STATE OF MISSOURI

MISSOURI PUBLIC SERVICE COMMISSION

GRAIN BELT EXPRESS CLEAN LINE LLC	:	
In the matter of the Application of Grain Belt Express	:	
Clean Line LLC for a Certificate of Public Convenience	:	
and Necessity Authorizing it to Construct, Own, Operate	:	
Control, Manage and Maintain a High Voltage	:	Case No. EA-2016-0358
Direct Current Electric Transmission Line and an	:	
Associated Converter Station Providing an Interconnection	:	
on the Maywood-Montgomery 345kV Transmission Line	:	

EXPERT REPORT AND DECLARATION OF RICHARD J. RODDEWIG

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QUALIFICATIONS

1. My name is Richard J. Roddewig. I am a professional real estate appraiser, real estate analyst, real estate counselor, and land use planning and zoning consultant. I am currently President of Clarion Associates, Inc., Chicago, Illinois. I am a Certified General Real Estate Appraiser in the State of Illinois (License Number 553.000129) and also currently hold a license as a Certified General Real Estate Appraiser in various other states including Missouri, Colorado, Florida, New York, Indiana, Wisconsin, Mississippi, Michigan, Ohio, Minnesota, Alabama, Louisiana, Maryland, Oklahoma, Pennsylvania, West Virginia,

Washington, Hawaii, North Carolina, South Carolina, Georgia, Tennessee, Virginia, Arizona, California, and Nevada. I have over 35 years of experience as a professional real estate appraiser. I also hold the following three professional designations: the MAI designation from the Appraisal Institute, the CRE designation from The Counselors of Real Estate, and the FRICS designation from the Royal Institution of Chartered Surveyors. The MAI designation is given by the Appraisal Institute (the largest professional organization of real estate appraisers) to those who complete a prescribed series of educational courses, pass a series of educational examinations, meet the appraisal experience requirements, and submit qualifying demonstration appraisal reports. The CRE designation is given to those invited into membership based upon their professional accomplishments as real estate consultants. The FRICS designation is an international appraisal designation given by the Royal Institution of Chartered Surveyors (headquartered in London) the largest international organization of appraisers and chartered surveyors. I am also a licensed real estate broker in Illinois and a licensed attorney in Illinois, although I do not now actively practice law.

2. One of my specialized areas of real estate appraisal practice involves properties actually or potentially impacted by environmental conditions. Over the past 25 years, I have been involved in assignments involving the analysis of the impact of contamination and other environmental conditions on real estate markets and market prices and values in the following states: Alaska, Hawaii, Washington, California, Wyoming, New Mexico, Colorado, Texas, Missouri, Kansas, Minnesota, Wisconsin, Ohio, Illinois, Indiana, Michigan, Pennsylvania, New York, Connecticut, New Jersey, Maryland, Washington, D.C., South Carolina, Georgia, Alabama, Mississippi, and Florida. For the Appraisal Institute, I have developed three seminars on how to value properties affected by various types of environmental conditions, and I have taught those courses for the Appraisal Institute all across the United States. Other seminars on the same topic prepared and taught by me include a 2003 course for the State of South Carolina Association of Tax Assessors and a 2013 one day seminar on the same subject for staff and contract appraisers of the Minnesota Department of Transportation. In 2001, the Appraisal Institute asked me to write a book on the appraisal of contaminated properties, and the result is *Valuing Contaminated Properties: An Appraisal Institute Anthology*, edited by me and published by the Appraisal Institute in 2002. In 2012, the Appraisal Institute asked me to prepare a second volume of that anthology which was published in 2014. I have written a number of articles on the appraisal of properties impacted by various types of environmental conditions that have been published in *The Appraisal Journal* and other professional publications. One of my more recent articles, "Power Lines and Property Prices," was published in the Fall 2014 edition of *Real Estate Issues* and deals with the effect of transmission line corridors on prices and values of adjoining and nearby properties.

3. A complete curriculum vitae including my publications and a list of deposition and trial testimony given during the past four years is provided as Exhibit A to this Report.

4. I have been retained by Grain Belt Express Clean Line LLC, (hereinafter, "Grain Belt Express") in the above captioned matter to analyze whether the proposed transmission line will have an adverse effect on the market value of residential and farmland properties along the proposed right-of-way in Missouri.

OVERVIEW OF MY SCOPE OF WORK IN THIS ASSIGNMENT

5. As part of our scope of work in this assignment, my staff and I have undertaken the following tasks:

A. Consulted by phone with representatives of Grain Belt Clean Line Energy LLC and reviewed maps of the Proposed Route of the Grain Belt Express transmission line project in Missouri.

B. Reviewed and summarized in this report the appraisal profession standards for determining whether prices and values of real property have been directly or indirectly affected by environmental conditions.

C. Summarized the generally accepted methods of the appraisal profession for determining the impacts, if any, from environmental conditions and risks created by power lines and other similar sources.

D. Reviewed and summarized the conclusions in the published real estate appraisal and national real estate literature concerning the impacts of transmission line corridors and power lines on real estate prices and values.

E. Reviewed my prior research into the relationship between proximity to transmission corridors and residential and farmland property values in Illinois.

F. Reviewed Rebuttal Testimony dated January 24, 2017 and submitted by Mr. Kurt C. Kielisch ("the Kielisch Submission") on behalf of intervenors in this case and analyzed the methods and data used in the Kielisch Submission.

