



1 presentation on Wind Turbine Generators – Shadow Flicker and Sound Basics. A copy of the  
2 powerpoint presentation is incorporated in the record of the meeting.  
3

4 Ms. Reilly introduced herself, stating that until recently she had been the Zoning and  
5 Building Director at Mason County, where she had been extensively involved with the review  
6 and approval of wind turbine developments near Ludington. Ms. Reilly said the Planning  
7 Commission had asked for her input on technical aspects of sound testing, shadow flicker  
8 measurement, mitigation methods for both and the applicability of the Township zoning  
9 ordinance. Ms. Reilly said that she had recently joined MSU Extension as a Government and  
10 Public Policy Educator in Manistee County.  
11

12 Ms. Reilly said that planning and zoning regulations exist to address shadow flicker,  
13 including definitions, modeling, variation and mitigation. Regarding sound, the method of  
14 describing and measuring sound is important. Ms. Reilly referenced Section 3.24 e 2 of the  
15 Township Zoning Ordinance, which provides that the Planning Commission may request a  
16 shadow flicker analysis and that such analysis shall identify location of shadow flicker that may  
17 occur and shall describe measures such as screening that shall be taken to eliminate or minimize  
18 shadow flicker.  
19

20 Ms. Reilly defined shadow flicker as “a pattern of moving shadows cast on a resident or  
21 an occupied community building caused by sunlight shining through moving wind turbine  
22 blades resulting in alternating changes in light intensity.” Ms. Reilly explained that the sun’s  
23 location is based on the earth’s rotation and that shadow flicker is always changing, by season,  
24 by the time of day and from day to day. She also said that the sun rises and sets at different  
25 times each day. Ms. Reilly said that the impact of flicker is variable, but also predictable, based  
26 on the following: distance to the turbine, orientation of the blade to the receptor, obstacles  
27 (trees, barns, topography), full sun/partial sun, clouds, hazy conditions, day and time of year.  
28 Ms. Reilly also provided information that shadow flicker is not known to cause seizures  
29 (industrial scale wind turbines turn at 10 – 20 rpm less than known frequencies that cause  
30 seizures). Also, blade orientation that is sideways produces the least amount of shadow flicker,  
31 while straight on blade orientation produces the most shadow flicker.  
32

33 Ms. Reilly presented videos showing variations of shadow flicker on 6 sites in Mason  
34 County; the sites were all within 1,000 to 1,500 feet of a turbine. Ms. Reilly said that it was her  
35 experience in Mason County that once a turbine is 2,000 to 3,000 feet away the shadow flicker  
36 is diffused and less intense. Ms. Reilly said that in Mason County the experience was showing  
37 that several houses were getting an average of 10 hours per year of shadow flicker. Ms. Reilly  
38 said that it was critical to establish how shadow flicker will be measured and how any limit on  
39 shadow flicker will be enforced. Ms. Reilly presented slides showing the impact of wind  
40 direction and blade orientation on shadow flicker.  
41

42 Ms. Reilly gave additional background on the shadow flicker information she had  
43 compiled through her employment in Mason County. She said that the County Planning  
44 Department chose 6 sites that were located approximately 1,500 feet from a turbine. There was  
45 100% participation in the study. She feels the findings gathered were very accurate. The second  
46 set of videos she showed were 3,000 to 4,000 feet away from a turbine – there was still a pulsing  
47 light, although it was broken up. The third set of sites showed less impact by shadow flicker.  
48 Ms. Reilly said that the location of the sun in the sky changes and that flicker results from the  
49 location of the sun in the sky.  
50

51 Ms. Reilly said that the models used by wind turbine developers tend to over predict the  
52 amount of shadow flicker. Ms. Reilly said Sempra did provide a shadow flicker map and that

1 Sempra’s analysis symbolizes a cumulative amount of shadow flicker for an entire year. It also  
2 explains what properties will experience shadow flicker. Ms. Reilly recommended that the  
3 Planning Commission think about allowing less than 30 hours of shadow flicker per year on  
4 residences and said that some properties will get shadow flicker even though they are not shown  
5 on Sempra’s shadow flicker map.  
6

7 Ms. Reilly next outlined the shadow flicker measurement methods for Mason County on  
8 a few slides. One slide depicted the shadow flicker butterfly – namely the wind turbine is the  
9 center of the butterfly, with one side being sunrise and the other being sunset, with the bottom  
10 of the butterfly being the sun in the winter and the top being the sun in the summer. It takes  
11 365 days for the sun to move from the bottom to the top and back to the bottom. This analysis  
12 represents the cumulative amount of shadow flicker over one year. Ms. Reilly also said that  
13 shadow flicker modeling can provide detailed information on how each residence (receptor) will  
14 experience shadow flicker, which can be predicted to within 6 minute increments. She said that  
15 Mason County requires continual submission of this kind of modeling information in order to  
16 insure enforcement of maximum shadow flicker on any one residence during a set period of  
17 time. Ms. Reilly then presented a slide on the Vestas Shadow Detection System (VSDS) and  
18 described how it worked. She said that sensors in the turbine can be programmed to stay off if  
19 receptors are getting flicker. A chip in the turbine will communicate with a sensor and the  
20 turbine will shut off. Ms. Reilly feels that the Vestas Shadow Detection System will work.  
21

