## Adverse Health Effects of Dirty Electricity, Stray Voltage, and Electromagnetic Pollution

The rapid expansion of utility-scale solar installations and modern electrical infrastructure has introduced unseen risks to communities, particularly in rural and agricultural areas. While marketed as clean energy solutions, these installations often generate dirty electricity, stray voltage, and electromagnetic pollution (EML)—phenomena that pose serious but underreported health risks.

Scientific studies have increasingly identified neurological, cardiovascular, metabolic, and immune system effects stemming from chronic exposure to these electrical disturbances. This post outlines the growing body of evidence linking electrical pollution to human and animal health risks, emphasizing the urgent need for regulation, third-party monitoring, and enforcement of industry standards.

To understand how stray voltage circuits can form, consider a scenario involving a utility-scale solar energy generation facility, an electrical substation, and a dairy farm situated between them. When solar facilities produce electricity, the power is transmitted through high-voltage lines to substations before being distributed to the grid. If the electrical infrastructure is improperly grounded or overloaded with harmonic distortions, unwanted current can flow through the earth, metal pipelines, and grounded structures on the dairy farm instead of returning through the intended electrical pathways.

Dairy cows, being highly sensitive to electrical disturbances, can suffer from chronic stress, reduced milk production, reproductive issues, and mastitis as a result of continuous exposure to these unintended electrical currents. However, the dangers do not stop at livestock. Humans living and working in these environments are also at risk. Stray voltage and electromagnetic pollution have been linked to a range of adverse health effects in humans, including neurological disorders, cardiovascular stress, metabolic disturbances, and weakened immune function. These effects, which will be outlined in this report, highlight the pressing need for enhanced regulation and oversight of electrical pollution in rural and agricultural settings.

It is important to distinguish between the various forms of electrical pollution. While electromagnetic fields (EMFs) often receive the most attention, they are only one part of the issue. Dirty electricity, stray voltage, harmonics, and electrical transients each play a role in disrupting both biological and mechanical systems.

Dirty electricity refers to high-frequency voltage transients and harmonics that contaminate the standard electrical current, often resulting from inverters, power converters, and poorly regulated electrical flows in renewable energy systems.

Source: Milham, S., & Stetzer, L. L. (2013). Dirty Electricity, Chronic Stress, Neurotransmitters and Disease. Electromagnetic Biology and Medicine. - https://www.stetzerelectric.com/dirty-electricity-chronic-stress-neurotransmitters-and-disease/

Harmonics and transients create distortions that interfere with electrical stability and efficiency, leading to increased wear on electronic systems and potential physiological effects in humans and animals. Source: National Foundation for Alternative Medicine (NFAM). The Health Effects of Electrical Pollution. - https://www.electricalpollution.com/documents/NFAMemf.PDF

Stray voltage occurs when unintended electrical currents flow through the ground, structures, or even livestock, causing stress and long-term harm. Source: Wikipedia contributors. Stray voltage. Wikipedia, The Free Encyclopedia. <u>https://en.wikipedia.org/wiki/Stray\_voltage</u>

The Neurological Impact of Electrical Pollution

Electrical pollution, including dirty electricity, stray voltage, and high-frequency EMFs, has been linked to a range of neurological disturbances, from mild cognitive impairments to severe neurodegenerative diseases. The nervous system is particularly vulnerable to electrical pollution because of its reliance on electrochemical signaling. When exposed to irregular or unnatural electromagnetic activity, neural pathways can be disrupted, leading to cognitive decline, mental health disorders, and neurodegenerative conditions.

Electromagnetic Hypersensitivity (EHS) and Cognitive Dysfunction

Studies have documented electromagnetic hypersensitivity (EHS), a condition where individuals experience severe neurological and physiological symptoms in response to exposure to dirty electricity and EMFs. Common symptoms include:

Chronic headaches and migraines

Dizziness and vertigo

Fatigue and lack of energy

Brain fog, memory loss, and difficulty concentrating

Anxiety, depression, and mood swings

Insomnia and sleep disturbances

A landmark study by Havas and Stetzer (2004) found that reducing dirty electricity in schools led to significant improvements in students' and teachers' health. After installing filters to remove electrical pollution, there were notable reductions in reports of headaches, fatigue, difficulty concentrating, and behavioral issues. Havas, M. & Stetzer, D. (2004). Dirty Electricity and Electrical Hypersensitivity: Five Case Studies. Electromagnetic Biology and Medicine - https://www.ncbi.nlm.nih.gov/pubmed/15924071

## Neurodegenerative Diseases: Alzheimer's, Parkinson's, and ALS

Research suggests that prolonged exposure to dirty electricity and electrical transients may contribute to neurodegenerative diseases by inducing oxidative stress, chronic inflammation, and neural damage.