G. Reviewed documents produced by intervenors to support the Kielisch Submission.

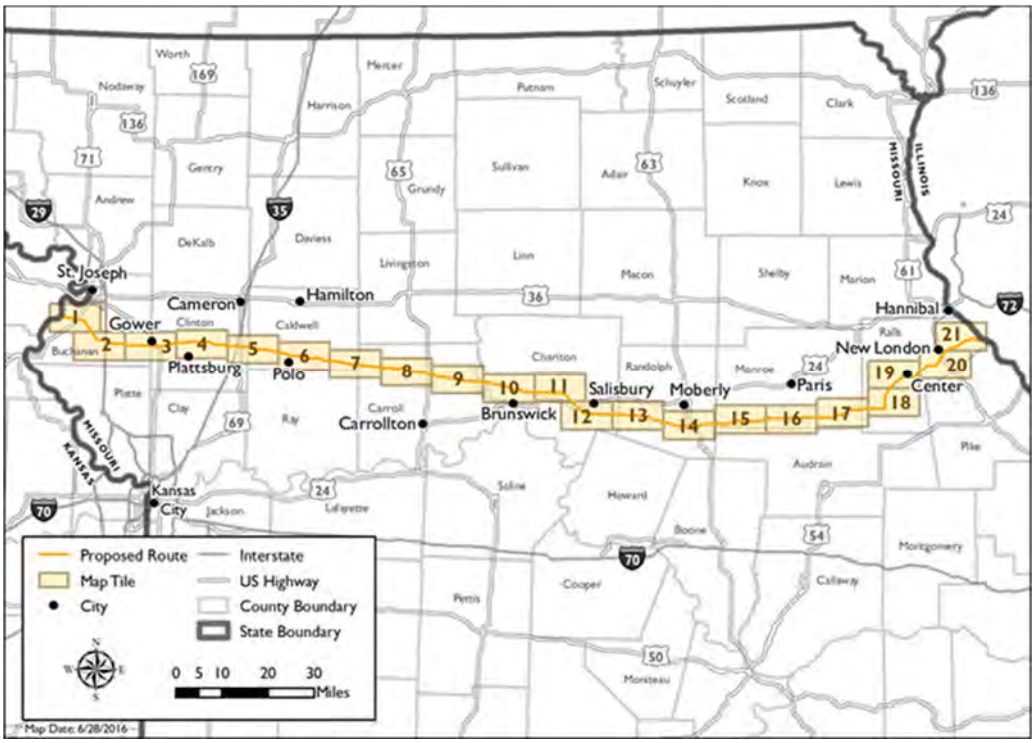
H. Reviewed the Rebuttal Testimony of Charles Henke, dated January 24, 2017.

I. Analyzed from a real estate market and real estate appraisal perspective whether prices and values of the residential and agricultural land along the proposed Missouri transmission line route will be decreased in any significant way by installation of the transmission line.

J. Analyzed whether transmission line impacts on farmland prices, when they occur, exceed the fee value of the portion of a farm property encumbered by a transmission corridor.

THE PROPOSED TRANSMISSION LINE AND THE TYPES OF ADJACENT PROPERTIES AND NEIGHBORHOODS

6. The Proposed Route of the Grain Belt Express Project in Missouri is shown on the map below:



7. The Proposed Route traverses agricultural land. The only locations where the Proposed Route is within a quarter mile of an incorporated town are near Cowgill in Caldwell County and Renick in Randolph County. In neither location, however, does the proposed route touch the boundary of the town.

8. Portions of the Proposed Route will be immediately adjacent to existing transmission line corridors in Buchanan and Monroe counties. In Ralls County, the proposed route parallels an existing transmission line located across a highway.

STANDARDS OF PROFESSIONAL APPRAISAL PRACTICE SPECIFY METHODS AND PROCEDURES FOR DETERMINING THE IMPACT OF ENVIRONMENTAL CONDITIONS ON PRICES AND VALUES

9. The Appraisal Standards Board in Washington, D.C. promulgated the *Uniform Standards of Professional Appraisal Practice* (hereinafter "USPAP") that are required by Missouri law and regulation to be followed by all licensed real estate appraisers in Missouri as well as in every other state.

10. USPAP requires licensed appraisers to complete the research and analyses "necessary to develop credible assignment results."[1] The Scope of Work Rule in USPAP then says that the acceptability of the research and analysis is measured based on what "an appraiser's peers actions would be in performing the same or a similar assignment."[2] The phrase "an appraiser's peers" is defined in USPAP as "other appraisers who have expertise and competency in a similar type of assignment."[3]

11. The answer to USPAP Frequently Asked Question 159 entitled "Judging the Actions of An Appraiser's Peers" states that "journals and publications, professional meetings and conferences, education through courses and seminars, and appraisal discussion groups"[4] are the sources of knowledge about what an appraiser's peers would do in a similar assignment.

12. Those courses and publications related to the valuation of properties impacted by adverse environmental conditions have long recognized the following:

A. Proximity to a source of an adverse environmental condition does not automatically cause an adverse impact to prices and values of nearby properties.

[1] USPAP, 2016-2017 Edition, Scope of Work Rule, p. 14, line 388.
[2] USPAP, 2016-2017, Scope of Work Rule, p. 15, lines 432-433.
[3] USPAP, 2016-2017, Definitions, p. 1, line 32.
[4] USPAP, 2016-2017, supra, FAQ 159, p. 284.

B. While opinions of homeowners and other non-real estate professionals may have some relevance to understanding a marketplace, such opinions are not a substitute for analysis of actual sales prices. As a publication of The Appraisal Institute puts it: "Those rendering opinions of market value or diminution in value should be properly credentialed and licensed, acknowledging that competent experts can still disagree because of limited market data, differing scopes of work, or other factors."[5]

C. As the professional appraisal literature discussed later in this report indicate, power lines do not always or automatically adversely impact prices and values of adjacent or nearby properties.

13. The appraisal profession has long recognized that proximity to sources of adverse environmental conditions in general, and power lines in particular, do not automatically result in an adverse impact on the value of adjacent or nearby properties.