22 Ms. Reilly said that the Casnovia Township Zoning Ordinance authorizes the Planning  
23 Commission’s to require methods to minimize or eliminate shadow flicker. She presented a  
24 slide on the common industry standard of 30 hours of actual shadow flicker per year, which she  
25 said is often measured at 10 rotor diameters (approximately 3,280 feet). She said that Mason  
26 County requires modeling out to 5,000 feet; this extent allows the Township to understand the  
27 true estimate of all properties that will be affected by shadow flicker. She cautioned that if the  
28 Township only models out to 3,280 feet (10 rotor diameters), the Township may not accurately  
29 pick up all the properties that will be affected by shadow flicker. She said just because  
30 something doesn’t show up on the model doesn’t mean it isn’t happening. The State of New  
31 Hampshire requires modeling to 5,280 feet (a mile).  
32

33 Ms. Reilly then talked about the worst case and actual flicker measurements. Ms. Reilly  
34 defined astronomical maximum as the measurement calculated as if he sun is shining, turbines  
35 always on, no obstructions and turbines are oriented to create maximum flicker. Ms. Reilly said  
36 that this is not a realistic measurement. She said that actual shadow flicker will adjust the  
37 astronomical maximum for the probability of sunny day, wind speed and wind direction. Ms.  
38 Reilly said that Germany limits astronomical maximum flicker to 30 hours per year and actual  
39 flicker to 8 hours per year/30 minutes per day. She also noted the shadow flicker limits in  
40 Australia (astronomical maximum 30 hours year/actual flicker 10 hours/year and Denmark (10  
41 hours per year actual flicker). Ms. Reilly said that actual flicker is calculated by applying a  
42 probability of a sunny day time the blades pass across the sun. Ms. Reilly said that at the Lake  
43 Winds Energy Park (Mason County) the calculation is  $0.3 \text{ blade pass} \times 0.4 \text{ clearness} = .12$ . Ms.  
44 Reilly said it is important that the Township understand the shadow flicker model used, the  
45 assumptions used and whether there will be actual shadow flicker on a residence. She said that  
46 Mason County allows 10 hours of LWEP, then no shadow flicker after that. Mason County  
47 models to 5,400 feet. Emmett County, Michigan does not allow any flicker on a dwelling or  
48 within 100 feet of a dwelling.  
49

50 Ms. Reilly then addressed wind turbine sound. She said the Casnovia Township Zoning  
51 Ordinance provides that sound shall not exceed 55 dB(A) at the property line closest to the WES.  
52 The Zoning Ordinance also provides “this sound pressure level may be exceeded during short

1 term events such as severe wind storms. If the ambient sound pressure level exceeds 55dB(A),  
2 the standard shall be ambient dB(A) plus 5 dB(A).” Ms. Reilly said that sound from wind  
3 turbines is variable. Sound will be emitted from wind turbine blades; this sound will change  
4 with the weather conditions. It may be a mechanical sound, which will be relatively predictable.  
5 She said that audibility is variable; it will be most pronounced with there are very low ground  
6 wind and high winds, such as wind shear. Ms. Reilly said that wind turbine sound testing  
7 should not be done during a wind storm, but should be done during quiet times (on the ground)  
8 with winds up high.  
9

10 Ms. Reilly discussed ambient sound. She said that ambient sound is background sound.  
11 This will vary throughout the Township, but will be highest by the roads or by a major industrial  
12 user; it will be lowest away from roads. She said it is not easy to regulate to the ambient level; it  
13 is easier to regulate to 55 dB(A). Ms. Reilly provided slides defining what a dB(A) is – A-  
14 weighted decibels are an expression of the relative loudness of sounds in air as perceived by the  
15 human ear. She said that in the A-weighted system, the decibel values of sounds at low  
16 frequents are reduced, compared with unweighted decibels, in which no correction is made for  
17 audio frequency. Ms. Reilly presented additional slides depicting sound pressure levels,  
18 describing sound power versus sound pressure, describing the setback to sound relationship  
19 (based on distance from a Vestas 100 turbine – different turbine than proposed for Casnovia  
20 Township) and an explanation on how to review sound modeling maps. Ms. Reilly noted that  
21 Sempra has submitted sound modeling maps for the Planning Commission’s review.  
22

