City of Carson City
Agenda Report

Date Submitted: February 24, 2009

Agenda Date Requested: March 5, 2009
Time Requested: 45 minutes

To: Mayor and Board of Supervisors

From: Development Services - Planning Division

Subject Title: Action to introduce, on first reading, Bill No._____, an ordinance amending the Carson City Municipal Code Title 18 Zoning, Chapter 18.03, Definitions, Section 18.03.010, Words and Terms Defined, to modify the definition of "Wind Energy/Conversion Facility" to "Wind Energy Conversion System, Private Use" and to add a definition for "Wind Machine"; and amending the Carson City Municipal Code Title 18 Zoning, Chapter 18.05, General Provisions, by adding Section 18.05.080, Private Use Wind Energy Conversion Systems to set forth specific standards and criteria for these systems, and other matters properly related thereto. (ZCA-08-127)

Summary: The proposed ordinance would create standards for the placement and use of small wind turbines for personal use in all areas of Carson City, including residential and commercial areas. Small wind turbines are typically for personal use to offset the cost of electricity to a home or business. There are currently no specific standards for such devices in the Carson City Municipal Code.

Type of Action Requested:
( ) Resolution
( ) Formal Action/Motion
(X) Ordinance-First Reading
( ) Other (Specify)

Does This Action Require A Business Impact Statement: ( ) Yes (X) No

Planning Commission Action: Recommended approval on January 28, 2009 by a vote of 5 ayes, 1 nay and 1 absent.

Recommended Board Action: I move to introduce, on first reading, Bill No._____, an ordinance amending the Carson City Municipal Code Title 18 Zoning, Chapter 18.03, Definitions, Section 18.03.010, Words and Terms Defined, to modify the definition of "Wind Energy/Conversion Facility" to "Wind Energy Conversion System, Private Use" and to add a definition for "Wind Machine"; and amending the Carson City Municipal Code Title 18 Zoning, Chapter 18.05, General Provisions, by adding Section 18.05.080, Private Use Wind Energy Conversion Systems to set forth specific standards and criteria for these systems, based on the findings contained in the staff report.

Explanation for Recommended Board Action: The Board of Supervisors, pursuant to Carson City Municipal Code, is required to take final action on all code amendments. See the attached staff report for more explanation.

Applicable Statute, Code, Policy, Rule or Regulation: 18.02.075 Zoning Code Amendments

Fiscal Impact: N/A

Explanation of Impact: N/A

Funding Source: N/A

Alternatives: 1) Refer back to staff and Planning Commission for further review
2) Deny

Supporting Material:
1) Ordinance
2) Case Record
3) Planning Commission Staff Report

Prepared By: Janice Brod, Management Assistant V

Reviewed By:

(Planning Division Director) Date: 2/24/09

(Development Services Director) Date: 2/24/09

(City Manager) Date:

(District Attorney's Office Melanie Bukelta) Date: 2-24-09

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay
2) _____

_____
(Vote Recorded By)

BILL NO. _____

ORDINANCE NO. 2009-_____

AN ORDINANCE AMENDING CARSON CITY MUNICIPAL CODE TITLE 18, ZONING, CHAPTER 18.03, DEFINITIONS, SECTION 18.03.010, WORDS AND TERMS DEFINED, TO MODIFY THE DEFINITION OF "WIND ENERGY/CONVERSION FACILITY" TO "WIND ENERGY CONVERSION SYSTEM, PRIVATE USE" AND TO ADD A DEFINITION FOR "WIND MACHINE"; AND AMENDING THE CARSON CITY MUNICIPAL CODE TITLE 18 ZONING, CHAPTER 18.05, GENERAL PROVISIONS, BY ADDING SECTION 18.05.080, PRIVATE USE WIND ENERGY CONVERSION SYSTEMS TO SET FORTH SPECIFIC STANDARDS AND CRITERIA FOR THESE SYSTEMS; AND OTHER MATTERS PROPERLY RELATED THERETO.

Fiscal effect: None

THE BOARD OF SUPERVISORS OF CARSON CITY DO ORDAIN:

SECTION I:

That Chapter 18.03 (Definitions), Section 18.03.010 (Words and Terms Defined) of the Carson City Municipal Code is hereby amended, in part, to modify the definition of "Wind Energy/Conversion Facility" and to add a definition for "Wind Machine", as follows:

Wind Energy/ ~~Conversion~~ System, Private ~~Facility~~ ~~means a machine or facility that converts the kinetic energy in the wind into a useable form~~ means a system consisting of a wind turbine, tower, and associated control or conversion electronics for the purpose of providing electrical power to a lawful principle use. A system having a rated capacity of 100 kilowatts (kW) or less shall be considered a private use system for the purposes of the regulations. These systems are considered accessory uses in all zoning districts.

Wind Machine. The individual component of a Wind Energy Conversion System that converts kinetic energy from the wind into electrical energy, independent of the electrical conductors, electrical storage system, electrical metering, or electrical inverters.

SECTION II:

That the Carson City Municipal Code Chapter 18.05, General Provisions, Section 18.05.080, Private Use Wind Energy Conversion Systems, is hereby added, as follows:

18.05.080 Private Use Wind Energy Conversion Systems. In order to balance the need for clean, renewable energy resources with the protection of the health, safety and welfare of the community, the purpose of this section is to regulate private use wind energy conversion systems (WECS) for the production of electricity for use on the subject site and for net metering through the power company.

1) **Applicability and Definition.**

a) **Private Use Wind Energy Conversion Systems (WECS).** A private use wind energy conversion system consists of a wind turbine, tower, and associated control or conversion electronics for the purpose of providing electrical power to a lawful principle use. A system having a rated capacity of *20 kilowatts (kW) or less for residential use or* 100 kW or less *for non-residential uses* shall be considered a private system for the purposes of these regulations. Not more than one machine shall be allowed per parcel of land when the size of the parcel is less than one acre in size. WECS are considered accessory uses as stated in CCMC 18.03.010 (Words and Terms Defined), Accessory Building or Accessory Structure and Accessory Use, and are allowed in all zoning districts.

b) **Wind Machine.** The individual component of a Wind Energy Conversion System that converts kinetic energy from the wind into electrical energy, independent of the electrical conductors, electrical storage system, electrical metering, or electrical inverters. This term shall include the towers or supporting structures.

c) **Building Code(s).** All codes, ordinances, policies and procedures, and standards adopted and enforced by the Carson City Building Division.

d) **Fire Code(s).** All codes, ordinances, policies and procedures, and standards adopted and enforced by the Carson City Fire Department.

e) **FAA.** The use of this acronym shall denote the Federal Aviation Administration, or any other applicable authority that regulates air safety within the Carson City jurisdiction.

f) Private use wind energy conversion systems shall be allowed as accessory uses in all Public zoning districts without the requirement of Special Use Permit approval provided the system meets all other requirements of this section.

g) All proposed Private Use Wind Energy Conversion Systems located within the Carson City Historic District must receive review and approval from the Historic Resources Commission prior to submission of a building permit.

2) **Standards.** All Wind Energy Conversion Systems are subject to and must comply with the following provisions of this section:

a) **Location.** No part of a wind energy conversion system shall be located within or over drainage, utility or other established easements.

b) **Setbacks.** Minimum setbacks for private use wind machines shall be:

i) A minimum of 1.1 times the total extended height from the project property lines adjacent to a residential, Conservation Reserve or Agricultural zoning district.

ii) Guy wire anchors may not extend closer than 10 feet from any property line.

iii) A 10 foot minimum setback from any part of the machine, rotors or guy wires to the property line of any other non-residential zoning district.

iv) Wind machines shall not be located within the front yard setback nor within the street-side setback of any parcel of land in residential zoning districts.

c) **Height.** *The maximum total extended height of Wind Energy Conversion Systems is 90 feet*, provided all required setbacks and other standards of this section are met.

i) Tower Height shall mean the height above adjacent grade of the fixed portion of the tower, excluding the wind turbine itself.

ii) Total Extended Height shall mean the height above adjacent grade to a blade tip at its highest point of travel and including any other portion of the Wind Energy Conversion System.

d) **Lighting.** Wind system towers shall not be artificially lighted unless required, in writing, by the Federal Aviation Administration (FAA) or other applicable authority that regulates air safety. Where the FAA requires lighting, the lighting shall be the lowest intensity allowable under FAA regulations; the fixtures shall be shielded and directed to the greatest extent possible to minimize glare and visibility from the ground; and no strobe lighting shall be permitted, unless expressly required by the FAA.

e) **Access.** All wind machine towers must comply with the following provisions:

i) The tower shall be designed and installed so that there shall be no exterior step bolts or a ladder on the tower readily accessible to the public for a minimum height of 12 feet above the ground. For lattice or guyed towers, sheets of metal or wood or other barrier shall be fastened to the bottom tower section such that it cannot readily be climbed; and

ii) All ground-mounted electrical and control equipment shall be labeled or secured to prevent unauthorized access.

f) **Rotor Safety.** Each wind machine shall be equipped with both manual and automatic controls to limit the rotational speed of the blade within the design limits of the rotor. The minimum distance between the ground and any protruding blades utilized on a private wind machine shall be 10 feet as measured at the lowest point of the arc of the blades.

g) **Noise.** All wind machines shall comply with the noise requirements in this section. These levels, however, may be exceeded during short-term events such as utility outages and severe wind storms. A manufacturer's sound report shall be required with a building permit application.

i) No wind machine shall create noise that exceeds a maximum of *50* decibels (dB) at any property line abutting a residential zoning district or 60 dB at any other property line. Measurement of sound levels shall not be adjusted for, or averaged with, non-operating periods. Any wind machine(s) exceeding these levels shall immediately cease operation upon notification by Carson City and may not resume operation until the noise levels have been reduced and verified by an independent third party inspector, approved by Carson City, at the property owner's expense. Upon review and acceptance of the third party noise level report, Carson City will allow operation of the affected wind machine(s). Wind Energy Conversion System(s) unable to comply with these noise level restrictions shall be removed upon notification by Carson City, after a period established by Carson City.

h) **Aesthetics and Maintenance.**

i) Appearance. Wind machines, unless subject to any applicable standards of the FAA, shall be painted using a non-reflective, non-obtrusive color such as tan, sand, gray, black or similar colors. Galvanized steel or metal is acceptable for the support structures. The painting or coating shall be kept in good repair for the life of the wind machine. In addition, any changes to the approved color shall result in notification by Carson City that the affected wind machine(s) shall cease operation until a color correction has been made. If the affected wind machine(s) are not repainted, using an approved color, within the period established by Carson City, the owner shall remove the affected Wind Energy Conversion System(s).

ii) Electrical Wires. All electrical wires leading from the tower to electrical control facilities shall be located underground.

iii) Maintenance. Wind machines shall be maintained in good repair, as recommended by the manufacturer's scheduled maintenance or industry standards, and shall be free from rust.

i) **Signs/Labels.**

i) Advertising Label. The only advertising sign allowed on the wind machine shall be a manufacturer's label, not exceeding one square foot in size, located on the generator housing.

j) **Compliance with FAA Regulations.** All wind machines shall comply with applicable FAA regulations, including any necessary approvals for installations.

k) **Ice Throw.** The potential ice throw or ice shedding from the proposed wind machine shall not cross the property lines of the site.