A. *Real Estate Damages: An Analysis of Detrimental Conditions,* published by the Appraisal Institute states that long-standing understanding as follows:

> "The fact that a property is impacted by a detrimental condition does not automatically mean that it has a material impact on the property's value. Detrimental conditions may or may not cause a material impact on value. Frequently, detrimental conditions have no material impact on value whatsoever. In the analysis of detrimental conditions, it is important that the appraiser be knowledgeable about the available tools, properly select and apply those tools, avoid unproven or suspect methodologies, and ultimately have relevant market data to support opinions and conclusions."[6]

B. As it specifically relates to power line impacts on prices and values, that *Real Estate Damages* books says the following: "As with many detrimental conditions, subjective fear of hazard does not necessarily equate to objective evidence of diminished property value." That book also states that "the impact [of power lines] on real estate is determined by the market and not by scientific analysis [related to possible health effects]."[7]

[5] Bell, et al., *Real Estate Damages: Applied Economics and Detrimental Conditions*, at 238.
[6] Bell, et al., *Real Estate Damages: Applied Economics and Detrimental Conditions*, at 238.
[7] Bell, et al., *Real Estate Damages: Applied Economics and Detrimental Conditions*, at 110.

C. Professor Thomas Jackson, PhD, MAI, a past member of the Appraisal Standards Board that promulgates USPAP and his research colleague Jennifer Pitts summed up past studies of the impacts of power lines on prices and values in a 2007 article in *The Appraisal Journal* as follows:

"Both the market interviews and academic literature show that the impacts of power lines on residential properties are varied and difficult to measure. The impacts from the power lines, as well as other negative externalities, depend on many factors, including market location, condition, and personal preference."[8]

THE PUBLISHED REAL ESTATE APPRAISAL AND REAL ESTATE ECONOMICS LITERATURE DO NOT SUPPORT A CONCLUSION THAT POWER LINES ALWAYS ADVERSELY IMPACT ADJACENT PROPERTY PRICES AND VALUES

14. The real estate appraisal and real estate economics literature has long been clear that power lines do not automatically adversely impact the value of adjacent properties and in some cases may actually enhance values.[9] Some studies have found adverse impacts while others have found no impacts. Pitts and Jackson in 2007 summarized the published appraisal and real estate economics literature as follows:

"While most research indicates that HVTL [high voltage transmission lines] have no significant impact or a slight negative impact on residential properties, some studies have shown that lots adjacent to or with views of an HVTL right-of-way actually sell for a premium over more distant lots.[10]

15. Among the more recent studies in the real estate appraisal and real estate economics literature are the following:

A. A July 2003 study in the *Appraisal Journal* that compared prices paid for 296 abutting properties to 296 comparable but non-abutting properties in Portland, Oregon, Seattle, Washington,

[8] Jennifer M. Pitts and Thomas O. Jackson, PhD, MAI, "Power Lines and Property Values Revisited," *The Appraisal Journa*l, Fall 2007, at 323.

[9] See, for example, Louis E. Clark, Jr., MAI, and F. H. Treadway, Jr., MAI, "Impact of Electric Power Transmission Line Easements on Real Estate Values, Society of Real Estate Appraisers, 1972, at pages 11-12: "Many persons have indicated by their actions a preference for a specific property, even though encumbered by an easement, as compared to other properties which are not. The reason for their actions is not as important as the effect, individually and collectively, on values . . . few within the real estate profession have factual knowledge of the impact of these easements on the value of real estate. Some appraisers rely on, and frequently express, opinions with no factual foundation. Thus, transmission line easements, and their effects, if any, on adjacent or nearby properties are controversial subjects."

[10] Pitts and Jackson, 2007, at 324.

and Vancouver, British Columbia. The authors could find no significant difference in prices between the two sets of sales. They could also find no effect on price appreciation rates from power line proximity.[11]

B. A Fall 2007 *Appraisal Journal* article said the following:

> "Many studies indicate that the HVTL (high voltage transmission line) have no significant effect on residential property values. More recently, however, an increasing number of studies do show a small diminution in value attributable to the close proximity of these lines.
>
> When negative impacts are evident, studies report an average discount of between 1% and 10% of property value."[12]

C. An *Appraisal Journal* Summer 2009 article looked at the previously published literature, specifically at what the authors called the 16 studies that form the "core of the professional literature." The authors summarized the key conclusions from those 16 articles as follows:

> "● Over time, there is a consistent pattern with about half of the studies finding negative property value effects and half finding none.
>
> ● When effects have been found, they tend to be small; almost always less than 10% and usually in the range of 3% to 6%.
>
> ● Where effects are found, they decay rapidly as distance to the lines increases and usually disappear at about 200 feet to 300 feet (61 meters to 912 meters).
>
> ● Two studies investigating the behavior of the effect over time find that, where there are effects, they tended to dissipate over time.
>
> ● There does not appear to have been any change in the reaction of markets to high-voltage transmission line proximity after the results of two widely publicized Swedish health-effects studies were preliminarily released in 1992."[13]

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[11] Marvin L. Wolverton, PhD, MAI, and Steven C. Bottemiller, MAI, "Further Analysis of Transmission Line Impact on Residential Property Values," *The Appraisal Journal*, July 2003, at 244.

[12] Jennifer M. Pitts and Thomas O. Jackson, "Power Lines and Property Values Revisited," *The Appraisal Journal*, Fall 2007, at 323.

[13] James A. Chalmers, PhD, and Frank A. Voorvaart, PhD, "High Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects," *The Appraisal Journal*, Summer 2009, 227, at 229.