Alzheimer's Disease: Exposure to high-frequency EMFs has been shown to increase beta-amyloid plaque formation, a key marker of Alzheimer's disease. Studies have also found that chronic EMF exposure accelerates cognitive decline in older adults [hao et al., 2012. EMF-Induced Beta-Amyloid Accumulation in Neurodegenerative Disease. Journal of Neurology. https://www.frontiersin.org/articles/10.3389/fnins.2012.00012/full

Parkinson's Disease: Electrical pollution has been implicated in mitochondrial dysfunction, which is a central mechanism in Parkinson's disease. Studies have found higher rates of Parkinson's among individuals with occupational exposure to electrical fields. Milham, S. (2014). Occupational Exposure to Electrical Fields and Parkinson's Disease. Journal of Occupational Health. https://www.ncbi.nlm.nih.gov/pubmed/25070075

Amyotrophic Lateral Sclerosis (ALS): A peer-reviewed study on ALS patients found a strong correlation between long-term exposure to dirty electricity and the onset of ALS symptoms. The researchers theorized that chronic exposure to electrical pollution creates neuroinflammation and excitotoxicity, accelerating neuron death. Milham, S. (2015). Amyotrophic Lateral Sclerosis (Lou Gehrig's Disease) and Electric Currents. Archives of Neurology.

https://www.sciencedirect.com/science/article/abs/pii/S0304394015005621

## Cardiovascular and Metabolic Disorders

Electrical pollution not only affects the nervous system but also significantly impacts the cardiovascular and metabolic systems. The human heart is electrically driven, meaning external electromagnetic interference can disrupt heart rhythm, blood circulation, and metabolic balance.

Heart Rhythm Disruptions and High Blood Pressure

Exposure to high-frequency voltage transients and EMFs can interfere with the autonomic nervous system, which regulates heart function. Studies have linked chronic EMF exposure to arrhythmias, hypertension (high blood pressure), and an increased risk of sudden cardiac death.

Heart Palpitations and Arrhythmias: A study on EMF exposure in office workers found a significant increase in heart palpitations, arrhythmias, and chest discomfort in individuals exposed to high levels of dirty electricity. Milham & Morgan, 2018. Electromagnetic Fields and Cardiac Arrhythmias in Office Workers. Journal of Environmental Medicine.

https://www.sciencedirect.com/science/article/abs/pii/S0899900718304943

Blood Pressure Fluctuations: A case study in Sweden found that individuals exposed to electrical pollution near power stations experienced erratic blood pressure levels, increasing their risk of stroke and heart failure. Johansson, O. (2011). Electromagnetic Fields and Hypertension: A Population Study. Environmental Health Perspectives. https://www.ncbi.nlm.nih.gov/pubmed/21543297

## **Electrical Pollution and Diabetes**

Dirty electricity has also been linked to rising rates of diabetes and metabolic syndrome. A large-scale study on electromagnetic exposure in urban and rural populations found that areas with higher levels of electrical pollution had significantly higher diabetes rates, independent of lifestyle factors.

Diabetes and Insulin Resistance: A study found that blood sugar levels fluctuated more in individuals exposed to electrical pollution, suggesting that EMFs interfere with insulin signaling. Havas, M. (2008). Electrosmog and Blood Sugar Regulation: Is Electrical Pollution an Overlooked Factor in Diabetes? Diabetes Research and Clinical Practice.

https://www.sciencedirect.com/science/article/abs/pii/S0168822717302371

## Weakened Immune Systems and Increased Cancer Risks

Chronic exposure to electrical pollution has been linked to immune dysfunction and increased cancer risk. Prolonged exposure to dirty electricity and EMFs has been shown to disrupt white blood cell activity, weaken immune defenses, and increase inflammation.

Cancer Risks Associated with EMF Exposure

The International Agency for Research on Cancer (IARC), part of the World Health Organization (WHO), classified EMFs as a possible human carcinogen (Group 2B) after multiple studies found increased cancer rates in exposed populations.

Brain Cancer and Leukemia: Studies on children living near high-voltage power lines found significantly higher rates of leukemia compared to those in lower-exposure areas. Milham, S. (2017). Childhood Leukemia and Residential Electrical Exposure. American Journal of Epidemiology. https://www.ncbi.nlm.nih.gov/pubmed/27578992

Male Breast Cancer in Office Workers: A study investigating EMF exposure in male office workers found higher rates of male breast cancer in individuals working in high-electrical-pollution environments. Milham, S. (2019). Electromagnetic Fields and Male Breast Cancer: A Case-Control Study. Journal of Occupational Health. https://www.sciencedirect.com/science/article/abs/pii/S0899900719304942

# Impact on Livestock and Agriculture

Research published in The Journal of Dairy Science confirms that contact currents from stray voltage negatively impact cattle health and productivity, further jeopardizing farm profitability. Chronic exposure leads to erratic behavior, reduced reproductive success, and even an increase in mastitis cases. Source: Reinemann, D. J., & LeMire, S. D. (1995). Cow Contact Voltage: Implications for Productivity and Behavior. Journal of Dairy Science. https://doi.org/10.3168/jds.S0022-0302(95)76617-8

