

December 19, 2019

Pueblo Commissioners;

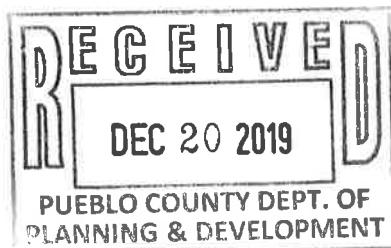
Per correspondence received from Gail Wallingford-Ingo regarding the December 12th public meeting regarding House Bill 1041 Permit 1041 2019-003, I have attached three appropriate, (and sometimes lengthy) reports from a multitude of studies regarding decreased property values as a result of high energy transmission lines, and their proximity to properties, residential, agricultural, and vacant land.

It is all about the public perception when it comes to real estate, and no one to deal with "these issues".


Janet Jordan

Penrose Neighbors for a Better Route

3 attachments



1415 14th St.
Penrose, CO 81240

The Electrifying Factor Affecting Your Property's Value

Vacant lots adjacent to power lines sell for significantly less than equivalent property further away as homeowners shy away from unattractive views

Adam Bonislowski

Aug. 15, 2018 10:31 a.m. ET

<~WRD000.jpg>

A recent study in the Journal of Real Estate Research by College of Charleston assistant professors Chris Mothorpe and David Wyman, finds that vacant lots adjacent to high-voltage transmission lines sell for 45% less than equivalent lots not located near transmission lines. Non-adjacent lots still located within 1,000 feet of transmission lines sell at a discount of 18%.

"You could have similar lots with similar views but different houses, and the pricing impact would be different because the housing structures would be different," he says. "So by just focusing on vacant land, we were able to not have to deal with those kind of issues."

Assuming a market where land represents 20% of a home's overall value, the 45% decrease translates to a drop in total property value of around 9%, the authors note.

For their analysis, the professors used sales data from 5,455 vacant lots sold between 2000 and 2016 in Pickens County, S.C.

The researchers also developed a "Tower Visibility Index" that Prof. Mothorpe says accounts for not only a lot's proximity to a

transmission line but also whether features like trees or hills hide the line from view.

“Even if the tower is within 1,000 feet, if it’s behind a big hill, I might not even know it’s there,” he says, which would lessen the tower’s impact on a property’s value. “There’s that idea of, out of sight, out of mind.”

For their analysis, the professors used sales data from 5,455 vacant lots sold between 2000 and 2016 in Pickens County, S.C., where a network of high-voltage lines transmits electricity from the Oconee Nuclear Station.

Prof. Mothorpe suggests three main factors driving the discount: health concerns associated with proximity to high-voltage lines (though, as the authors note, researchers have not established solid links between proximity to power lines and health issues); the unattractive views; and, for properties very close to the lines, the humming sound they produce.

“It’s hard [based on the study data] to distinguish between the three,” he says. “But my intuition tells me the visual [component] is the largest of the three.”

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Kris Healy
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PROPERTY DEVALUATION CAUSED BY FEAR OF ELECTROMAGNETIC FIELDS: USING DAMAGES TO ENCOURAGE UTILITIES TO ACT EFFICIENTLY

ROBYN L. THIEMANN*

INTRODUCTION

LoCal, a local electric utility company, plans to expand its service into the newly developed outskirts of Anytown. To effectuate this plan, it must build new electric transmission and distribution lines through several existing neighborhoods. Despite vigorous opposition from homeowners groups, the public utility commission approves the placement and construction of the new power lines. Within a few months, LoCal acquires the necessary property through eminent domain, and condemnation proceedings begin.¹

Following the advice of its appraiser, LoCal offers each homeowner several thousand dollars to compensate for its taking of the land on which the lines will be erected. In addition, LoCal offers each homeowner several hundred dollars for "consequential damages" to the remaining property resulting from the installation of the power lines.² This payment is intended to compensate for noise made by the power lines, the nuisance of having electric utility workers on the property inspecting the wires, and any devaluation of the remaining land due to loss of aesthetics or loss of view.

Having watched news reports on the potentially dangerous effects of electromagnetic fields emanating from power lines, Hilda Homeowner questions whether LoCal's offer is sufficient compensation. She realizes that the uncertainty regarding the health effects of electromagnetic fields fuels the public's fear of these fields, and that this fear will significantly devalue her property. Hilda therefore believes that the utility company should compensate her for this diminution in

* I am indebted to Professor Mark Geistfeld, Robert Steinman, and the entire production staff of the *New York University Law Review* for their thoughtful critiques and unflagging encouragement throughout the preparation of this Note.

¹ Electric utility companies may avoid using their power of eminent domain by first negotiating with the individual landowners affected by the power lines. This hypothetical assumes that any such negotiations have failed.

² When an electric utility condemns property for a power line, it must pay the property owner "just compensation" for both the land taken and any loss in value to the remaining land. See *infra* text accompanying notes 33-37.

property value that results from the newly installed power lines in her backyard. After voicing her concern and failing to reach agreement with the utility company, she turns to the courts to challenge the condemnation award.³

Hilda has a good chance of recovering for the devaluation of her property resulting from the public's fear of electromagnetic fields. The majority rule, followed by many courts, compensates landowners for loss of value due to public fear—regardless of the reasonableness of the fear—if the plaintiff demonstrates that the fear reduced the property's value.⁴ Hilda can easily demonstrate that the public's fear of electromagnetic fields did in fact devalue her property and therefore she will be compensated for this loss.

Hilda believes she has achieved a double victory in her lawsuit. Not only has she been justly compensated, but she also believes that her damage award, and others like hers, will force LoCal to deal efficiently with the uncertainty surrounding the potentially dangerous health effects of electromagnetic fields. Hilda is confident that, because LoCal has been affected economically by this uncertainty, it will have an incentive to determine the most cost-efficient way to deal with it.

Unfortunately for Hilda, LoCal is not particularly concerned about the economic ramifications of the public's fear. Even if the court allows recovery, LoCal knows that these damage awards will be recouped through its rates. LoCal operates as a state-sanctioned monopoly⁵ and is therefore subject to rate regulation. Under current rate

³ In addition to her challenge of the condemnation award, Hilda may assert that she should be compensated for "cancerphobia," a term used by courts and commentators to describe the emotional distress caused by the fear of developing cancer. See Dr. Sharlene A. McEvoy, *Double-Edged Sword of Damocles: Utility Companies' Liability for Diminution of Property Values Due to Electromagnetic Fields*, 23 *Real Est. L.J.* 109, 112 n.18 (1994) (describing "cancerphobia" as "a phobic reaction or apprehension . . . due to fear of contracting cancer in the future"). A full discussion of such a claim is beyond the scope of this Note. This Note deals primarily with compensating the landowner for all property devaluation and forcing the utility company to engage in an efficiency analysis. Cancerphobia is relevant to this consideration only because it fuels the decline in value of property near power lines.

⁴ See, e.g., *San Diego Gas & Elec. Co. v. Daley*, 253 Cal. Rptr. 144, 151-52 (Ct. App. 1988) (applying majority rule).

⁵ This Note assumes that the public utility is functioning as a state-sanctioned monopoly. Recently, the public utility commissions in several states, including New York, California, Massachusetts, Maine, and New Hampshire, have approved plans providing for direct competition in the utility market by 1998. See James Dao, *Plan Approved to Let Power Users Pick Suppliers of Their Electricity*, *N.Y. Times*, May 17, 1996, at B1. The plan advocated in this Note will be unnecessary in such situations because competition presumably will force utilities to make efficient decisions. However, it most likely will take many years for the electric utility industry to become fully subject to competition. See Benjamin A. Holden, *Con Edison, Other New York Utilities Expected to Seek Gradual Deregulation*,

regulation procedures, LoCal is guaranteed recovery of its "cost of service" plus a reasonable rate of return.⁶ Since a utility's "cost of service" includes the cost of acquiring land on which to build new power lines, all the money paid to Hilda will be returned to LoCal via a slight increase in utility rates.⁷ The additional cost resulting from the public's fear of electromagnetic fields does not factor into the utility's calculus and therefore does not affect its behavior.

This system affords no incentive to make cost-efficient decisions regarding the underlying issue—the uncertainty about the health effects of electromagnetic fields. Utilities have little reason to engage in a cost-benefit analysis to determine the most cost-effective strategy for dealing with the uncertainty if they are insulated from its economic effects. As a result, utilities make inefficient decisions and consumers are left holding the tab.

By failing to deter such inefficiency, rate-setting procedures facilitate wasteful allocation of resources and the economic exploitation of consumers. Because consumers ultimately will bear the cost resulting from the uncertainty (i.e., the increased condemnation awards) via increased rates, utilities have no incentive to be concerned about these costs. This Note argues that to protect the consumer from unfair and unnecessary rate increases, public utility commissions should employ a regulatory strategy that encourages utilities to address the uncertainty in the most cost-effective manner.

Part I of this Note provides a general overview of electromagnetic fields and outlines their effect on the value of property situated adjacent to power lines. It then sets forth the "majority rule"—the rule of compensation employed by the majority of courts dealing with condemnation and property devaluation in the electric utility context. Additionally, Part I describes the public utilities' right of eminent domain and the rate-setting procedures currently employed by most public utility commissions that enable electric utilities to pass on to ratepayers the cost of condemnation awards.

Part II argues that under this regulatory system, efficiency will be achieved by pairing the majority rule with a regulatory structure that encourages utilities to determine and implement the most cost-

Wall St. J., Oct. 1, 1996, at C16 (noting that Con Edison proposed "opening up only about 1% of its electric revenues to competition in 1998" and that full phase-in will take 6 to 10 years).

⁶ See *infra* text accompanying notes 53-62.

⁷ To be eligible for increased rates, utilities must show that their expenditures are "reasonable." Charles F. Phillips, Jr., *The Regulation of Public Utilities* 258 (1993). For this reason, utilities are deterred from offering extraordinary condemnation payments or automatically agreeing to increase payments when challenged by homeowners.

effective strategy for dealing with the uncertainty surrounding electromagnetic fields. This strategy may take one of two forms: (1) the utility will continue to pay out consequential damages until some other agency resolves the uncertainty or (2) the utility will resolve the uncertainty itself. Either way, the utility must have an incentive to choose the most cost-effective option. To this end, Part II offers two regulatory responses that, if coupled with the majority rule, would encourage the utility to adopt the most cost-effective alternative. First, the state public utility commissions could undertake an ad hoc efficiency analysis to determine which option—continuing to pay out consequential damages or attempting to resolve the uncertainty—is most cost effective. Second, state public utility commissions could deny utilities recovery through rates for damage awards resulting from the effect of fear of electromagnetic fields. By forcing the utility to internalize these costs, the utility commissions would encourage efficient behavior.⁸ Implementation of either response, in conjunction with the majority rule, will encourage utilities to follow a cost-efficient approach toward the uncertainty regarding the effects of electromagnetic fields.

I

POWER LINES, ELECTROMAGNETIC FIELDS, AND PROPERTY VALUES: THE PROBLEM

Electric power is supplied to consumers via overhead distribution and transmission lines.⁹ Transmission lines carry electricity at high voltages, moving electricity from power generators located in rural areas to "urban load centers" where the power will be used.¹⁰ Substations near the load centers use power transformers to "step down" the voltage to a level that is safely useable for consumers.¹¹ The electric power is then sent to consumers over local distribution lines.¹²

A web of approximately 642,000 miles of power transmission lines and two million miles of power distribution lines covers the United States.¹³ Both types of power lines create and emit electro-

⁸ Some have argued that denial of cost recovery by public utility commissions will not affect utility behavior. For an outline of this argument and this Note's response, see *infra* Part II.B.2.c.

⁹ See Christopher A. Wilson, Note, Power Line EMF: A Proposed State Utility Regulatory Response, 10 J. Contemp. Health L. & Pol'y 469, 469 n.1 (1993).

¹⁰ See *id.*

¹¹ *Id.*

¹² See *id.*

¹³ See Sean T. Murray, Note, Comparative Approaches to the Regulation of Electromagnetic Fields in the Workplace, 5 Transnat'l L. & Contemp. Probs. 177, 178 (1995); see also Eileen N. Abt, Coping with the Risk of Cancer in Children Living Near Power Lines, 5

magnetic fields.¹⁴ To understand the issues surrounding these power lines, a brief technical overview of electromagnetic fields is necessary.

A. *Electromagnetic Fields: The Science and the Studies*

Electricity in motion creates electric and magnetic fields, referred to as electromagnetic fields (EMFs). Electric currents, and therefore EMFs, exist almost everywhere—around power lines, appliances, electric blankets, home and office wiring, computers, automobiles, cellular telephones—even the earth itself creates an electromagnetic field.¹⁵

Historically, researchers focused primarily on the health effects of the electric-field component of EMFs.¹⁶ Recently, however, researchers have come to believe that magnetic fields are potentially more dangerous.¹⁷ This is due in part to the fact that although electric fields may be blocked by trees, walls, and other physical objects, magnetic fields “penetrate most substances and are virtually impossible to shield.”¹⁸

A significant amount of controversy surrounds the health effects of EMFs. While some researchers believe exposure to EMFs leads to an increased risk of developing certain forms of cancer, others deny the existence of any negative effects associated with EMFs.¹⁹ Although several dozen epidemiological studies and numerous in vi-

Risk: Health, Safety & Env't 65, 67 (1994) (citing existence of 350,000 miles of transmission lines and two million miles of distribution lines); Thomas E. Riley & Steven L. Vollins, *Electromagnetic Field Property Damage Claims: Why Class Actions Are Not Appropriate*, Inside Litig., Jan. 1994, at 23 (“There are enough overhead high-voltage transmission lines in the United States to stretch back and forth between New York and Los Angeles more than 200 times.”).

¹⁴ See Cindy Sage & Joseph G. Johns, *Electromagnetic Radiation: A Case for Relevance in Real Estate Transactions and Eminent Domain*, 20 Real Est. L.J. 193, 194 (1991).

¹⁵ See Kenneth R. Foster, *Weak Magnetic Fields: A Cancer Connection?*, in *Phantom Risk: Scientific Inference and the Law* 47, 47 (Kenneth R. Foster et al. eds., 1993); John Weiss, Note, *The Power Line Controversy: Legal Responses to Potential Electromagnetic Field Health Hazards*, 15 Colum. J. Envtl. L. 359, 361 (1990); Wilson, *supra* note 9, at 473.

¹⁶ See C. Michelle Depew, Comment, *Challenging the Fields: The Case for Electromagnetic Field Injury Tort Remedies Against Utilities*, 56 U. Pitt. L. Rev. 441, 446 (1994). The strongest electric fields are associated with power lines. See Foster, *supra* note 15, at 48-49 fig. 3.1. Power lines can emit electric fields 100 to 1000 times stronger than those generated within a foot of home appliances, and up to 10,000 times stronger than those extending a foot or more away from home appliances. See *id.*

¹⁷ See Depew, *supra* note 16, at 446.

¹⁸ *Id.* at 446-47.

¹⁹ See generally Foster, *supra* note 15, at 51-65, 75-76 (surveying opinions of researchers).

tro and animal studies have been undertaken,²⁰ no scientific consensus has yet emerged.