D. A Winter 2012 article in *The Appraisal Journal* article summarized the published literature as typically indicating either no effect on prices, or a relatively small effect when there are impacts. It then commented as follows: "(T)heir [high voltage transmission lines] presence is apparently not given sufficient weight by buyers and sellers of real estate to have had any consistent material effect on market value."[14] That article ended with the following statement about the published literature: "the findings in the published literature (are) that property value effects cannot be presumed and are generally infrequent." [15]

E. A Summer 2016 article in *The Appraisal Journal* involved a statistical study of power line impacts in Salt Lake City and involved a data set involving "almost all single-family home sales in Salt Lake County from 2001 through 2014."[16] The study analyzed the impacts on home prices "for all types of high-voltage and medium-voltage transmission lines (500kV, 345kV, 230kV, 138 kV, 100kV, and 46kV) as well as substation locations."[17] Based on the entire 2001-2014 data base of sales, the authors found "no negative effects from 345kV lines" and, in fact, a "slight positive effect" on property prices within 50 meters of 345kV lines.[18] Homes within 50 meters of 138kV lines showed the highest price impact, a "5.1% decrease in value" while homes within 50 meters of 46kV lines showed no impact on price.[19] With one exception, the impacts decreased with distance from the line.[20] Substations were found to have a negative impact of 2.5% on homes within 50 meters.

F. One of the impact studies submitted by Kurt C. Kielisch in this proceeding summarizes the published real estate economics literature involving transmission line impacts as follows: "The rather consistent view that one gets from the literature is that electric transmission lines do not affect rural, recreational, or agricultural property values" and that when transmission line easements across farmland are acquired for new power line corridors, "no one has ever found" that there are additional damages to the value of the portion of the farmland not taken for the easement.[21]

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[14] James A. Chalmers, PhD, "High Voltage Transmission Lines and Rural, Western Real Estate Values," *The Appraisal Journal*, Winter 2012, 30, at 31.
[15] Chalmers, PhD, supra, at 44.
[16] Ted Tatos, Mark Glick, PhD, JD, and Troy A. Lunt (MAI), "Property Value Impacts from Transmission Lines, Subtransmission Lines, and Substations," *The Appraisal Journal*, Summer 2016, 205, at 206.
[17] Ibid.
[18] Ibid., at 213.
[19] Ibid.
[20] For 46kV lines, there was no impact on prices of homes within 50 meters or greater than 100 meters, but at 50 to 100 meters, there was a 2.5% impact.
[21] Peter F. Colwell and Jim L. Sanders and Peter F. Colwell, The Impact of Electric Transmission Lines on the Value of Farmland, 2015.

16. My article, "Power Lines and Property Prices" co-authored with my Clarion colleague Charles T. Brigden published in *Real Estate Issues* in 2014 (attached as Exhibit B) references the first four of the above studies as well as our own research at Clarion Associates on the impacts of power lines on property prices and values. This article also discusses the literature concerning the impact of power lines and transmission corridors on agricultural land prices. The following are among the results of studies of farmland prices referenced in my article:

A. A 1972 study concluded that "little empirical evidence can be found to show conclusively that price reductions are incurred because of transmission lines."[22]

B. A 2012 article in the *Appraisal Journal* involving an analysis of 19 production agricultural land transactions in Montana concluded that "there was no market evidence to support a claim of adverse effect of the transmission lines on sale prices."[23]

C. A study of 88 rural land transactions that occurred between 2002 and 2008 in Wisconsin (and referenced in the 2012 *Appraisal Journal* article) is reported to indicate that "edge locations showed no effect, while properties crossed by the [transmission] line showed a small price effect of 2.1 to 3.4 percent."[24]

D. Another study referenced in that same 2012 *Appraisal Journal* article is reported to have found no negative impact from the presence of high voltage transmission lines.[25]

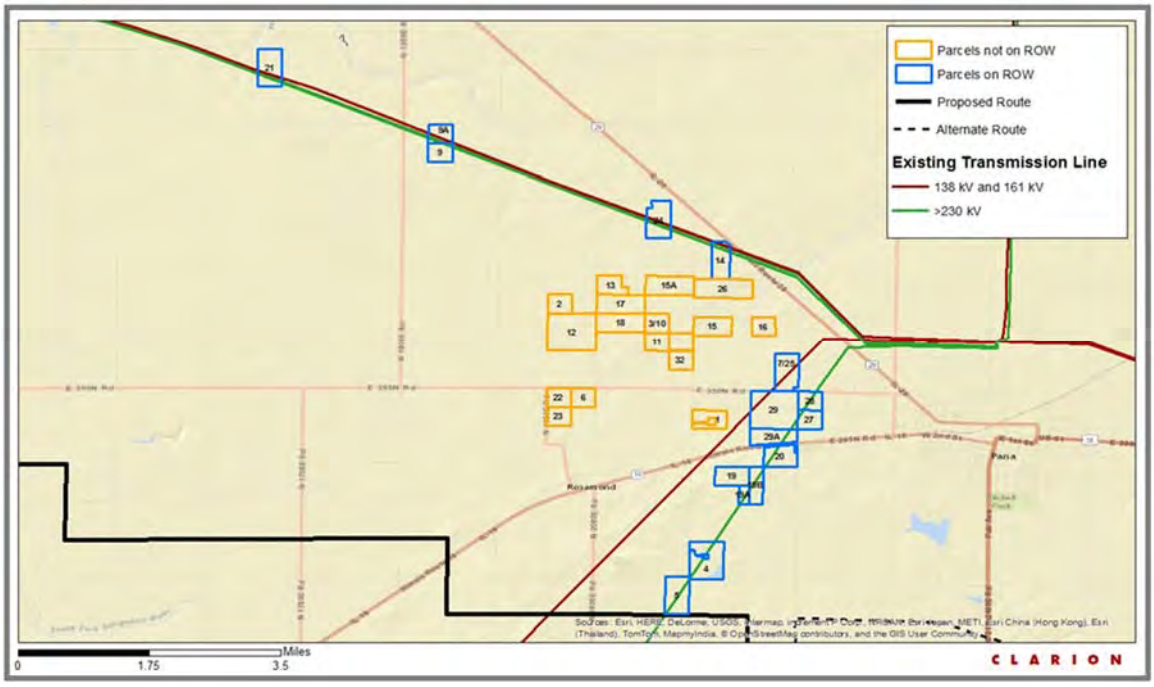
Exhibit C to this report contains a list of published articles related to power lines and property values that we have collected and reviewed for purposes of this report and analysis.

