

Designing a Wind Farm

When developing a wind farm, Apex ensures each project is specifically designed to fit the properties and communities that host them.

As part of this process, our development team conducts sophisticated analyses to ensure each wind turbine is placed in a safe, environmentally sound location. These studies help us keep turbines a responsible distance from homes, important public infrastructure, and certain natural features. These setbacks can transform a seemingly wide-open area into a complex patchwork of smaller open spaces where turbines may be appropriately sited (see images at right). Factors typically considered include:

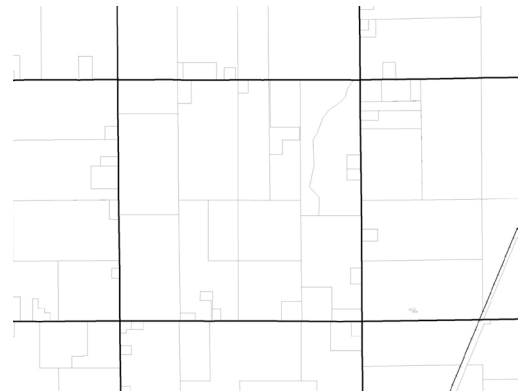
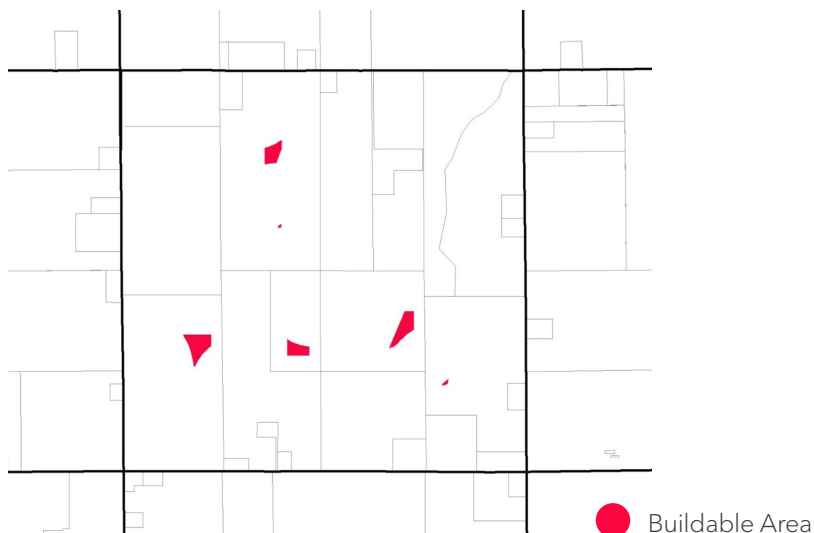
- Setbacks from road, rail, and other utility infrastructure (e.g., oil and gas, transmission lines, etc.)
- Setbacks from homes (Apex's standard minimum setback is 1,225 feet)
- Setbacks from nonparticipating property lines
- Setbacks from streams, ditches, and other wetlands
- Avoidance of cellular, radio, and television "beam paths"
- Soil stability
- Cultural or historic resources

With these factors in mind, we work with each landowner on the placement of facilities such as access roads, collection lines, and turbine placement to minimize disruption to agricultural operations.

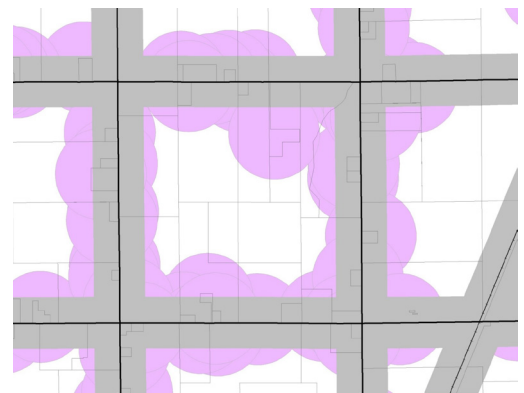
After taking all of these factors into account, there is limited suitable land available for the siting of turbines as illustrated below:



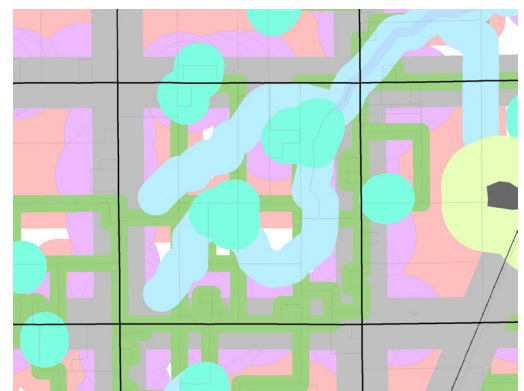
Scan this QR code or go to siting.apexcleanenergy.com to view an interactive example of how a wind project is designed using a real-world example from an Apex-built project.



Example Section and Parcel Boundaries



● Houses ● Roads



● Wetlands
● Streams and Ditches
● Forest
● Participating Property Lines
● Non-Participating Property Lines

Designing a Wind Farm

Wind energy and agriculture are a perfect fit due to the relatively small footprint of each individual turbine. A typical wind farm leaves 98% of land undisturbed and free for agricultural uses.

