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## WIND TURBINES: 2010, 2007 CBC

## IR A-29

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References:

Issued 11-03-10

California Code of Regulations (CCR): Title 24

Part 1, California Administrative Code, Sections 4-304, 4-305, 4-306, and 4-308

California Education Code, Sections 17368 and 81165

Discipline: All

This Interpretation of Regulations (IR) is intended for use by the Division of the State Architect (DSA) staff, and as a resource for design professionals, to promote more uniform statewide criteria for plan review and construction inspection of projects within the jurisdiction of DSA which includes State of California public elementary and secondary schools (grade K-12), community colleges and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

This IR is reviewed on a regular basis and is subject to revision at any time. Please check the DSA web site for currently effective IRs. Only IRs listed in the document at [www.dgs.ca.gov/dsa/publications](http://www.dgs.ca.gov/dsa/publications) at the time of plan submittal to DSA are considered applicable.

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**Purpose:** The purpose of this Interpretation of Regulations (IR) is to clarify where wind turbines and their support structures can be placed on public school campuses. There are many types and sizes of wind turbines. This IR is intended to apply to both those mounted on a pole or tower and those mounted directly on a building.

**Background:** The major components of a typical wind turbine are blades, rotor, hub and nacelle (housing that contains the drive train) typically mounted on a pole or tower. There are currently no earthquake resistance requirements for wind turbines in any standards or codes. While DSA will not review wind turbine blades, hub or nacelle, it is important to note that turbine blades are designed to be lightweight and that blade failure is not uncommon.

However, the poles, towers and other structural elements that support the wind turbine are able to be reviewed for conformance with the California Building Code regulations, and DSA will perform this review, as noted in this IR.

**1. Useable Life:** Wind turbines are expected to last about 20 years. After 20 years moveable parts and high-tech composite blade materials may wear out, this could result in failure. A special paragraph will be added to the DSA approval letters stating that the wind turbine and its support structure will either be removed from the campus or refurbished and reapproved by DSA no later than 20 years from the date of start of construction of the wind turbine project.

**2. Access Compliance Requirements:** When installed as energy generating equipment only and not visited by students, teachers or the public, wind turbine projects are exempt from access compliance requirements.

**3. Certification Requirements:** Wind turbines must meet the requirements of International Electrotechnical Commission (IEC) latest edition International Standard IEC 61400-1, Wind Turbines – Part 1: Design Requirements. The turbine manufacturer must also hold a current certification from Germanischer Lloyd (GL) for the type of wind turbine selected for the project.

**4. Special Inspection:** Installation torque of bolts for the rotor, blades, hub and nacelle is critical. Special inspection and verification by an independent inspector is required and should be included on the Statement of Structural Tests and Special Inspections, Form DSA-103.

**5. Small Wind Turbines:** Wind turbines with blades equal to or less than 6 feet in diameter will be accepted by DSA for installation on school campuses with the following limitations:

- 5.1 The turbines cannot be installed within 30 feet of an exit or entrance of the building.
- 5.2 The turbine design, location and operation shall be such that the tip of the blades cannot come within 15 feet of a location where building occupants have access.
- 5.3 The turbines must have a current industry standard certification from an independent agency.
- 5.4 DSA will not review the rotor, hub, blades or nacelle.
- 5.5 DSA will review the attachment of the turbine to the structure or supporting structure.
- 5.6 If the turbine uses any portion of an existing building for support, DSA will review the existing building for capacity to resist the additional loads.
- 5.7 DSA will review the structural elements that support the wind turbine for compliance with the latest edition of the California Building Code.

**6. Large Wind Turbines:** Wind turbines with blades greater than 6 feet in diameter will be accepted by DSA for installation on school campuses with the following limitations:

- 6.1 The turbines may not be installed on an existing school building.
- 6.2 Students and teachers must not have access to the area near the turbine. This is a circular area, centered on the turbine and having a radius equal to twice the height of the hub of the turbine above finish grade. Access to this area is usually prevented by installation of a fence with a locked gate. This area also may not be used as a safe dispersal area.
- 6.3 In accordance with Section 4-310, Part 1, Title 24, California Code of Regulations the school district must pass a resolution stating that the structure will not be used for school purposes and no pupils or teachers will be subjected to a hazard resulting from its collapse, and post the structure with a sign pursuant to Section 17368 or Section 81165 of the Education Code.

**Note:** Students and teachers may enter the posted area for short periods of time for purposes of the up close experience, similar to field trips to museums and theaters. The purpose of the fence and posting is to prevent access by the general student population.

- 6.4 DSA review and approval of the support structure is required, otherwise the access to the area or use as a safe dispersal area must be prevented for a distance of at least four times the height of the hub above finish grade in all directions.

**7. Enclosed Wind Turbines:** Wind turbines that have the blades enclosed in a cage will be accepted by DSA for installation on school campuses with the following limitations:

- 7.1 The limitations in Section 5 for Small Wind Turbines apply, except Section 5.2.
- 7.2 The maximum size is limited to wind turbines with blades equal to or less than 20 feet in diameter.