23 Ms. Reilly noted that Casnovia Township has 55dB(A) requirement at the property line  
24 closest to the WES, but does not specify the sound descriptor. She noted that Sempra’s sound  
25 modeling appears to have assumed a sound descriptor of LEQ. She referenced the Planning  
26 Commission to recent Michigan case law in which a Township used an Lmax sound descriptor  
27 for measurement, versus LEQ. (*Tuscola Wind III v Almer Charter Township*) Ms. Reilly  
28 explained that Lmax is an instantaneous reading of max sound level , such that any one instance  
29 of exceeding the required dB(A) is an ordinance violation. For instance, if the sound of the blade  
30 pass exceeds the db(A) limit at any time, that one instance will be an ordinance violation. An  
31 LEQ sound descriptor is the continuous equivalent sound, namely the average of the sound  
32 pressure over an entire monitoring period. Ms. Reilly said LEQ is the most common sound  
33 descriptor. In terms of Lmax sound descriptors, she said that an L90 is a common level –  
34 meaning that the sound level exceeds this number 90% of the time. L50 is the median – sound  
35 level exceeds this number 50% of the time. Ms. Reilly presented slides on these sound  
36 descriptors, their definitions and their application.  
37

38 Ms. Reilly reiterated that there are different ways to describe sound and that a special  
39 use approval allows the Township to define how it will describe and measure sound from any  
40 wind turbine. Ms. Reilly mentioned that the Planning Commission should consider the sound  
41 monitoring period, if there is a requirement for follow up testing and if the Township will hire  
42 an acoustic consultant for input on the sound issue. Ms. Reilly said that sound modeling and  
43 methodology should be a mandatory element in any zoning application for a large wind energy  
44 system.  
45

46 Chairperson Mansfield asked if Ms. Reilly had personally listened to wind turbines? Ms.  
47 Reilly said she has. Ms. Reilly said that turbines do make noise, but that the sound level is  
48 variable. Chairperson Mansfield asked if there is a difference in sound produced by a turbine  
49 based on the turbine height? Ms. Reilly said not really. She said that, in her experience, the  
50 wind turbines in McBain make the same sound/noise as the turbines in Mason County, and  
51 McBain turbines are shorter. Chairperson Mansfield said she had visited both McBain and

1 Ludington to look at and listen to the turbines. She did not hear much noise from turbines in  
2 either place.  
3

4 Mr. Willick asked if the sound study should be done before construction, in order to  
5 establish a baseline sound level? Ms. Reilly said that in Mason County, the sound study was  
6 done as part of the zoning review, so as to measure the ambient noise level. Mr. Willick asked  
7 Ms. Reilly if she recommended this approach. Ms. Reilly said it is up to the Planning  
8 Commission- ambient noise is a moving target. She said it is important for the Planning  
9 Commission to understand what the information is and how the Planning Commission can use  
10 it for the project review. She said that the Township can also determine the ambient noise level  
11 once the project is installed (if it is approved) by simply shutting down the turbines and  
12 measuring the ambient sound at that point. Ms. Reilly said that 55dB(A) is a fairly high sound  
13 regulation. She said that Sempra has modeled the sound of the proposed turbines at closer to 45  
14 dB(A).  
15

16 Mr. Willick asked if Sempra used an LMax or LEQ sound descriptor in their sound  
17 modeling? Ms. Reilly said that the Planning Commission should clarify that issue with Sempra.  
18 Chairperson Mansfield asked if the turbines were quieter farther back from the road. Ms. Reilly  
19 said that the turbines emit the same sound wherever they are located. She added that the  
20 audibility may be different, because if you live by a road there will likely be more ambient noise.  
21 Ms. Anderson asked if there are any areas that would be louder than 55dB(A) because of  
22 overlapping sound from more than one turbine. Ms. Reilly advised the Planning Commission to  
23 ask Sempra about accumulated sounds from multiple turbines.  
24

25 Chairperson Mansfield thanked Ms. Reilly for her presentation and assistance.  
26

## 27 **TOWNSHIP ENGINEER PRESENTATION**

28

29 Chairman Mansfield said the next item on the agenda was comments by Lee  
30 VanderMuelen, Progressive A/E, Casnovia Township's engineering consultant.  
31

32 Mr. VanderMuelen said the applicant had submitted additional information on shadow  
33 flicker, which he had reviewed. The first article addressed wind turbines and epilepsy. Mr.  
34 VanderMuelen said that the article described the pulse of lights on the turbines and cited a  
35 number of studies, ultimately finding no direct correlation between seizures and epilepsy and  
36 wind turbines. Mr. VanderMuelen said that he agreed with Sempra on this point.  
37

38 Mr. VanderMuelen said that Sempra also submitted a spreadsheet of the expected  
39 shadow flicker on 768 non participating parcels – each labeled as a receptor. This information  
40 did not include shadow flicker that would affect participating parcels. The information  
41 highlighted which receptors (non-participating parcels) would receive over 30 hours of shadow  
42 flicker per year (27 parcels), which would receive 20+ hours of shadow flicker (74 parcels) and  
43 which would receive 10+ hours of shadow flicker (159 parcels). Mr. VanderMuelen  
44 recommended that Sempra should explain the shadow flicker results to the Planning  
45 Commission, including explaining any variables (ie, how many sunny days, etc.) Mr.  
46 VanderMuelen opined that shadow flicker modeling programs are very accurate; he believes  
47 that the Planning Commission can rely on this information and the modeling. He did say that  
48 discrepancies may occur due to topography, obstacles, buildings, blade position, etc..  
49