3) **Repair and Removal of Wind Machines.** Any wind machine found to be unsafe by an official of the Carson City Building Division shall immediately cease operation upon notification by Carson City and shall be repaired by the owner to meet federal, state, and local safety standards or be removed within six months. Wind machines that are not operated for a continuous period of 12 months shall be removed by the owner of the wind machine.

a) When a wind machine is removed from a site, all associated and ancillary equipment, batteries, devices, structures or support(s) for that system shall also be removed. For the purposes of this section, non-operation shall be deemed to include, but shall not be limited to, the blades of the wind machine remaining stationary so that wind resources are not being converted into electric or mechanical energy, or the wind machine is no longer connected to the public utility electricity distribution system.

4) **Mounting of Wind Machines.** Attachment of the wind machine, including any support or structural components, to any building or structure shall be in strict compliance with regulations of the Carson City Building Division.

5) **Compliance with Regulations.**

a) All systems shall comply with applicable fire and building codes.

b) All standards are absolute. Once wind machines are permitted, the owners have the option of compliance with the standards or discontinuation of operations. If the operation of the wind machine(s) does not comply with the provisions of this article, the operator shall promptly take all measures necessary to comply with these regulations, including, but not limited to, discontinued operation of one or more wind machines.

c) Variations to the regulations and standards of this section may only be permitted by special use permit, approval of which shall be pursuant to Title 18, Section 18.02 (Special Use Permits).

SECTION III:

No other provisions of Title 18 of the Carson City Municipal Code are affected by this ordinance.

PROPOSED on _____, 2009.

PROPOSED BY Supervisor _____

PASSED _____, 2009.

VOTE:

AYES: _____

_____

_____

_____

_____

NAYS: _____

_____

ABSENT: _____

_____

_____

BOB CROWELL, Mayor

ATTEST:

_____

ALAN GLOVER, Clerk-Recorder

This ordinance shall be in force and effect from and after the _____day of the month of _____ of the year 2009.

CARSON CITY PLANNING COMMISSION

CASE RECORD

MEETING DATE: January 28, 2009 **AGENDA ITEM NO.: H-3**

APPLICANT(s) NAME: N/A **FILE NO. ZCA-08-127**
PROPERTY OWNER(s): N/A

ASSESSOR PARCEL NO(s): N/A
ADDRESS: N/A

APPLICANT'S REQUEST: Action to consider an ordinance amending the Carson City Municipal Code Title 18, Zoning, Chapter 18.05 General Provisions, adding Section 18.05.080, Small Wind Turbines, to provide standards for the placement and use of small wind turbine generators.

COMMISSIONERS PRESENT: [X] KIMBROUGH [X] MULLET [ ] BISBEE

[X] PEERY [X] REYNOLDS [X] VANCE [X] WENDELL

STAFF REPORT PRESENTED BY: Lee Plemel [X] REPORT ATTACHED
STAFF RECOMMENDATION: [X] APPROVAL
APPLICANT REPRESENTED BY: Lee Plemel

_X_ PERSONS SPOKE IN FAVOR OF THE PROPOSAL _X_ PERSONS SPOKE IN OPPOSITION OF THE PROPOSAL

DISCUSSION, NOTES, COMMENTS FOR THE RECORD:

Planning Commission:

Craig Mullet; What is the average consumption of energy? What is 100 KW??

Bill Vance: 100 KW is a lot!!!!

Public comments:

Jenny Scanlon ~ of Pinion Hills Drive: Must waive all fees for this to really work! My neighbor has one of these and it is really quiet and hard to see. Don't make cost too high. Want to put one in.

Roy Engelhardt: Carson City resident, Goni Rd.- I have an acre lot next to Carson City property with a 30 foot barn. I want a 20 foot system on the barn. Is that ok? $7,500 for typical system that can run a home. $5,000 for a typical system that can run a portion of a home. It would cost about $15,000 installed.

Dave Campbell: Carson City resident- 55 decibels is too loud!! Don't agree with no limitation on the number of turbines on lots. Intent of SUP is so that neighbors can review it. Solution: New "windmill" special use permit. Maybe no fees charged for these SUP's? Carson City should get a sound guy there and let us hear what 55 decibels is. "My view cannot be interfered with!" Public zoning okay without SUP? Why aren't the number of systems regulated?? Why?

Mark Turner-Silver Oak -Silver Oak is looking into alternative energy for the golf course. $100,000 is spent on electricity annually for the golf course. When the wind blows in Carson City and it's howling, it makes noise. If you add a few decibels it is not going to make a difference. Wind generators create no noise when the wind is not blowing. "Wind spires" are designed to be used in mulitiple array.

Bruce Kittess: Carson City resident-The Washington D.C. bailout offers $4,000 subsidy for these units. The best bet is a wind/solar combination. Roof-mounted wind conjunction with solar is promising. This all about finding a way to lower the threshold of permitted uses (i.e. height and setbacks).

Tim Howard: Carson City (Valley View Dr.) resident for 25 years-(Read letter from Spanish Springs resident into the record. Ice not an issue) this code is meant to not restrict or make harder the use of these systems. You must install these systems where they will be most productive and safe. 60 decibels is too loud and must be lower. Our emphasis should be safety. Why only one per acre and restrictions and location? All are less than 60 db, most are 20-30 db.

Dennis Mederios-Solar Store owner: 100 KW for residential is too much. We should look at commercial facilities. We must look at KW hours.

Leslie Mederios-Solar Store owner: Compliment on quick action. Windmills aren't unattractive. This is beautiful and may be considered a work of art. "It gets more beautiful the less I pay for energy". The height restriction goes against NRS 278.0208. Windmills are not ugly. Color should not be obnoxious-too limiting. Minimum BP costs is a good thing. Color put on by manufacturer and if often white.

Scott (Durson?)-Nevada Energy: The average home uses 750 KW hours per month and 9000 KW hours per year. Systems must be sized properly so they don't lose money. Nevada Energy-one could get a credit-not a check, and there is no transfer of energy from main meter allowed Multiple generators at one location is a viable option. Credits stay with the system only. Solar is predictable. Wind is not predictable. Rebates are significant. Every household payment includes a small amount for the rebate system in Nevada. There are five wind system manufacturers in northern Nevada. Bird strike issue- geese are always at Nevada Energy site with no strikes from their wind generator.

Mark Harris: Electrical Engineer- Siting of generators away from structures is important for efficiency. Color-as blades get longer they are white. It's all about thermal expansion. White allows less thermal expansion to the blades. Large blades must be white. Velocity and rotor area are very important. Turbulance from upwind can impact downwind.

Derwin Bass: Architect- Most systems use positive pressure. We are working on a new product that uses positive/negative pressure that will increase output x 4. There will be these systems incorporated into building design. Will that require a special use permit?

Gary Kilty: Interested in a small system. Setbacks okay. Engineering should prevent these systems from falling over. Don't need setbacks of 1.1:1 for safety.

Dave Campbell: are vertical axles part of the machine's height? Three decibels doubles the noise intensity. You can paint anything. This whole program in NOT environmentally sound. Big generation plants are more efficient than small ones; a commercial "wind farm" would be better. That makes sense.

Planning Commission:

Steve Reynolds: The proposal is reducing regulations, so we can appropriately adopt appropriate standards per NRS. We are considering a relaxation of the CCMC. It is not an addition of restrictions. Should we consider the aesthetic aspect of it? If these were cell towers there would be people angry. I question the height issue. Maybe there should be a limit. Suggest 48-50 db as maximum at property line.

Bill Vance: Safety of rotor?

George Wendell: Report on issues in one year?

*Motion to approve: Wendell/Peery as recommended by staff.

Steve Reynolds: Disagrees with no limit on height restriction, e.g. 85 feet. Height may be 90 feet?

Craig Mullet: Has a problem with height and a problem with decibels.

Wendell: Would amend motion to limit maximum height to 90 feet and limit decibels adjacent to residential to 50 db.

***CHANGES TO ORDINANCE: 90' MAX HEIGHT AND 50 DECIBELS IN RESIDENTIAL**

MOTION WAS MADE TO RECOMMEND APPROVAL

MOVED: George Wendell SECOND: John Peery PASSED: 5/AYE 1/NO 0/ABSTAIN 1/ABSENT

SCHEDULED FOR THE BOARD OF SUPERVISORS DATE: February 19, 2009

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF JANUARY 28, 2009

FILE NO: ZCA-08-127 **AGENDA ITEM: H-3**

STAFF AUTHOR: Heidi Eskew-Herrmann, AICP, Associate Planner

APPLICANT: Carson City Planning Division

RECOMMENDED MOTION: "I move to recommend to the Board of Supervisors approval of ZCA-08-127, a Zoning Code Amendment to the Carson City Municipal Code Title 18, Chapter 18.03, Definitions, to amend the definition of "Wind Energy/Conversion Facility," to add a definition for "Wind Machine"; and Chapter 18.05, General Provisions, to add section 18.05.080, Private Use Wind Energy Conversion Systems, which sets forth specific standards and criteria for these systems."

Purpose

In response to increased public interest and inquiry about requirements and standards for residential and private use wind energy conversion systems within Carson City, Planning staff brought forth a discussion item to the Planning Commission at their October 29, 2008 meeting. The intent was to get direction from the Commission on drafting an ordinance for these systems in Carson City. The Planning Commission directed staff to draft a wind turbine ordinance.

The purpose of this Zoning Code Amendment is to develop an ordinance related to residential and private use wind turbine systems which, through the use of review and performance criteria, will ensure that these systems are appropriately designed, sited and installed within Carson City. There is increased interest in these systems partly because WindGenerations/NV Energy offers rebates that somewhat offset the installation cost of wind systems for grid-connected customers. This rebate system is available to help the State of Nevada achieve 20 percent renewable power by 2015, as required by legislation.

Presently, city staff considers standards for residential and private use wind systems to be the same as other accessory structures. Certain height and setback restrictions must be met. However, no other standards are set forth that address noise levels, aesthetics or safety for these types of structures. The intent of this ordinance is to allow wind energy conversion systems outright as accessory uses in all zoning districts in Carson City if the performance standards are met. Variations to the regulations and standards may be permitted by special use permit.

Master Plan Conformance

As stated at the Planning Commission meeting of October 29, 2008, the Carson City Master Plan and the Nevada Revised Statutes address the promotion of alternative energy.

The Carson City Master Plan encourages the use of alternative energy, specifically in:

Chapter 3: A Balanced Land Use Pattern
Guiding Principle I: A Compact and Efficient Pattern of Growth
Goal I.I: Promote the Efficient Use of Available Land and Resources
Policy I.I f: Energy Conservation

which states that Carson City will *"encourage the incorporation of site planning and other design techniques that promote solar and wind efficiency in the construction of new homes and non-*

residential development…Encourage the use of new and emerging technologies that lead to increased energy conservation for both residential and non-residential use."

Nevada State Law Conformance
The Nevada Revised Statutes (NRS) encourage the use of alternative energy by restricting local governments from prohibiting such uses. The applicable NRS section is as follows:

NRS 278.0208 Restrictions on use of system for obtaining solar or wind energy prohibited.