Apex has partnered with landowners across America to develop wind projects that operate seamlessly alongside their active agricultural operations, including traditional row crops, cattle ranches, dairy farms, timber harvesting, and even specialty crops like Maine wild blueberries.

Wind Energy Land Use

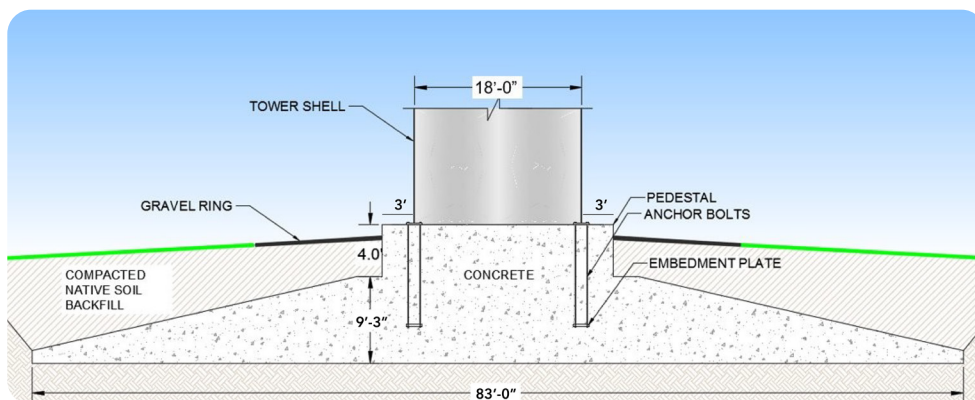
When it comes to the direct impact of the turbines themselves, wind energy has one of the lowest land use impacts per MWh of electricity generated when compared to other sources of energy (see chart at right).

To demonstrate the minimal above ground footprint of wind projects compared to the total project area, here is an example from a recent 300 MW wind project in Illinois where Apex determined the total above-ground footprint of project facilities.

Total Above-Ground Footprint of Facilities: Just **over 38 acres** out of nearly **40 square miles** of leased land (less than 0.1 percent of leased property). This includes:

- **Wind Turbines: 3.21 acres.** 53 turbines with an 18' wide turbine pedestal and 20' wide gravel pad around the pedestal for a total above ground diameter per turbine of 58' (0.06 acre above ground footprint per turbine)
- **Aircraft Detection Lighting System: 0.27 acre.** 80'x80' pad for the ADLS radar tower and 20' wide access road
- **Operations & Maintenance Facility: 1.29 acres.** Footprint of the facility including building, storage, and parking (in some cases existing structures may be used)
- **Project substation: 2.63 acres.** Footprint of the facility
- **Access roads: 31.36 acres.** 16' wide access roads to turbines

Typical Footprint of Turbine Pad and Foundation

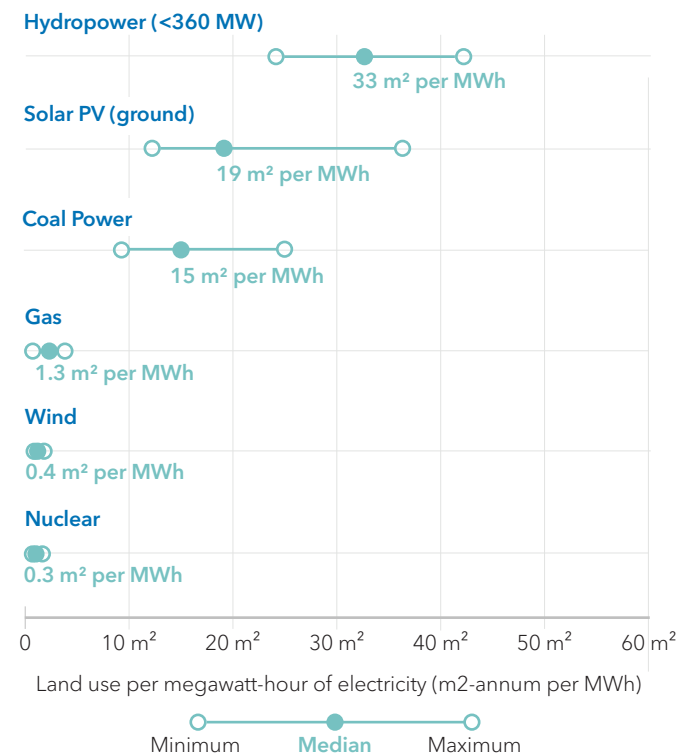


Once construction and site restoration is complete, landowners can plant and farm right to the base of the turbine.

Land use impact of different energy sources

Includes direct land use impact, mining of materials for construction, fuel inputs, decommissioning, and waste.

Source: Lifecycle Assessment of Electricity Generation Options, UNECE (2021)



A landowner plants corn right up to the gravel apron of a turbine at Apex's Hoopston Wind project in Illinois.