50 Mr. VanderMuelen also addressed the shadow detection system proposed by Sempra.  
51 He said that Ms. Reilly explained this system well. He said there will be a light meter on each  
52 turbine; residences will be programmed as receptors. The shadow detection system will shut

1 down the turbine if there is flicker detected. Mr. VanderMuelen advised that the Planning  
2 Commission ask Sempra to explain the variables that can be put into the system and how it  
3 works. It is his understanding that the Vestas Shadow Detection System can be programmed to  
4 totally eliminate shadow flicker on non-participating residences (receptors).  
5

6 Mr. VanderMuelen recommended that if the project is approved by the Township, it is a  
7 proactive approach to shadow flicker to require the installation of the Vestas Shadow Flicker  
8 Detection system and require mitigation of shadow flicker through use of the system. Mr.  
9 VanderMuelen said that it is likely that the Township will hear complaints, but that Sempra has  
10 proposed a complaint resolution process. He noted that the wind turbines may need to be  
11 reprogrammed to meet the shadow flicker level approved by the Township (if the project is  
12 approved). He also said that Sempra is willing to install window treatments, but this approach  
13 should be a last resort. He recommends that if the Planning Commission recommends  
14 approval of Sempra's special use request, the Planning Commission require the installation and  
15 use of the Vestas Shadow Detection System on all turbines and define the allowable level of  
16 shadow flicker on non participating parcels. Mr. VanderMuelen noted that Sempra has modeled  
17 their shadow flicker analysis on 30 hours per year of shadow flicker on non-participating  
18 parcels.  
19

20 Chairperson Mansfield asked if cloudy weather would cut down on shadow flicker. Mr.  
21 VanderMuelen recommended that the Planning Commission ask the applicant about the  
22 variables used in their modeling.  
23

24 **COMMENTS BY APPLICANT - SEMPRA ENERGY, RICH NERZIG**  
25

26 Mr. Nerzig provided a number of comments, starting with his assertion that Sempra has  
27 been open and transparent throughout the special use process. Mr. Nerzig said that Sempra has  
28 reviewed the ordinance and has met or exceeded it as a show of good faith. Regarding shadow  
29 flicker, Mr. Nerzig said that a small number of houses will receive shadow flicker. He said that  
30 the Planning Commission asked for a report and Sempra submitted a report. He said Sempra  
31 also provided raw data on the number of hours each receptor would be affected. Mr. Nerzig said  
32 he hoped the Planning Commission members had each reviewed the data. He said 80% of the  
33 receptors will get between 0 to 10 hours of shadow flicker per year. Thirty percent (30%) will  
34 get 30 hours of shadow flicker per year. Mr. Nerzig said that the town doesn't have a standard  
35 number of hours of shadow flicker allowed – so Sempra imposed the industry standard of 30  
36 hours per year on themselves. Mr. Nerzig committed to providing the Vestas Shadow Detection  
37 System on each turbine to bring the absolute minimum impact on residences.  
38

39 Regarding sound, Mr. Nerzig said that studies clearly show that state of the art turbines  
40 are very quiet; they will not exceed the 55d(B)A level. Mr. Nerzig also said that the 55 d(B)A  
41 level is measured at the property line (per Township Zoning Ordinance requirements) so there is  
42 additional setback distance from a nearby residence. He said that the project as proposed  
43 clearly meets Township regulations, and in fact exceeds them. Mr. Nerzig also said that Sempra  
44 has committed to pre and post construction sound testing and will reimburse the town for the  
45 cost of an acoustic expert. Mr. Nerzig thanked the Township engineer for his review of the  
46 additional information submitted by Sempra.  
47

48 Mr. Winell asked Mr. Nerzig if Sempra had ever appealed its taxes at the Apple Blossom  
49 site or elsewhere. Mr. Nerzig answered no.  
50

51 Joanne Blake, Stantech, next addressed the Planning Commission. Ms. Blake is a sound  
52 and shadow flicker consultant working for Sempra. Ms. Blake addressed some of the Planning

1 Commission's previous questions. Regarding accumulation of sound from more than one  
2 turbine, Ms. Blake said that the sound modeling takes into account all sound – modeling is done  
3 at the highest maximum sound level, with all turbines operating and all emitting sound, with a  
4 downwind direction. Ms. Blake also said that the model considers the max sound. It is not  
5 measuring an Lmax instantaneous sound, but an average of sound at the highest operating  
6 sound level. She said there are different measurements when doing pulse monitoring – that  
7 would be using an LEQ over a set period of time (such as 10 minute period). She said that if the  
8 Township hires an acoustic expert, that person can guide the Township through the process of  
9 understanding sound measurement.