1. *A governing body shall not adopt an ordinance, regulation or plan or take any other action that prohibits or unreasonably restricts the owner of real property from using a system for obtaining solar or wind energy on his property.*

2. *Any covenant, restriction or condition contained in a deed, contract or other legal instrument which affects the transfer, sale or any other interest in real property that prohibits or unreasonably restricts the owner of the property from using a system for obtaining solar or wind energy on his property is void and unenforceable.*

3. *For the purposes of this section, "unreasonably restricting the use of a system for obtaining solar or wind energy" means placing a restriction or requirement on the use of such a system which significantly decreases the efficiency or performance of the system and does not allow for the use of an alternative system at a comparable cost and with comparable efficiency and performance.*

(Added to NRS by 1995, 1105; A 2005, 1820)

**** Reviser's Note.***

Ch. 425, Stats. 2005, which amended this section, contains the following provision not included in NRS:

"The Legislature hereby declares that wind energy is a clean, renewable energy source, the use of which must be promoted. Regional planning is needed for communities to choose good turbine locations where wind is available. The provisions of this act allow the governing bodies of cities and counties to promote the use of this renewable resource while promoting the general welfare by regulating the location, height and noise level of wind turbines, as well as the parcel size on which turbines may be placed. The provisions of this act require cities and counties to balance the effects that wind turbines have on the environment through the existing master plan and zoning process."

This draft was sent out to a group of people that expressed interest in this ordinance, including homeowners, contractors, realtors, the Builders Association of Western Nevada and the Nevada representative for the Department of Energy. A draft was emailed to the interested parties and comments received were reviewed and, if applicable, added to the draft ordinance. All received comments have been included as attachments to this report.

Recommended Code Modifications

Staff's recommended items for modifications to the Carson City Municipal Code (CCMC) would establish regulations regarding Private Use Wind Energy Conversion Systems:

- **Applicability and Definition:** The current Carson City Municipal Code definition is not adequate and must be modified. A new definition for Wind Machine to differentiate the system tower and turbines from the other system components including conversion boxes, etc. has also been added.

Staff has included three alternatives to the restriction of one machine allowed per parcel of land when the size of the parcel is less than one acre in size, based on various comments received. Other alternatives may be considered by the Planning Commission.

Alternative A does not place a limit on the number of wind machines allowed per parcel of land regardless of the parcel size as long as the standards are met. Staff received a comment from Mariah Power indicating that we should not restrict the number of wind machines because, in general, installing greater than one, but smaller, wind machine per parcel is more aesthetically pleasing than just one larger machine. And, it allows the owner to cover a greater portion of their electrical needs. However, we also received comments from homeowners who would like to see a limit put on the number of wind machines allowed per parcel, as well as a minimum parcel size.

Alternative B restricts wind energy conversion systems to not more than one machine per five acre parcel of land.

Alternative C would prohibit wind energy conversion systems on parcels less than one acre in size.

Staff looked to other counties for their requirements. Douglas County restricts the zoning district to a five acre minimum for micro systems (with a second machine requiring an additional five acres) and a 19 acre minimum for small systems (with a second machine requiring an additional 19 acres) before a wind energy conversion system may be installed. City of Reno and Washoe County do not have a minimum parcel size nor a maximum number of allowed machines.

- **Location:** This restricts WECS from being located within or over drainage, utility or other established easements.

- **Setbacks:** All other cities and counties researched have minimum setbacks for wind machines.

Washoe County requires a minimum of 1.1 times the overall machine height in all residential areas. Wind machines located adjacent to industrial, commercial, open space or parks and recreation zoning districts may be located to within 15 feet of the property line.

City of Reno requires machines to be a minimum of 30 feet from the front property line and at least 10 feet from the side and rear property lines.

Douglas County requires 150 foot setback from adjacent property lines for micro systems and a 200 foot setback from adjacent property lines for small systems.

Staff recommends that 1.1 times the Total Extended Height in and adjacent to residential zoning districts is reasonable and that a 10 foot minimum setback from any part of the machine, rotors or guy wires to the property line of any other non-residential zoning district is acceptable. Requiring a larger setback adjacent to residential zoning districts also serves an aesthetic purpose. It provides a buffer in between the wind machines and the adjacent residentially zoned properties.

- **Height:** In lieu of restricting a maximum height for wind machines, the maximum height allowed is guided by minimum setbacks.

Alternative A restricts a wind machine to a certain total extended height such as 60 feet.

Douglas County restricts micro systems (those with a rotor diameter not exceeding 10 feet) to the height restricted by the zoning district, or 45 feet, which ever is less. Small systems (those with a rotor diameter not exceeding 25 feet) are restricted to a maximum height limit of 90 feet.

Washoe County and the City of Reno do not have a maximum allowed height as long as all other standards are met.

- **Lighting:** We recommend prohibiting lighting on WECS unless it is required by the FAA.

- **Access:** Access to the system shall be restricted for safety reasons. Footholds and rungs shall be prohibited on the lowest 12 feet of any tower.

- **Rotor Safety:** Both manual and automatic controls are required to limit the rotational speed of the blades within the design limits of the rotor. The blades shall be no closer than 10 feet from the ground.

- **Noise:** There are differing views on the issue of noise. Staff has suggested a few alternatives for this topic. The easiest way to regulate noise is to require a manufacturer's specification report with the building permit application. The abbreviation dBA below stands for the average decibel level over a certain time period, usually 24 hours.

Mariah power says that their Windspire machine operates at 8dB above ambient in a 50mph wind.

The noise level for non-residential zoning districts in the City of Reno "shall not exceed 60dBA as measured at the property line of the closest neighboring inhabited dwelling", except for short-term events such as high windstorms.

Washoe County code states that "no wind machine shall create noise that exceeds a maximum of 55 dBA at any property line abutting a residential regulatory zone or 60dBA at any other property line."

Douglas County has a noise ordinance that allows for the following maximum levels:
Residential zoning districts: 55dBA
Commercial zoning districts: 64dBA
Industrial zoning districts: 70dBA

The Douglas County noise levels are based on a 24 hour average noise level.

Staff recommends that the manufacturer's noise specifications be submitted with the building permit application limiting noise levels to 55 dB at a residentially zoned property boundary and 60 dB at a non-residentially zoned property boundary.

- **Aesthetics:** Staff recommends limiting the color choices for wind machines to those that blend well with the surrounding terrain and sky. Non-reflective, non-obtrusive colors such as tan, sand, gray, black or similar colors will be allowed.

- **Maintenance:** The wind machines shall be maintained in good repair.

Staff drafted this ordinance after conducting research into industry standards as well as gathering information and codes from the surrounding cities, counties and those areas around the country that already have such ordinances. Staff contacted Washoe County, City of Reno and Douglas County planners and drafted the following ordinance closely following their lead, since all three jurisdictions have recently updated their code or are in the process of updating their code for wind turbines. Staff also considered model ordinances such as that written by the American Wind Energy Association.

Staff recommends that the ordinance be reviewed by the Planning Commission in one year from the date of adoption to determine whether or not any modifications need to be made.

The following attachment is a draft version of the proposed ordinance.

Respectfully Submitted,
Carson City Planning Division
Heidi Eskew Herrmann
Heidi Eskew-Herrmann, AICP
Associate Planner

CARSON CITY, NEVADA

CONSOLIDATED MUNICIPALITY AND STATE CAPITAL

MEMORANDUM

TO: Lee Plemel, Planning Director
Heidi Eskew-Herrmann, Assistant Planner
Jennifer Pruitt, Senior Planner (Hardcopy and Email)

FROM: Roger Moellendorf, Parks & Recreation Director

DATE: January 14, 2009

SUBJECT: Parks & Recreation Department's Comments for the Wednesday, January 28, 2009, Planning Commission Meeting Agenda

ZCA-08-127	Our department would like the Planning Division and Planning Commission to consider adding language to the Carson City Municipal Code, Title 18, Zoning Chapter, proposed Section 18.05.080, to allow all publicly zoned parcels the ability "by right" to use small wind turbine generators. This ability to install small wind turbines at sport complexes, park sites, and public buildings could assist in offsetting the annual and on-going cost of electricity to the City and our department's various user groups. Another application of cost savings would be with new construction in rural or natural areas of the City. This type of wind power generation could eliminate the cost to bring power lines into remote areas where minimal power needs are required for the project.
SUP-08-124	It is our department's understanding from talking with the applicant there will be no street improvements associated with this project. As a result, our department has no comments and takes no exception to this project.
AB-08-126	Over the past year, our department, along with the City's Public Works Department and Planning Division, have been working with Vidler Water Company representatives regarding various aspects of their development. These issues include but are not limited to: implementation of the Unified Pathways Master Plan (UPMP), site specific trail alignment and design issues, trail construction, land acquisition of flood plain properties for the Open Space Program, well and utilities infrastructure, and public access issues. During this process, our department examined the possibility of using this public right-of-way for a public access easement. After reviewing the UPMP, our department believes the City is currently providing and/or planning for a variety of public access locations on the west side of the Carson River. This public access issue is addressed with trailheads located at Morgan Mill Road River Access Area, Empire Ranch (at the end of Empire Ranch Road), Moffat Open Space Property, Riverview Park, Hidden Meadows (Buzzy's Ranch Road), Silver Saddle Ranch, and Carson River Park. In addition, our department has historically resisted using narrow corridors between residences to provide access to public lands. These corridors can become attractive nuisances for undesirable activities, trash collectors, graffiti tunnels, impact the privacy of adjacent property owners, increase our maintenance responsibilities, and limit our department's ability to provide public amenities. As a result, our department supports the applicant's request for an abandonment of public right-of-way located at 5080 Hells Bells Road (APN 010-681-06).

BLD DIV DRAFT 01/15/2009

BILL NO. _____

ORDINANCE NO. 2009-_____

AN ORDINANCE AMENDING CARSON CITY MUNICIPAL CODE TITLE 18, ZONING, CHAPTER 18.03, DEFINITIONS, SECTION 18.03.010, WORDS AND TERMS DEFINED, TO MODIFY THE DEFINITION OF "WIND ENERGY/CONVERSION FACILITY" TO "WIND ENERGY CONVERSION SYSTEM, PRIVATE USE"; ALSO AMENDING THE CARSON CITY MUNICIPAL CODE TITLE 18 ZONING, CHAPTER 18.05, GENERAL PROVISIONS, BY ADDING SECTION 18.05.080, PRIVATE USE WIND ENERGY CONVERSION SYSTEMS TO SET FORTH SPECIFIC STANDARDS AND CRITERIA FOR THESE SYSTEMS; AND OTHER MATTERS PROPERLY RELATED THERETO.

Fiscal effect: None

THE BOARD OF SUPERVISORS OF CARSON CITY DO ORDAIN:

SECTION I:

That Chapter 18.03 (Definitions), Section 18.03.010 (Words and Terms Defined) of the Carson City Municipal Code is hereby amended, in part, to modify the definition of "Wind Energy/Conversion Facility", as follows:

Wind Energy/ Conversion ~~Facility~~ ~~means a machine or facility that converts the kinetic energy in the wind into a useable form.~~

Wind Energy Conversion System, Private Use means a system consisting of a wind turbine, tower, and associated control or conversion electronics for the purpose of providing electrical power to a lawful principle use. A system having a rated capacity of 100 kilowatts (kW) or less shall be considered a private use system for the purposes of the regulations. These systems are considered accessory uses in all zoning districts.

SECTION II:

That the Carson City Municipal Code Chapter 18.05, General Provisions, Section 18.05.080, Private Use Wind Energy Conversion Systems, is hereby added, as follows:

18.05.080 Private Use Wind Energy Conversion Systems. In order to balance the need for clean, renewable energy resources with the protection of the health, safety and welfare of the community, the purpose of this section is to regulate private use wind energy conversion systems (WECS) for the production of electricity for use on the subject site and for net metering through the power company.