[22] Louis E. Clark, Jr., MAI, and F. H. Treadway, Jr., MAI, "Impact of Electric Power Transmission Line Easements on Real Estate Values," 1972, at p. 19.
[23] Chalmers 2012, op. cit., p. 35.
[24] Thomas Jackson, "Electric Transmission Lines: Is There an Impact on Rural Land Values?" *Right of Way*, November/December 2010, pp. 32-38.
[25] See Dean J. A. Brown, "The Effect of Power Line Structures and Easements on Farmland Values," Right of Way, December 1975/January 1976, pp. 33-38.

MY PRIOR RESEARCH INDICATES THAT TRANSMISSION LINES DO NOT HAVE A SIGNIFICANT IMPACT ON FARMLAND PRICES IN CHRISTIAN COUNTY, ILLINOIS

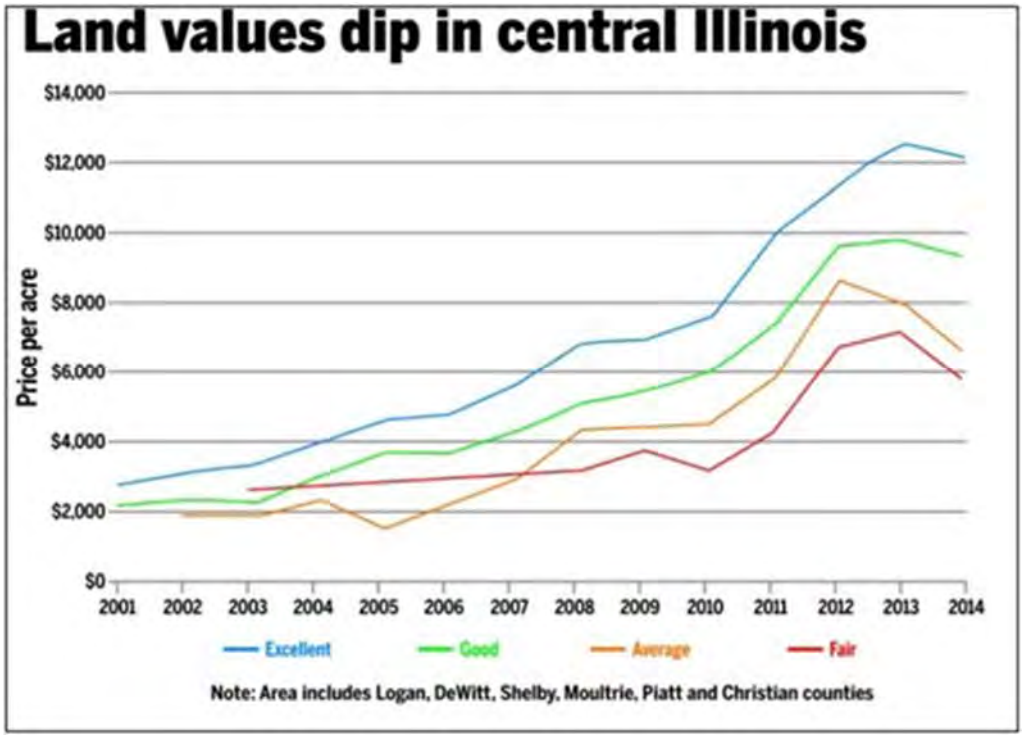
17. Much of the published research related to power line impacts deals with agricultural land, and, as indicated above, most of that research could find no evidence of any adverse impact from transmission lines on farmland prices.

18. As part of our work in preparing an expert report for Grain Belt Clean Line Energy LLC in the Illinois Commerce Commission proceedings involving the Grain Belt Express transmission line corridor, we collected and analyzed farmland sale prices in Christian County, Illinois, one of the counties through which the proposed Grain Belt Express right-of-way passes. There are existing transmission line corridors in Christian County, and we researched prices paid for farmland on the existing power line corridors and compared them to prices paid for similar nearby farmland not on those existing corridors. The map below shows existing transmission line corridors in Christian County and the locations of the farmland sales we analyzed.



19. We inspected the Christian County transmission lines, the properties on which they are located, and gathered and inspected agricultural land sales data. The sales occurred between February of 2002 and March of 2015. We adjusted all of the sales to January of 2015 to account for changes in market conditions.

Our market condition adjustments were based on agricultural land price trends as analyzed by the Illinois Society of Professional Farm Managers and Rural Appraisers. Their price trend graph for central Illinois including Christian County, is shown below.



20. We also researched county records to determine the soil classification and farmland quality characteristics of each property, and then made adjustments to each sale price to account for differences in their characteristics and quality based upon the average prices for various quality categories as shown in the graphic above. The table below shows the date of sale, sale price, acreage, farm quality classification, and sale price adjusted to January of 2015.