10  
11 Mr. Willick asked for clarification on the different sound measurement descriptors. Ms.  
12 Blake said that Sempra will measure sound after the turbines are in place. Sempra and their  
13 consultants will go into the field for a 2-3 day period and will measure sound when the turbines  
14 are operating. Mr. Willick asked what over what period of time would the sound be measured?  
15 Ms. Blake said it could be a 10 minute average period of time – but whatever the length of time,  
16 it would be when the turbines are operating at their max, when wind speed is high and when it is  
17 humid. She said that monitors will be installed at 3-4 sites and will be left in place for several  
18 weeks.

19  
20 Ms. Anderson asked what conditions would equal maximum sound from the turbines?  
21 Ms. Blake said when the blades are turning at maximum speed. Mr. Willick asked if there  
22 could be spikes in noise up to 60 – 65 d(B)A which would average over time to 55 d(B)A. Ms.  
23 Blake said that you will hear spikes at the turbine base, but as you move away from the turbine  
24 sound will diffuse over distance. She said a general rule of thumb is that as the distance  
25 doubles, the sound halves.

26  
27 Chairperson Mansfield asked if the blades will turn with the wind. Ms. Blake said that  
28 they would turn to their maximum in wind. Ms. Blake also said that there have been no noise  
29 complaints at the Apple Blossom project in Huron County, including no complaints about the  
30 yaw of the blades. Ms. Anderson asked how a citizen complaint about noise would be addressed  
31 and resolved? Mr. Nerzig outlined Sempra's proposed complaint resolution process.

32  
33 Ms. Blake also discussed shadow flicker, saying that Sempra used climatological date  
34 from Grand Rapids, taking a monthly average of sunlight to use in shadow flicker modeling.  
35 Sempra also took into account the fact that the blades move and turn.

36  
37 Mr. Willick asked for clarification on the annual property tax payments, asking Sempra  
38 to specify how many tax dollars would go to the school systems, the county ISD, etc. Mr. Nerzig  
39 noted that he forwarded the requested tax information a few days prior to the meeting. He said  
40 that he calculated it based on current millage rates.

41  
42 Chairperson Mansfield asked for clarification if Sempra could reduce or eliminate  
43 shadow flicker using the Vestas Shadow Detection System discussed by Mary Reilly and the  
44 Township Engineer. Mr. Nerzig said that Sempra planned to reduce shadow flicker to the  
45 industry standard – 30 hours per year. He also said that other methods could be used to  
46 mitigate shadow flicker, including installing window treatments and/or landscaping. Mr. Nerzig  
47 said any complaints could be dealt with through the proposed complaint resolution process.

48  
49 **PLANNING COMMISSION DELIBERATION**

50  
51 Mr. Willick said he needed more information on the costs to rebuild the Township roads  
52 following Sempra construction. He asked Sempra to get with the Township Engineer and the

1 Road Commission to determine a reasonable dollar amount for a road construction bond. Mr.  
2 Willick feels it is important for the Planning Commission to know how much money it should  
3 recommend for bonding for road construction projects. Mr. Nerzig assured the Planning  
4 Commission that it will pay all road construction costs.  
5

6 Ms. Anderson also asked for the property tax breakdown for all taxing entities if the  
7 project is approved. Attorney Kaufman directed the applicant's attention to Sections 3.24 and  
8 17.06 of the Township zoning ordinance, re standards for special use approval of a utility grid  
9 wind energy system.  
10

11 Mr. Montgomery asked if Sempra could provide the Planning Commission with videos of  
12 the turbines at Apple Blossom running, so that the Planning Commission could hear them and  
13 see them. Mr. Nerzig said that the turbines at Apple Blossom are not the same as the ones that  
14 will be used in Casnovia Township. The turbines proposed for Casnovia Township are the  
15 Vestas 136 – they are not used elsewhere in Michigan at this time.  
16

17 Ms. Anderson asked how long after project construction would it take for Sempra to  
18 upgrade the Township roads? Mr. Nerzig said that Sempra will first restore the roads to an  
19 improved condition, then project construction would take place, then it will repair the roads to  
20 the original improved condition. Mr. Nerzig said that several intersections will be upgraded  
21 prior to construction, to provide required turning radii. Ms. Anderson asked about dust control  
22 in summer months. Mr. Nerzig said Sempra will pay for dust control on the impacted roads in  
23 the summer months.  
24