The epidemiological studies have been criticized on several points. Methodologically, researchers made assumptions regarding EMF exposure based on the subject's occupation or the proximity of the subject's home to power lines instead of measuring actual EMF exposure.²¹ Other criticisms target the interpretation of the evidence and the technical limitations of the various studies.²² Further, results from the studies vary widely and are often contradictory.²³ The conflicting evidence and the relative lack of sophistication of the studies thus far have led most scientists and commentators to agree that the evidence on the health effects of EMFs is generally inconclusive.²⁴

This uncertainty about the health effects of EMFs has impacted the real estate market. **Absent conclusive evidence to the contrary, it remains possible that EMFs do in fact cause cancer. This possibility has resulted in decreased market value of homes situated near power**

²⁰ For an exhaustive bibliography cataloging the various review articles, consensus and group reports, and individual studies relating to the health effects of EMFs, see *id.* at 79-85.

²¹ See *id.* at 68-70. Critics contend that focusing solely on occupational title or power-line proximity fails to take into account EMFs generated by home appliances (i.e., microwaves, hair dryers, and electric blankets). See *id.*

²² See *id.* at 65-68.

²³ See *id.* at 51-65, 75-76 (outlining procedures and results of major studies on health effects of EMFs); see also Margo R. Stoffel, Comment, *Electromagnetic Fields and Cancer: Legitimate Cause of Action or a Result of Media Influenced Fear?*, 21 *Ohio N.U. L. v.* 551, 551 (1994) ("The major problem is that although there are a number of studies linking adverse health effects to EMF[s], there are an equal number of studies that do exactly the opposite.").

²⁴ See Matthew G. Parisi, *Cancerphobia: The Fear and the Decision*, N.Y. St. B.J., Mar./Apr. 1995, at 30, 33 ("[A] causal relation is difficult to make due to the lack of consistency among published studies and the absence of an accepted biological explanation for such a relation."); Rufus C. Young, Jr. & Craig S. Gunther, *Electromagnetic Fields: Invisible Hazard?*, C930 *ALI-ABA* 189, 193 (1994), available in Westlaw, *ALI-ABA* database ("[E]xisting evidence is insufficient to provide a basis for concluding with certainty that adverse health effects will in fact result from exposure to EMF radiation . . ."); Sherry Young, *Regulatory and Judicial Responses to the Possibility of Biological Hazards from Electromagnetic Fields Generated by Power Lines*, 36 *Vill. L. Rev.* 129, 150 (1991) ("At present, the scientific evidence regarding the possibility of adverse biological effects from exposure to power-frequency fields . . . is inconclusive."); Lara M. Vukelic, Note, *A Prudent Regulatory Response to the Potential Health Hazards of Electromagnetic Fields*, 19 *Wm. & Mary Env'tl. L. & Pol'y Rev.* 105, 108-113 (1994) (noting conflicting results of studies investigating health risks posed by EMFs); Wilson, *supra* note 9, at 474 ("[M]ost of the studies and experiments to date are inconclusive in determining whether there is a definite link between EMF[s] and certain diseases."); John Simpson, *\$10 Billion a Year Could End EMF Exposure*, *Panel Told*, *Pub. Util. Fort.*, May 15, 1993, at 45, 45-46 (reporting that scientists were years away from definitive answers to question of EMFs' effects).

lines.²⁵ For example, in one Illinois home market, homes located near power lines sold for at least 10% less than similar homes away from the lines.²⁶ A study completed by a real estate appraiser in Houston produced similar results: properties bordering transmission lines sold for 13% to 30% less than comparable properties in the same neighborhood but away from transmission lines.²⁷ Additionally, according to one real estate broker, while the average time a home remains on the market is 140 days, homes near power lines often remain on the market for an average of one year.²⁸

If this loss in property value is linked to the public's fear of EMFs, the following questions arise: Is compensation for the public's fear of EMFs warranted? Will requiring such compensation encourage utilities to make cost-efficient decisions regarding the uncertainty surrounding the health effects of EMFs? Addressing these larger issues requires an understanding of the unique position of public utilities and some background on the approaches courts take when confronted with the compensation issue.

B. *The Utility Model*

Public utility companies are in a unique market position. As state-sanctioned monopolies, they have different rights and obligations than firms which operate in competitive markets. States require utilities, as common carriers, to provide safe and adequate service to all who apply, to serve all customers on equal terms, and to charge only a "just and reasonable" rate for service.²⁹ In consideration for these obligations, states allow utilities to operate free of competition. To safeguard against the tendency of monopolists to overcharge con-

²⁵ See generally Peter F. Colwell, *Power Lines and Land Value*, 5 J. Real Est. Res. 117, 126 (1990) (concluding that "proximity to a power line is associated with diminished selling prices"); Lita Furby et al., *Electric Power Transmission Lines, Property Values, and Compensation*, 27 J. Envtl. Mgmt. 69, 72-78 (1988) (reviewing empirical studies regarding effect of transmission lines on property values); Elizabeth Thomas & Jill Hanson Reinmuth, *EMFs: The Newest Real Estate Hobgoblin?*, Prob. & Prop., Nov./Dec. 1993, at 19, 20 ("Public fears of the potential health hazards of human exposure to EMFs generated by power lines frequently affect the marketability of property near power lines."); Jay Romano, *Warning to Sellers: Let the Buyer Be Aware*, N.Y. Times, Sept. 1, 1996, § 9, at 1 (noting that power lines "greatly affect real estate values").

²⁶ See Sharon Tomecek, *EMFs: Charged with Controversy*, Real Est. Today, Nov./Dec. 1992, at 18, 20 (reporting experiences of Illinois real estate broker).

²⁷ See Alix M. Freedman, *Power Lines Short Circuit Sales, Homeowners Claim*, Wall St. J., Dec. 8, 1993, at B1 (reporting appraiser's 1993 study). Although the unsightliness of the power line and loss of view may account for some of this decline in value, fear of EMFs emanating from the power lines also has an effect. See Furby et al., *supra* note 25, at 71 (listing fear of adverse health effects as one reason individuals may pay less for property).

²⁸ See Tomecek, *supra* note 26, at 20 (citing broker's estimation).

²⁹ See Phillips, *supra* note 7, at 120.

sumers, however, utilities must submit to price regulation by the public utility commission. Further, utilities are granted the right of eminent domain.³⁰ The two distinguishing characteristics of public utilities most relevant to this Note are their right of eminent domain and the rate-setting procedures utilized by public utility commissions in determining a "just and reasonable" rate for service.

1. *Public Utilities' Right of Eminent Domain*

Most states grant public utilities the right of eminent domain, thereby allowing them to condemn private property "when necessary to the proper conduct of their business."³¹ Consequently, electric utilities are able to take land for power-line sitings³² so long as they pay "just compensation" to the aggrieved landowners.³³ Just compensation includes compensation for direct damages (the cost of the land taken) as well as consequential damages (the damage to the remaining property).³⁴ Direct damages are measured by the "fair market value"³⁵ of the taken land; damage to the remaining property usually is measured by the depreciation in value of that property as a result of

³⁰ See *id.* at 119-20.

³¹ *Id.* at 120. The power of eminent domain is usually reserved to the government. Nevertheless, state legislatures have conferred this power upon utilities to enhance their ability to acquire land and thus to provide better and cheaper service to their customers. See *id.*

³² See, e.g., Kan. Stat. Ann. § 12-895 (1991) (authorizing condemnation of property for electric power lines); N.C. Gen. Stat. § 40A-3 (1984) (same).

³³ See Peggi A. Whitmore, Note, Property Owners in Condemnation Actions May Receive Compensation for Diminution in Value to Their Property Caused by Public Perception, 24 N.M. L. Rev. 535, 536 (1994) ("The Fifth Amendment to the U.S. Constitution . . . provide[s] for 'just compensation' for those whose private property is taken for public use.").

³⁴ See *id.* ("An obvious taking occurs when the Government condemns private property for its own use, but a taking also occurs when a condemnation case causes a significant diminution in the value of neighboring land." (citing *Pennsylvania Coal Co. v. Mahon*, 260 U.S. 393, 413 (1922))).

Although there is no set formula to determine whether a taking has occurred, courts generally consider "the character of the governmental action including economic impact—particularly the extent to which the action substantially interferes with property owners' 'reasonable investment-backed expectations.'" Linda J. Orel, Perceived Risks of EMFs and Landowner Compensation, 6 Risk: Health, Safety & Env't 79, 81 (1995) (citing *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 120 (1978)). A question may exist of whether diminution in value of land is a taking. The case law relevant to this Note assumes that such diminution in value constitutes a taking; therefore, this Note will proceed under the same assumption.

³⁵ "Fair market value" is defined as "the amount of money which, as of the date of valuation, an informed and knowledgeable purchaser willing, but not obligated, to buy property would pay to an informed and knowledgeable owner willing, but not obliged, to sell it . . . [taking into consideration] all uses for which the land is suited and might be applied." Julius L. Sackman, 4 Nichols On Eminent Domain, § 12.02[1], at 12-75 (rev. 3d ed. 1996) (footnote omitted).

the taking.³⁶ Thus, when an electric utility condemns land, it pays not only for the land actually used for the power line but also for the reduction in value to the remaining land.³⁷

This latter category of damages has been the subject of numerous disputes since the proliferation of studies on the effects of EMFs. Property owners have claimed that the land surrounding their condemned land has been devalued as a result of the uncertainty about the effects of EMFs.³⁸ Because prospective buyers would be less likely to purchase the property, and the landowners would therefore receive less for the property than they would have prior to the condemnation, the landowners have expected the utility to compensate them for this diminution in property value.³⁹ When utilities have refused to compensate for this devaluation, the landowners have turned to the courts to challenge the condemnation award.

2. *Condemnation Actions and the Judicial Approach to Damages Resulting from the Public's Fear of EMFs*

In the past, courts have applied one of three rules to handle disputes regarding consequential damages resulting from the public's fear of EMFs.⁴⁰ These three rules, referred to as the "majority," "minority," and "intermediate" rules, are as follows: The majority rule compensates landowners for loss of value due to public fear—regardless of the reasonableness of the fear—if the plaintiff demonstrates that such fear reduced the property's value.⁴¹ The minority rule holds

³⁶ See 4A id. § 14.02[1].

³⁷ Loss of view, loss of aesthetics, and loss of land use often form the basis for consequential damages. See, e.g., *La Plata Elec. Ass'n v. Cummins*, 728 P.2d 696, 700 (Colo. 1986) (en banc) (awarding landowner compensation for diminution of property value resulting from unsightliness of power line); *Central Ill. Pub. Serv. Co. v. Westervelt*, 367 N.E.2d 661, 663 (Ill. 1977) (deeming unsightliness of power line relevant in determining damages).

³⁸ See, e.g., *Criscuola v. Power Auth.*, 621 N.E.2d 1195, 1195 (N.Y. 1993) (plaintiffs claimed that "public's perception of a health risk from exposure to electromagnetic emissions from power lines negatively impact[ed] upon the market value of their property").

³⁹ See, e.g., *Ryan v. Kansas Power & Light Co.*, 815 P.2d 528, 531-32 (Kan. 1991) (upholding recovery for loss in property value resulting from public's fear of EMFs); *Criscuola*, 621 N.E.2d at 1195 (same).

⁴⁰ This Part will discuss cases arising in the direct-condemnation context. Plaintiffs also have asserted claims for "inverse condemnation," which occurs when the proximity of a power line decreases property values although none of the plaintiff's property is physically taken for the erection of the power line. A full discussion of such claims is outside the scope of this Note.

⁴¹ See, e.g., *Ryan*, 815 P.2d at 532 (applying majority rule and affirming jury award that included compensation for reduction in property value resulting from public's fear). The two federal appellate courts that have considered the issue adhere to the majority rule. Additionally, of approximately 10 lower jurisdictions that have dealt with this issue, 7 of them adhere to the majority rule. See *infra* note 44.

that a "fear in the marketplace" is too speculative to justify damages and awards damages only where there is some traditional decline in value, such as loss of aesthetics or loss of use.⁴² The intermediate rule awards recovery if the fear is reasonable and affects the value of the property.⁴³

As its name suggests, a majority of courts follow the first rule and find that the impact of public fear on market value is compensable, regardless of the reasonableness of the fear.⁴⁴ This is the best rule because, in the current situation, the reasonableness of the fear should

⁴² See, e.g., *Alabama Power Co. v. Keystone Lime Co.*, 67 So. 833, 837 (Ala. 1914) (denying landowner's claim for compensation because the law "cannot allow any compensation on account of any claimed depreciation of such remaining land which is due to the mere fears of some of the people"). The minority rule was last applied in 1962, before the controversy over EMFs began. See *Central Ill. Light Co. v. Nierstheimer*, 185 N.E.2d 841 (Ill. 1962). With the progression of scientific knowledge and the proliferation of studies on the effects of power-line-frequency EMFs, it is doubtful that courts in jurisdictions previously applying the minority rule would continue to do so. In fact, Florida recently abandoned the minority rule in favor of the majority position. See *Florida Power & Light Co. v. Jennings*, 518 So. 2d 895, 899 (Fla. 1987). Accordingly, the minority rule does not merit significant discussion.

⁴³ See, e.g., *Dunlap v. Loup River Pub. Power Dist.*, 284 N.W. 742, 745 (Neb. 1939) (holding that if fear was "reasonable, not speculative [or] ill-defined," the resulting property devaluation would be compensable). The intermediate rule was applied most recently in 1989. The jurisdiction applying it at that time, however, has since adopted the majority rule. See *Criscuolo*, 621 N.E.2d at 1196-97. Prior to its application in 1989, the intermediate rule was articulated in *Willsey v. Kansas City Power & Light*, 631 P.2d 268 (Kan. 1981). However, there is some question of whether the *Willsey* court indeed adopted the intermediate rule. See *Ryan*, 815 P.2d at 533 ("[T]he Court of Appeals [in *Willsey*] found admission of testimony concerning fear in the marketplace was proper without definitively deciding whether it was adopting the intermediate rule or the [majority] rule."). Nonetheless, this jurisdiction recently explicitly adopted the majority rule. See *id.* at 534-35. At the intermediate rule's status as a rule governing compensation is uncertain.

In addition to the questionable status of this rule, there are independent reasons to reject the intermediate rule and its reasonableness requirement as a rule governing compensation. See *infra* notes 45-47 and accompanying text.

⁴⁴ See, e.g., *United States ex rel. T.V.A. v. Easement & Right of Way*, 405 F.2d 305, 309 (6th Cir. 1968) (noting that public fear of high voltage lines may offset market value and should be compensable); *United States ex rel. T.V.A. v. Robertson*, 354 F.2d 877, 881 (5th Cir. 1966) (finding it proper to consider diminution of value resulting from public's fear of power lines); *Selective Resources v. Superior Court*, 700 P.2d 849, 852 (Ariz. Ct. App. 1984) (determining that evidence of alleged health hazards was highly relevant to assessing damages); *San Diego Gas & Elec. Co. v. Daicy*, 253 Cal. Rptr. 144, 151-52 (Ct. App. 1988) (finding just compensation could include damages associated with public fear of EMFs); *Ryan*, 815 P.2d at 534-35 (holding evidence of fear in marketplace admissible on question of decline in property value); *Jennings*, 518 So. 2d at 898 ("[T]he impact of public fear on the market value of the property is admissible without independent proof of the reasonableness of the fear."); *Louisiana Power & Light Co. v. Mobley*, 482 So. 2d 706, 714 (La. Ct. App. 1985) ("[F]ear [of power-line effects] is certainly a factor which may be considered in fixing damages."); *Criscuolo*, 621 N.E.2d at 1196 (holding that landowners could recover based on public's fear of health risks, regardless of whether fear was reasonable); *Basin Elec. Power Coop., Inc. v. Cutler*, 217 N.W.2d 798, 800 (S.D. 1974) (stating that witnesses may testify to conjectural damages such as danger of fire from high voltage power lines).

not be a factor in assessing damages. A reasonableness requirement forces the court to determine whether the current scientific data is sufficient to establish a link between EMFs and cancer⁴⁵—a judgment the scientific community is unable to make at this time.⁴⁶ Absent scientific consensus, courts are unable and ill-equipped to make a reasonableness determination and therefore are not in a position to condition recovery on the reasonableness of the public's fear.⁴⁷

On the other hand, courts *are* able to determine the market response to the uncertainty regarding the risks associated with living near power lines. As detailed in Part I.A, the unknown, potentially dangerous effects of EMFs translate into lowered property values for homes near power lines.⁴⁸ This is an empirically verifiable and legitimate response to the uncertainty and, therefore, is an effect of the condemnation action that should be recognized by the courts and compensated.⁴⁹ The majority rule, by removing the reasonableness requirement, compensates for this loss resulting from the market's response to uncertainty.

