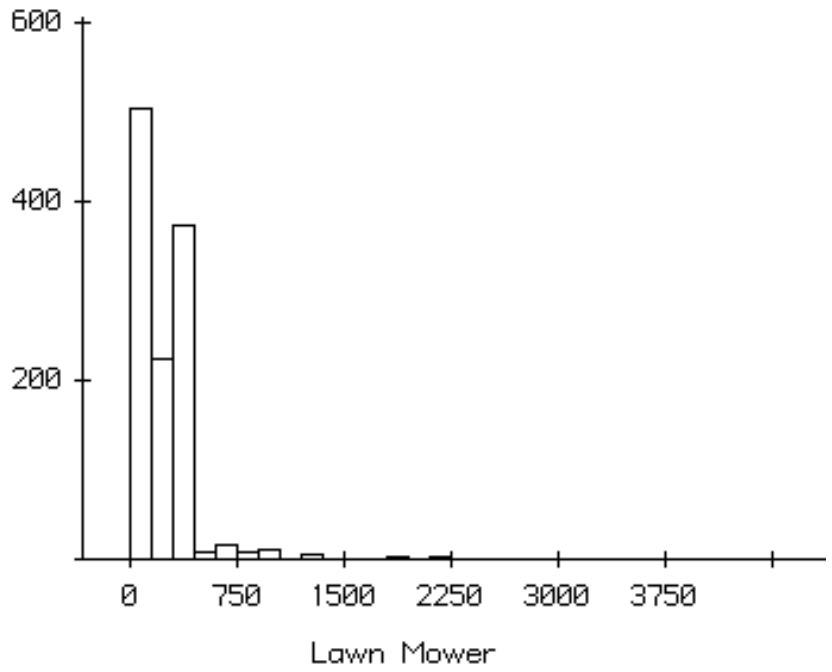
AIR has commented that ARB should have used a geometric mean to estimate annual activity instead of an arithmetic average, even after removing outliers. Arithmetic averages are generally used for data that is normally distributed – i.e., the familiar bell-shaped curve. The annual activity data, however, are not normally distributed, even after removing a few outliers. The data are highly skewed toward higher uses, and there is no data below 0 hours, for obvious reasons. Nowhere in ARB's analysis can we find a discussion of how the ARB annual use data from the survey are distributed (after removal of outliers), and what rationale ARB relied upon in choosing and arithmetic average instead of some other metric for estimating central tendency.

Reference 9 (Costa) from ARB's new sources discusses circumstances under which the geometric mean can be used in certain datasets. The following statements from the report are relevant.

a. "Page 1, "A geometric mean, unlike an arithmetic mean, tends to dampen the effect of very high or low values, which might bias the mean if a straight average were calculated"
b. Page 2, "Geometric mean is often used to evaluate data covering several orders of magnitude, and sometimes for evaluating ratios, or percentages, or other data sets bounded by zero."

The plot below shows the distribution of data on annual use for landscape lawnmowers. The vertical axis is frequency, the horizontal axis is hours per year of use. No outliers have been removed from these data.

[3] References 4, 9, 10, 14, 17, 19, 23
[4] *2020 Emissions Model for Small Off-Road Engines – SORE2020*, ARB, September 2020.
[5] AIR also identified outliers and these were identified in previous EMA and OPEI comments.



Some landscape lawnmowers are used for less than 0.5 hours per year, others as much as 2250 hours per year. These data cover several orders of magnitude as discussed in Costa and therefore the use of a geometric mean is appropriate.

Overall, this report lends support to the use of a geometric mean to estimate annual activity as recommended by AIR. At a minimum, ARB should have examined the distribution of responses for each equipment type (and category) after removal of outliers and determined the best method of estimating annual use after examining these distributions.