25 Mr. Willick asked about spikes of sound – if the sound is measured by Lmax. Mr. Willick  
26 asked if someone's house is 1500 feet from a turbine, what types of noise spikes might they  
27 hear? Mr. Nerzig said that the sound modeling submitted by Sempra assume that all turbines  
28 were running at full output and downwind of the receptors. The model was the worst case  
29 scenario. Mr. Willick said he is concerned that measuring sound over time (LEQ) evens out any  
30 peaks and valleys in sound. Mr. Nerzig said sound measurement will be collected during peaks  
31 and valleys (ie., spikes); as you move away from the turbine, sound will become more diffuse.  
32 Mr. Willick asked what would be the worst case scenario soundwise that Mr. Nerzig could  
33 anticipate. Mr. Nerzig said that there could be a small number of spikes, but they could be  
34 handled through the compliant resolution process. Such spikes would be revealed in post  
35 construction sound testing. However, Mr. Nerzig is confident that sound spikes will most likely  
36 not happen because the sound modeling meets the Township standards for all the turbines.  
37

38 Ms. Anderson said she is concerned as 30% of the affected non-participating parcels  
39 would have shadow flicker of 30 hours or more per year. Ms. Blake, from Stantech, said that  
40 the shadow flicker modeling did not take into account any blocking of the sun. Mr. Nerzig said  
41 that a small percentage of houses would get shadow flicker over 30 hours or more per year.  
42

43 Chairperson Mansfield asked if Sempra would have staff in Casnovia Township 24/7.  
44 Mr. Nerzig said yes; Sempra staff will live here and will be part of the community. Mr. Nerzig  
45 said Sempra's obligations do not stop even if Sempra sells off its renewable portfolio.  
46

47 Mr. Willick said he has been considering this application in terms of compliance with the  
48 special use standards of Section 17.06, namely, would this project be harmonious with the  
49 general objectives of the zoning ordinance. He is devoting a lot of thought to how this project  
50 may or may not be harmonious. Ms. Anderson said she is considering the shadow flicker report  
51 in more detail.  
52

1 Attorney Kaufman recommended that the Planning Commission get an estimated dollar  
2 amount from the County Road Commission and/or the Township Engineer, in terms of bonding  
3 for road construction improvements. She recommended that the Township include this type of  
4 bonding requirement as a condition of any special use approval.  
5

6 Mr. Montgomery asked for more information on the proposed road improvements. He  
7 said that heavy ag equipment uses the roads daily. He would like more information on  
8 proposed road improvements, how much they will cost and the timetable for making them. Mr.  
9 Nerzig said that Sempra will enter into a road agreement as a condition of special use approval.  
10 Mr. Nerzig said that Sempra commits to restoring the roads to the same or better condition than  
11 they started in; that Sempra will secure that obligation with the County Road Commission;  
12 Sempra will work with the Road Commission to establish a bond amount; Sempra will have an  
13 inspection done before and after the project; and Sempra agrees to using a third party inspector  
14 for the follow up inspections. Mr. Nerzig agreed that the third party inspector could be chosen  
15 by agreement of the parties, including the Township. Chairperson Mansfield clarified that the  
16 Planning Commission is asking for a report from the Road Commission.  
17

18 Mr. Nerzig stressed his understanding that Sempra would enter into a road agreement  
19 with the County Road Commission and finalize a road use agreement as a condition of any  
20 special use permit.  
21

22 Ms. Anderson again asked about the shadow flicker information submitted by Sempra,  
23 which showed several houses being affected by more than 30 hours per year of shadow flicker.  
24 Mr. Nerzig said that the use of the mitigation software could bring those totals under 30 hours  
25 per year.  
26

27 Mr. Montgomery again asked for video of the Vestas turbines that are proposed to be  
28 used in Casnovia Township. Mr. Nerzig agreed to forward video to the Planning Commission.  
29 Chairperson Mansfield asked how the turbines proposed for Casnovia Township differ from  
30 those used at the Apple Blossom project. Mr. Nerzig said the turbines are the same, but the  
31 blades are longer.  
32

33 Mr. Willick said that there were several things he still needed to still consider regarding  
34 the application. He needed time to review the information presented by Mary Reilly on sound  
35 and shadow flicker and he wanted additional information from the Road Commission regarding  
36 road construction bonding amounts.  
37

38 Willick moved to table continued deliberation on the special use application until the  
39 more information can be gathered and the Planning Commission has time to adequately review  
40 the information presented to date. Chairperson Mansfield seconded the motion. The motion  
41 passed unanimously.  
42

### 43 **PUBLIC COMMENT**

44

45 There being no further Planning Commission discussion, Chairperson Mansfield opened public  
46 comment. Chairperson Mansfield first asked Planning Commission Secretary Anderson to note  
47 for the record the correspondence received by the Planning Commission. Ms Anderson noted  
48 receipt of the following correspondence.  
49

- 50 1. Email from Paul Black, 10/14/18
- 51 2. Email from Randy Abend, 10/24/18
- 52 3. Email from Jennifer Armstrong 10/17/18

1 4. Letter from Dave VerSluis, 10/9/18.

2  
3 Chairperson Mansfield opened the floor for public comment.