1) Applicability and Definition.

a) **Building Code(s).** All codes, ordinances, policies and procedures, and standards adopted and enforced by the Carson City Building Division.

b) **Fire Code(s).** All codes, ordinances, policies and procedures, and standards adopted and enforced by the Carson City Fire Department.

c) **FAA.** The use of this acronym shall denote the Federal Aviation Administration, or any other applicable authority that regulates air safety within this jurisdiction.

d) **Private Use Wind Energy Conversion Systems (WECS).** A private use wind energy conversion system consists of a wind turbine, tower, and associated control or conversion electronics for the purpose of providing electrical power to a lawful principle use. A system having a rated capacity of 100 kilowatts (kW) or less shall be considered a private system for the purposes of these regulations. Not more than one machine shall be allowed per parcel of land when the size of the parcel is less than one acre in size. WECS are considered accessory uses as stated in CCMC 18.03.010 (Words and Terms Defined), Accessory Building or Accessory Structure and Accessory Use, and are allowed in all zoning districts.

e) **Wind Machine**. The individual component of a Wind Energy Conversion System that converts kinetic energy from the wind into electrical energy, independent of the electrical conductors, electrical storage system, electrical metering, or electrical inverters.

f) Private use wind energy conversion systems shall be allowed as accessory uses in all Public zoning districts without the requirement of Special Use Permit approval provided the system meets all other requirements of this section.

g) All proposed Private Use Wind Energy Conversion Systems located within the Carson City Historic District must receive review and approval from the Historic Resources Commission prior to submission of a building permit.

2) **Standards.** All Wind Energy Conversion Systems are subject to and must comply with the following provisions of this section:

a) **Location.** No part of a wind energy conversion system shall be located within or over drainage, utility or other established easements.

b) **Setbacks.** Minimum setbacks for private use wind machines shall be:

i) A minimum of 1.1 times the total extended height from the project property lines adjacent to a residential, Conservation Reserve or Agricultural zoning district.

ii) A 10 foot minimum setback from any part of the machine, rotors or guy wires to the property line of any other non-residential zoning district.

iii) Wind machines shall not be located within the front yard setback nor within the street-side setback of any parcel of land in residential zoning districts.

iv) Guy wire anchors may not extend closer than 10 feet from any property line.

c) **Height.** Wind Energy Conversion Systems are exempt from zoning district height requirements provided all other standards of this section are met.

i) Tower Height shall mean the height above adjacent grade of the fixed portion of the tower, excluding the wind turbine itself.

ii) Total Extended Height shall mean the height above adjacent grade to a blade tip at its highest point of travel.

d) **Lighting.** Wind system towers shall not be artificially lighted unless required, in writing, by the Federal Aviation Administration (FAA) or other applicable authority that regulates air safety. Where the FAA requires lighting, the lighting shall be the lowest intensity allowable under FAA regulations; the fixtures shall be shielded and directed to the greatest extent possible to minimize glare and visibility from the ground; and no strobe lighting shall be permitted, unless expressly required by the FAA.

e) **Access.** All wind machine towers must comply with the following provisions:

i) The tower shall be designed and installed so that there shall be no exterior step bolts or a ladder on the tower readily accessible to the public for a minimum height of 12 feet above the ground. For lattice or guyed towers, sheets of metal or wood or other barrier shall be fastened to the bottom tower section such that it cannot readily be climbed; and

ii) All ground-mounted electrical and control equipment shall be labeled or secured to prevent unauthorized access.

f) **Rotor Safety.** Each wind machine shall be equipped with both manual and automatic controls to limit the rotational speed of the blade within the design limits of the rotor. The minimum distance between the ground and any protruding blades utilized on a private wind machine shall be 15 feet as measured at the lowest point of the arc of the blades.

g) **Electromagnetic Interference.** If degradation of television, radio, cellular telephone or microwave reception occurs as the result of the wind machine, the owner/developer shall pay all reasonable costs to correct the television, radio, cellular telephone or microwave reception. Failure or inability to correct the problem within 30 days of notification by Carson City shall require the wind machine remain inactive until the interference is remedied, which may include relocation or removal.

h) **Utility Notification.** No wind machine that is to be connected to electric utility equipment of any utility grid shall be operated until a net metering agreement or power purchase agreement has been made with the affected electric utility company(s), and the utility company or companies have approved the proposed method of interconnection and evidence has been provided. An off grid system shall be exempt from this requirements if the property is not served by an electrical utility provider.

i) **Noise.** All wind machines shall comply with the noise requirements in this section. These levels, however, may be exceeded during short-term events such as utility outages and severe wind storms. A manufacturer's sound report shall be required with a building permit application.

i) No wind machine shall create noise that exceeds a maximum of 55 dB(A) at any property line abutting a residential zoning district or 60 dB(A) at any other property

line. Measurement of sound levels shall not be adjusted for, or averaged with, non-operating periods. Any wind machine(s) exceeding these levels shall immediately cease operation upon notification by Carson City, and may not resume operation until the noise levels have been reduced, and verified by an independent third party inspector, approved by Carson City, at the property owner's expense. Upon review and acceptance of the third party noise level report, Carson City will allow operation of the affected wind machine(s). Wind Energy Conversion System(s) unable to comply with these noise level restrictions shall be removed upon notification by Carson City, after a period established by Carson City.

j) **Aesthetics and Maintenance.**

~~i) Appearance. Wind machines shall, subject to any applicable standards of the FAA, be of a non-reflective, non-obtrusive color: tan, gray, black or sand are permitted. The painting or coating shall be kept in good repair for the life of the wind machine.~~

Appearance. Wind machine(s) and tower(s), unless subject to any applicable standards of the FAA, shall be painted using one (01) of the following non-reflective, non-obtrusive colors: tan, sand, gray, or black. Unless approved by Carson City. In addition, any changes to the approved color shall result in notification by Carson City that the affected wind machine(s) and tower(s) shall cease operation until a color correction has been made. If the affected wind machine(s) and tower(s) are not repainted, using an approved color, within the period established by Carson City, the owner shall remove the affected Wind Energy Conversion System(s).

ii) Electrical Wires. All electrical wires leading from the tower to electrical control facilities shall be located underground.

iii) Maintenance. Wind machines shall be maintained in good repair, as recommended by the manufacturer's scheduled maintenance or ~~industrial~~ industry standards, and shall be free from rust.

k) **Signs.**

i) Warning Signs. Signs warning of high voltage electricity or electric shock hazard shall be posted on stationary portions of each wind machine.

~~ii) Advertising Signs. The only advertising sign allowed wind machine shall be a logo on the generator housing.~~

Advertising Signs. Wind machine(s) used for advertisement may only have the logo or text applied to the generator housing, when the application does not affect operation, and is approved by Carson City.

l) **Compliance with FAA Regulations.** All wind machines shall comply with applicable FAA regulations, including any necessary approvals for installations.

m) **Ice Throw.** The potential ice throw or ice shedding from the proposed wind machine shall not cross the property lines of the site to strike adjacent residences or accessory buildings, nor impinge on any public right-of-way or access easement.

3) **Repair and Removal of Wind Machines.** Any wind machine found to be unsafe by an official of the ~~Building and Safety Department~~ Carson City Building Division shall be repaired

by the owner to meet federal, state, and local safety standards or be removed within six months. Wind machines that are not operated for a continuous period of 12 months shall be removed by the owner of the wind machine.

a) When a wind machine is removed from a site, all associated and ancillary equipment, batteries, devices, structures or support(s) for that system shall also be removed. For the purposes of this section, non-operation shall be deemed to include, but shall not be limited to, the blades of the wind machine remaining stationary so that wind resources are not being converted into electric or mechanical energy, or the wind machine is no longer connected to the public utility electricity distribution system.

4) ~~**Roof Mounted Private**~~ **Mounting of Wind Machines.** ~~Roof mounted~~ Wind machines shall be located so that in the event of failure, no part of the ~~machine~~ Wind Energy Conversion System will fall across any parcel line ~~and onto any adjacent building~~. Attachment of the wind machine, or support component(s), or structural component(s), to any ~~to the~~ building or structure shall be in strict compliance with ~~regulations~~ requirements of the ~~Building and Safety Department~~ Carson City Building Division.

5) **Compliance with Regulations.**

a) All systems shall comply with applicable fire and building codes.

b) All standards are absolute. Once wind machines are permitted, the owners have the option of compliance with the standards or discontinuation of operations. If the operation of the wind machine(s) does not comply with the provisions of this article, the operator shall promptly take all measures necessary to comply with these regulations, including, but not limited to, discontinued operation of one or more wind machines.

c) [redacted]

Question: If we cannot establish a benchmark for what constitutes a "small wind energy system", than we should remove this section. It only acts to create confusion, and it creates an enforcement nightmare.

SECTION III:

No other provisions of Title 18 of the Carson City Municipal Code are affected by this ordinance.

PROPOSED on _____, 2009.

PROPOSED BY Supervisor _____

PASSED _____, 2009.

VOTE:

AYES: _____

NAYS: _____

_____

_____

ABSENT: _____

_____

_____

BOB CROWELL, Mayor

ATTEST:

_____

ALAN GLOVER, Clerk-Recorder

This ordinance shall be in force and effect from and after the _____day of the month of _____ of the year 2009.

From: Vern Krahn
To: Lee Plemel
CC: Ann Bollinger; Bob Keith; Heidi Eskew-Herrmann; Jennifer Pruitt; Jua...
Date: 1/16/2009 12:48 PM
Subject: Wind Turbine Draft Ordinance - Questions & Comments to P.D. Staff From P&R Dept. Staff
Attachments: ZCA-08-127 Wind DRAFT.pdf

Lee.....

Sorry this is a bit late..... but

As we spoke yesterday, here are some questions and comments on the language in the DRAFT Wind Turbine Ordinance for your review and consideration.

1. Overall - How critical is it to use the word "Private" throughout the document ??? To me it seems a little confusing as it relates to the type of uses identified in the ordinance. Are you trying to differentiate between Individual/Private Sector Commercial use vs (SPPC) Production type use ???
2. Under 1b - I realize 100 kilowatts (kW) is a lot of power generation for a residence and even for small park buildings (ie. snack bars, maintenance shops, and caretakers residences - to name a few) but what process would the City have to go through, if the City wanted to install a wind energy conversion system ABOVE that threshold either in a sports complex, special event facility, park or even on a public
building downtown or at the City's Corporate Yard ???
Dare I say it ----- a Special Use Permit ??? or is this covered in 5C ???
3. Also under 1b - I am glad you made this VERY CLEAR that these systems can be installed in all public zoning districts without a Special Use Permit so long as they meet the other provisions of the ordinance !!!
You are my HERO !!!
3. Under 2bi - Can you add Public Zoning Districts to this list ??? Your thoughts.... or would 2bi accomplish the same thing ???
4. Under 2jii - Should you add something like " shall be located underground at a depth as specified per national / local electrical codes. ???
5. Under 2kii - you reference a logo: Do you need to specify a maximum logo size ???
6. Under 2ji - Should you use the term "earth tone" colors instead of specifically naming them ???

Finally, thank you for working with me on 1b to include this in the ordinance.....

I hope this helps !!! Please give me a call, if you would like to discuss any of these questions or comments.