⁴⁵ See Parisi, *supra* note 24, at 36 ("A reasonableness requirement subjects the trial of fact to a scientific and medical battle between parties relying on inconclusive studies being undertaken in an attempt to determine whether there is a causal connection between electromagnetic field exposure and disease.").

⁴⁶ See *supra* notes 19-24.

⁴⁷ Indeed, it is precisely the lack of a definitive answer regarding the risk of living near power lines that fuels the public's fear and results in the decline in property value. By definition, then, in the current circumstances, the public's fear cannot be reasonable or unreasonable—it is simply a response to this uncertainty. The majority rule accounts for this by removing the reasonableness requirement altogether.

⁴⁸ For a detailed analysis of the effects of uncertainty on property values, see generally David Zachary Kaufman, Comment, Efficient Compensation for Lost Market Value Due to Fear of Electric Transmission Lines, 12 Geo. Mason U. L. Rev. 711, 732-34 (1990).

⁴⁹ We can look at other market examples to see the same effect in the face of uncertainty. For instance, insurance companies increase premiums to compensate for a particular kind of uncertainty called ambiguity. See W. Kip Viscusi, The Risky Business of Insurance Pricing, 7 J. Risk & Uncertainty 117, 118-20 (1993). When an insurance company faces this kind of uncertainty, it will increase the price of the policy to compensate for the additional risk. See Howard Kunreuther & Robin M. Hogarth, How Does Ambiguity Affect Insurance Decisions?, in Contributions to Insurance Economics 307, 321 (Georges Dionne ed., 1992) ("A principal conclusion emerging from surveys of actuaries and underwriters is that they will add an ambiguity premium in pricing a given risk whenever there is uncertainty regarding either the probability or losses."). The effect of uncertainty is reflected in investment strategy as well. Investors demand high returns on risky investments. See Zvi Bodie et al., Essentials of Investments 114 (2d ed. 1995). The "risk premium" (the amount of expected return in excess of the amount that could be earned on risk-free securities) must be sufficiently high to justify the risk taken by the investor. See *id.* at 113-14. In other words, investors require compensation for uncertainty about the actual rate of return in the form of higher expected returns. The real estate market, by requiring some form of compensation to face the uncertainty associated with the health effects of EMFs, is acting just as any other market does in the face of uncertainty.

Application of the majority rule requires the utility to fully compensate the property owner for damages caused by the condemnation. As the following discussion demonstrates, however, it ultimately achieves only a transfer of wealth from electricity consumers to the affected landowner. This is a result of the cost-of-service regulatory scheme and the rate-setting procedures employed by public utility commissions.

3. *Public Utilities' Rate-Setting Procedures*

Absent rate regulation, utility companies would be able to exact "monopoly prices" for their services.⁵⁰ Moreover, as electricity is considered a "necessity," consumer demand is relatively inelastic. That is, regardless of the good's price, consumers will demand approximately the same amount.⁵¹ Therefore, without rate regulation, the utility could charge relatively high prices without having to endure a corresponding reduction in demand. Consumers would then be forced to pay the monopoly price for electricity or have no electricity at all.

To guard against potential exploitation of this monopoly status, states require that utilities submit to price regulation by the public utility commission.⁵² This process, referred to as "cost-of-service ratemaking," requires the public utility commission to set a "just and reasonable" rate for service. To determine the "just and reasonable" rate that the utility may charge, the public utility commission follows a uniform procedure. First, it determines the utility's "cost of service" for a particular year.⁵³ It selects a recent representative year and computes the utility's total cost of service.⁵⁴ Included in this total cost are

⁵⁰ Utilities are generally not subject to competition within their regions because the government regulates entry to the industry. When a utility is granted entry, it becomes a state-sanctioned monopoly, and the state protects the utility from competition. A monopolist would normally have the ability to set prices higher than it would if it were subject to competition. See Thomas D. Morgan, *Economic Regulation of Business* 213 (1976). Rate regulation purports to combat this possibility by attempting to set prices at a level close to those that would be realized in a competitive marketplace. See *id.*

⁵¹ See Robert S. Pindyck & Daniel L. Rubinfeld, *Microeconomics* 109 (3d ed. 1995) ("When demand is inelastic . . . the quantity demanded is relatively unresponsive to changes in price.").

⁵² All 50 states and the District of Columbia have public utility commissions with jurisdiction over electric utilities. See Phillips, *supra* note 7, at 133. Although their authority differs from jurisdiction to jurisdiction, most commissions have broad legislative grants of power, allowing for significant discretion. See *id.* at 147. Most importantly, the majority of commissions have the authority "to require prior authorization of rate changes, to suspend proposed rate changes, to prescribe interim rates and to initiate rate investigations." *Id.* at 136.

⁵³ See Richard A. Posner, *An Economic Analysis of Law* 347 (4th ed. 1992).

⁵⁴ See *id.*

"operating costs," which include the cost of condemnation awards.⁵⁵ To this total cost of providing service is added a "reasonable return on invested capital."⁵⁶ The cost-of-service amount plus the amount of return equals the firm's "revenue requirements"—the total amount the company will be allowed to make for that year.⁵⁷

Condemnation awards, as operating costs, are recovered by utilities through rate increases. In effect, what the utility pays the landowner to compensate for the decrease in value of her property, it later recoups from consumers via higher rates. Thus, condemnation awards are effectively a transfer of wealth: from electricity consumers to aggrieved landowners.

The utility's ability to pass on 100% of the cost of damage awards to consumers is unique. In a competitive market an increase in cost will be borne by the producer, except to the extent it can pass on some of the cost to the consumer.⁵⁸ Consider the effect of imposing a specific tax of one dollar per unit sold. Each unit thus effectively costs one dollar more to produce, shifting the entire supply curve upward by one dollar. This shift will cause the market price to rise until it reaches the point where supply and demand become equal. Where demand is elastic, the increase in price will always be less than the increase in cost.⁵⁹ In the electric power market, however, where supply is elastic and demand is relatively inelastic, consumers will bear the majority of an increase in cost.⁶⁰ Only a relatively large increase

⁵⁵ See Lisa M. Bogardus, *Recovery and Allocation of Electromagnetic Field Mitigation Costs in Electric Utility Rates*, 62 *Fordham L. Rev.* 1705, 1725 (1994). "Operating costs" also include the legal fees incurred defending and challenging condemnation awards. See *id.*

⁵⁶ [A "reasonable return" is] determined by multiplying the company's rate base—an estimate of the value of the capital assets used by the company to render the regulated service—by the company's reasonable rate of return. The latter is a weighted average of the long-term interest rate plus the rate of return to the equity shareholders that the agency considers appropriate in light of the risk of the investment and the rate of return enjoyed by shareholders in comparable firms.

Posner, *supra* note 53, at 347.

⁵⁷ See *id.* This entire process is represented by the following equation: $R = O + (V - D)r$, where R is the total revenue the utility may earn, O represents operating costs, V is the value of tangible and intangible property, D is accrued depreciation on tangible and reproducible property, and r is the allowed rate of return. See Phillips, *supra* note 7, at 177.

⁵⁸ See Pindyck & Rubinfeld, *supra* note 51, at 305 (noting share of cost borne by consumers "depends on the shapes of the supply and demand curves, and in particular on the relative elasticities of supply and demand").

⁵⁹ See Richard Craswell, *Passing on the Costs of Legal Rules: Efficiency and Distribution in Buyer-Seller Relationships*, 43 *Stan. L. Rev.* 361, 366-67 (1991) (examining the relationship between elasticity of demand and ability to pass on costs).

⁶⁰ See *id.*

in price would significantly affect demand.⁶¹ Thus, the producer is able to increase price without a significant decrease in demand and will elect to do so, thereby passing on most of the increased costs to consumers.

This would be the result if electric utilities were granted monopoly status and allowed to set rates according to market forces. To safeguard against such abuse of power, the regulatory process attempts to simulate a competitive market. However, because rates are based on the amount needed to adequately cover operating costs and ensure a reasonable rate of return, utilities are able to pass on to the consumer all of the increased costs associated with consequential damages. Therefore, no "sharing" of costs occurs under this system; the utility is able to recover the entire amount of damages paid to landowners.⁶²

In summary, EMFs emanate from power transmission and distribution lines. Although the scientific evidence regarding the effect of EMFs is inconclusive, some studies suggest that exposure to EMFs may result in an increased risk of cancer. This uncertainty about the health effects of EMFs impacts landowners and utilities in the eminent domain context. When an electric utility condemns a strip of land to install a power line, it must pay just compensation to the landowner. Some landowners have successfully asserted that these condemnation awards should include compensation for the decrease in value of the remainder property due to the public's fear of EMFs. The rate-setting formulas used by public utility commissions ensure that the utility will recover, through rates, the cost of all condemnation awards paid out. Therefore, the utility has no incentive to minimize the costs associated with these condemnation awards. Part II explains the importance of efficiency and suggests two regulatory strategies that, when combined with the imposition of condemnation awards, will encourage the utility to make efficient decisions regarding this issue.

II EFFICIENCY PROPOSAL

The present regulatory system does not encourage utilities to act efficiently. Under the present system a utility is able to make inefficient decisions leading to increased costs—costs that are then reimbursed by the consumer. To ensure that consumers are not held captive to such abuse, the present regulatory system must be altered.

⁶¹ See *id.*

⁶² See Murray, *supra* note 13, at 183-84 (contrasting utility sector with private business sector regarding ability to pass on costs from EMF liability).

A. *Efficiency Ought to Matter*

In a competitive market consumers would be able to shop around for the lowest-cost electricity.⁶³ Electricity providers would need to minimize costs to remain competitive in such a market because consumers would purchase electricity from the supplier that offered the maximum benefits at the lowest cost.⁶⁴ The market thus provides the incentive for efficiency—the firms that can maximize benefits at the lowest cost are rewarded by high consumer demand. The desire to sell the product is sufficient to encourage the manufacturer to make efficient choices.

Regulation attempts to simulate, as closely as possible, the outcome that would be reached in a perfectly competitive market.⁶⁵ Because the outcome in a perfectly competitive market is by definition efficient, this is just another way of saying that regulators are striving for efficiency. Thus, although utilities are regulated monopolies, efficiency concerns remain important.⁶⁶ Efficiency is valuable in the public utility context for the same reasons it is lauded elsewhere—it maximizes benefits while minimizing costs.

Unfortunately, the current regulatory system is not an effective way to simulate competition and achieve efficient outcomes.⁶⁷ One reason for this is that public utility commissions are unable to access and internalize the vast amount of information necessary to make effi-

⁶³ "Cost" is not necessarily equivalent to retail price. The term "cost" encompasses all of the costs associated with a product that would be borne by the consumer. For an example of the kinds of considerations that enter into the calculation of full cost, see Mark Geistfeld, *The Political Economy of Neocontractual Proposals for Products Liability Reform*, 72 *Tex. L. Rev.* 803, 809-10 (1994).

⁶⁴ This assumes that consumers are perfectly informed and can make accurate determinations regarding the full cost associated with the product.

⁶⁵ See Phillips, *supra* note 7, at 173 (noting that "regulation is a substitute for competition and should attempt to put the utility sector under the same restraints competition places on the industrial sector").

⁶⁶ In fact, efficiency concerns motivate the just compensation requirement underlying the system of eminent domain. We require the government, or in this case a quasi-public entity, to pay just compensation to ensure that private property is taken only when it is efficient to do so. If a utility could take land without compensating the landowner, that power would likely be abused. See Posner, *supra* note 53, at 58 ("[The requirement of just compensation] prevents the government from overusing the taking power. If there were no such requirement, the government would have an incentive to substitute land for other inputs that were socially cheaper but more costly to the government."); William A. Fischel & Perry Shapiro, *Takings, Insurance, and Michelman: Comments on Economic Interpretations of "Just Compensation" Law*, 17 *J. Legal Stud.* 269, 269-70 (1988) ("The compensation requirement thus serves the dual purpose of offering a substantial measure of protection to private entitlements, while disciplining the power of the state, which would otherwise overexpand unless made to pay for the resources that it consumes.").

⁶⁷ See Morgan, *supra* note 50, at 213 ("Realistically . . . regulation cannot reproduce the structure of incentives for quality, efficiency, or price which are created by competition.").

cient decisions.⁶⁸ Additionally, because public utility commissions generally allow utilities to recoup all "reasonable" costs,⁶⁹ utilities are not under the same kinds of constraints as firms subject to competition.⁷⁰

One function of this latter feature of utility regulation was explored in Part I.B.3. Utilities can pass on costs to consumers, and therefore they lack sufficient incentive to minimize their costs.⁷¹ In the EMF scenario, this means that utility companies presently do not have to internalize the effect of the uncertainty surrounding EMFs because the consequential damages paid out to landowners represent operating costs and can be recouped by the utility through increased rates.⁷² The current regulatory approach to the uncertainty surrounding the effects of EMFs therefore does not encourage efficiency. As a result, consumers may be shouldering unnecessary and inflated costs. To protect the consumer from such unnecessary costs, the regulatory procedures must be altered in a way that encourages utilities to minimize the costs associated with the uncertainty surrounding the effects of EMFs.

B. Proposal: Methods of Encouraging Efficiency

Two potential regulatory approaches address the result of uncertainty surrounding the effects of EMFs. Under one approach, the state public utility commissions would undertake the efficiency analysis and determine which option—continuing to pay out consequential damages or attempting to resolve the uncertainty—is the most cost effective. After making this determination, the commission would require the utility to pursue the most cost-effective option. The other

⁶⁸ See Lee Loevinger, *Regulation and Competition as Alternatives*, 11 *Antitrust Bull.* 101, 125 (1966) ("The difficulty is that no regulatory agency can acquire or utilize effectively the range of data which influence a competitive market.").

⁶⁹ See Phillips, *supra* note 7, at 258.

⁷⁰ Although public utility commissions attempt to simulate the constraints of competition by requiring that expenditures be reasonable and necessary, see *id.*, most commentators agree that this system fails to reproduce adequately the competitive environment. See Morgan, *supra* note 50, at 213.

⁷¹ See Young, *supra* note 24, at 180 (noting that "utility has little incentive to dispute the amount of money it must pay for a right of way since that cost will simply be passed on to ratcpayers"). Admittedly, once a new rate is set, the utility has an incentive to minimize costs for that year in order to achieve the highest allowable rate of return. Yet in contrast to the normal market situation where price determines demand, utilities need not be concerned with the amount rates will increase due to the damage awards. Consumers' demand for electricity is inelastic—they will purchase it regardless of price. Thus, although the utility may have a short-term incentive to minimize costs, it does not face the same market constraints as other producers.