Sales on Right-of-Way				
Map No.	**Date of Sale**	**Sale Price ($/Acre)**	**Soil Quality Rating**	**Adjusted Sale Price**
4	1/2003	$1,859	Fair to Average	$7,584
5	11/2003	$2,200	Average	$7,974
7	12/2004	$2,930	Average	$9,573
14	2/2008	$5,100	Average	$12,230
9/9A	1/2006	$3,925	Average	$11,569
19/19A/19B	3/2010	$3,820	Average	$7,509
20	3/2010	$5,918	Average to Good	$9,306
21	11/2010	$7,344	Average to Good	$10,928
24	11/2011	$6,220	Good	$7,152
25	12/2011	$5,781	Average to Good	$7,753
27	9/2012	$9,900	Good	$8,415
28	9/2012	$9,280	Average	$11,600
29/29A	9/2012	$7,700	Average to Good	$9,615
		Overall Average: Sales on ROW		**$9,323**
		Median Adjusted Price: On ROW		**$9,306**
Sales Not on Right-of-Way				
Map No.	**Date of Sale**	**Sale Price ($/Acre)**	**Soil Quality Rating**	**Adjusted Sale Price**
1	12/2001	$2,507	Average to Good	$8,721
2	2/2002	$2,200	Average to Good	$7,537
3	8/2002	$1,413	Average to Good	$4,611
6	1/2004	$3,000	Average	$10,699
10	3/2006	$3,100	Average to Good	$7,138

11	3/2006	$3,100	Average to Good	$7,138
12	10/2006	$1,525	Average to Good	$3,319
13	1/2008	$3,937	Average to Good	$7,672
15/15A	6/2008	$9,750	Good	$15,398
16	8/2008	$6,033	Average	$13,788
17	11/2008	$6,000	Good	$9,183
18	11/2008	$6,071	Average	$13,664
22	4/2011	$6,900	Average	$12,330
23	4/2011	$12,938	Average	$23,121
26	3/2012	$7,600	Average	$9,500
32	3/2015	$5,588	Good	$4,750
		Overall Average: Sales Not on ROW		**$9,911**
		Median Adjusted Price: Not on ROW		**$8,952**

21. The average adjusted price as of January 2015 for Christian County farmland that sold with an existing transmission line corridor crossing the property is only 5.93% less than the average adjusted price for similar farmland not on a transmission line corridor. However, the median price on a transmission line corridor is about 3.95% higher than the median price for farmland not on a right-of-way. Since one of the sale prices paid for farmland on a right-of-way (Sale No. 23) is at a price dramatically higher than the average, and another (Sale No. 12) is significantly lower than the average, a comparison of the median prices may be more appropriate. Based on the two comparisons, prices on a transmission line corridor in Christian County are selling at only a small discount of perhaps no more than negative -2.0% per acre.

22. Our study of Christian County farmland prices is also relevant to any concerns that addition of a second transmission line corridor across a parcel of farmland can result in an additional negative impact on land values. As shown on the map above, five of the farmland transactions we analyzed involved parcels with more than one transmission line. The sales data in the table above indicates that the average adjusted price of the two line parcels is $10,299 per acre, significantly higher than the average adjusted price of the single line parcels as well as significantly higher than the average adjusted price ($9,911 per acre) for the Christian County sales involving farmland not located on a transmission line corridor.

MY PRIOR RESEARCH INDICATES THAT POWER LINES DO NOT HAVE ANY SIGNIFICANT NEGATIVE IMPACT ON PRICES OR VALUES OF ADJACENT RESIDENTIAL PROPERTIES AND UNDEVELOPED RESIDENTIAL LAND

23. Over the past 25 years I have conducted a number of studies concerning the effect of existing transmission line corridors and power lines on prices and values in northeastern Illinois. These studies have included the following areas:

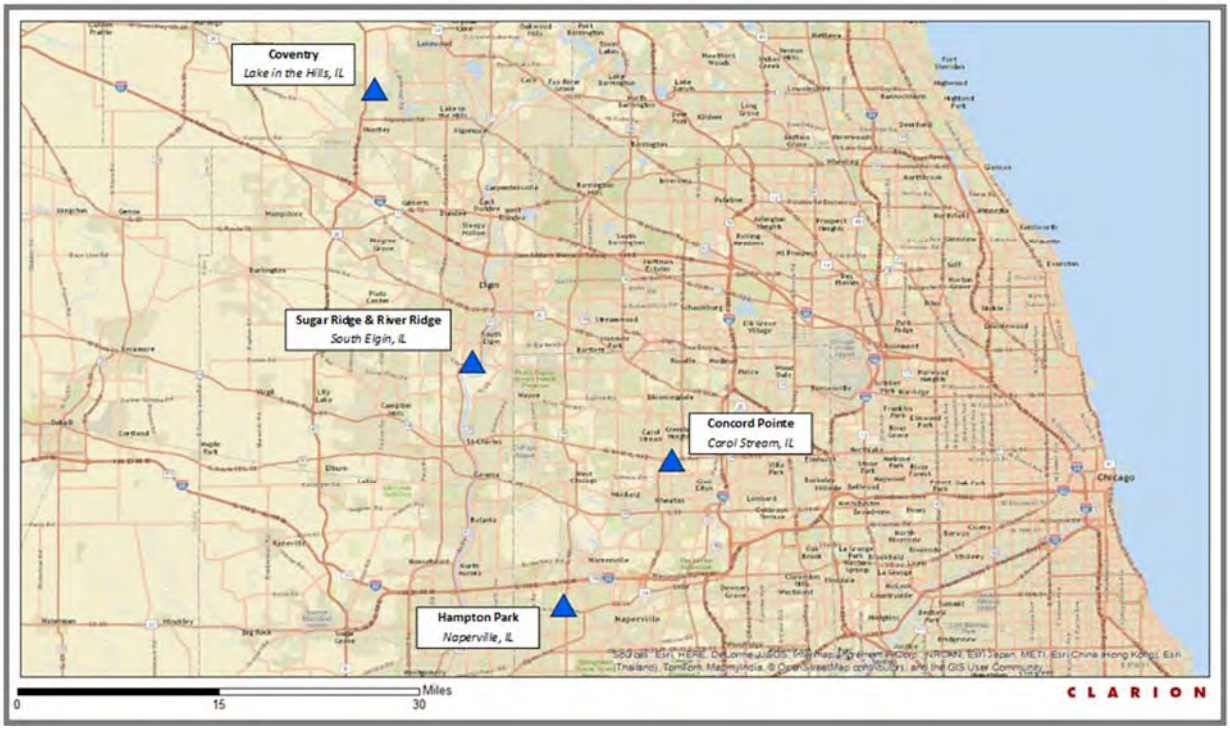
A. The Sugar Ridge and River Ridge single-family home subdivisions in South Elgin, Illinois.