VERN

Vern L. Krahn
Park Planner
Carson City Parks & Recreation Department
3303 Butti Way, Building #9
Carson City, NV 89701
Tel: (775) 887-2363 x1006
Fax: (775) 887-2145
Email: vkrahn@ci.carson-city.nv.us

>>> Heidi Eskew-Herrmann 1/13/2009 2:36 PM >>>
Vern,
Here is the draft ordinance for wind turbines. If you have any comments, please get them to me before noon on Friday, January 16th.

Thanks,

Heidi Eskew-Herrmann, AICP
Associate Planner
Carson City Planning Division
(775) 887-2180 X 30068

4840 Gentry Lane
Carson City, NV 89701-6527
E-mail: CampbellMediations@charter.net
Home: 775.883.8458
January 14, 2009

Carson City Planning Commission
2621 Northgate Lane #62
Carson City, NV 89706

Commissioners:

The 01/01/09 draft of the "Wind Energy" code change has some serious problems. Please fix them. The paragraphs below are keyed to the draft.

Section II, Preface

This paragraph states that the effort is to balance between "clean, renewable energy resources with ... the health, safety and welfare of the community...." While the objective of clean, renewable energy sources undoubtedly is a laudable goal, one wonders if private windmills in residential areas is a good approach. Energy generation is often used as an example of activities that benefit from economies of scale. In almost all cases, for instance, bigger hydroelectric plants generate more electricity per dollar invested, per square foot of footprint, per unit of pollution emitted, or almost any other measure than do smaller plants. That analogy applies to windmills, too. If, then, windmill enthusiasts want clean, renewable energy from windmills, one suspects they should invest in commercial windmill farms. They will get more bang for the buck.

If, on the other hand, the enthusiasts' objective is to save money on their personal electricity bills, also a laudable objective, windmills are a good option. Neighbors ought not have to absorb any negative consequences of personal money-saving efforts, however.

What would be the reaction if I were able to get a good deal on diesel fuel and, to save on my electric bill, wanted to put in a commercial generator running on diesel? My generator would only emit 55 dB sound. I would have to get a special use permit and, in effect, get my neighbors' approval. And I support that because they will have to absorb the externalities, the disutilities escaping from my property.

SUGGESTION:

Disapprove the use of windmills for electricity generation on any parcel connected to the grid unless the parcel has more than five acres.

Section II, 2) b) iii)

This section requires the windmills not to be located on the street sides of the buildings. The authors apparently are aware the windmills are unattractive. Even ugly.

For years, high-end developments have had buried utilities because buyers appreciate, and will pay for, attractive and uncluttered views. Now, many cities require new developments, high-end or not, to bury utilities. They do that to make their towns

more attractive and, they hope, economically vibrant. Those cities are making good decisions.

From my residence I can see three utility poles and they are a couple of hundred yards away. That is good. That has value.

SUGGESTION:

Disapprove the use of windmills for electricity generation on any parcel connected to the grid unless the parcel has more than five acres.

Section II, 1) a)

This portion permits any number of machines on any parcel larger than one acre. This may be acceptable for the "paddle fan" turbines usually seen but not for other types. Attachment 1 shows some of the other types now available. It is easy to see how many of them could be packed on any parcel. Advancing technology will create even more additional types and there is no knowing what they will look like.

One-acre parcels are not uncommon in CC. It is easy to visualize any number of "other" types on those parcels. How many of Types 1, 2, or 6, for instance, could fit on one acre? The clutter and visual pollution would be extreme. The pollution would be as extreme if one machine were put on the smaller lots.

SUGGESTIONS:

1. Prohibit machines on parcels of one acre or smaller.
2. Limit machines to one per acre on parcels smaller than five acres.

Section II, 2) c)

This paragraph has two problems. First, tower height for the "other" types may not be a meaningful concept. How high is the mast for Types 1, 2, or 4, for instance? And again, what will new technology types look like?

Does the "height above grade" include the housing for the generator? That generator likely moves to keep the paddles pointed into the wind. It may be large.

SUGGESTION:

This paragraph must be reworked to allow for "other" types. I suggest that the total height of the entire mechanism be regulated.

Section II, 2) g)

This paragraph lists the types of electromagnetic interference that may not be caused by the machine. (I must assume, because it is not specified, that "radio" includes wireless computer nets and devices that rely on or can be affected by electromagnetic waves even though they are not communication devices. A pacemaker, for instance, ought not be interfered with.)

It requires the owner/developer to pay all "reasonable" costs to correct electromagnetic interference. If the land owner does not pay <u>all</u> costs, who will?

It gives him/her 30 days to fix it. For that 30 days, a neighbor's equipment may be out of commission.

SUGGESTIONS:

1. Do not limit, or suggest limits to, the types of interference that must be corrected. Any and all electromagnetic interference with neighbors' activities is unacceptable.
2. Require the owner of the property to pay all costs to repair.
3. Require the machine to be shut down until the interference is corrected.

Section II, 2) i) i)

A maximum, at the property lne, of 55 dB is permitted in residential areas and 60 dB elsewhere. This is outrageously loud. CC is a quiet community. That attribute is a factor in attracting people to live here and visit here. Many residents, for instance, sleep with their windows open and enjoy being outside on their properties.

This problem likely arises from a misunderstanding of how loud 55 dB is. Too often one relies on assertions from not-disinterested "experts" such as windmill salespersons. Dr. Tatum of University of Victoria, not a salesperson, clarifies the issue in Attachments 2 and 3. Certainly in his view, 55 dB is loud—loud enough to interfere with normal conversation. And remember that the 55 dB noise CC is considering accepting is at the lot line, perhaps a few feet from the neighbor's bedroom window or the barbeque.

Attachment 4 outlines the noise pollution standards of the World Health Organization. Note on Table 1 of the attachment that 55 dB would result in "serious annoyance, daytime and evening" on the neighbor's patio. Can we doubt that 55 dB at the fence line may easily result in 35 dB inside an open house? The WHO suggests that 45 dB outside will result in "sleep disturbance" with the windows open. With 55 dB at the lot line, it may not be possible to have a civilized, non-shouting conversation inside or outside the house. All that is needed for that level of disturbance is 35 dB.

Attachment 5 indicates that 55 dB results in loss of economic value of the land. That finding was made in England but one doubts that American economics is much different. Noise is not desirable.

Attachment 6 is hardly scientific but cites a source many have come to rely on—Yahoo. It puts a typewriter and loud conversation at 50 dB and a noisy office at 60 dB. Dr. Tatum notes as a mathematical fact in Attachment 3 that 53 dB is <u>twice</u> as intense as 50 dB; 55 dB, of course, is louder still.

The US EPA has no noise pollution standards, leaving it up to the states. Nevada has not chosen to set standards. Some government agencies have set standards as needed by their missions. Shown in Attachment 7, the FAA asserts that houses subjected to 65 dB by airport traffic should be sound insulated using double-glazed windows and the like. And we are considering allowing 60 dB at the fence line in non-residential areas.

Overriding all of this discussion is the fact that the proposed code will permit at least one windmill on each and every private parcel in the city. It would be quite possible, indeed likely, that some of us effectively will be surrounded by windmills; each of the three adjoining neighbors could have one.

SUGGESTIONS:

1. Do not decide what level of noise is acceptable unless and until the noises are presented to the public. To that end, hire an appropriate independent expert to attend a Commission public meeting. The expert should bring an audio generator

capable of generating various intensities of sound at various frequencies. 55 dB emulating a squeaking bad bearing may be particularly instructive.

2. If the first suggestion is not accepted, lower the permissible sound pollution to a substantially lower, more reasonable level. That, however, would be a terrible solution.

Section II, 2) m)

Given a 15' blade (30' tower minus 15' ground clearance) rotating at high speed, it is not difficult to visualize a large and heavy piece of ice's being thrown. It likely will leave the blade at the bottom of its arc with a slight upward vector at high speed.

This section implies that ice throw/shed into a neighbor's property is not prohibited if the ice does not strike "...adjacent residences or accessory buildings..." At the same time, no throw/shed into a public right-of-way or easement is acceptable. Why would it be acceptable to damage the neighbor's fence or patio furniture? To hit the neighbor's children? Pets?

SUGGESTION:

1. Prohibit any ice throw/shed from leaving the site.
2. State that all costs of repair of damage from ice throw/shed are the responsibility of the windmill owner.
3. State that all costs for removal of ice throw/shed are the responsibility of the windmill owner.

Section II, 3)

This portion does not prohibit an unsafe windmill from operating for six months. It also permits inoperative windmills to remain for 12 months. Twelve months is a long time to have a dysfunctional eyesore in one's neighbor's yard.

SUGGESTIONS:

1. Prohibit unsafe windmills from operating at all.
2. Require removal of inoperative windmills in six months.

Respectfully,

David Campbell

Attachments

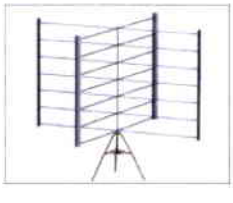
1. "Other" Types of Windmills
2. The Physics, Physiology, and Psychology of Noise
3. Physics, Physiology and Psychology
4. World Health Organization, Guidelines for Community Noise
5. Transport for London, Thames Gateway Bridge
6. Yahoo Answers
7. O'Hare Airport Noise Home Insulation Program Shortfalls

"OTHER" TYPES OF WINDMILLS

Here are some examples of windmills not dependent on "paddle fans." We are used to seeing paddle-fan windmills and they are the only kind considered by the proposed code. These examples were located by a 30-minute web search.

Type 1

Type 2



Type 3

Type 4

Type 5

Type 6

Type 7

[Source: Various web sites]

[This more scientific approach by Dr. Tatum explains some of the math of sound measurement and the relationships, or lack thereof, between the numbers and the annoyance.]

The Physics, Physiology, and Psychology of Noise

by Dr. Jeremy Tatum, University of Victoria *This is the essence of a talk delivered by Dr. Tatum to the annual general meeting of the SSAP in November 1996.*

The intensity of sound is measured in units called decibels and is measured with an instrument called a decibel meter. But have you ever had this experience? You complain to your local council that you are being annoyed by a noise made by a source that you identify and which is trespassing into your property. Council sends round an Official armed with a Decibel Meter who then takes Measurements. What, you wonder, can possibly be the purpose of these measurements? Does not the council already have all the relevant information? You have told them that there is a noise, and where the noise is coming from, that it is trespassing on your property and that it is annoying you. What more information is required? Is the Official taking measurements to verify that you are in fact annoyed? Could you perhaps be mistaken and the noise does not annoy you after all? Or, if you really are annoyed, is the Official perhaps taking measurements to see how annoyed you are?

In this talk I shall try to distinguish between the physics, the physiology and the psychology of noise. I shall point out that some municipal bylaws make it an offence to exceed a certain decibel level, while others make it an offence to annoy you. While the first type of bylaw may seem to be more "objective" and therefore workable, I shall argue that in practice it is unenforceable and that the degree of annoyance of a noise is not closely related to the decibel level, and that the bylaw you should favour is one that makes it an offence to annoy you.

Physics

Sound is a form of energy, and in physics, energy is expressed in units called joules. Rate of production of energy, or power, is expressed in watts, a watt being one joule per second.