⁷² See Bogardus, *supra* note 55, at 1725 (noting that utilities can generally recover ancillary costs through increase of rates).

approach requires the state public utility commissions to deny utilities recovery through rates for EMF damage awards. The effect of the uncertainty would thus be borne by the utility company, encouraging the utility to determine the most cost-effective way of addressing it.⁷³

1. *Analysis and Resolution by the Public Utility Commission*

As noted above, one way to achieve efficiency is to require the state public utility commission to determine the most cost-effective way to deal with the uncertainty surrounding EMFs. If the commission concludes that the most efficient strategy is to continue to pay out damages until some other body resolves the causation question, it need not require any action from utilities. If the commission instead determines that the most cost-effective option is to resolve the causation question, it can mandate an appropriate amount of money to be spent on research, adjusting rates accordingly.

Several difficulties undermine the feasibility of this option. The success of this strategy depends on the commission's ability to make an efficiency analysis and to mandate funding if the commission determines it is cost justified. Addressing the efficiency question requires a significant amount of information about the costs involved in studying the problem, as well as the costs involved with continuing to pay out consequential damages.⁷⁴ Although public utility commissions deal regularly with electric utilities, they may not be in the best position to acquire this information. Furthermore, even with access to such information, they might not have the resources to undertake such an endeavor.⁷⁵ In addition, because each public utility commission is limited by its statutorily granted powers, all commissions may not have the power to address the problem in this manner.

Historically, utility commissions that have addressed the uncertainty about EMFs have not followed this approach. Some placed moratoriums on construction of new power lines, enforced EMF limits on new constructions, or suggested a policy of "prudent avoidance."⁷⁶

⁷³ It has been suggested that denial of cost recovery by public utility commissions will not affect behavior. For an outline of this argument and this Note's response, see *infra* Part II.B.2.c.

⁷⁴ For an in-depth consideration of this analysis, see *infra* text accompanying notes 94-100.

⁷⁵ Utility commissions already have difficulty performing their current responsibilities. See Phillips, *supra* note 7, at 140. The regulatory process is time consuming and plagued with delays caused by the increasing volume and complexity of the work of the commissions, inadequate budgets, lack of defined standards and policies, ineffective personnel, and bureaucratic inertia. See *id.* at 879. Adding to the responsibilities of the commissions may only exacerbate these problems.

⁷⁶ See Bogardus, *supra* note 55, at 1711-19 (examining different approaches). "Prudent avoidance" is defined as an approach that "look[s] systematically for strategies which can

These actions responded to public concern about the health effects of EMFs but failed to address the problem of the decline in property value associated with the uncertainty.

The plausibility of this strategy turns on the power and efficacy of the state utility commission. Skepticism about the power of the commission, or its ability to appropriately conduct an efficiency analysis, suggests that the alternative of leaving the analysis to the utilities themselves is preferred.

2. *Analysis and Resolution by the Utility: Incentive for Efficiency Through Cost Internalization*

When setting rates, utility commissions habitually review the claimed operating costs submitted by the utility.⁷⁷ Utility commissions have the discretion to disallow recovery of an operating expense through rates.⁷⁸ If public utility commissions do not allow utilities to pass on to consumers the expenses resulting from the fear of EMFs, the utility will bear these expenses directly.⁷⁹ The utility will internal-

keep people out of 60 Hz fields arising from all sources but only adopt[s] those which look to be 'prudent' investments given their cost and our current level of scientific understanding about possible risks." *Id.* at 1712 (quoting Office of Technology Assessment, U.S. Congress, *Biological Effects of Power Frequency Electric and Magnetic Fields—Background Paper*, OTA-BP-E-53, at 77 (Washington, D.C., U.S. Gov't Printing Office, May 1989)).

Some commentators have criticized these approaches. A moratorium on construction appears to be an overreaction to inconclusive evidence. See Vukelic, *supra* note 24, at 115 ("[P]utting moratoria on the construction of new lines . . . is premature and overaggressive."). Since a relationship between amount of exposure and effect has not been confirmed by the research currently available, EMF strength limits would be arbitrary. See Young, *supra* note 24, at 182 ("[F]ield strength limits are basically worthless. . . . [I]f there are any hazards associated with exposure to E[M]F fields, there is no reason to believe that field strengths within the regulatory limits are any safer than stronger or weaker fields."). The same objection applies to prudent-avoidance strategies; until we have more information, we do not know what we should be prudently avoiding. See Murray, *supra* note 13, at 208-09 (summarizing arguments against prudent-avoidance approach). Most commentators agree, however, that this strategy is the lesser of the possible evils. See, e.g., Vukelic, *supra* note 24, at 118 (determining that "prudent avoidance approach is the most logical response to the EMF problem, given current uncertainties").

⁷⁷ See Bogardus, *supra* note 55, at 1722 (noting that these expenses are reviewed because utilities "pass these expenses directly on to ratepayers").

⁷⁸ See Phillips, *supra* note 7, at 258 (noting that utilities cannot "spend freely and expect all expenditures to be included as allowable operating expenses"). Most public utility commissions have statutorily granted discretion in ascertaining which expenses may be included as operating costs. See, e.g., Tex. Rev. Civ. Stat. Ann. art. 1446c, § 41(c)(3) (West 1980) (authorizing public utility commission to "promulgate reasonable rules and regulations with respect to the allowance or disallowance of certain expenses for ratemaking purposes").

⁷⁹ See Phillips, *supra* note 7, at 260 (noting that public utility commission may "refus[e] to permit a utility to charge a particular expense to operating expenses. In so doing, the expense is charged to investors.").

ize the costs, giving it an incentive to engage in an efficiency analysis and minimize costs.⁸⁰

At least one public utility commission has recognized that requiring a utility to bear costs provided an incentive to act efficiently. In *In re City Gas Co.*,⁸¹ the Florida Public Service Commission refused to consider \$53,856 of overtime pay as operating expenses because the Commission did not believe that the company was trying to minimize its costs.⁸² The Commission stated: "Regulated utilities should be encouraged to control cost. If the Company does not have the incentive to control cost, then the Commission should provide the incentive."⁸³ This is exactly what requiring internalization of EMF-related damage awards would do.⁸⁴

Under this regulatory strategy, the incentive may flow through one of two channels: through EMF tort damages or through consequential damages after condemnation.⁸⁵ As the following discussion will demonstrate, tort law has not provided landowners with an avenue for recovery; thus, the incentive most likely would come from the condemnation cases involving consequential damages for lost property value due to the public's fear of EMFs.

a. Recovery Through Tort for EMF-Related Damages. To date, no plaintiff has recovered under the tort doctrines of nuisance, trespass, or products liability for EMF-related damages.⁸⁶ Alleged damages from EMFs do not fit into the doctrines as presently applied.⁸⁷

⁸⁰ For the opposing view that cost internalization will not affect utility behavior, and his Note's response, see *infra* Part II.B.2.c.

⁸¹ 120 Pub. Util. Rep. 4th (PUR) 319 (Fla. Pub. Serv. Comm'n 1991).

⁸² See *id.* at 328.

⁸³ *Id.*

⁸⁴ A policy adopted by many public utility commissions also reflects this strategy. This policy requires utility companies and consumers to "share" the expense of bringing rate cases before the commissions as an incentive to minimize the time and expense dedicated to such cases. See, e.g., *id.* at 325-26 ("Commission policy is to remove unamortized rate case expense from working capital thus reducing rate base and the allowable return on that rate base. The objective of this policy is to effect a sharing of costs between ratepayers and stockholders This sharing of costs is supposed to provide an incentive for the Company to minimize rate case expenses." (citations omitted)).

⁸⁵ Under this system, the utility will be unable to recover the cost of EMF-related damages. Direct damages from condemnation, as well as consequential damages that do not involve damages from EMFs, will continue to be classified as operating costs and will be eligible for recovery through increased rates.

⁸⁶ For a review of tort theories that may be applicable in the EMF context, see Roy A. Torres, *Causes of Action for EMF Harm*, 5 *Fordham Envtl. L.J.* 403 (1994); Depew, *supra* note 16, at 449-56; Philip S. McCune, Note, *The Power Line Health Controversy: Legal Problems and Proposals for Reform*, 24 *U. Mich. J.L. Ref.* 429, 444-58 (1991).

⁸⁷ See Depew, *supra* note 16, at 482 ("Traditional tort causes of action are not well suited to the EMF context.").

For instance, in order for a landowner to prevail on a nuisance claim, she must show that the defendant's actions have interfered with her right to use and enjoy her property.⁸⁸ A landowner may experience

difficulties establishing a prima facie case because EMFs do not, at least in the traditional sense, interfere with the use and enjoyment of property. Additionally, difficulties may arise in proving that the defendant utility acted unreasonably.⁸⁹ For a trespass claim, the plaintiff must show "an actionable invasion of land."⁹⁰ Although courts have upheld an action for trespass when a defendant caused particles or gasses to enter the plaintiff's property,⁹¹ courts may not be willing to extend trespass to include EMFs. The fact that most jurisdictions hold that, until electricity passes through the customer's meter, it is a service and not a product poses a major obstacle for a products liability cause of action.⁹² Thus, electricity is not a product when it surges through power lines and emits EMFs. Consequently, strict products liability claims are inapplicable.⁹³

If property owners lacked an alternate cause of action, an expansion of tort doctrine might be necessary to compensate landowners and provide utilities with an incentive to minimize costs. However, the just compensation requirement affords landowners a legitimate and recognized means of recovery and satisfies the efficiency objective.

b. Eminent Domain Law: The Established Alternative. If public utility commissions require utilities to internalize the cost of EMF-related consequential damages in condemnation actions, the utilities will have an incentive to minimize these costs. These costs are a result of the uncertainty surrounding the health effects of EMFs.⁹⁴ To determine the most efficient course of action, the utility must weigh the cost of resolving this uncertainty⁹⁵ against the cost of continuing to pay out damages resulting from the uncertainty.

⁸⁸ See Restatement (Second) of Torts § 822 (1977).

⁸⁹ See Depew, *supra* note 16, at 455.

⁹⁰ *Martin v. Reynolds Metals Co.*, 342 P.2d 790, 792 (Or. 1959).

⁹¹ See *id.*

⁹² See Mark S. Atterberry, Comment, The Strict Liability of Power Companies for Cancer Caused by Electromagnetic Fields, 19 S. Ill. U. L.J. 359, 363 (1995) (noting that courts consider electricity a product only when utility has relinquished exclusive control).

⁹³ In addition, strict products liability actions are not available when the only injury claimed is economic loss. See *East River Steamship Corp. v. Transamerica Delaval*, 476 U.S. 858, 876 (1986) (applying this principle in admiralty context).

⁹⁴ See *supra* Part I.B.

⁹⁵ This proposal assumes that public utility commissions will require utility companies to internalize the cost of studies to determine the effects of EMFs.

This analysis necessarily includes a consideration of many factors that contribute to the cost of either alternative. For instance, the cost of accepting the uncertainty includes not only the actual damage awards, but also the legal fees involved in defending the cases. These litigation expenses can be staggering. One source reports that EMF-related legal expenses cost the New York Power Authority approximately \$1.5 million in fees and expert witness expenses in a single trial.⁹⁶ If utilities elect not to address the causation question themselves, they will continue to incur these costs until some other agency resolves the issue.⁹⁷

On the other hand, resolving the causation question will most likely necessitate a large-scale research project, requiring several years and large amounts of funding. As between the utility, the landowner, and the consumer, however, the utility is clearly in the best position to conduct, or at least fund, the appropriate research. Furthermore, the actual cost to any one utility company could be minimized by a joint study. If each electric utility company contributed to a research fund, perhaps in proportion to its market share, a vast sum of money could be generated. This money could fund a large-scale research project that would be more cost effective than independent research performed by the individual companies. Although most utilities are already spending money on EMF research programs,⁹⁸ the most effective research would result from a coordinated national program. If utilities are forced to absorb the costs associated with the fear of EMFs, they may be more likely to participate in a collective effort to

⁹⁶ See Michael Freeman, *The Courts and Electromagnetic Fields*, Pub. Util. Fort., July 19, 1990, at 20, 21.

⁹⁷ This may take 10 to 15 years. See *id.* at 22. If research reveals that EMFs cause no adverse health effects, a rational market will respond and property will no longer lose value due to fear of EMFs. On the other hand, if research establishes that EMFs are detrimental to one's health, then the utility potentially will be liable for significant property and personal injury damages. The burden of shouldering such costs might force the utility out of the industry. As electricity is a necessary and socially useful product, it would be unwise to force utilities to leave the industry. Therefore, once the uncertainty is resolved, the utility should be allowed to pass on costs associated with EMFs.

If utilities become aware of any health effects associated with EMFs, they would be required to exercise reasonable care to protect the public from these effects. Taking reasonable care may require shielding or burying the wires, or reconfiguring the distribution of power to minimize EMFs. These measures require significant expenditures. The increased costs that may be associated with providing safe electricity are equivalent to the "safety premium" consumers pay for airbags in cars, shields on power saws, etc. Expecting the consumers to pay for such safety features, just as they do for other products, is justifiable.

⁹⁸ See Bogardus, *supra* note 55, at 1726 ("Almost every utility spends some money on EMF research, both through membership in either electric trade organizations, such as the Edison Electric Institute (EEI) or the Electric Power Research Institute (EPRI), or as part of its own independent research.").

resolve the uncertainty.⁹⁹ At the least, utilities will have an incentive to determine and implement the most cost-efficient strategy.

The question of which alternative is most cost effective—accepting or resolving the uncertainty—is an empirical matter. A utility may find that the cost of research outweighs the costs associated with “fear-of-EMF” property damages. In this case, the utility would choose to continue paying consequential damages until some other agency resolves the causation question. Conversely, if the value of resolving the uncertainty outweighs the cost of acquiring the information, the most cost-effective strategy would be for the utility to undertake a research program designed to resolve the uncertainty.¹⁰⁰

In summary, not allowing utilities to pass on to consumers the cost of EMF-related damages requires the utility to recognize the effect of the uncertainty. A self-interested utility would choose to minimize the cost associated with this effect—a choice that requires a determination of the most cost-efficient strategy to deal with the uncertainty. The utility may choose to continue to pay out damages, or it may decide to fund research to resolve the uncertainty. In either case, the utility would be making this decision based on efficiency considerations.

Each of these regulatory strategies—having the public utility commission make an efficiency analysis or requiring cost internalization by the utilities—will encourage efficiency. The current regulatory

⁹⁹ This analysis may present a free-rider problem. See Susan Rose-Ackerman, *Market-Share Allocations in Tort Law: Strengths and Weaknesses*, 19 J. Legal Stud. 739, 745 (1990) (discussing nature of free-rider problem). All electric companies use the same technology to produce and transmit electricity, and all power lines produce the same kind of EMFs. Thus, a company may choose not to fund research, believing that the other companies will address the problem. The “free-rider” company would reap the benefits of the research without having to pay for them.

There is some evidence within the industry that this would not be the response. Almost every utility devotes some funding to EMF research, see Bogardus, *supra* note 55, at 1726, suggesting that a collective project is possible. In fact, many utilities have engaged in just this kind of cooperative endeavor—the largest percentage of funding for EMF research has come from the Electric Power Research Institute, an organization funded solely by utilities. See Weiss, *supra* note 15, at 383.

¹⁰⁰ If the utility produces research that disproves the existence of harmful effects from EMFs, but the market does not respond by restoring property values to their previous levels, it means that there is something unsatisfactory about the research results. When the market is persuaded by the evidence, land values will go back up. Thus, we must assume that although “science cannot prove a negative,” at some point the number and quality of the studies will assure the scientific community and the public that no significant risk exists.