Survey Methods

Reference 10 (E.H. Pechan) from the new ARB sources discusses how to develop local or regional inputs lawn and garden activity (hours per year) for the EPA NONROAD model. There are extensive discussions on sample sizes and survey methods. Chapter 3 discusses survey methods. Pages 3-10 and 3-11 discuss forming the correct survey questions to get the appropriate answers. On page 3-11, one of the suggested survey questions is "How long does it take to mow your lawn?" The report qualifies this question, however, by indicating

> "The……question as posed could lead to overestimating lawn mowing activity if survey respondents consider the actual time that they spend taking care of the lawn, including, e.g.,raking clippings or using an edge trimmer. Instead, the more accurate and direct question "How long does your lawnmower run when you mow the lawn?" should be asked.

This is a critical point that ARB and its contractor overlooked when conducting the SORE survey. The surveyors never asked the respondents for engine-on or equipment run times.

Some respondents probably understood what the surveyors meant, but many did not. ARB should clearly address whether they think their survey appropriately considered this point.

Box-Cox Transformations of Activity Data

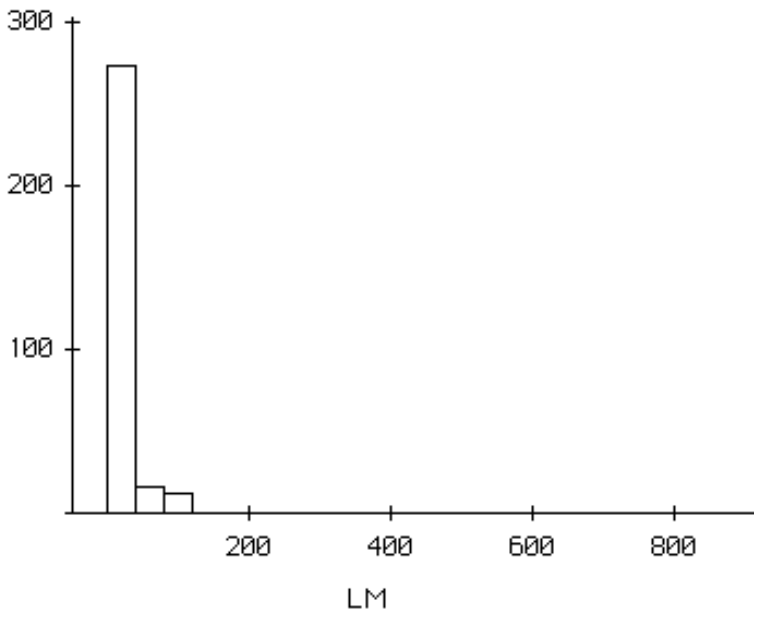
The Box-Cox transformation is also often used for data that is highly skewed. The data are first transformed using this methodology, and then an arithmetic average is computed and converted back to real space. [6]

We used the Box-Cox transformation method on residential and commercial lawnmowers as an example.

Residential Lawnmowers

The Box Cox Transformation methodology was applied to the Residential Lawn Mower data. This statistical procedure usually changes a highly skewed dataset into a more normal distribution. The graph below shows the histogram of the original data. As can be seen, the data are highly skewed to the right.

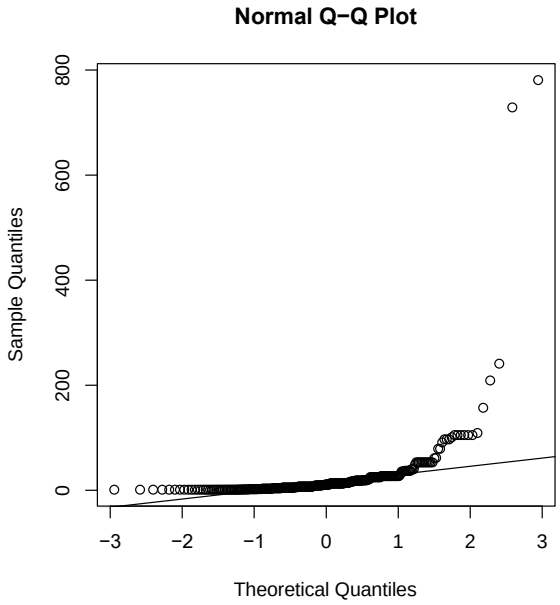
Original Residential Lawn Mower Activity Histogram



Since the Box Cox Transformation requires positive data, all activity values were increased by 1. The Q-Q below shows that the data are still highly skewed. (A normal distribution will have the symbols lie along the line.)