As far as I am concerned, a machine may generate as many watts of acoustic power as it likes as long as it is a hundred miles from me and I can't hear it. What concerns me as a sufferer from noise is *flux* (Latin = flow) of acoustic energy arriving at my location. This is the rate of flow of acoustic energy arriving at my location in watts per square metre. A sound of a million watts is of no concern if it is spread out over a square kilometre; but if it is concentrated in a square centimetre in the vicinity of my eardrum I am very concerned indeed.

Now a scientist would be quite content to express acoustic energy flux in watts per square metre and have done with it; but, for no particularly good reason, engineers prefer to use a decibel (dB) scale. The decibel level is merely another way of expressing acoustic energy flux, and, for those who are interested in and understand such things, the relation between the flux F in watts per square metre and the decibel level D is

$D = 10 \log F + 120.$

What this means is that, for every increase of 10 dB, there is a ten*fold* increase in the energy flux. Thus

60 dB equals one millionth of a watt per square metre
70 dB equals ten millionths of a watt per square metre
80 dB equals 100 millionths of a watt per square metre.

What can those of you who are neither scientists nor engineers rescue from this that is understandable in terms of the cacophony that you have to put up with?

Sixty decibels is sometimes described as being about the level of conversation. Well, we all know people who do talk that loud. I would describe 60 dB as more like shouting; 55 dB is more like civilized discourse. But, just be aware that the Official who took Measurements in response to your complaint is likely to report back to the Authorities that the noise level is "only" 58 dB, which has been set in some parts of Saanich [British Columbia], for example, as perfectly legal and is less than the level of conversation; and consequently the Official has determined that you were quite mistaken in your belief that the noise was annoying you. Let me put it this way, however. If there was a noise in this room at 58 dB, you would not be able to hear what I am saying. Whenever you are asked to say what is meant by a noise level of 58 dB, you should not say that it is about the level of conversation; rather, it is the level of noise that seriously interferes with normal conversation.

Physiology

Well, it has been nice and easy so far. We have been doing physics, a nice and simple subject. It is now time to move on to something more difficult -- physiology. What we have to deal with here is not merely the energy flux is watts per square metre, but the *perceived loudness*. The ear is not equally sensitive to all frequencies, nor even at one frequency is its response directly proportional to the energy flux or even to its logarithm. It varies from individual to individual, and with age for a given individual.

If you were to look at a chart showing the sensitivity of the human ear to different intensities and frequencies, there is one thing you would all agree upon -- it is very complicated! Hidden in such a chart is the common misconception that an increase of ten decibels corresponds to a increase in perceived loudness of a factor of only two. In practice a subject cannot in general say when he or she perceives one sound as being twice as loud as another.

What is done in studying perceived loudness is to ask a subject to listen to two sounds of different frequencies and intensities, and for the subject to say when the two sounds are of equal perceived loudness. I shall spare you the details, but I'll just mention that for pure tones perceived loudness is expressed in units called sones or phons. A sone is analogous to the acoustic energy flux in watts per square meter, and a phon is analogous to its logarithmic counterpart in decibels. The zero point of the phon scale is set so that for a pure tone at 1000 Hz (Hz is short for hertz, one hertz being a frequency of one cycle per second) the phon and decibel levels are equal. The relationship between phons (P) and sones (S) is approximately

$$P = 33.22 \log S + 40$$

and those to whom this equation means something will be able to verify that a doubling of the number of sones corresponds to an increase of 10 phons.

For sounds that are not pure tones but which cover a wide frequency range, which is the usual situation, there are analogous units. The noy (which suggests both noise and annoyance) is analogous to sones or to watts per square metre; and its logarithmic counterpart, PNdB, which is short for perceived noise in decibels, is analogous to the decibel scale. A similar equation holds:

$$PNdB = 33.22 \log N + 40.$$

Here N is the number of noys, and again the mathematically inclined will recognize that doubling the number of noys results in an increase of 10 in the PNdB.

But none of this -- not the physics, which measures the energy flux in watts per square metre, nor the physiology, which attempts to quantify with sones and phons the average response of the human ear -- tells us very much if anything at all about how annoying an intrusive noise can be. We have to enter the even more difficult realm of

Psychology

Is it possible to express quantitatively how disturbing a noise is to those who have it inflicted upon them? Attempts have been made to measure annoyance quantitatively by recording the number of complaints received. But this fails because people cease to complain when their complaints are not treated seriously or are treated with hostility.

I want to give three examples to illustrate that the decibel levels or the phon levels or the PNdB are by no means the only or even the most important factors in noise disturbance. They may even be scarcely relevant. My examples consist of three pairs of sounds, in one of which the acoustic energy flux is twice as much as in the other -- a difference of 3 decibels. Ask yourself which is the more annoying sound: the 58 dB sound, or the "quieter" 55 dB sound.

1. (a) 58 dB for 5 seconds?
   (b) 55 dB for 5 hours?

2. (a) 58 dB at 3:00 p.m.?
   (b) 55 dB at 3:00 a.m.?

3. (a) a Mozart piano sonata at 58 dB?
   (b) someone scraping fingernails on a blackboard at 55 dB?

These examples illustrate that none of the complicated mathematical equations relating phons to sones or noys or decibels, and none of the Important Measurements made by our Official, even begin to address how annoying a noise can be. Indeed, the decibel level hardly seems to be relevant at all.

This conclusion is of crucial practical importance, for the following reason. There are two types of municipal bylaw, which read something like this:

"No person shall make or cause or permit to be made or caused any noise that disturbs or tends to disturb the quiet, peace, rest, enjoyment, comfort or convenience of persons..."

or:

"No person shall make, cause or permit to be made a sound that exceeds, at a point of reception, 58 decibels..."

The latter type is often held to be "better" in that it is "more objective." I strongly argue against this. In the first place, the decibel level is usually set far too high -- our specimen sets a level that will seriously interfere with normal conversation. And once that bylaw is passed, you are stuck with it: it is now perfectly legal for someone to interfere with your conversation.

But more seriously, such a bylaw is unenforceable, and may well be designed to be. Most of the noise that disturbs you does so in the evenings, at weekends and at night-time, or it may be transitory -- a truck, for example, with its motor running or hooter sounding for twenty minutes. The Official with his Decibel Meter is unavailable at the hours when you are being most disturbed by the noise, and, even if it is during working hours, the offending truck will be long gone by the time the Official arrives (which will probably be several weeks later, if at all).

My conclusion is this: a person is a nuisance not by making a noise above a certain decibel level (which may not actually be annoying anybody) but by causing a disturbance to his or her neighbours, and *that* is the criterion that should be tested in the bylaws to determine if there is an offence. Residents in my apartment, for example, twice took cases to court when our bylaw was of the "annoyance" type -- and we won. As a consequence, the municipality changed the bylaw to a "decibel" type in order to prevent any further complaints from us -- and we have had no recourse against unwanted or unwonted noise ever since.

[Source: www.quiet.org/readings/tatum.htm.]

Physics, Physiology and Psychology

Author: Jeremy B. Tatum, E-mail: UNIVERSE@UVVM.UVIC.CA, Department of Physics and Astronomy, University of Victoria

When we complain about intrusive noise, sooner or later we encounter the word decibel. Typically what happens is that some official comes along and mumbles something about decibels and then explains to the authorities that the noise we are complaining about isn't really all that loud at all. He will say something about logarithms, which municipal council members don't understand at all but will be impressed by the long words, and your complaint is dismissed.

I have suffered through this process, and I have had to listen to a professional acoustical engineer spouting jargon to a municipal council, and the council swallowing everything he says. What makes it all the more annoying for me is that I am by profession a research physicist and I have had to sit through technical evidence that is to me manifest scientific nonsense.

One apparently common misconception (deliberate or otherwise I know not), is that an increase of 10 decibels corresponds to only a doubling of perceived loudness. I have heard an engineer give evidence to this effect to a municipal council, and it is repeated, quite erroneously, in the Harvard Medical School Health Letter article "Noise Pollution: Irritant or Hazard" which has been distributed by our own Society. I have from time to time had occasion to teach physics to medical students, and I can tell you that it is a rather discouraging experience! The problem with this particular myth is that we are told that the "perceived loudness" of, say 60 decibels is not all that much louder than, say, 55 decibels. We need to put this straight.

Another problem is that we are often told that 55 dB is about the level of normal conversation and is therefore nothing to complain about. Again, we need to put this straight.

This article will be technical where need be, and I shall not avoid equations when necessary. Not everyone will understand the more technical and mathematical bits. But I feel that it is very important to put it on record correctly and in a manner that can be understood at a scientific level. To avoid this would mean trying to argue scientific matters by polemics rather than by reason. In any case I am sure that most members will follow most of the article and are capable of skipping over the mathematical bits.

The problem of how loud a sound is, or is perceived to be, or how annoying it is, can be discussed from the points of view of physics, or of physiology, or of psychology. I am going to take each of these in turn. Of these, believe it or not, it is physics that is easiest! _In physics it is possible to specify and measure a sound level with great precision, and the decibel scale has its basis in good physics. Sound is a form of energy, and energy is expressed in a very precise unit called the joule. The sound intensity arriving at your dwelling can be very precisely measured in terms of the rate of arrival of energy across unit area, and is expressed in joules per second per square metre. There is nothing at all subjective about it. Nor does it depend on the frequency of the sound wave.

The decibel scale is used to express the ratio of a particular sound intensity to some standard, usually taken to be an intensity of 1.E-12 joules per second per square metre. (Sorry for the technicality there, but we must put it on record in precise terms.) The scale is such that if one sound has TEN times (NOT twice!) the intensity of another, the difference in sound levels is said ten decibels, or 10 dB. Those familiar with logarithms will understand (and those unfamiliar will be mystified!) that a factor of two in sound intensity corresponds to a difference of THREE

(NOT ten!) decibels.

In summary: 53 dB is twice the sound intensity of 50 dB, 60 dB is ten times the sound intensity of 50 dB. And do not let anyone tell you otherwise!!!!

We now move on to a science a little less precise than physics, namely physiology. The ear is not equally sensitive to all frequencies, and entirely insensitive to very high and very low frequencies. The frequency response of the ear varies from individual to individual, and especially it varies with age, and it also varies with the intensity of the sound. The relative sensitivity of the ear to different frequencies can be measured (somewhat subjectively) by asking an individual to compare two sounds of different frequencies, and by varying the intensity of one sound until the subject judges them to be equally loud. Thus we can measure something that might be called "perceived loudness", which is not the same thing as sound intensity; it does depend on the sound intensity, but it also depends on the frequency spectrum.

In order to allow for the properties of the human ear, a "dBA" scale, or "decibels on the A scale" has been set up, in which a decibel meter is set up to imitate as closely as possible the frequency sensitivity of the human ear. This varies from human to human; however, the dBA scale is set up in reference to a "standard" human ear, whose frequency sensitivity is in fact precisely defined, even if it may not coincide exactly with your own ear. Thus the dBA scale, even though intended to imitate a sort of average human ear, is quite precisely defined in the sense that the sound intensity on the dBA scale is not a matter of opinion but it is capable of almost as precise definition and measurement as a frequency-independent scale.