In a normal market situation, manufacturers might have an incentive to hide research results suggesting that EMFs are harmful. The structure outlined above, however, provides no such incentive to utilities. When the uncertainty is resolved, utilities should be eligible to pass EMF-related expenses on to consumers. Utilities, therefore, should have little interest, economically speaking, in the actual research results.

scheme, altered in one of these two ways, offers the best approach to compensation for lost market value due to the fear of EMFs.

c. *A Response to Criticisms.* One Supreme Court case has suggested that cost internalization will not affect a utility's total return on investment and, therefore, will not affect behavior. In *Duquesne Light Co. v. Barasch*,¹⁰¹ Chief Justice Rehnquist suggested that if certain assets were systematically excluded from the formulation of the rate base, the utility would become a riskier investment and the rate of return on investment would need to increase to attract future investors.¹⁰² Theoretically, the same result could follow from systematic exclusion of costs from the category of operating costs. Cost internalization, as the argument goes, would not affect behavior because exclusion of operating costs would necessitate an increased rate of return, and therefore total revenue would remain the same.

Although theoretically sound, this argument assumes perfect regulation—i.e., regulation that controls and accounts precisely for every variable. Regulation, however, is far from perfect.¹⁰³ Rate-setting procedures utilize information from the past and projections for the future to determine appropriate rates of return on investment.¹⁰⁴ Although the likelihood that all of the relevant information from the past will hold true in the future is minimal, public utility commissions tend to assume that past conditions will continue.¹⁰⁵ Thus, the information on which the rate of return is based is necessarily imprecise. As a result, a direct correlation does not exist between each cost disallowed and an increase in rate of return. Although it is conceivable

¹⁰¹ 488 U.S. 299 (1989).

¹⁰² See *id.* at 310-12, 310 n.7.

¹⁰³ See Conference, Harvard Electricity Policy Group: Regulatory Decisionmaking Reform, 8 Admin. L.J. Am. U. 789, 833 (1995) (quoting Hon. Stephen Breyer describing cost-of-service ratemaking as "a terrible system," and "a system that does not work perfectly"); see also Phillips, *supra* note 7, at 382 (noting that people "familiar with the actual practice of American rate regulation need no reminder about the uncertain relationship between the supposed 'principles' of rate-of-return determination . . . and the considerations that actually lead commissions to allow whatever rates of return they do allow in specific cases. . . . [S]ome of the decisions lead one to suspect that the commissions have first reached a conclusion as to reasonable revenue requirements in terms of dollars per annum and then have proceeded to translate these requirements into whatever combination of a rate base and a percentage rate of return will be likely to pass muster with the appellate courts or with public sentiment." (first alteration in original) (quoting James C. Bonbright, *Principles of Public Utility Rates* 281 (1961))).

¹⁰⁴ See *supra* notes 53-57 and accompanying text.

¹⁰⁵ See, e.g., Morgan, *supra* note 50, at 214 ("[C]ommissions have been hesitant to make future forecasts of consumer demand, often preferring instead to assume that the test period demand conditions will hold in the immediate future." (quoting C.F. Phillips, *The Economics of Regulation* 136-37 (1969))).

that some increase in rate of return may be granted, the utility cannot be confident that it will in fact be compensated for all of its increased costs. Rate setting is an imprecise and unpredictable process, and utilities cannot rely on it alone to compensate for inefficient decisions. Thus, because the utilities are not guaranteed recovery through an increased rate of return for all disallowed costs, such disallowance is likely to have some effect on the utilities' behavior.

On the other hand, because courts generally do not isolate the precise amount of damages awarded for EMF-related claims, it is possible that such damages are *de minimis*. If such is the case, disallowing these costs would not serve as an adequate incentive for the utility to minimize these costs.

There is, however, some reason to believe that the costs associated with EMF damage awards and litigation are significant. One commentator reports that a New York utility spent "two million dollars on attorneys and expert witnesses fees in defending against 140 landowners who claimed \$117 million in property devaluation due to 'cancerphobia' associated with the lines."¹⁰⁶ Although utilities may generate upwards of \$700 million in net income each year,¹⁰⁷ fees and damage awards at this level should be significant enough to affect their behavior.¹⁰⁸

CONCLUSION

The uncertainty surrounding the health effects of EMFs results in a decrease in property value for land on which power lines are sited. A majority of courts allow landowners to recover for this diminution of property value. Although this appropriately compensates the landowner, it does not give the utility an incentive to address the issue underlying this decline in value—the uncertainty regarding the health effects of EMFs.

To encourage efficient behavior regarding this issue, the regulatory scheme must be altered in one of two ways. Either the public utility commission should perform its own efficiency analysis and require that the utility implement the most cost-effective strategy for dealing with the uncertainty, or the commission should not allow the

¹⁰⁶ Bogardus, *supra* note 55, at 1726.

¹⁰⁷ See Consolidated Edison Co., 1994 Annual Report 31 (1995) (reporting \$734 million in net profits).

¹⁰⁸ Notably, Con Edison believed that the threat of EMF-related damages was significant enough to be included in its annual report. See *id.* at 40 (noting that several scientific studies have shown that EMFs may present health risks, disclosing its status as defendant in several suits alleging property damage, and acknowledging that developments in legal or public policy doctrines may have adverse affects on company).

utility to pass on to consumers the cost of EMF litigation and damages. Both alternatives would encourage the utility to make a cost-benefit analysis and choose the most cost-effective option for dealing with the uncertainty surrounding the effects of EMFs. Either approach encourages the utility to minimize its costs, thereby protecting consumers from unnecessary rate increases.

Q2 10% to 30% loss of Value
Q9 Stray Voltage → Horse Farms

Valuation Guidelines for Properties with Electric Transmission Lines

By: Kurt C. Kielisch, ASA, IFAS, SR/WA, R/W-AC

Before a discussion can be entered about the perception of electric transmission lines and their effect on property value, it is important to understand what a transmission line is and how it differs from a distribution line.

An electric *transmission* line is an electric line that transports electrical power from one substation to another. These lines are typically 100kV (kilovolts) or larger exceeding one mile in length¹, have large wood or steel support towers over 45ft in height, and often have more than one set of wires (3 wires per circuit plus the static wire). Electric transmission lines do not directly serve electric utility customers: their power is distributed from distribution point to distribution point. Transmission line wires are not insulated and are "bare". Typically, they constructed to have at least 20ft of clearance between the ground elevation and wire at low sag.

An electric *distribution* line is a power line that transports electricity from the substation to the electric utility customers. These lines are of less voltage, typically under 65kV, carried on wood poles of 45ft in height or less and hold one pair of wires. The voltages of these lines are downgraded before the electricity is brought to the customer's residence or commercial building. The focus of this report is on "transmission" lines, not "distribution" lines

Perception = Value

The valuation of properties that have an electric transmission line requires an understanding of the basic principles of Market Value. Market Value is defined, in layman's terms, as the value a property would sell for at a given date considering an open market. (A complete definition of this term is included in the body of the appraisal report.) An open market assumes that the property is available for purchase by the public, being properly marketed for maximum exposure, and that the buyer is well informed, fully knowledgeable and acting in their best interest. Included in this definition is that the buyer has full knowledge of the pros and cons of the property, and then acts with that knowledge in a way that will benefit them. In other words, the value of the property is based on the perception of the buyer. Understanding that perception drives value is the foundation in analyzing the effect that electric transmission lines have on property value.

The key point of the Market Value definition, which gives guidance to answer the "impact" question, is the "willing buyer" part of the equation. In appraising a property the appraiser attempts to reflect the potential buyer of the subject property and estimate their action as to the subject property with all its advantages and disadvantages (knowledgeable buyer). To accurately reflect this buyer, the appraiser must determine the typical profile of such a buyer of the property in question. An example of this

¹ Wis. Stat. 196.491(1)(f)

would be a one bedroom condominium along a lake may indicate a typical buyer to be a retired couple who is looking for a recreational retreat for themselves and their guests. Another example would be a parcel with the best use being a dairy farm; the typical buyer would be a person either currently engaged in dairy farming looking to expand or relocate, or one who desires to enter into this field -- in either case a "dairy farmer." Such an analysis should be obvious, yet often overlooked when appraising properties.

For rural properties that are utilized for agricultural purposes, the most likely buyer would be one who: (1) prefers the rural lifestyle over the urban lifestyle; (2) typically generates their income from working in the agricultural field; (3) would be sensitive to environmental issues that affect the uses of the land and the view shed of the land; and (4) would be sensitive to health and safety issues relating to the land and its use.

It is most likely that such a person, when confronted with an electric transmission line traversing the property, would view such an improvement as aesthetically "ugly," potentially hazardous to their health, disruptive to rural lifestyle and potentially harmful to the use of the land for agricultural purposes.

Research Format

Our research into the impact of electric transmission lines followed several stages. The first was a "literature" study. This study involved investigating, collecting, indexing and reading many of the published articles, news stories and published transcripts relating to the topics of EMFs and stray voltage. Stray voltage was included in this research due to the concern dairy farmers have relating to its presence from high voltage power lines. This research resulted in over 2,500 pages of information collected and analyzed. The purpose of this study was to discover "what is the public's perception of high voltage transmission lines." Overall, the majority of the articles indicated a "fear" of these power lines, citing health concerns as the primary factor. Other concerns included stray voltage issues (mainly with rural publications) and aesthetics. It was clear that most of the information the public receives about these matters is negative. The literature study will follow these "guidelines."

The second part of our study involved researching studies completed on the effects on property value due to the presence of electric transmission lines. This included collecting many of the published research studies on this topic found in the public domain. Additionally, the study reviewed trade journals not available to the public, but available only to real estate professionals. Again, to be fair, some of the studies indicated that there was no measurable effect. However, there were a number of studies (mostly recent) that indicated there was a measurable effect and that effect ranged from a loss of 10% to over 30% of the overall property value. These studies included both improved and vacant land.

Empirical Studies

Below is a sampling of some studies we have reviewed regarding the impact that electric transmission lines have on land value and were utilized to formulate our opinion of value when a property is impacted by a high voltage transmission line.

- *Study of the Impact of a 345kV Electric Transmission Line in Clark County, Town of Hendren.*

(Appraisal Group One, Kurt C. Kielisch, 2006, revised 2009) This study was limited to Hendren Township, Clark County, and covered a five year time period from January 1st, 2002 to June 1st, 2006. This study included 22 land sales of agricultural and recreation land, of which 4 were encumbered with a 345kV electric transmission line having wood H-pole design, 60ft height and 150ft wide easement. The other 18 land sales were considered comparable to the power line encumbered sales. The conclusion of this study was that: (a) the land sales with an electric transmission line sold for 23% less than comparable land sales without a transmission line; and, (b) the more severe the location of the power line the greater was the loss of value.

- *An Impact Study of a 345kV Electric Transmission Line on Rural Property Value in Marathon County - Wisconsin.* (Appraisal Group One, Kurt C. Kielisch, 2006) This study focused on the impact a 345kV line, known as the Arrowhead-Weston line, had on property value. This power line was a 345kV electric transmission line, having steel single poles ranging in height from 110ft to 150ft, single and double circuit lines, having a 120ft wide easement. The study compared sales within a 2 year time period (January 1st, 2004 to December 31st, 2005) in Marathon County, Wisconsin, focusing the area to the Townships of Cassel and Mosinee. This study used 14 land sales, of which 5 were encumbered with the power line and 9 were not. A simple regression technique and matched pair analysis was used to extract the value impact. The study concluded with a finding that when the power line traversed the property along the edge, such as a back fence line, the loss was as low as -15%, and when it bisected a large parcel the loss was as high as -34%. The properties were all raw land sales with either agricultural or residential land use. -15%
to -34%
- *Transmission Lines and Property Values State of the Science* (Electric Power Research Institute [EPRI], 2003). This study completed by EPRI for the benefit of its electric utility clients reviewed the issue of property values being impacted by electric transmission lines by summarizing research they had on the subject. Essentially they concluded that the results are mixed, some cases showing a loss in value ranging from 7-15% with appraisers who had experience with valuing such properties, to having no effect. Interestingly, it appeared in their survey that appraisers who did not have experience valuing such properties tended to overrate the negative effects. 7% - 15%
- *American Transmission Company, Zone 4, Northeast Wisconsin - High Voltage Transmission Line Sales Study* (Rolling & Company, 2005). This study researched the impact that high voltage electrical transmission lines have on property value in the northeast Wisconsin area. They collected information on 682 land sales of which 78 involved lots near a transmission line corridor, but not directly encumbered by the transmission line. Their conclusions were: (a) easement lots sold at about 12% less than lots located over 200ft from the transmission lines; and (b) no clear impact on "proximity" lots those that lie within 200ft from the easement area but are not directly subject to the easement. -12%

- *Properties Near Power Lines and Valuation Issues: Condemnation or Inverse Condemnation* (David Bolton, MAI. Southwestern Legal Foundation. 1993). This study cites a number of studies that prove a loss of property value due to proximity to an electric transmission line and then cites his own study. His own study found that in the Houston area assessed values of properties that adjoined a power line easement had a 12.8% to 30.7% lower assessment than the average homes not on the line, but in the same area. He also found that: (1) many buyers refused to even look at such properties; (2) such properties took at least twice as long to sell; (3) some brokers said such properties can take three times longer and finally sell at a 25% loss of value; and (4) overall homes adjoining transmission line easements took six times longer to sell and experienced a 10% to 30% loss in value.

25% loss
+ 3x time
to sell
+

- *Power Line Perceptions: Their Impact on Value and Market Time* (Cheryl Mitteness and Dr Steve Mooney. ARES Annual Meeting paper. 1998) The authors interviewed homeowners on or near electric transmission lines and found: (1) that in relation to the average impact of overall property value, 33% said 2-3% loss and 50% said a 5% loss or greater; (2) nearly 66% said the power line negatively affected their property value; (3) 83% of real estate appraisers surveyed said the presence of the power lines negatively affected the property values, most saying the loss was 5% or greater.

10 to 30% loss
+ 6x longer
to sell

- *Analysis of Severance Damages* (James Sanders, SRA, 2007) This study completed an analysis of the impact of a transmission line through the middle of the Continental Ranch subdivision outside of the Tucson, Arizona area. This subdivision had a wood H-pole high voltage electric transmission line running through a portion of the subdivision. The author compared the residential lots abutting the easement to ones that were not. All lots abutting the easement were much bigger than the non-easement abutting lots. The author used improved properties for his study and by the use of regression analysis isolated many variables of value for an improved property to remove them from the analysis. In conclusion, through extensive use of the regression technique, the author finds an overall loss to the improved properties abutting the power line easement at -12%. This loss is attributed to both the land and improvements. However, the author notes that the lots are typically twice the size of the non-easement lots. When the size of lots was factored the overall loss to the land only was factored at -40%. It should be noted that the residences were at a distance from the power line.

-12%
Abutting the
Property

-40%

- *The Peggy Tierney property: A Comparative Study of the Impact of a 69kV Transmission Line v. 345kV/69kV Transmission Line* (Kurt C. Kielisch). This was a brief study on the impact difference, if any, between an existing 69kV transmission line and a new proposed 345kV and 69kV transmission line on the same property. The property was a 3.70 acre residential lake front improved property that had an existing 69kV transmission line crossing the west half of the parcel along the road and required the property owner to cross under the power line to enter the parcel. The 69kV line had an easement width of approximately 100ft, wood H-poles at 50-60ft in height. The new 345kV line was to be placed within the existing easement, more or less, would have 140ft monopoles and carries both a 345kV and 69kV line. The seller attempted to sell the property at its full list price after an experienced lake front home Realtor established the list price from a comparative sales analysis. The home eventually sold for 27% less than the list price and took longer to sell in a relatively strong lake front home market. The buyer cited the pending 345kV line as the principle reason for their low offer.