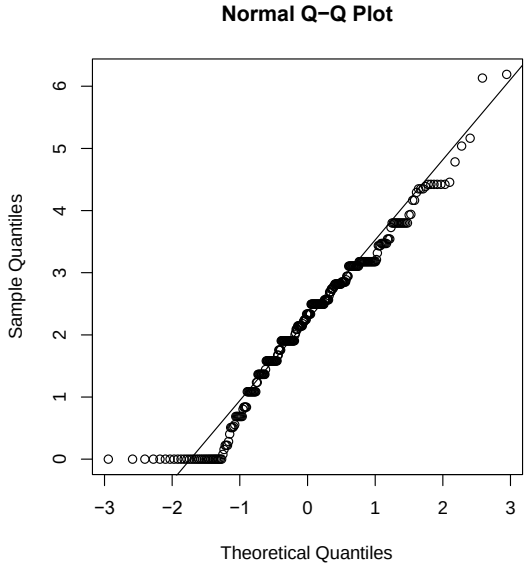
Residential Lawn Mower Activity

[6] https://onlinestatbook.com/2/transformations/box-cox.html



The next step was to perform the Box Cox Transformation on the data. This resulted in a more normally distributed Q-Q plot, but the 32 zero activity entries are an issue.

Box Cox Transformed Lawn Mower Annual Activity



Finally, the mean and median of this transformed data were computed and then reverted back to real-space, with 1 subtracted.

The results of this analysis are summarized below:

Household Gasoline Lawn Mower Annual Hours						
Dataset/ Method	**Count**	**Minimum**	**Maximum**	**Average**	**Median**	**Geometric Mean**
Original	308	0	780	23.4	10.0	**8.5**
Box Cox	308	-	-	**8.3**	10.0	-

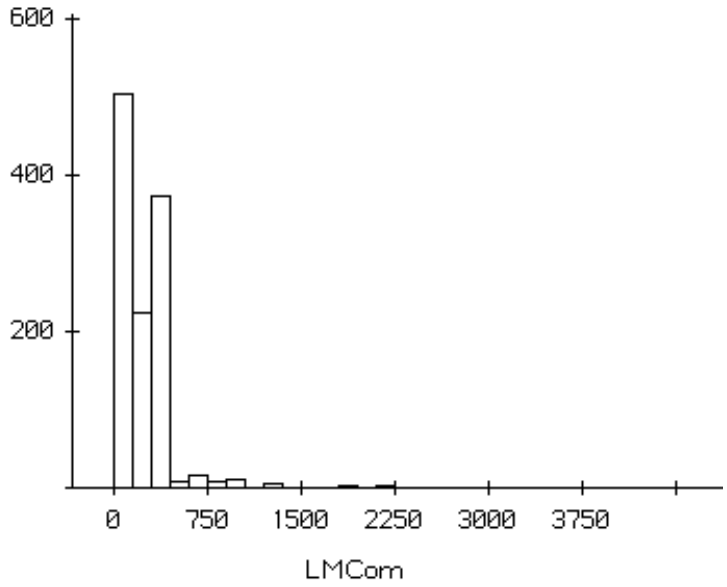
As can be seen, the Geometric Mean and the Box Cox Average values are very close and are much lower than the arithmetic average.

Landscape Lawnmowers

The Box Cox Transformation methodology was applied to the Landscape Lawn Mower data. This statistical procedure usually changes a highly skewed dataset into a more normal distribution.