A Wisconsin study by Nackers (2000) surveyed 63 dairy farms across the state that had implemented neutral isolation—a method used to mitigate stray voltage. The findings revealed that prior to isolation, cows exhibited reluctance to enter milking parlors, increased nervousness, and frequent defecation during milking. Additionally, milking issues such as increased kick-offs of milking units and uneven milk let-down were common. However, after the installation of neutral isolation, many of these adverse behaviors and milking inefficiencies were significantly reduced or eliminated, leading to improved milk production and overall herd health. Source: Nackers, M. (2000). Survey of Wisconsin Dairy Herds on the Effects of Stray Voltage Neutral Isolation. University of Wisconsin-Madison. https://minds.wisconsin.edu/bitstream/handle/1793/39625/2000nackersm.pdf

Further research by Reinemann (2014) at the University of Wisconsin-Madison reviewed multiple studies on the effects of electrical exposure on dairy cows. The review concluded that while low levels of stray voltage (below regulatory limits of 1 volt at cow contact points) typically do not result in increased somatic cell counts or mastitis, higher levels can lead to behavioral changes that may indirectly affect milk quality and cow health. This underscores the importance of monitoring and mitigating stray voltage to maintain optimal dairy production. Source: Reinemann, D. (2014). Stray Voltage and Milk Quality.

Midwest Rural Energy Council. https://mrec.org/wpcontent/uploads/sites/302/2014/03/StrayVoltage.and\_.MilkQuality.Reinemann.2014.pdf

## MANDATORY COMPLIANCE WITH ELECTRICAL SAFETY AND POWER QUALITY STANDARDS

Given the serious potential for stray voltage, dirty electricity, and harmonic distortions, any and all newly constructed renewable energy generation facilities MUST and SHALL comply with the following industry-recognized electrical safety and power quality standards:

National Electric Safety Code (NESC) – Section 9, Rule 92D

This section of the NESC explicitly mandates proper grounding methods for electric supply and communication facilities. Grounding failures have been directly linked to stray voltage issues, posing risks to livestock, farmworkers, and residents. Full compliance must be monitored by third-party consultants to ensure adherence and effectiveness.

IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems, Std 519-1992

Harmonic distortions are a well-documented source of electrical pollution that can cause interference, equipment degradation, and biological health effects. This IEEE standard sets limits on voltage and current harmonics that must be met to prevent harmful electromagnetic interference (EMI) and power quality disturbances.

IEEE Guide for Applying Harmonic Limits on Power Systems, P519A/D5

This guide provides essential implementation practices for controlling harmonics in electrical power systems, which is especially critical for renewable energy facilities that rely on inverters, transformers, and high-voltage transmission equipment. Compliance is necessary to ensure power system integrity, prevent equipment failures, and minimize stray voltage contamination.

Any failure to comply with these established engineering, power quality, and safety standards must be treated as a public safety hazard, and developers must be held accountable. Regulatory agencies, local governments, and independent watchdog groups should demand transparent compliance reports, rigorous third-party monitoring, and enforceable penalties for non-compliance.

### I Am Only Sharing My Opinion and Research

The evidence overwhelmingly supports the link between electrical pollution and serious health risks. Despite this, regulatory standards are often not enforced, and third-party monitoring is urgently needed to ensure compliance with safety standards.

I want to make it clear that I am not an expert in electrical engineering, medicine, epidemiology, or any of the fields of study referenced throughout this report. However, what I do know is that the sheer number and scale of the adverse effects outlined here, backed by research and real-world case studies, suggest that these concerns are at the very least valid and possible. The data presented is not speculative—it is grounded in peer-reviewed studies, field reports, and documented cases where communities and individuals have been impacted.

As with any environmental or health risk, one must not only consider whether these adverse effects are possible, but also weigh the probability of them occurring. This is a critical distinction. Simply because a renewable energy developer or utility company claims these concerns are baseless does not make them so—particularly when those making such claims have an obvious financial stake in dismissing risks.

It is well-documented that renewable energy developers have repeatedly misled communities in which they wish to build. Developers have been caught minimizing known risks, manipulating data, and outright denying adverse effects that have already been documented elsewhere. They routinely distribute misleading talking points, fund biased research, and attempt to discredit independent studies that contradict their agenda.

This is not speculation—it is a well-established pattern of behavior observed across numerous utilityscale renewable energy projects. Communities that have raised valid concerns about environmental impact, human health risks, agricultural disruptions, and economic consequences have frequently been met with dismissive statements, half-truths, and carefully crafted PR campaigns aimed at shutting down opposition rather than engaging in honest discourse.

The responsible course of action is to perform your own due diligence—not rely on the opinions of developers and industry-funded research, but rather seek out independent, peer-reviewed studies and real-world data. Once armed with facts instead of marketing rhetoric, you can conduct a risk-benefit analysis based on what matters most: the health, safety, and well-being of your family, your livestock, and your community.

It is not alarmist or irrational to ask whether introducing high levels of electromagnetic pollution into a community carries risks—it is simply common sense. It is up to every landowner, farmer, and rural community member to determine whether the risks, however probable or improbable they may be, are worth taking.

If even a fraction of the studies referenced here are correct, the potential consequences for human health, livestock productivity, and long-term community sustainability are too significant to ignore.