-27%

- A comparative sales analysis to isolate the percentage of loss a residential and/or agricultural

land use property suffers due to the presence of a high voltage electric transmission line (HVTL). This study was found in an appraisal completed by Aari K. Roberts for American Transmission Corporation (ATC) on the Herbert Bolz property located in the Town of Rubicon, Dodge County, Wisconsin. Mr. Roberts compared the sale of a rural agricultural 24 acre land parcel that had an HVTL crossing the property, to three comparable agricultural land sales of comparability that did not have a HVTL. His sales comparison study concluded that the property with a HVTL suffered a 29% loss of value due to the presence of the HVTL. This study was completed in September 2007.

29%

- A sales analysis of the property located at: N8602 CTH D, Town of Deer Creek, Outagamie County, Wisconsin. This is a single family home located on 3.19 acres in the rural area of Outagamie County. The home was a ranch style residence with 1,500sf GLA, attached 2-car garage, 8/3/2 room count, full basement and was in average condition overall. The property also had a 104ft x 52ft pole barn and two other outbuildings. There were two appraisals completed on this property, one by the condemnor (ATC) and one by the property owner. The average Before taking value of the two appraisals was \$221,000. The property was then improved with a 345kV & 138kV electric transmission line having 126ft pole height and was placed along the roadside reaching 68ft into the property. The edge of the easement was in less than 20ft to the residence, however the placement of the pole was as close to the roadway right-of-way as possible. The condemnor American Transmission Company (ATC) purchased the property and installed the transmission line. Then they upgraded the property with new paint, doors, sinks, dishwasher and flooring, plus cleaned the premises and outbuildings. ATC put the property on the market asking \$179,900 a number established by the appraiser for ATC as the After value. It was sold for \$128,500 10 months after ATC purchased it.

28.3%

The Before taking average value was \$221,000. The property was then improved and upgraded at an expense estimated to be \$8,000-\$10,000, then resold 10 months later with the transmission lines in place for \$92,500 less or 42% less. The only differences between the Before taking market value and After taking sale price were the transmission line and time. A review of the Outagamie County market between November 2008 and September 2009 shows only a small downward trend in rural residential property value, therefore the biggest part of the loss is attributed to the presence and near proximity of the transmission line that being 38%-40%.

42% loss

- *The Gene Laajala property: A Comparative Study of the Impact of a 161kV Transmission Line v. 345kV/161kV Transmission Line (Kurt C. Kielisch).* This was a brief sales study on the impact difference, between an existing 161kV transmission line and a new 345kV/161kV transmission line on the same property. The property was a 20 acre rural agricultural and residential property that had an existing 161kV transmission line bisecting the parcel along the east side. The 161kV line had an easement width of approximately 120ft, wood H-poles at 50ft± in height. This line was replaced with an upgraded easement comprised of 345kV/161kV line which was to be placed within the existing easement, more or less, and had (2) 110ft and (3) 120ft steel H-poles. The property was appraised in January 2007 with a Before condition value of \$204,500 using the Cost approach and \$185,500 using the Comparable Sale approach, by Ted Morgan, MAI. (The whole property appraised was 40 acres and the 20 acre parcel was portion out of this whole). The ATC appraiser did not appraise the home in the Before condition, but did conclude the Before taking land value was \$44,000 for 20 acres (using his \$2,200/acre conclusion for 40 acres) and the assessed value of the improvements were \$107,600, indicating a \$151,600 Before

value. The property sold and closed in October 2007 for \$120,000. The seller attributes the loss to the new power line, it being larger and more lines. The loss indicated was \$65,500 (using Morgan's Comparable Sales value) or \$31,600 (using ATC's land plus assessed improvement value), indicating a loss range of 35% to 21%.

35%
to 21%

- *An Impact Study of the Effect of High Voltage Power Lines on Rural Property Value in Southwestern Indiana* (Kurt C. Kielisch, Appraisal Group One, 2010). This study was based in southwest Indiana in Gibson County. It was focused on large agricultural land and the impact of a high voltage transmission lines (HVTL) varying in size from monopole to large steel lattice towers. The study included 32 land sales of which 10 were HVTL sales. The time period was January 1st, 2006 to December 31st, 2009. Adjustments were made for time, location and other utility easements (if any) and the results were graphed to compare the non-HVTL land sales to the HVTL land sales. The study concluded that the power lines negatively impacted the property with an impact range from -5% to -36% with the average impact being -20%.

5% to 36%
Avg = 20%

Other Value Issues

Another issue relating to the presence of the transmission line is potential for the creation of an "utility" corridor. Such a corridor is a where several utility transmission lines are placed, such as gas transmission pipelines and communication lines. Indeed, the State of Wisconsin made it a legislative rule that future placement of such utilities are to be given preference to "existing utility corridors."² An electric transmission line meets the definition in this statute as an existing corridor. This "corridor" concept continues to grow in the perception of the public as such rules become more commonly known. The reality of such an event happening is the placement of the Arrowhead-Weston Power line, which was often placed within an existing utility corridor such as an oil transmission pipeline, smaller electrical transmission lines or abandoned electric transmission line easements. The very power line that is the focus of this analysis is further proof of the corridor effect for it has been expanded, enlarged and added circuits within the existing easement.

Other factors to consider regarding the valuation of HVTL impacted rural properties are agricultural equipment concerns operating under and near the line, health issues of workers in close proximity of the lines, health concerns of farm animals in close proximity of the lines, stray voltage, the concerns of public in relation to electro-magnetic fields, safety issues regarding bare wires of the transmission line and other concerns addressed in the literature study to follow.

In conclusion, it can be stated with a high degree of certainty that there is a significant negative effect ranging from -10% to -30% of property value due to the presence of the high voltage electric transmission line. The actual loss depends on factors of land use, location of the power line and its size.

² Wis. Stats 1.12(6)(a).

Literature Study

HVTL Impacts on Rural and Agricultural Properties

Throughout the nation's rural communities, literature research suggests that the presence of an HVTL easement can have a noticeable impact on both the use and appeal of rural properties and farms. Common concerns include stray voltage, health risks to livestock and cattle, diminished livelihoods and heritage, limited land use, and lessened aesthetic appeal. As the following literature survey will show, many different issues play a role in shaping one's perception of the impact of HVTLs on rural property values.

Stray Voltage

To understand the potential impact of HVTLs on rural land, it's important to discuss a key component in many farmers' apprehension about HVTLs: stray voltage.

Stray voltage is the rural equivalent of the high-profile residential Electromagnetic Field (EMF) factor, but instead of fearing leukemia or brain cancer, farmers fear their animals will become unproductive, ill, and even die.

Whenever energy is transferred, some is lost along the way. If metal buildings are near leaking energy, they can act as a conduit for voltage to find its way to feeding systems, milking systems and stalls.

In their 1995 presentation, "Stray Voltage: The Wisconsin Experience," a team of researchers led by Mark Cook and Daniel Dascho stated that farmers most worry that stray voltage will increase somatic cell count in their animals, make cows nervous, reduce milk production, and increase clinical mastitis.³

"Few issues are more upsetting to dairymen than fighting case after case of clinical mastitis with more and more cows in the sick pen," writes Dr. Winston Ingalls. "It represents extra time to properly handle such cows, lost production, vet calls, treatment products, concern about contaminated milk and an occasional dead or culled cow."⁴

In Cook & Dascho's presentation, they discuss their findings from a non-random sampling study of farms with stray voltage complaints stemming from a nearby substation. Their research team found no significant relationship between cow contact current and distance from the substation or contact currents. However, they also noted that cow contact current depends on many physical factors from on-farm and off-farm electrical power systems. They say, "There are many confounding factors that may outweigh the impacts of stray voltage which makes it difficult to draw conclusions from field studies about its effects on production and animal health."⁵

3 Stray Voltage: The Wisconsin Experience. Written for presentation at the 1995 International Meeting by Mark A Cook, Daniel M Dascho, Richard Reines and Dr. Douglas J Reinemann.

4 Clinical Mastitis. Winston Ingalls, Ph.D. GoatConnection.com. August 2, 2003.

http://goatconnection.com/articles/publish/article_173.shtml

5 Stray Voltage: The Wisconsin Experience. Written for presentation at the 1995 International Meeting by Mark A Cook, Daniel M Dascho, Richard Reines and Dr. Douglas J Reinemann.

In a 2003 study prepared for the NRAES Stray Voltage and Dairy Farms Conference, a research team conducted by the University of Wisconsin-Madison and led by Dr. Douglas J Reinemann studied the effects of stray voltage on cows at four dairy farms over a two-week time period. He and his team found that after the first few days of exposure, cows quickly acclimated to the presence of stray voltage. They also found that stray voltage of 1mA had little effect on the immune system of a cow.⁶

Concerning EMF levels, they noted that “even though man-made signals were larger than the naturally occurring currents, levels are significantly lower than what is considered sufficient earth current strength to develop step potential anywhere near the Public Service Commission ‘level of concern.’”⁷

Stray voltage is usually undetectable by humans, and some researchers believe it occurs when electricity escapes a power line or wiring system and emits a secondary current. The problem intensifies with older barns that add automated electrical equipment, “raising ambient levels of current. Soon the cumulative effect of these secondary currents becomes harmful to cows.” Though stray voltage can be measured, experts don’t know how and why it happens or what conclusive effect (if any) it has on animals.⁸

Despite little concrete evidence, courts have compensated farmers for their losses due to stray voltage when all other factors are eliminated. In 1999 a jury awarded Peterson Bros. Dairy \$700,000 after deciding that stray voltage from an automated feeding system from Maddalena’s Dairy Equipment of Petaluma, California slashed the herd’s milk output and increased the cow’s death rate.⁹

The company’s defense attorney called stray voltage “junk science,” the Petersons’ claim of stray voltage in the milk barn a “harebrained theory” unsupported by electrical engineers, and blamed the herd’s health problems on the Petersons’ own mismanagement.¹⁰

In a similar case in Wisconsin in 2004, a dairy operation owned by George and Kathy Muth successfully sued Wisconsin Electric Power Co. (now We Energies) for negligence in the maintenance and operation of a distribution system on their farm. They claimed that the system led to stray voltage that injured and killed several of their dairy cows and damaged their milk production. The utility said that the levels of stray voltage were “extremely low” and were levels you could find anywhere.¹¹

6 Dairy Cow Response to the Electrical Environment: A Summary of Research conducted at the University of Wisconsin-Madison. Paper presented at the NRAES Stray Voltage and Dairy Farms Conference. Dr. Douglas J. Reinemann. April 2003.

7 Results of the University of Wisconsin Stray Voltage Earth-Current Measurement Experiment. A revised version of a report submitted to the State of Wisconsin Legislature on June 25, 2003. Written by David L. Alumbaugh and Dr. Louise Pellerin.

8 Jury gives \$700,000 to dairy farmers for losses blamed on “stray voltage.” Author Unknown. The Associated Press. April 21, 1999.

9 Ibid.

10 Ibid.

11 Power company negligent in dairy suit; Jury awards \$850,000 to couple over effect of stray voltage on cows. Lauria Lynch-German. Milwaukee Journal Sentinel. February 27, 2004.

The farmers said that shortly after moving to their new location, they faced low milk production, excessive illnesses, and deaths of cows.¹² The cows didn't walk right or act normal. They didn't want to go into the barn, inside, or into the stalls. The Muths examined everything from the animals' food to their bedding until consultants told them it could be stray voltage. In one year, they lost 15-18 cows and calves. Autopsies were inconclusive.¹³

After reviewing herd management and nutrition, they hired a consultant who detected stray voltage. Later that year the utility found no stray voltage problems. The farmers further consulted with veterinarians and tested and ruled out all the other factors except for stray voltage.¹⁴

The farmers hired an electrician to upgrade the farm's wiring, but it didn't decrease the stray voltage. After being asked, the utility made some other changes, but this also had no effect. Further consultants still found stray voltage from a conductor on the utility's distribution lines. A couple years later the utility removed a piece of underground electrical equipment and the herd immediately recovered...though the level of stray voltage remained the same.¹⁵

The utility's attorney stated that being able to measure something doesn't make it harmful. He cited several federal and state studies that say the current must be 2 milliamps or higher to adversely affect cattle and said no reading on their farm reached that level.¹⁶

The jury awarded the dairy farm \$850,000 in damages.¹⁷

Stray voltage fears aren't limited to dairy or cattle operations. Max Hempt, a horse farm owner in Pennsylvania, tried to oppose a proposed 9-mile 138kV HVTL because he feared that the line's EMFs caused by stray voltage could cause sterility and death among his horses.¹⁸

Though it's difficult to prove a significant presence of stray voltage, and even more difficult to prove a direct correlation between stray voltage and poor health, courts have awarded farmers sizable judgments to compensate them for damaging stray voltage from nearby power lines.

In 2002, one such case in Iowa made it to the state supreme court where the court upheld a \$700,000 judgment to a dairy farmer who argued that stray voltage from nearby power lines injured his herd. A substation sits less than a quarter mile from his farm. He said he often got electric shocks from the metal buildings on the farm. Also, he said his herd acted oddly, appearing frightened and refusing to enter barns. Milk production also suffered.¹⁹

12 Jury must decide in voltage complaint; Farm family says stray power harmed dairy herd. Lauria Lynch-German. Milwaukee Journal Sentinel. February 5, 2004.

13 Dairy farm owner testifies that stray voltage killed cows in his herd. Lauria Lynch-German. Milwaukee Journal Sentinel. February 10, 2004.

14 Jury must decide in voltage complaint; Farm family says stray power harmed dairy herd. Lauria Lynch-German. Milwaukee Journal Sentinel. February 5, 2004.

15 Ibid.

16 Ibid.

17 Power company negligent in dairy suit; Jury awards \$850,000 to couple over effect of stray voltage on cows. Lauria Lynch-German. Milwaukee Journal Sentinel. February 27, 2004.

18 Farmer Fears Stray Voltage From PP&L 138 kV Line Could Harm His Horses. Author Unknown. Northeast Power Report. June 24, 1994.

19 Court upholds stray voltage judgment. Mike Glover. The Associated Press. October 10, 2002.

The defendant, Interstate Power Co., said that “there’s an inherent risk to transmitting electricity” and it shouldn’t be vulnerable to such lawsuits unless they were negligent. The court ruled in favor of the dairy farmer, citing the lack of a statute exempting electric utilities from nuisance claims.²⁰

One year later the Wisconsin Supreme Court similarly found “that a utility can be held responsible for harming the health of a dairy herd with stray voltage even though state-recommended voltage tests did not find potentially damaging levels where the animals congregated.”²¹

As the preceding case studies show, courts have acknowledged stray voltage and its possible effects. However, to fully understand the apprehension surrounding power lines, one must examine the EMF debate and its fear factor.

EMFs and Fear

In 1990, the EMF debate was so prevalent that members of Congress passed a bill that would limit the public’s exposure to EMFs.²² A couple years later, in response to public concern about EMFs, Congress established the EMF-RAPID program in 1992. Its purpose was to coordinate and execute a limited research program to fill information gaps concerning the potential health effects of exposure to EMFs, to achieve credibility with the public that previous research has not earned, and to coordinate and unify federal agencies’ public messages about possible EMF effects.²³ The program originally was to receive \$65 million in funding, but total funding is expected to be \$46 million.²⁴

Several years later in 1999, the National Institute of Environmental Health Sciences studied the health effects of EMF exposure and found conflicting results. Though they concluded that the evidence is weak linking EMFs to health risks, they also found that the most common health risk was leukemia (mostly appearing in children). They also found a fairly consistent pattern of a small, increased risk of childhood leukemia with increasing exposure. The majority of the panel’s voting members voted to acknowledge EMFs as a possible human carcinogen. They concluded that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence.²⁵

In 2005, UK scientists conducted a case-control study on childhood cancer in relation to distance from high voltage power lines in England and Wales. They found an association between childhood leukemia and proximity of home address at birth to HVTLS. “The apparent risk extends to a greater distance than

20 Ibid.

21 **Utility liable for stray voltage, high court says.** Don Behm. Milwaukee Journal-Sentinel. June 26, 2003.