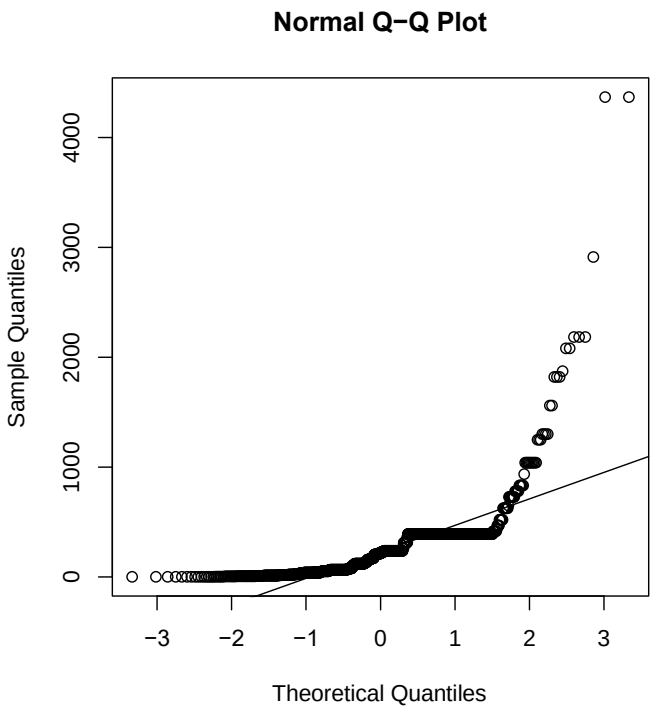
The graph below shows the histogram of the original data. As can be seen, the data are highly skewed to the right, and may be bimodal via the two peaks.

Original Landscape Lawn Mower Activity Histogram



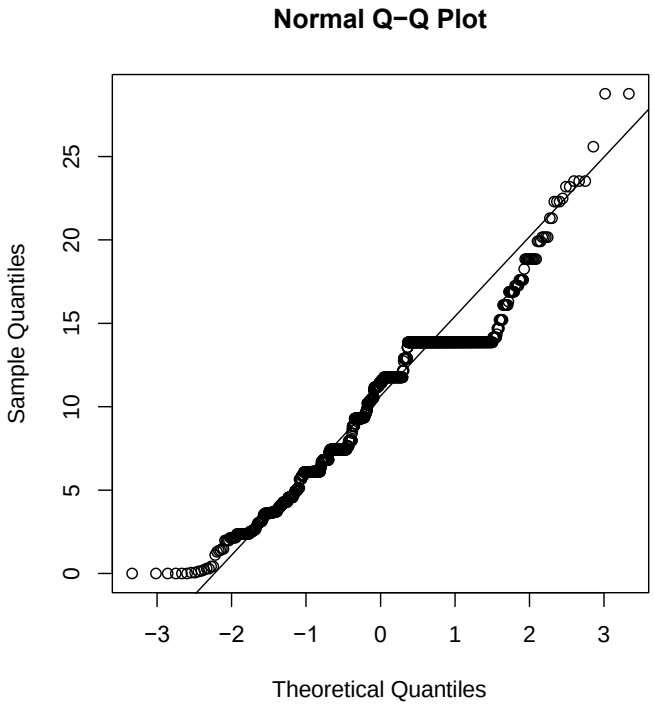
Since the Box Cox Transformation requires positive data, all activity values were increased by 1. The Q-Q below shows that the data are still highly skewed. (A normal distribution will have the symbols lie along the line.)