4  
5 Dee Ann Chirco, 1788 Peters Road, said that if the project is approved, property owners in the  
6 area will have to pay higher homeowners insurance because the turbines can throw blades up to  
7 1 1/2 miles. She asked who would pay for that damage. She said that property values will decline  
8 and asked if the company would buy her house. She said that her family in Ludington said that  
9 they do not like the wind turbines there and that having wind turbines nearby devalues their  
10 home. She also asked who will benefit from this project; what will the residents get. She said  
11 shadow flicker will impact their homes and they will not be able to sell their homes. She asked  
12 what the Township will do for nearby property owners. She also said that school buses drive on  
13 the dirt roads and the proposed construction will destroy the dirt roads. Last, she said she does  
14 not want blinds or landscaping put on her property to block shadow flicker. That proposed  
15 solution is not fair to the residents in the area.

16  
17 Jennifer Armstrong, 17401 Laketon, said she submitted a study to the Planning Commission for  
18 review, regarding seizures from wind turbines. She has seizures and has been tested for what  
19 triggers them. Fireworks, flashlights, strobelights all trigger her seizures. She said that shadow  
20 flicker on her house will trigger her seizures. She mentioned Chiara malformation. She said  
21 that there are 7 proposed turbines near her house. She asked Sempra to buy her house from her.

22  
23 Paul Black, 210 N. Canada Road, thanked the Planning Commission for effort to get the facts on  
24 this application. He noted that it was hard to get to the facts. He asked the Planning  
25 Commission to keep doing the excellent and thorough job it was doing until it got all the  
26 information it needed. He said if the Planning Commission needs to take additional time to get  
27 facts and review them, it should do so. Mr. Black said that Sempra is selling its renewable  
28 energy portfolio and they want that deal closed. There are huge implications as to who the  
29 Township's partner will be on the project, if Sempra is out. Mr. Black said that the Township  
30 will be tied up in lawsuits if the Township ends up having a partner it doesn't know. There is no  
31 commitment by Sempra to Casnovia Township. Mr. Black asked the Planning Commission to  
32 keep doing its job thoroughly and take as long as it needed to work through the information  
33 provided. He said that people's lives are at risk. He does not want to look at these turbines for  
34 the rest of his life.

35  
36 Terry Cook, 1973 S. Road, said he has worked on two oil projects in different states where  
37 the roads have been destroyed. The sides of the roads were torn off, culverts destroyed, etc.  
38 The oil company was long gone and the roads were left in terrible shape. The Board is missing  
39 the point about the road deal – the Road Commission should be in on the discussion. He asked  
40 how often Sempra would grade the roads. He asked how the school buses would go down the  
41 roads during construction.

42  
43 Nola Carew thanked the Planning Commission for their hard work. She said that 768 properties  
44 are in the vicinity of the turbines; 34% would be affected by shadow flicker. Ms. Carew noted  
45 that Mason County does not allow any shadow flicker – zero hours per year. She said there is a  
46 way to get rid of shadow flicker. Casnovia Township does not have a standard for shadow  
47 flicker. She noted that Kevon Martis said that Casnovia Township had a weak ordinance. She  
48 also said that Ms. Reilly noted that the ordinance is not clear on how to measure sound. The  
49 World Health Organization (WHO) has provided new guidelines that 45 dB(A) is the acceptable  
50 noise level. She asked the Township to review its ordinances. She also said that Harvard  
51 University has found that climate warming is occurring because of wind turbines and that  
52 reindeer habitat in Sweden is also affected by wind turbines.

1  
2 Mary VerSluis, 2375 S. Peters Road, said there is a correlation between wind turbines and the  
3 decrease in the bee population. She is worried that the proposed wind turbines could affect the  
4 surrounding apple orchards and farms. She said that bees are sensitive to atmosphere and  
5 climate. She also said that bees are very important to farmers. Ms. VerSluis also said that she  
6 does not want Peters Road fixed. Right now the road is used by walkers, kids playing and she  
7 does not want the road improved. She also asked about shadow flicker that would occur from  
8 the turbines even if they were not moving. Her house is in the are projected to be affected by  
9 shadow flicker (more than 30 hours per year).

10  
11 Jesse Sincler, 1376 Behler Road, referred the Planning Commission to Section 17.06 c of the  
12 Zoning Ordinance, saying that a special use should not be hazardous or disturbing to  
13 neighboring land uses. He said that the Planning Commission has heard people say that this  
14 will disturb them. He noted that 3% of homes would get shadow flicker of over 30 hours per  
15 year. He feels that noise at a 35 d(B)A level is disturbing. He referenced case law from Tuscola  
16 County regarding making a reasonable decision.