22 **Electric Powerlines: Health and Public Policy Implications** – Oversight Hearing before the Subcommittee on General Oversight and Investigations of the Committee on Interior and Insular Affairs House of Representatives, 101st Congress, second session on electric powerlines: health and public policy implications. March 8, 1990.

23 **Electric and Magnetic Fields Research Program** by Mr. Mukowski from the Committee on Energy and Natural Resources. 105th Congress, first session. June 12, 1997.

24 Ibid.

25 **NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields.** Released by the National Institute of Environmental Health Sciences on May 4, 1999.

would have been expected from previous studies" although they have yet to discover an "accepted biological mechanism" to explain their results.²⁶

Though an accepted biological mechanism remains elusive, an early nineties case made it possible to link loss of property value to a fear of EMFs. In the 1993 case, *Criscuola v. Power Authority of the State of New York*, the court found that, "there should be no requirement that the claimant must establish the reasonableness of a fear or perception of danger or of health risks from exposure to high voltage power lines" and "Whether the danger is a scientifically genuine or verifiable fact should be irrelevant to the central issue of its market value impact."²⁷

Utilities say that landowners should not be able to recover damages or injunctive relief "based on myth, superstition or fear about an alleged health risk that is not supported by substantial scientific or medical evidence."²⁸

With the EMF debate unresolved, and evidence for both sides of the argument, some communities are reluctant to approve new HVTLs...and may even legally oppose them.

In an effort to preempt public opposition, Public Service Enterprise Group offered hundreds of thousands of dollars to New Jersey towns opposing its proposed HVTL project if the towns dropped all opposition and didn't comment on the payments. Opponents called them "bribes." The utility called them "settlements" to help minimize impacts of the project on towns and residents.²⁹

Some towns accepted payment, but the majority did not. Either they said they didn't have enough time to respond to the offer, or they rejected them as payoffs. One of the opposing mayors, Mayor James Sandham of Montville, said it's not about the money; "It's about safety and property values."³⁰

HVTLs and Property Values

Fear can impact the public's buying habits. Residential homeowners' resistance to abutting HVTLs is well documented. Though homeowners may fear negative effects on their community and environment,³¹ their first point of opposition is usually safety, especially if there are many children in the neighborhood. Though the 1979 Wertheimer study linking EMFs to childhood leukemia has long been contested, supported, and contested again, the very existence of a debate about the safety of EMFs sows enough doubt in residents' minds to justify the fear.³² And that fear can influence the values of nearby homes.^{33 34 35 36}

26 Childhood cancer in relation to distance from high voltage power lines in England and Wales: a case-control study. Gerald Draper, Tim Vincent, Mary E Kroll, John Swanson. British Medical Journal (bmj.com). June 3, 2005.

27 'Criscuola' - The Sparks Are Still Flying. Michael Rikon. New York Law Journal. April 24, 1996.

28 High Court Hears Arguments Today on EMF Claims. Todd Woody. The Recorder. June 6, 1996.

29 Opponents of \$750M N.J. power line project argue towns were paid to drop opposition. Lawrence Ragonese. The Star-Ledger. January 31, 2010.

30 Ibid.

31 NY Power Line Opponents Win Court Fight. Associated Press. New York Post. February 20, 2009.

32 Lines in Sand and Sky. B.Z. Khasru. Fairfield County Business Journal. September 3, 2001. Vol. 40 Issue 36, p3, 2p.

33 Power line plan concerns metro residents. Melissa Maynarich. News 9 (Oklahoma). July 22, 2008.

When given the choice to purchase two identical homes, one with such health concerns and the other without, most buyers will choose the home without the concern,³⁷ forcing the homeowner to lower their price. Aesthetic impact can also influence a property's value. Many residents don't want to look at HVTLS,³⁸ something they consider to be an "eyesore."³⁹

One of the hardest properties to sell can be one encumbered by an HVTL. Unlike roadway proximity, its effect isn't readily noticeable or measurable. Though homes near HVTLS typically have larger lots (and that can be a benefit), the biggest disadvantage is the fear factor surrounding EMFs.⁴⁰

In the early nineties, when EMFs were just entering the public consciousness, it was difficult to find a measurable price difference between homes close to an HVTL and those that were not.⁴¹ However, two researchers (Hsiang-te Kung & Charles F Seagle) conducted a case study on the impact of power transmission lines on property values and found that such negligible results depended almost entirely on the public's ignorance of EMFs and their related issues. They also found that the amount of potential property loss increased dramatically the more homeowners were aware of the potential health impacts of EMFs.⁴²

The effect of HVTLS on property values has long been a matter of contention with many studies either proving a diminutive effect or none at all. Methodologies differ and different areas of the country register different results. Some markets (ex. high-end homes) are very sensitive to HVTLS whereas others (ex. low-end homes) hardly notice them. The size of the line and the pylons are also a factor. A 69kV power line will have less effect than will a 1,200kV power line. Distance from the easement also matters. Some studies combine homes thousands of feet from HVTLS with those directly encumbered. Research sponsors also may play a factor with many being funded by the utilities themselves.

For example, in a 2007 study funded by a utility, researchers Jennifer Pitts and Thomas Jackson conducted market interviews, literature research and empirical research and reported little (if any) impact of power lines on property values. However, they did note that there is an increasing recent opinion that proximity to power lines has a slight negative effect on property values.⁴³

34 **Power Line Worries Landowners.** Ben Fischer. The Wisconsin State Journal. June 3, 2006.

35 **Lines in Sand and Sky.** B.Z. Khasru. Fairfield County Business Journal. September 3, 2001. Vol. 40 Issue 36, p3, 2p.

36 **Commissioners voice opposition to transmission lines.** David Rupkalvis. The Graham Leader. February 9, 2010.

37 **Real Estate Agents on Property Value Declines.** 4 Realtor opinion letters submitted to residents in the Sunfish, MN area whose properties are being affected by an HVTL.

38 **Ibid.**

39 **Power line plan concerns metro residents.** Melissa Maynarich. News 9 (Oklahoma). July 22, 2008.

40 **High Voltage Transmission Lines, Electric and Magnetic Fields (EMF's) And How They Affect Real Estate Prices.** David Blockhus. January 3rd, 2008. <http://siliconvalleyrealestateinfo.com/electric-and-magnetic-fields-emfs-and-how-they-affect-real-estate-prices.html>

41 **Impact of power transmission lines on property values: A case study.** Hsiang-te Kung & Charles F Seagle. Appraisal Journal. Vol. 60, Issue 3, p.413, 6p. July 1992.

42 **Ibid.**

43 **Power lines and property values revisited.** Jennifer M. Pitts & Thomas O. Jackson. Appraisal Journal. Fall, 2007.

Two California appraisers, David Harding and Arthur Jimmy, published a rebuttal to the Pitts-Jackson study that disagreed with their methodology, took issue with their sponsor, addressed omitted information, and failure to conduct before-and-after cost comparisons.⁴⁴

Pitts and Jackson responded to the rebuttal and defended their methodology, saying they purposely limited their literature research to only include empirical, peer-reviewed articles from The Appraisal Journal and the American Real Estate Society journals. They acknowledged they conducted the research for "a litigation matter" but did not elaborate on their sponsor.⁴⁵

In a similar case, researchers James A Chalmers and Frank A Voorvaart published a large study spanning nearly 10 years and over 1,200 properties in which they found that an encumbering HVTL had only a small negative effect on the sale price of a residential home. In half of their samples they found consistent negative property values mostly limited to less than 10%, with most between 3%-6%.⁴⁶

They summarized their findings as showing "no evidence of systematic effects of either proximity or visibility of 345-kV (kilovolt) transmission lines on residential real estate values."⁴⁷

They did, however, say that "An opinion supporting HVTLs effects would have to be based on market data particular to the situation in question and could not be presumed or based on casual, anecdotal observation. It is fair to presume that the direction of the effect would in most circumstances be negative, but the existence of a measureable effect and the magnitude of such an effect can only be determined by empirical analysis of actual market transactions."⁴⁸

Appraiser Kerry M. Jorgensen disagreed with the authors' views that paired data analysis and retroactive appraisal were "too unrefined and too subjective to be of much value," and that only through objective statistics could the effect of HVTLs on property value be truly understood. He argued that relying too much on statistics can be dangerous as there could be problems with how the data is compiled and interpreted. For example, he points out that out of their set of 1,286 qualifying sales, only 78 (6%) are directly encumbered by a power line easement, and only 33 (2.6%) more are within 246 feet of a power line easement.⁴⁹

44 Comments on "Property Lines and Property Values Revisited." (Letter to the editor) David M. Harding & Arthur E. Jimmy & Thomas O. Jackson & Jennifer M. Pitts. Appraisal Journal. Winter, 2008.

<http://www.entrepreneur.com/tradejournals/article/176131510.html>

45 Ibid.

46 High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects. James A Chalmers and Frank A Voorvaart. The Appraisal Journal via the Appraisal Institute website. Volume 77, Issue 3; Summer, 2009; pages 227-246. Reposted by CostBenefit of the Environmental Valuation and Cost-Benefit News blog -

<http://www.envirovaluation.org/index.php/2009/11/09/high-voltage-transmission-lines-proximity-visibility-and-encumbrance-effects>

47 Power Lines Don't Affect Property Values. The Appraisal Journal. July 30, 2009.

http://www.appraisalinstitute.org/about/news/2009/073009_TAJ.aspx

48 High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects. James A. Chalmers, PhD and Frank A. Voorvaart, PhD. The Appraisal Journal. Summer 2009. Pgs. 227-245.

49 Letters to the Editor. Kerry M. Jorgensen. Appraisal Journal. January 1, 2010.

<http://www.thefreelibrary.com/Comments+on+high-voltage+transmission+lines:+proximity,+visibility,...+a0220765052>

The Chalmers-Voorvaart study also attracted the interest of Washington Post Real Estate writer Elizabeth Razzi who wrote that the study was paid for by Northeast Utilities and completed before they proposed a high-voltage transmission grid in New England. She also wrote that both Chalmers and Voorvaart are appraisers and expert witnesses for the power industry.⁵⁰

X

Several studies have found that, over time, property value damages from nearby HVTLS diminish though properties near the pylons stay permanently damaged no matter the elapsed time.⁵¹ In the first case, though the property owner may grow accustomed to HVTLS and thus think less of them, new potential buyers aren't as sensitized and the diminutive impact is fresh to them.

Realtors usually oppose HVTLS. Nearly all surveyed realtors and appraisers in the Roanoke and New River valleys of Virginia said that close proximity to HVTLS would diminish property values by as much as \$25,000, but mostly for high-end homes. Lower-end homes see little impact.⁵²

Diminished property values can also impact communities. In one case, Delaware residents were worried that a proposed 1,200 megawatt HVTL would depress local property values, thus weakening the local tax base and leading to higher taxes to offset the losses. Kent Sick, author of a 1999 paper on power lines and property values, projects losses from a few percentage points to 53%.⁵³

In Atlanta, a local realty group named Bankston Realty ranked power lines as the number one item that damages resale value, followed closely by busy roads and inferior lot topography. They advise buyers to pay 15% less of the asking price if power lines are present, and they advise sellers to accept it as a logical perception of value.⁵⁴

15%

Evidence suggests that HVTLS affect the health of residents in close proximity to lines 345kV and higher. Evidence also suggests that the power lines have little to no impact on property values because encumbered lots are often larger and more private than unencumbered lots, resulting in no diminution of purchase price. However, most studies did observe longer time on the market for encumbered properties.⁵⁵

Rural Impact

Now that the reader is aware of stray voltage, EMFs, and property values, the reader will have a deeper understanding of the potential effects of HVTLS on rural land throughout the United States.

⁵⁰ Do High-Voltage Lines Zap Property Values? Elizabeth Razzi. Local Address. August 4, 2009.

http://voices.washingtonpost.com/local-address/2009/08/do_high-voltage_lines_zap_prop.html

⁵¹ The Effect of Public Perception on Residential Property Values in Close Proximity to Electricity Distribution Equipment. Sally Sims, B.Sc. Paper presented to the Ph.D. Forum at the Pacific Rim Real Estate Society Conference. January 2002. This is the first part to the study.

⁵² A Question of Power: Part III – Realtors: High voltage lines lower property values. Leslie Brown. Roanoke Times. 1998. <http://www.vaproperyrights.org/articles/98lineslowervalues.html>

⁵³ Expert: Power lines hurt property value, market research shows sellers lose up to 53 percent. Elizabeth Cooper. Gannett News Service. May 20th, 2006.

⁵⁴ Atlanta Homes and Resale Value... Power lines are a definite NO. The Bankston Group. July 17, 2008.

<http://atlantaintheknow.com/2008/07/17/atlanta-homes-and-resale-value-power-lines-are-a-definite-no/>

⁵⁵ High Voltage Power Lines Impact On Nearby Property Values. Ben Beasley. Right of Way Magazine. February 1991.

In Goodhue County, Minnesota, an area locally known for protecting agriculture, CapX2020 (a utility consortium) is proposing to build a 345kV HVTL through the county that may be doubled to 690kV. Local landowner Linda Grovender voiced her concern in a 2010 letter to the editor of the Cannon Falls Beacon. She worries that the line, proposed to traverse residential and agricultural lands instead of following existing utility right-of-way, will have an adverse effect on her family's health (due to EMFs), jeopardize agricultural interests, result in lost agricultural productivity, and damage property values.⁵⁶ She wrote that if the proposed 345kV HVTL is doubled to 690kV (as it legally could be) it could have an adverse effect on her family's health, jeopardize agricultural interests, result in lost agricultural productivity, and damage property values.⁵⁷

Elsewhere in Minnesota, Dairyland Power Cooperative (one of the chief members of CapX2020) surveyed rural landowners for their opinion regarding the proposed HVTL in their area. Whether they were crop or dairy farmers, each had several reasons why the proposed line would impact their business. The unnamed respondents shared Grovender's views and said they prefer to use highway corridors and woodlands to avoid impacts to productive agricultural land; protect livestock; avoid interference with large farm equipment, GPS, and navigation systems used in farm machinery; preserve open channels for crop-dusting; protect farm buildings; protect pasture land, tree farms, and timber production.⁵⁸

The Dairyland survey also found that livestock operations are concerned that the HVTL will generate stray voltage, impacting livestock and feedlots. Cattle, horses, and other livestock will not go near transmission lines due to stray voltage. And stray voltage can impact the health of beef cattle and hogs. Farmers also fear potential impacts on dairy operations, poultry, livestock mortality, horse boarding facilities, and herd reproduction.⁵⁹

HVTLs also pose potential technological obstacles. For example, The GPS equipment used in the farm equipment may not be able to steer around transmission poles, potentially making farming around the towers extremely difficult.⁶⁰

One major concern was the routing the HVTLs through the middle of properties or fields. The surveyed farmers quoted many repercussions for bisecting a property. They include: Interrupted irrigation and tile drainage equipment and practices; decreased food production; fragmented existing cropland and dairy operations; diminished lease value: the addition of transmission lines would make it difficult to lease farm land for the top rental price; compacted soil from construction of the HVTLs and access roads: it would take 3–5 years to restore.⁶¹

Across the border in Wisconsin, the state's Department of Agriculture validated many of the Minnesota respondents' concerns when it found that HVTL construction could compact soil, making it difficult to

⁵⁶ **No CAPX2020.** Letter to the Editor by Linda Grovender. The Cannon Falls Beacon. March 23, 2010.

