



equinor

What is EMF?

Underground Transmission Cables and Magnetic Fields

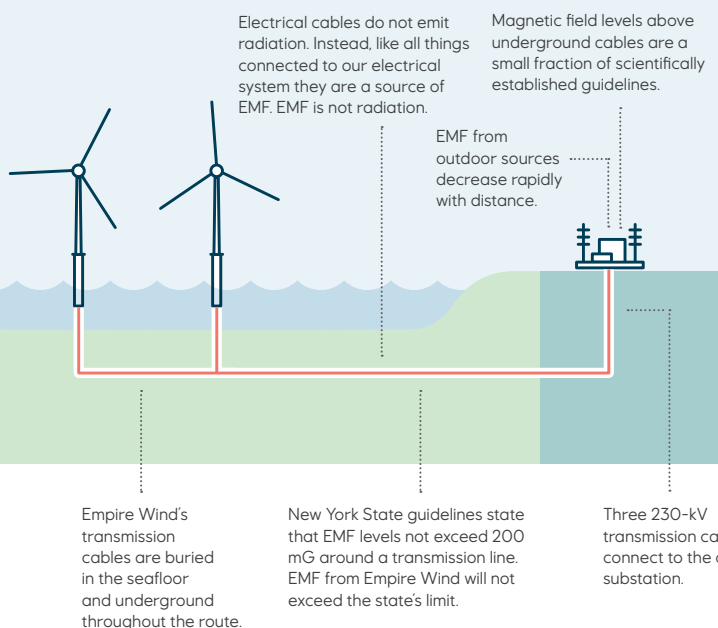
EMPIRE WIND is a 2.1 gigawatt (GW) offshore wind project that will bring renewable energy to Long Islanders, helping achieve New York's renewable energy requirements and creating exciting new opportunities for economic growth. Empire Wind will be developed in two projects—Empire Wind 1 & 2—in ocean waters 15-30 nautical miles south of Long Island. Empire Wind will install up to 147 offshore wind turbines in the Atlantic Ocean south of Long Island, with power coming onshore via underwater export cables, and then to an onshore substation to connect to the power grid.

What are electric and magnetic fields?

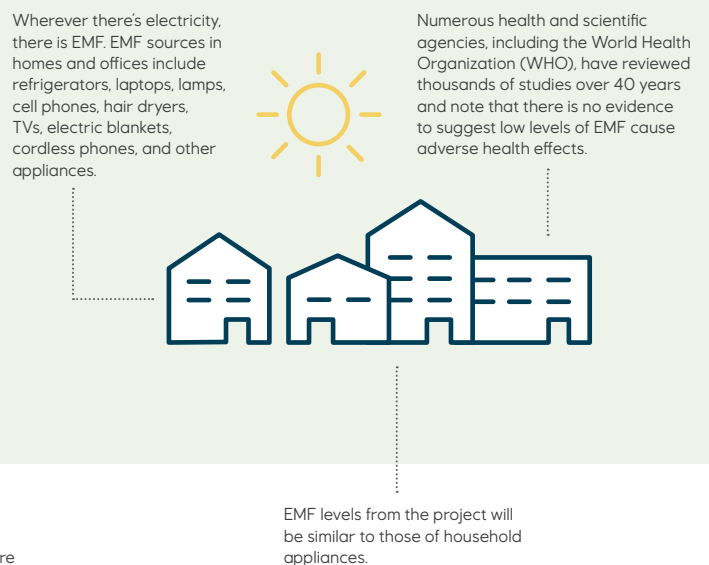
Electric and magnetic fields (EMF) are produced by any source that generates, transmits, or uses electricity. In North America, EMF from these sources have a frequency of 60 Hertz (Hz) and are sometimes referred to as extremely low frequency or power-frequency EMF. Since Empire Wind's cables are shielded and underwater or underground, the project will produce no electric fields above ground; therefore, this fact sheet focuses on magnetic fields.

EMF is present wherever there is electricity:

EMF IN GENERATION



EMF IN YOUR HOME



What are common sources of EMF?

All electrical devices in our homes are a source of magnetic fields—hair dryers, vacuum cleaners, refrigerators, and coffee makers—all emit EMFs. **Table 1** shows the magnetic field levels near household appliances. It's important to know that EMF levels diminish quickly with distance.

Does the government limit EMF?

New transmission lines in New York are subject to the standards established by the New York Public Service Commission (NYPSC). Empire Wind will meet NYSPC guidelines for EMF and will be much lower than the guidelines set by two scientific organizations, as shown in **Table 2**.

As shown in **Table 2**, the magnetic-field levels above the project cables in the road or at the edge of the road are a fraction of the guidelines established by scientific organizations. Beyond the edge of the road, field levels continue to decrease rapidly to <1 mG within 25 feet of the cables.

How will the project affect magnetic-field levels in the area?

The EMF produced by the project cables are the same power-frequency fields as those produced by household appliances. The strength of the magnetic field from the underground cables will be highest directly above the cables and decrease quickly with distance.

What have health and scientific agencies concluded about health effects of EMF exposure?

Numerous health and scientific agencies, including the World Health Organization (WHO), have reviewed thousands of studies over 40 years and note that there is no evidence to suggest low levels of EMF cause adverse health effects.

TABLE 1. MAGNETIC-FIELD LEVELS¹ (IN MILLIGAUSS) MEASURED NEAR HOUSEHOLD APPLIANCES

Appliance	6 inches away	12 inches away
Hair Dryer	300	1
Electric Shaver	100	20
Blender	70	10
Can Opener	600	150
Vacuum Cleaner	300	60
Coffee Makers	200	40

¹Values represent median magnetic field levels (i.e., half of the appliances tested had higher levels and half had lower levels than those shown).

Source: *Electric and Magnetic Fields Associated with the Use of Electric Power*, National Institute of Environmental Health Sciences (NIEHS) and National Institutes of Health, June 2002

TABLE 2. COMPARISON OF CALCULATED MAGNETIC-FIELD LEVELS TO EXPOSURE GUIDELINES (IN MILLIGAUSS)

Project Location	Average Loading
Directly Above Cables (in Road)	16
Edge of Road (±12.5 ft from Center)	4
Exposure Guidelines set by Scientific Organizations	Average Loading
ICNIRP ¹ guidelines	2,000
ICES ² guidelines	9,040

The WHO's website provides information about EMF and states: Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health.
<https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields>

Have a question about Empire Wind?
 Contact empirewind@equinor.com
 To sign up for project updates, visit www.empirewind.com

Empire Wind is a 50/50 partnership between Equinor and bp. Equinor will be the operator through the development, construction, and operations phases of the project.

¹International Commission on Non-Ionizing Radiation Protection (ICNIRP). Guidelines for limiting exposure to time-varying electric and magnetic fields (1 Hz to 100 kHz). Health Phys 99: 818-836, 2010.
²International Committee on Electromagnetic Safety (ICES). IEEE Standard for Safety Levels With Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz, Standard IEEE C95.1-2019, Oct. 2019.