I have seen no justification in any scientific literature of the common statement that "perceived loudness" doubles for every increase of ten on the dBA scale. I have seen this incorrect statement accompanied by an explanation that perceived loudness is proportional to the logarithm on the sound intensity. I first heard these assertions given in evidence to a municipal council by an engineer who was attempting to convince the council that 60 dB wasn't all that much louder than 55 dB, and that my complaints about noise were unjustified. In fact the engineer was merely displaying his ignorance of elementary logarithms at a high school level, for both statements cannot possibly be true. If it were indeed so that 10 dB results in only a two-fold increase in perceived loudness, it does not mean that perceived loudness is proportional to the logarithm of the intensity. It would mean that the perceived loudness is proportional to the intensity to the power of 0.3. This may sound very technical, but it is important to put it on record, because we who are disturbed by noise are often portrayed as ignorant and it needs an engineer to come along and make some measurements and talk about logarithms and decibels to prove that we really aren't disturbed by the noise at all!

In fact one of the reasons that the decibel scale was first set up was to accommodate a physiological "law" known as the Weber-Fechner law, in which it was supposed that perceived loudness was proportional to the logarithm of the intensity; or, put another way, if the sound intensity increases geometrically, the perceived loudness increases arithmetically. According to this law, the perceived loudness would be linearly proportional to the decibel scale. The Weber-Fechner law is, however, only a rather approximate rule of thumb rather than a physical law, although it is fairly good over a moderate range of intensities. No very simple mathematical expression exists, for accurately describing perceived loudness over a wide range of frequencies and intensities, and there is no basis at all for the "doubling for every 10 dB". What cannot be denied, however, is that sound intensity, if not perceived loudness, increases tenfold for every 10 dB. _We have seen, then, that from the point of view of physics, the decibel scale is perfectly well defined. From the point of view of physiology, the "dBA" scale has been set up to approximate the response of the human ear. The third word in our title was psychology, and this

deals with how annoying or disturbing a sound actually is. Psychology is the least amenable to quantification of the three sceinces in the title. It is barely possible to set up a mathematical scale to determine how annoying a particular noise is, and indeed from this point of view the engineer's measurments of decibels and his learned if erroneous talk of logarithms is largely irrelevant. For example, it is sometimes held that normal conversation is about 58 dB and a noise at this level is therefore nothing to complain about. Indeed Saanich Municipality on this basis allows 58 decibels continuously from 9 a.m. to 10 p.m. at my property on this very basis that 58 dB is "only" normal conversation and is not harmful and it is therefore unreasonable to complain about. But try yourself to hold a conversation with someone, or to read a book or to watch television, or to study or to go to sleep when someone is unceasingly making a noise at 58 dB! Such an unwanted intrusion is utterly intolerable, and it is no answer at all to say it is "only" 58 dB and is not "harmful". _We can give many very simple and ridiculously obvious examples to show that the decibel scale gives no indication at all as to how annoying or disturbing an unwanted noise can be. We have seen above that 58 dB is twice the sound intensity of 55 dB. Does it follow that 58 dB is twice as annoying? Not a bit of it! Consider the following examples.

(1) Which is the more annoying: _(a) 58 dB for five seconds? or_(b) 55 dB for five hours?

(2) Which is the more annoying: _(a) 58 dB at 3:00 p.m.?or_(b) 55 dB at 3:00 a.m.?

(3) Which is the more annoying: _(a) a Mozart piano sonata at 58 dB?_(b) someone scraping his fingernails over a blackboard at 55 dB?

These absurdly simple examples demonstrate clearly that the amount of annoyance a noise causes is not to be measured by decibels or by engineers, and **we must not allow "authorities" to tell us that we are not annoyed by some noise because the decibel reading proves that we are not annoyed.**

This is an important point, because there are generally two types of municipal noise bylaw. In one, it is deemed to be an offence to make a noise thay causes disturbance to persons. In the other, it is deemed to be an offence to make a noise that exceeds a certain decibel level. It is often held that the latter type of bylaw is more "scientific" and more "objective" and hence more desirable. In a future article I shall argue very strongly against this viewpoint and I would warn very strongly about accepting a bylaw that sets a decibel level rather than one which prohibits disturbance.

http://interact.uoregon.edu/MediaLit/wfae/readings/Physics.html

[Source: www.lowertheboom.org/links/oi09_physiology.html. Professor Tatum's university web site is at http://www.astro.uvic.ca/~tatum/.]

World Health Organization, Guidelines for Community Noise, Executive Summary, Section 4 Guideline values.

Table 1 presents the WHO guideline values arranged according to specific environments and critical health effects. The guideline values consider all identified adverse health effects for the specific environment. An adverse effect of noise refers to any temporary or long-term impairment of physical, psychological or social functioning that is associated with noise exposure. Specific noise limits have been set for each health effect, using the lowest noise level that produces an adverse health effect (i.e. the critical health effect). Although the guideline values refer to sound levels impacting the most exposed receiver at the listed environments, they are applicable to the general population. The time base for LAeq for "daytime" and "night-time" is 12–16 hours and 8 hours, respectively. No time base is given for evenings, but typically the guideline value should be 5–10 dB lower than in the daytime. Other time bases are recommended for schools, preschools and playgrounds, depending on activity.

It is not enough to characterize the noise environment in terms of noise measures or indices based only on energy summation (e.g., LAeq), because different critical health effects require different descriptions. It is equally important to display the maximum values of the noise fluctuations, preferably combined with a measure of the number of noise events. A separate characterization of night-time noise exposures is also necessary. For indoor environments, reverberation time is also an important factor for things such as speech intelligibility. If the noise includes a large proportion of low-frequency components, still lower guideline values should be applied. Supplementary to the guideline values given in Table 1, precautions should be taken for vulnerable groups and for noise of certain character (e.g. low-frequency components, low background noise)

Table 1: Guideline values for community noise in specific environments.

Specific environment	Critical health effect(s)	L_{Aeq}_[dB(A)]	Time base_[hours]	L_{Amax}_fast_[dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors Inside bedrooms	Speech intelligibility & moderate annoyance, daytime & evening	35	16	45
	Sleep disturbance, night-time	30	8	
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms & pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	-

Pre-school bedrooms, indoor	Sleep disturbance	30	sleep-time	45
School, playground outdoor	Annoyance (external source)	55	during play	-
Hospital, ward rooms, indoors	Sleep disturbance, night-time Sleep disturbance, daytime and evenings	30 30	8 16	40 -
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial shopping and traffic areas, indoors and outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music and other sounds through headphones/ earphones	Hearing impairment (free-field value)	85 #4	1	110
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults) Hearing impairment (children)	- -	- -	140 #2 120 #2
Outdoors in parkland and conservations areas	Disruption of tranquillity	#3		

#1: As low as possible.
#2: Peak sound pressure (not LAF, max) measured 100 mm from the ear.
#3: Existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low.
#4: Under headphones, adapted to free-field values.

[Source: www.who.int/docstore/peh/noise/ComnoiseExec.html]

Transport for London, Thames Gateway Bridge
Rebuttal to GASP TfL/REB/2069/2, paragraph 13.3.

[The document was apparently written to answer a constituent's objections to a bridge project.]

13.3 The 55 dB LAeq cut off was used because the Bateman, Lake and Day study only found measurable economic effects above 55 dB. Thus the use of 55dB has nothing to do with national or international standard for environmental noise; it is threshold for the suggested correlation between noise levels and economic valuation used in the study. ...

[Source: www.persona.uk.com/thamesgateway/TFL_docs/rebuttals/2000-2999/TFL-REB-2069-2.pdf]

Yahoo Answers

How loud is 55db? Please give example comparing to known common noises.?

Is 55db noise level louder than a bath shower, or toilet flushing sound? Can you give another example like a air conditioner, or TV at half volume from 3 feet away?

Best Answer - Chosen by Asker

It's about as lound [sic] as a conversation with a loud talker. Maybe this will help.

Examples of Sound Levels
(in decibels)

10 a light whisper
20 quiet conversation
30 normal conversation
40 light traffic
50 typewriter, loud conversation
60 noisy office
70 normal traffic, quiet train
80 rock music, subway
90 heavy traffic, thunder
100 jet plane at takeoff

[Source: answers.yahoo.com/question/index?qid=20070719054635AAKrwHh]

O'Hare Airport Noise Home Insulation Program Shortfalls
R. E. Ruthenberg 4/19/05

This report investigates the issue of how many homes fall within certain noise contours, including the air transportation industry's Federal Aviation Administration (FAA) guideline 65dB DNL and the similar public health protection institution's standard such as the World Health Organization's (W.H.O.) minimum recommended 55dB, under various considerations of Chicago O'Hare airport operational levels, both today's and future projections related to Chicago/O'Hare airport expansion ("modernization") proposals. FAA and O'Hare's acceptance of the need to "mitigate" the airport noise problems to W.H.O. recommended levels would be to admit to the need to spend several billion dollars on the program, rather than around a quarter of a billion on the current program track. To be generous, it is extremely doubtful that such acceptance will be forthcoming ("pigs flying"), leaving the public largely unprotected if such expansion proposals are approved and implemented.

...

CONCLUSIONS
It is estimated that 8325 homes surrounding O'Hare airport currently exist within a 65dB or greater DNL area and would therefore qualify for noise insulating, per generally accepted FAA-industry guidelines. The Chicago O'Hare Noise Compatibility Commission (ONCC) indicates that 4752 homes have been insulated to date (largely those in the 69dB DNL or greater areas), leaving about 3573 homes to go. At the current rate of 600/year, 65dB DNL program completion will take approximately 6 years, assuming no expansion in operations, either through straight increases in activity or through airport expansion, with corresponding activity increases.

[Table 1 from the WHO document, shown in Attachment 4 of the package in your hand, are cited in Table 3 of this O'Hare document as the standards to be met. To print it here would be redundant.]

[Source: www.areco.org/Noise%20Home%20Insulation.pdf]

>>> David Campbell <CampbellMediations@charter.net> 12/10/2008 1:20 PM
>>>
Lee:

About those windmills people want to put in their back yards. Fie!

I have a good view of the mountains. I don't want to see windmills; I want to see the mountains. Anything that impinges on my view, aside from what is necessary (houses, etc.) ought not happen. Further, it is quiet where I live. The whop, whop, whop of windmills will not add to my peaceful enjoyment.

Here is a counterproposal: I like diesel and have a one-acre lot. I want to put a diesel generator in. Would that be OK with the City and neighbors? Probably not. Nor should it be because the externalities (the effects that escape my land) would be burdensome to the neighbors. So it is with windmills.

If the City permits them in residential areas, however, there must be a requirement that one be taken down if it falls into disuse for, say, six months.

Thank you,
Dave

==========

Dave Campbell
775.883.8458
4840 Gentry Lane
Fax: 810.277.2759
Carson City, NV 89701
775.225.4252

Home:

Cell:

Heidi Eskew-Herrmann - Subject: DRAFT Wind Energy Conversion System Ordinance for Carson City

From: <howardfamilynv@juno.com>
To: <HEskew-Herrmann@ci.carson-city.nv.us>
Date: 1/15/2009 11:32 AM
Subject: Subject: DRAFT Wind Energy Conversion System Ordinance for Carson City
CC: <awkbuilt@sbcglobal.net>, <solarsuitcase@sbcglobal.net>, <e-energy@live.com>, <leslee.m@sbcglobal.net>, <khalbard@earthlink.net>, <valeriewiens@att.net>, <williselectricinc@yahoo.com>, <skloan@sbcglobal.net>

Dear Heidi;
Ref:
Subject: DRAFT Wind Energy Conversion System Ordinance for Carson City

The following two points need to be corrected on the draft:

The painting of the tower should be deleted because wind towers are galvanized light poles or are color impregnated rust colored like the ones used by the utility companies and don't have to be painted.