⁵⁷ **Ibid.**

⁵⁸ **SE Twin Cities-Rochester-La Crosse Transmission System Improvement Project Macro-Corridor Study, Appendix A: Summary of Public Comments regarding a proposed HVTL.** Dairyland Farm Cooperative. September 2007.

⁵⁹ **SE Twin Cities-Rochester-La Crosse Transmission System Improvement Project Macro-Corridor Study, Appendix A: Summary of Public Comments regarding a proposed HVTL.** Dairyland Farm Cooperative. September 2007.

⁶⁰ **Ibid.**

⁶¹ **Ibid.**

plow and plant those areas, naturally resulting in reduced crop yields. The HVTLS force farmers to change planting patterns to avoid support structures. Since farm land is only as valuable as its ability to yield good crops, rural property values suffer from the limitations and effects of HVTLS on their land.⁶²

Potential compaction, forced building changes, and lower property values equally threaten dairy operations as much as agricultural farmers. Susan and Robert Herckendorf, dairy farmers in the path of the proposed A-W HVTLS, are worried that the line could put local dairies out of business.⁶³

In researching the possible negative factors of the then-proposed Arrowhead-Weston HVTLS in Wisconsin in 2000, the state's Public Service Commission found that rural property values may decrease from "concern or fear of possible health effects from electric or magnetic fields; The potential noise and visual unattractiveness of the transmission line; Potential interference with farming operations or foreclosure of present or future land uses."⁶⁴ They also found that the value of agricultural property will likely decrease if the pylons inhibit farm operations.⁶⁵ However, they also found that adverse effects appear to diminish over time.⁶⁶

The impact report further states that, on farmland, HVTLS installation can remove land from production, interfere with operation of equipment, create safety hazards, and deprive landowners the opportunity to consolidate farmlands or develop the land for another use. The greatest impact on farm property values is likely to occur on intensively managed agricultural lands.⁶⁷

Nearly a decade later in 2009, the Wisconsin Public Service Commission conducted another study on the environmental impacts of transmission lines and found that "in agricultural areas, the number of poles crossing a field may be the most significant measure of impact," and "agricultural values are likely to decrease if the transmission line poles are in a location that inhibits farm operations."⁶⁸ Beyond the impact of pole placement, the PSC found that "the overall aesthetic effect of a transmission line is likely to be negative to most people, especially where proposed lines would cross natural landscapes. The tall steel or wide 'H-frame' structures may seem out of proportion and not compatible with agricultural landscapes or wetlands."⁶⁹ They further explained that "Transmission lines can affect farm operations and increase costs for the farm operator. Potential impacts depend on the transmission line design and the type of farming. Transmission lines can affect field operations, irrigation, aerial spraying, wind breaks, and future land development."⁷⁰

The study further examines how rural HVTLS pole placements can affect agricultural land values: They can create problems for turning field machinery and maintaining efficient fieldwork patterns; expose

62 Line could affect farms, property values. Author Unknown. Oshkosh Northwestern. June 26, 2000.

63 Ibid.

64 Property Values (pages 212-215) from Final Environmental Impact Statement, Arrowhead-Weston Electric Transmission Line Project, Volume 1. Public Service Commission of Wisconsin. Docket 05-CE-113. Date issued, October 2000.

65 Ibid..

66 Ibid.

67 Property Values (pages 212-215) from Final Environmental Impact Statement, Arrowhead-Weston Electric Transmission Line Project, Volume 1. Public Service Commission of Wisconsin. Docket 05-CE-113. Date issued, October 2000.

68 Environmental Impacts of Transmission Lines. Public Service Commission of Wisconsin. March 2009.

69 Ibid.

70 Ibid.

properties to weed encroachment; compact soils and damage drain tiles; result in safety hazards due to pole and guy wire placement; hinder or prevent aerial activities by planes or helicopters; interfere with moving irrigation equipment; hinder future consolidation of farm fields or subdividing land for residential development.⁷¹

To oppose these potentially diminutive effects on their land, landowners sometimes organize against them. In Ohio, a group of concerned citizens formed the group, Citizens Advocating Responsible Energy (CARE), to oppose FirstEnergy's proposed Geauga County power line. On their website they state the reasons for their opposition. They fear the HVTL will devalue the properties it crosses, force affected property owners to continue paying taxes on damaged property, damage natural beauty and local ecology, lessen agricultural productivity of impacted land, thus reducing farm income and local purchasing power, and create a thorough-fare for snowmobiles and off-road vehicles.⁷²

Other times, concerned landowners are united in voice, but not in form. In 2010, Idaho property owners in Bonneville County are nervously following the progress of Idaho Falls Power's proposed 161kV HVTL that would pass close to their homes.⁷³

Lynn Pack, a Bonneville County dairy farmer, has educated himself on HVTLs and said he's most concerned with stray voltage. "It causes so many problems with cow's production. They won't feed, they won't drink water, they dry up and when they dry up they just don't give any milk."⁷⁴ Another property owner, Sharon Nixon, fears the HVTL could harm her husband's health after his recent victory over bone cancer. She also fears the value of her home will fall. "It is not something we want in our backyard. We worked all our lives. This is our dream home."⁷⁵

Idaho Falls Power General Manager Jackie Flowers said the HVTL is a necessary step to meet new federal energy reliability standards and that the utility is open to the public's input.⁷⁶

A year earlier in Idaho, a coalition of Rockland County farmers tried to convince Idaho Power Company to avoid routing a new HVTL through their land, citing environmental and development concerns.⁷⁷ Doug Dokter, Idaho Power project leader, said the new lines are required because the existing lines are at their capacity.⁷⁸ Because of their concerns, utility representatives say they're looking at other options and hope for a compromise to avoid invoking eminent domain to take the land.⁷⁹

Sometimes opposition to a proposed HVTL route can alter its course. In 1994, Public Service Company of New Mexico abandoned plans to take new right-of-way through the Jemez Mountains for a 50-mile long HVTL extension that Indian groups and environmentalists argued would cut through several miles

⁷¹ Ibid.

⁷² **We oppose FirstEnergy's proposed Geauga County power line.** Website posting by Citizens Advocating Responsible Energy (CARE). Date unknown but website copyright suggests sometime from 2008-2009.

⁷³ **Transmission Lines Worry Property Owners.** Brett Crandall. Local News 8. March 5, 2010.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ Ibid.

⁷⁷ **Headway being made on proposed route for power transmission line.** Author Unknown. The Power County Press and Aberdeen Times. April 8, 2009.

⁷⁸ Ibid.

⁷⁹ Ibid.

of pristine vistas and Native American ruins.⁸⁰ The utility instead re-routed the extension to follow an existing utility corridor, bringing the decade-long dispute to a close.⁸¹

In 2008, California farmers and ranchers found themselves in a similar situation. San Diego Gas & Electric proposed a 150-mile long, 500kV HVTL (in conjunction with several 230kV HVTLs) across San Diego and surrounding counties to meet increasing energy needs and transport required renewable energy.⁸²

Affected landowners are worried the line will have “huge” impacts on their properties. Katie Moretti, an affected cattle rancher, and other farmers worry that building construction access roads across untouched land will limit their land’s future use. She also worries that the utility won’t compensate her for the loss of use.⁸³

Another rancher, Glen Drown, also worries about the impact the line will have on land-use and property values since the proposed route bisects several of his parcels subdivided for future development.⁸⁴

Local dairy producer, Richard Van Leeuwen, is worried that stray voltage from the line would damage the health of his calves and milking cows. To protect his herd’s health he said he would have to relocate the calf farm to another part of his property, costing millions.⁸⁵

San Diego County Farm Bureau Executive Director Eric Larson acknowledges that the farming community won’t be able to stop the project, but he’s trying to make it compatible with the area’s farming interests by recommending burying the line underground in some areas, going around some areas, and utilizing existing right-of-way.⁸⁶

Elsewhere in the state, the City of Brentwood researched the potential impact of HVTLs on agricultural land values by interviewing several of their local and experienced Real Estate brokers. All the brokers said that “Agricultural land with power lines above ground is worth less than properties with below-ground utilities.”⁸⁷

However, in a 2007 report, the California Department of Conservation’s Farmland Mapping and Monitoring Program reported that HVTLs installed on agricultural land for a wind farm will result in a temporary disturbance of 10 acres of farmland and permanently affect 1 acre. Since the affected areas are mainly grazing land, the report concluded that the HVTL would not significantly impair productivity. Though the impact to agricultural productivity during construction would be negative, they claimed it would be mostly insignificant.⁸⁸

⁸⁰ PNM Scraps Jemez Power Line Plan. Keith Easthouse. Sante Fe New Mexican. December 16, 1994.

⁸¹ Ibid.

⁸² Proposed power line would impact farms. Christine Souza. California Farm Bureau Federation. May 28, 2008.

⁸³ Proposed power line would impact farms. Christine Souza. California Farm Bureau Federation. May 28, 2008.

⁸⁴ Ibid.

⁸⁵ Ibid.

⁸⁶ Ibid.

⁸⁷ City of Brentwood, California. Website page explaining their approaches to valuing agricultural land. Date and author unknown.

⁸⁸ 3.3 Agricultural Resources. Part of the public draft by The California Department of Conservation’s Farmland Mapping and Monitoring Program. July 2007.

Across the country in Leesburg, Virginia, 26 landowners opposed Dominion Energy's proposed 230kV HVTL, saying it will damage their property values, thus decreasing their tax base and thus affect the county as a whole. They also fear its impact on Blue Ridge tourism.⁸⁹

Bill Hatch, owner of a 400-acre farm was upset to learn the line would run through his farm. He said the proposed line would so affect his farm that he could only afford to keep it by direct marketing or agro-tourism, but he admitted that few people would want to visit a farm with power lines.⁹⁰

Landowners want the utility to bury the lines, but the utility says it will cost 10 times more than traditional overhead lines. However, Harry Orton, an underground power line expert, testified that while the initial costs of burying the lines are higher, the lower cost of maintenance over the years evens the cost along the lines' lifecycle.⁹¹

A year later in 2006, Dominion proposed an additional 500kV HVTL to meet growing demand and routed it through northern Virginia because it was the most efficient route. However, the area is also one of the state's most pristine, and the proposal met with fierce resistance from landowners, environmentalists, Congressman Frank Wolf, and actor Robert Duvall.⁹²

In the path of the HVTL are landowners of some of the most valuable land in Virginia, and they were bothered that the utility plans to erect the 40-mile, 15-story HVTL in their back yards.⁹³

One landowner, Cameron Eaton, fears the line will bring financial ruin and "sink" her investment into her 100-acre Fauquier County property and horse business. "No one will buy that land if some ugly power line could run right over their house. I'm broken off at the knees."⁹⁴

Real estate agents consider the area's picturesque countryside to be its most valuable quality. Matt Sheedy, a land developer and president of Virginians for Sensible Energy Policy, said that the very proposal that the line will soon dominate the countryside has already "sent land values plummeting." Brokers confirmed that the market froze. People backed out of real estate contracts, unwilling to live anywhere under the line. Sheedy's groups estimated that land immediately affected could lose as much as 75% of its value.⁹⁵

"When you're out in the country and you're selling property, what you're selling is the open space and the bucolic views and the history," Sheedy said. "Running power lines through an area like this is just devastating." To landowners Gene and Deborah Bedell, who were trying to sell their 223-acre farm to pay for their retirement, it was a hard blow. Their agent told them no one would buy their property if they knew "that it could have a power line looming over it."⁹⁶

89 Committee Hears Debate Over Underground, Overhead Power Lines. Megan Kuhn. Leesburg Today. May 20, 2005.

90 Ibid.

91 Committee Hears Debate Over Underground, Overhead Power Lines. Megan Kuhn. Leesburg Today. May 20, 2005.

92 Landowners Fear Ruin from Power Line Route. Sandhya Somashekhar. Washington Post Staff Writer. December 11, 2006.

93 Ibid.

94 Ibid.

95 Ibid.

96 Ibid.

Further north in New York, over 50 landowners and local officials spoke before the state's Public Service Commission in opposition to Upstate NY Power Corp's proposed construction of a 230kV HVTL in their community.⁹⁷

Sharon B. Rossiter, co-owner of Doubledale Farms in Ellisburg, said the HVTL will damage their crop cycle, remove 100 acres from use, and make planting difficult by having to navigate around the poles. Also worried is Roberta F. French, owner of Farnham Farms in Sandy Creek. The proposed line will bisect her blueberry farm, eliminating two-thirds of it.⁹⁸

Jay M. Matteson, Jefferson County agricultural coordinator, advocated routing the HVTL through public land to avoid damaging productive, private land. "The burden should be on New York state and the developer to prove to local landowners why their land is less valuable than public land," he said.⁹⁹

The Town of Henderson opposed it because the town's foundation is tourism and agriculture, and the community is "very concerned about the visual impacts of this project."¹⁰⁰

Robert E. Ashodian, chairman of the Henderson Harbor Area Chamber of Commerce's Economic Development Committee, agreed. "The scenic resources of the community and the natural resources are at the heart of the value of the community."¹⁰¹

In an effort to appease worried or angry landowners, agricultural property owners in Montana with HVTLs encumbering their land will be exempt from paying taxes on land within 600 feet on either side of the HVTL Right-of-Way.¹⁰²

In the 2002 study, "The Impact of Transmission Lines on Property Values: Coming to Terms with Stigma," authors Peter Elliott and David Wadley cite a 1978 Canadian study that, according to one commentary, found "the per acre values from more than 1,000 agricultural property sales in Eastern Canada were 16-29% lower for properties with easements for transmission lines than for similar properties without easements." The impact was greater on smaller properties. The 1978 study found little difference in impact from 230kV or 500kV HVTLs. The study also found that the impacts didn't seem influenced by time.¹⁰³

Three more Canadian studies on the impact of HVTLs on agricultural land values found different results.¹⁰⁴ Brown 1976 studied the effect of low-voltage power lines on agricultural land in Saskatchewan and found no measurable impact on property values. The Woods Gordon 1981 study focused on the effects of 230kV to 500kV HVTLs on Ontario farmland and found some areas had an average of a 16.9% negative impact, two areas had a positive effect, and others showed no statistically

97 **Transmission line gets no support.** Nancy Madsen. Watertown Daily Times. November 17, 2009.

98 **Transmission line gets no support.** Nancy Madsen. Watertown Daily Times. November 17, 2009.

99 *Ibid.*

100 *Ibid.*

101 *Ibid.*

102 **Tax facts on proposed power line.** The Montana Standard Staff. The Montana Standard. July 11, 2009.

103 **The Impact of Transmission Lines on Property Values: Coming to Terms with Stigma.** Peter Elliott & David Wadley. Property Management, pgs.137-152. 2002.

104 **The Effects of Overhead Transmission Lines On Property Values: A Review And Analysis Of The Literature.** Edison Electric Institute Siting & Environmental Planning Task Force. 1992.

significant effect. The third study, a master's thesis referred to as Thompson 1982 found sales prices lower for properties crossed by HVTLs but only where the land has potential for irrigation.(pgs. 56-57)¹⁰⁵

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105 Ibid.