Landscape Lawn Mower Annual Activity

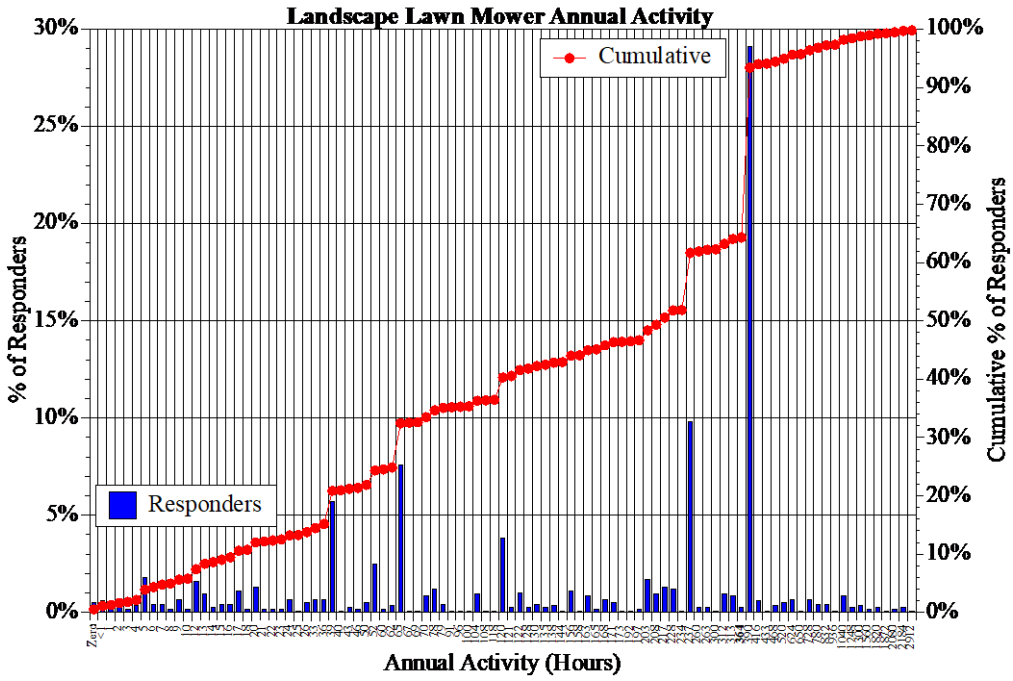


The next step was to perform the Box Cox Transformation on the data. This resulted in a more normally distributed Q-Q plot.

Box Cox Transformed Lawn Mower Annual Activity



However, an abnormality is present in the Q-Q plot. The horizontally flat area indicates that something is very odd about the data. As a result, the following plot was created.



This plot shows that 342 responses (~29% of the total) were at the 390 hour/year mark. Such a concentration can adversely affect obtaining any meaningful statistics.

Nevertheless, the mean and median of the Box Cox transformed data were computed and then reverted back to real-space, with 1 subtracted.

The results of this analysis are summarized below:

Landscape Gasoline Lawn Mower Annual Hours						
Dataset/ Method	**Count**	**Minimum**	**Maximum**	**Average**	**Median**	**Geometric Mean**
Original	1174	0	4368	253.8	216.7	162.3
Box Cox	1174	-	-	**121.4**	216.7	-

Finally, the table below shows that the landscape lawn mower activities are being dominated by only a few responders.:

ID	Count	Hours
199-G2	50	390.0
258-G1	50	390.0
315-G1	50	236.6
397-G1	50	390.0
16-G1	35	390.0
480-G1	32	236.6
345-G1	30	65.0
208-G2	20	390.0
269-G1	20	202.5
1-G5	15	216.7
21-G1	15	5.4
97-G2	15	39.0
527-G1	12	121.7
182-G1	10	65.0
190-G1	10	69.8
2-G1	10	162.5
319-G1	10	227.5
324-G1	10	313.3
4-G2	10	390.0
462-G1	10	12.8
484-G1	10	390.0
499-G1	10	390.0
18-G1	8	390.0
194-G1	8	39.4

276-G1	8	168.1
13-G2	7	119.6
218-G1	7	390.0
90-G1	7	12.2
147-G2	6	236.6
151-G1	6	236.6
152-G1	6	32.9
190-G2	6	170.9
211-G1	6	17.3
222-G1	6	19.9
302-G1	6	65.0
313-G1	6	39.0
41-G1	6	390.0
426-G1	6	390.0
501-G1	6	390.0

Summary

Due to the survey methods used, and the general nature of activity data obtained through telephone surveys instead of through using actual data loggers on equipment, the annual activity data collected by ARB and its contractor are highly skewed. As a result, arithmetic averages should not be used on the raw data, but alternative methods such as geometric averages, or transformation of the data by the Box-Cox method, should have been used by ARB to estimate annual activity for SORE equipment.