Carson City has to realize they are not even connected to the purchase power agreement for small wind generators. This is a net metered agreement between the resident and the utility and is regulated by the federal government at the buy down going rate. State already has a net metering law that forces a Utility to buy any excess power.

Your progress is commendable;
Timothy Howard

Heidi Eskew-Herrmann - RE: DRAFT Wind Energy Conversion System Ordinance for Carson City

From: "Tracy Twist" <ttwist@mariahpower.com>
To: <HEskew-Herrmann@ci.carson-city.nv.us>
Date: 1/15/2009 1:54 PM
Subject: RE: DRAFT Wind Energy Conversion System Ordinance for Carson City
CC: "Mike Hess" <mhess@mariahpower.com>

Heidi,

Thanks for sharing with us. We do have a few concerns:

Section 1a reads "Not more than one machine shall be allowed per parcel of land when the size of the parcel is less than one acre in size. "

While this makes sense for a large turbines, I see no reason why you would restrict the number of smaller turbines. Perhaps you are trying to avoid the "wind farm" look, but for certain properties and systems it makes sense to put more than one up, just as it makes sense to put more than one 1 kW solar panel on a roof. Our Windspire is a 1.2kW turbine, and we have installed several on a number of properties in order to allow home and business owners to cover a greater portion of their electricity needs. I've attached a couple of photos. In general, installing a few Windspires has MORE aesthetic appeal than just a single Windspire, although obviously you would not want people to go overboard. I would suggest the limitation be place rather on a certain kW limit, that is reasonable for the power usage on the property – say 10 kW.

Section 2b – Setbacks are reasonable. However, I would set a criteria that would allow them in the front yard, if they gain approval from neighbors whose properties fall within a certain distance from the property line. The clause is probably motivated by aesthetic concerns (?), but these will vary with the technology chosen. Also, some forward-thinking streets or neighborhoods may want to install wind turbines as a community project – lining streets, for example – and this kind of environmental action should be given a process that makes it possible. It would be a very good reflection of the city and its citizens.

Section 2f – Of course I am thinking of this relative to our technology. Our "blades" (more airfoils, as they are straight not pointy-tipped) go down to 10 feet above ground on our vertical axis design. Besides the difference in them not being pointy-tipped, they also do not spin at anything like the rate of propeller-style turbines – in fact they spin about ¼ the speed, at most. So… not sure it makes sense for this blanket requirement. I would suggest re-phrasing it such that the provision applies to horizontal axis turbines, and that the minimum airfoil height for vertical axis turbines is 10 feet above ground.

Section 2i – Noise – the requirement is okay, but I would specify "noise above ambient", so it is looking solely at the noise from the turbine. If it is "noise above ambient", then I would suggest the bar is far too high… 55 dB is really loud. We are 8 dB above ambient, in a 50 mph wind. Propellers are

louder, but some designs incorporate measures to minimize noise, something that should be expected for installation in urban/suburban areas.

Section 2ki – voltage warning – this should only apply to turbines that have high voltage. Our generator has a 60 V output, the highest voltage in the whole turbine is 110 V output. Again, making this a blanket requirement doesn't make sense.

Section 2kii - Signs – I would rephrase as "label", not "logo". Also manufacturers typically put their labels in their own specific location, it may not be on the generator housing. I would suggest instead allowing a manufacturer's label not to exceed a certain size (say 8x5").

Again, thank you for the opportunity to present comments. Please feel free to call and discuss more – 916-837-6048.

Respectfully,

Tracy Twist

From: Heidi Eskew-Herrmann [mailto:HEskew-Herrmann@ci.carson-city.nv.us]
Sent: Friday, January 09, 2009 1:39 PM
To: Sheena Beaver; Dave Campbell; Jeneane Harter; Matt; Rich Hamilton; Howard; Mike Hess; Steven Siegel; Bob Fredlund; Mark Harris; Gregg Swanson; Steve Graehl; James, Leslie or Dennis; Tyler
Subject: DRAFT Wind Energy Conversion System Ordinance for Carson City

Hi All,

You are receiving this email because you expressed interest in wind energy conversion systems for Carson City, Nevada.

Attached is the first draft of the proposed Carson City Wind Energy Conversion System Ordinance.

Please review it and provide any comments to me before **noon on Friday, January 16th, 2009.** The comments will be reviewed and the "final draft" that will be reviewed by the Planning Commission will be ready on Friday, January 23, 2009. On that date, I will email you a copy of the "final draft" as well as a staff report and agenda for this proposed ordinance.

The Planning Commission will review this proposal at their meeting on January 28, 2009. The time and order of the item will be available on the agenda that I will email to you on January 23. In addition to providing written comments, please plan to attend the meeting to voice your opinion on this ordinance.

All comments provided to me will be given to the Planning Commissioners. Comments can be emailed, faxed to 887-2278, mailed or hand delivered to 2621 Northgate Lane #62, CC, NV 89706.

Heidi Eskew-Herrmann - Adopting of CC Ordnance on Wind Turbines.

From: Leslie Medeiros <leslee.m@sbcglobal.net>
To: <HEskew-Herrmann@ci.carson-city.nv.us>
Date: 1/16/2009 1:33 PM
Subject: Adopting of CC Ordnance on Wind Turbines.
CC: James Medeiros <solarsuitcase@sbcglobal.net>, Tim Howard <howardfamilynv@juno.com>, dennis medeiros <dennis.medeiros@sbcglobal.net>

Dear Heidi,
I received a copy of Tim Howard's reply to you and agree with him totally-the painting of a wind turbine could be a problem for a lot of reasons and the net metering is already included in other legislative areas, no need to repeat it.

There was no discussion of fees-hopefully they will be minimal and NOT include "special use permit". Any hint of that yet?

We are delighted to see how much progress Carson City is making in becoming a true 21st century city--we look forward to seeing you on the 28th!

Leslie Medeiros
The Solar Store

January 20, 2009

TO: Carson City Planning Department
FR: Bruce Kittess
RE: Draft Wind Turbine Ordinance

Thank you for the opportunity to comment.

1. Wind turbines are active devices and should be reserved for commercial enterprises not in residential zones. I have no problem with wind turbines in rural areas on properties five (5) acres or more. My preference for home use is passive devices such as photovoltaic solar panels AND off grid.

2. If wind turbines are to be permitted in residential areas, they should be self supporting meaning no hazardous guy wires AND off grid. Connecting home wind turbine systems to the NV Energy system will screw up the neighborhood transformers and we will all pay more.

3. The draft states no more than one turbine on properties less than one (1) acre. How many can I place on my two (2) acres? I believe it should read no more than one (1) on five (5) acres or less.

4. The draft refers to "blades (propellers)" and does not refer to other configurations.

5. A building permit must be required. If connected to the grid an electrical permit.

6. Proof of homeowner's liability insurance and stated coverage for the proposed wind turbine and adjacent properties.

7. Do you think the ground clearance requirements take into account turbines placed on steep slopes?

8. Am I reading it right? My lot is 200 feet wide and more than 200 feet deep. I can place a 90 foot high tower with 99 foot setbacks? If yes, than ridiculous. There must be some maximum height dimension.

DATE: February 8, 2009

TO: Mayor Crowell, Supervisors Aldean, Livermore, Walt and Williamson.

FROM: Bruce Kittess, private citizen, Carson City

SUBJECT: Wind turbine ordinance to be heard on February 19, 2009, maybe?

We understand the States must comply with Federal regulations and Cities and Counties must comply with State regulations. Follow the leader.

The free market has been pushed aside again. Our government knows better. We must subsidize solar and wind systems regardless of economic validity. Federal tax credits are given with taxpayer dollars. NV Energy tax rebates are paid with ratepayer dollars (refer to your NV Energy monthly statements starting Dec 2008).

1. Why must solar and wind regulations be applicable in the same manner? NV Energy website states Nevada is NO. 1 in solar energy. We were told "our No. Nevada winds are sporadic". "Solar generation is predictable, but wind generation is not predictable and varies from site to site and is the reason for further study". NV Energy just started a 3 year demonstration study of their 80' wind turbine pictured

below. If we are No. 1 in solar energy why waste subsidies on wind energy in Northern Nevada?

2. Why must solar and wind regulations be applicable to all zoning districts? I am in favor of "passive, safer, quieter, less visually intrusive solar systems in all zones. I am not in favor of active wind turbines in residential neighborhoods. The draft ordinance will permit a 90 foot tower in one (1) acre residential neighborhoods.

3. The experts say the most efficient wind farms are in the Midwest due to predictable winds. If we must subsidize alternative energy, why not subsidize the solar systems in Nevada and wind systems in the Midwest? Some say solar systems are more expensive. A simple solution, as long as we are subsidizing, why not make them equal in cost or better yet, subsidize solar more in Nevada. Please tell our legislators and PUC to just do it. Did you know there are no more applications for NV Energy solar rebates until the end of this year? Why? Could it be because the public isn't stupid and applied for more solar systems? Are wind systems are being promoted over solar for hidden reasons?

4. As a homeowner would you rather opt to maintain the solar system on your roof yourself or pay someone else a lot of money to service your 90' wind turbine?

5. If after subsidizing wind and solar systems for a number of years, we may buy less and less kilowatts from NV Energy. If NV Energy is charging us 0.14 per KWH today (as approved by our PUC) how can they give us credit for the same 0.14 when our cost of building the solar or wind system is subsidized and our costs of operation is infinitesimal compared to theirs? It can't and eventually the utility rates must go up and be more than the credit they give the public. We have a public utility, experts in the field to serve the public. If we all could produce our own energy we won't need a public utility? Does it make sense to you?

Background:

I responded to the proposed draft ordinance in writing and spoke at the Planning Commission meeting along with David Campbell and others. We learned a lot and it prompted more questions. The Planning Commission did make a few minor changes to the draft ordinance you will be reviewing, but they missed the mark. Not the first time.

The last speaker at the Planning Commission meeting was Scott Gerz, Outreach Manager, Renewable Generations, NV Energy. We understand the public utility must comply with NRS and the PUC.

Several neighbors and I visited with Mr. Gerz at his office on February 4. He was very helpful and

answered all our questions. Our meeting included viewing NV Energy's solar system and "demonstration" 80 foot wind turbine.

Our staff used the Washoe County and Reno ordinances as a guide to the draft ordinance for Carson City. (Staff did not use Douglas County because they require 5 acres which would mean very few wind turbines in Carson). When we asked at NV Energy how many solar and wind systems were on the grid we were told about 400 statewide. No break down by residential, commercial or industrial or by solar or wind are available. I question just how much experience Washoe and Reno have had with wind turbines in residential neighborhoods? (Personally I don't care because it is just plain wrong).

I am writing to you early enough to give you all time to visit the NV Energy demonstration wind turbine. Did Maybe you or our city lobbyist can take a few assemblymen and senators with you? Please ask how many kilowatts the turbine produces. Not much. Please ask if the turbine ever fell off the tower. It did.

Would you and you family like to live next door to this 80 footer or how about a 90 footer?

Congress created the financial mess we are in. We can't sell our homes without a deep discount. Our savings our shrinking. Now we are being told we

must pay to subsidize these monsters in our neighborhoods we are trying to preserve.

In conclusion, you can bet we will gather as many citizens we can to testify at SB 114 hearings this legislative session. Thank you for reading, I feel much better for now.