B. The Coventry townhouse development in Lake in the Hills, Illinois.

C. The Concord Pointe townhouse development in Carol Stream, Illinois.

D. The Hampton Park townhouse development project in Naperville, Illinois

24. The locations of those Illinois transmission line impact studies by me are shown on the map below.



25. My research into the Sugar Ridge and River Ridge detached single-family home neighborhoods in South Elgin, Illinois indicated that there has been no adverse impact since 1995 on the prices of homes located either adjacent to an existing transmission line corridor or with views of the power lines. My research also indicatesd that the addition of a second power line did not adversely impact property prices or values.

26. My research into three townhouse projects in the Chicago metro area (Coventry in Lake in the Hills, Concord Pointe in Carol Stream, and Hampton Park in Naperville) indicated there has been no impact on prices of townhomes located in proximity to the transmission line corridors and power lines located adjacent to them.

27. A detailed summary of my Chicago metro area research into the impact of transmission lines on adjacent home prices is contained as Exhibit E attached to this report.

THE ANALYSIS AND CONCLUSIONS IN THE KURT C. KIELISCH REBUTTAL TESTIMONY

Introduction

28. I have reviewed the Kielisch Submission on behalf of intervenors in this case and analyzed the methods and data used in that report. My review of the Kielisch Submission indicates that it contains significant errors. When the errors are corrected, his analysis does not support his conclusion that transmission lines have a significant adverse impact on prices and values of farmland ranging from -10% upwards to -34%. Nor does the corrected analysis support his conclusion that "HVTL easements have a much greater impact than 100% of the underlying fee value of the easement itself." (Kielisch Submission, pages 33 -34).

Components of the Kielisch Submission

29. The Kielisch Submission includes three principal components:

A. a review of the published real estate appraisal and real estate economics literature analyzing the impacts of transmission lines on property prices and markets;

B. Summaries of various news stories and commentaries on public perceptions concerning transmission lines; and

C. nine "HVTL Easement Impact Studies"[26] reportedly conducted by Mr. Kielisch.

The Kielisch Submission Review of the Published Professional Real Estate Literature

30. The review of the published professional real estate literature in the Kielisch Submission includes the following statements:

[26] The text of the Kielisch Submission (page 27, Line 4) references eight impact studies. However, Schedule KCK-7 in the Kielisch Submission summarizes nine studies.

A. "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 note." (Page 51)

B. "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." (page 51)

C. "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." (page 51)

D. A study by Chalmers and Voorvart "found 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%. They summarized their findings as showing 'no evidence of systematic effects of either proximity or visibility of 345Kv (kilovolt) transmission lines on residential real estate values.'" (page 52)

E. One Canadian study found that "the per acre values from more than 1,000 agricultural property sales in Eastern Canada were 16-29% lower for properties with easement for transmission lines than for similar properties without easements" while three other Canadian studies "found different results" that were much lower or showed no adverse impact.

Summary of the Results of the Kielisch Impact Studies

31. The eight "impact studies" in the Kielisch Submission are as follows:

A. *Kielisch Study No. 1*: A statistical multiple regression analysis of land values in Christian, Logan, Macon, and Sangamon counties in Illinois resulting in a conclusion by Mr. Kielisch that a transmission line easement "had an impact equal to 2.47 times the easement size (in acres) divided by the total acres of the encumbered parcel" and on a four acre easement area on a 60 acre farmland property would result in a negative impact of -16.5%.

B. *Kielisch Study No. 2*: A review[27] of a statistical multiple regression study in Wisconsin undertaken by Professor Thomas Jackson of Texas A&M University resulting in a conclusion by Mr. Kielisch that the study indicated an impact from a transmission line equal to 2.43 times the easement size in acres divided by the total acres of the encumbered parcel.

[27] It is not clear what role Mr. Kielisch had in the review of the Jackson study. The Kielisch Submission describes the review as having been undertaken by Mr. Jim Sanders, a real estate appraiser based in Arizona, and Professor Peter Colwell who teaches at the University of Illinois in Champaign/Urbana, Illinois

C. *Kielisch Study No. 3*: A "paired sales analysis" in two Kansas counties involving prices paid for farmland "with and without" HVTL transmission lines resulting in a conclusion by Mr. Kielisch that the negative impact from the transmission line was -23% to -24%.

D. *Kielisch Study No. 4*: A simple regression analysis and paired sales analysis in Marathon County, Wisconsin involving prices paid for farmland and residential land "with and without" HVTL transmission lines resulting in a conclusion by Mr. Kielisch that negative impacts on prices from power lines ranged from -15% to -34% depending on the manner in which the power line traversed the properties.

E. *Kielisch Study No. 5*: A comparison of one sale of 78.05 acres of farmland in Tuscola County, Michigan, traversed by a transmission line to 12 "comparable properties" without a transmission line resulting in a conclusion by Mr. Kielisch that the negative impact on the value of the 78.05-acre parcel was between -16% and -18%.

F. *Kielisch Study No. 6*: A paired sales analysis of four competitive bid sales in Tuscola County, Michigan, involving two properties that were not traversed by a transmission line resulting in a conclusion by Mr. Kielisch that the transmission line had a negative impact on the value of -20%.