17  
18 Deb Vanderhoff, 1638 Peters Road, said that Sempra is in a hurry to get this approval, because  
19 the company will get a 55% tax credit this year, while it will drop to 45% next year. After that  
20 the tax credit will be eliminated. Ms. Vanderhoff referenced information presented by Dr. Sara  
21 Mills regarding most of the tax money from this type of project will go to the County, not the  
22 Township. She also said that an article in the Grand Rapids Press showed that Muskegon  
23 County had huge financial deficits; this project could help make up some of those shortfalls.  
24 Ms. Vanderhoff also said that the Vestas safety manual provided a distance for how far  
25 employees should run away from a turbine if there was a problem; she lives within that  
26 evacuation distance. She told the Planning Commission she does not want blinds or  
27 landscaping on her house; she believes that wind turbines will lower her property value; she said  
28 that there are more suicides by people affected by wind turbines because of shadow flicker and  
29 ambient noise. Ms. Vanderhoff said that Casnovia Township does not need these problems.  
30 Ms. Vanderhoff submitted a number of documents to the Planning Commission.

31  
32 Mark Miller, 17445 Laketon, said that low frequency noise can bother livestock and can lead to  
33 cattle loss. He also said that the more moisture in the air at night, the louder noise will be. He  
34 said that blades will spin up to 175 mph at top speeds; this will drive worms away. He said that  
35 farmers are being offered additional money over and above the lease payment to cover the  
36 electric cost.

37  
38 John Chirco, 1788 Peters Road, asked what is in this for the community. He said the residents  
39 will be stuck with turbines and decreased property values. He said that the Canadian Supreme  
40 Court has recognized that wind turbines decrease property values. He thanked the Planning  
41 Commission for dealing with a challenging issue. He asked that the Planning Commission keep  
42 the residents in mind when making the decision.

43  
44 Randy Abend, 1250 Behler Road, asked that the public have access to the shadow flicker report.  
45 He said his parents do not get too much shadow flicker at their property in the Thumb, but there  
46 are turbines proposed near his house and he would be affected by shadow flicker. He said that  
47 in Sanilac County, many turbines are having the blades replaced after 5- 10 years. He asked how  
48 the Township would protect itself from paying for road maintenance costs. He said that  
49 Delaware Township in Sanilac County did not think of this when a project was approved there.  
50 In regards to noise, Mr. Abend said that the direction or the wind may allow him to hear the  
51 wind turbines a mile away. People living closer will be able to hear the turbines.  
52

1 Zoning Administrator Harrison said that the sound study and the shadow flicker information  
2 are available at Township Hall to review.

3  
4 Rebecca Sible, 920 S. Orchard Hill, said that many people were unable to attend tonight's  
5 meeting because of conflicting schools obligations. She said that the public is unable to rely on  
6 information about Planning Commission meeting dates and times. She appreciates the  
7 Planning Commission's work on this issue.

8  
9 Rick Sible, 920 S. Orchard Hill, applauded the Planning Commission for doing a good job. He  
10 said that the Zoning Ordinance sets forth the evaluation standards for special use approval. He  
11 said that road improvements will include the removal of trees and widening of many  
12 intersection. He appreciates that Sempra has gone beyond Zoning Ordinance requirements in  
13 some cases, but feels it may not be enough to protect the residents. Mr. Sible thanked Planning  
14 Commissioner Willick for addressing the Zoning Ordinance standards for approval of a special  
15 use including whether the use would be harmonious to the community. He wondered about the  
16 impact of the project on agricultural uses.

17  
18 Dave VerSluis, 2375 S. Peters Road, said he has lived in his house for 30 years. He will not live  
19 there if this project is approved. He asked Sempra to make him an offer to buy his house. He  
20 said that his life savings are invested in his house; if this project is approved, he may not be able  
21 to sell his house. If he cannot sell his house, his new hobby will be attending PC meetings and  
22 he will come to every meeting.

23  
24 Barb \_\_\_\_\_, 1529 \_\_\_\_\_, said the wind turbines will have impacts on earthworms,  
25 bees, apple trees. She asked if the applicant should be required to have an EPA study prepared  
26 to assess the impact on agricultural uses.

27  
28 Steve Sower, Shaw Road, said the proposed project will impact his family. He said there is a  
29 wind turbine proposed 1,000 feet from his front door. He said he works 60-70 hours per week.  
30 The turbine near his house can throw ice as far as his house; it could blow through his house.  
31 He does not want to move, but will have to if the project is approved. He lives near family now.  
32 He asked the Planning Commission to put a condition on any special use approval that people  
33 that did not opt in to lease land to Sempra should not have to deal with the impacts.

34  
35 Sharon Yeager, 2179 S. Peters Road, said that if property values go down, taxes will also go  
36 down.

37  
38 There being no further public comment, Willick moved to close the public hearing. Anderson  
39 seconded the motion. The motion passed unanimously and the public hearing was closed at 9:40  
40 p.m.

41  
42 There being no further business, Chairperson Mansfield made a motion to adjourn the meeting.  
43 The motion was seconded by Montgomery; the motion passed unanimously. The meeting was  
44 adjourned at 9:42 p.m.

45  
46  
47  
48 \_\_\_\_\_  
49 Kim Anderson, Secretary

50 Minutes Prepared: November 6, 2018  
51 Minutes Approved: November 27, 2018