G. *Kielisch Study No. 7*: A paired sales analysis involving farmland sales in St. Clair County, Michigan, involving properties with and without transmission lines resulting in a conclusion by Mr. Kielisch that the transmission line negative impact on the prices ranged from -11% to -24% depending on the manner in which the power line traversed the properties and had an average impact "across the spectrum" of locations of -16%.

H. *Kielisch Study No. 8*: Two paired sales analyses[28] involving farmland in Stearns County, Minnesota resulting in a conclusion that the transmission lines had a negative impact on values ranging from -16% to -26% depending on the manner in which the power line traversed the properties.

32. In addition to the eight studies discussed by Mr. Kielisch in the testimony portion of his submission, Schedule KCC-7 accompanying the submission contains a ninth study involving a comparable sales analyses of cropland and rural residential home site prices in Stearns County, Minnesota, resulting in a conclusion by Mr. Kielisch that negative impacts on prices from power lines ranged from -12% to -22% depending on the manner in which the power lines traversed the properties.

33. The Kielisch Submission (page 33) summarized his conclusions from his eight studies as follows: "Our studies indicated the impact of a 345kV HVTL on overall land value ranged [from] -10%,

[28] The analysis is reported to have been done by Meeks Appraisal & Consulting, Inc. It is not clear from the Kielisch Submission if Mr. Kielisch had a role in the analysis.

upwards to -34%, with the impacts dependent on the location of the easement, size of the line, size of the encumbered parcel and support structures" and that "HVTL easements have a much greater impact than 100% of the underlying fee value of the easement itself."

SUMMARY OF THE ERRORS IN THE KIELISCH IMPACT STUDIES REVIEWED

Introduction: The Five Kielisch Impact Studies Reviewed

34. We have undertaken a detailed review and analysis of the following five of the eight Kielisch impact studies:[29] Impact Study No. 1 involving central Illinois farmland; Impact Study No. 4 in Marathon County, Wisconsin; Impact Studies No. 5 and No. 6 in Tuscola County, Michigan, and Impact Study No. 7 involving St. Clair County, Michigan. The Kielisch impact studies fall into two groups as follows: (1) statistical multiple regression model studies (Study No. 1 and No. 2) and (2) matched pairs, or paired sales analysis studies (Studies No. 3 through 8 plus the ninth study referenced in Schedule KCK-7).

Summary of the Most Significant Errors in the Kielisch Impact Studies Reviewed

35. The most significant errors in the Kielisch statistical multiple regression model study (Study No. 1) may be summarized as follows:

A. There are too few sales (observations) to support the number of variables tested and then specified in the models resulting in unsupported results. When only a few additional sales are added to the model, the results change dramatically and do not support the conclusion by Mr. Kielisch.

B. The study includes an inappropriate outlier in the multiple regression model. When that outlier is excluded and the model is run in a simple linear specification, the result of the model changes dramatically and it does not support the conclusion by Mr. Kielisch.

36. The most significant errors in the Kielisch matched pairs (paired sales analysis) studies reviewed by us (Studies No. 4 through No. 7) may be summarized as follows:

A. The studies resort to "data mining" – sometimes called "cherry picking -- of sales that significantly bias some of the matched pairs studies. When additional sales are added to the paired sales analysis, the results of the analyses change significantly and do not support the conclusions by Mr. Kielisch.

[29] Kielisch submitted his backup file producton on 2/9/17. Those files were transmitted to us on 2/13/17. As of the date of this report, we have had only eight days to review and analyze the data and information in those files. As a result, only five of his impact studies have been reviewed as of the date of submission of this expert report and declaration.

B. The studies include unsupported adjustments to prices paid and fail to make other adjustments that should have been made to sales prices used in some of the studies. When necessary corrections are made to the adjustments and other appropriate adjustments are added, the results of some of the studies do not support the conclusions by Mr. Kielisch.

C. Sales in one submarket are compared to sales in another submarket rather than to sales in the same submarket.

ANALYSIS AND CORRECTION OF THE ERRORS IN THE KIELISCH MULTIPLE REGRESSION MODEL

Recognition by the Appraisal Profession of the High Error Rates and Inaccuracies Inherent in Multiple Regression Modeling

37. A statistical multiple regression model is a form of automated valuation model, or AVM. Standards of professional practice of the appraisal profession recognize that AVMs including multiple regression models are subject to a high error rate and are subject to manipulation to achieve predetermined results (bias).

38. Because of their inaccuracies, the home lending industry has not been widely utilizing AVMs that incorporate multiple regression models to determine the value of individual properties for mortgage origination: “The reluctance to use this product (AVMs) for first mortgages is due to uncertainty concerning the reliability of the product in high loan-to-value situations.”[30] According to the Appraisal Institute, the largest professional organization of real estate appraisers, "AVMs are rarely accepted by mortgage investors." (*Appraiser News Online*, June 1, 2004).

39. The inaccuracy of mass appraisal techniques is specifically recognized by the Appraisal Standards Board USPAP Standard 6: "It is implicit in mass appraisal that, even when properly specified and calibrated mass appraisal models are used, some individual value estimates will not meet standards of reasonableness, consistency, and accuracy."[31]

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[30] Mark R. Linne, MAI, CRE, ASA, FRICS, “A Vision for Valuation: Automated Valuation Models and Appraisal Practice,” paper presented at the 23rd Pan Pacific Congress of Appraisers, Valuers and Counselors, San Francisco, CA, September 16-19, 2006. AVMs have also begun to be used by some lenders “for internal purposes, either in a quality control environment as an appraisal review tool or for funding on high-quality loans that were kept within the institution such as home equity loans.” Victoria Cassens Zillioux, “Automated Valuation Models: Automation vs. Hybrid,” paper presented at the 23rd Pan Pacific Congress of Appraisers, Valuers and Counselors, San Francisco, CA, September 16-19, 2006.

[31] USPAP 2016-2017 Edition, Standard 6: Mass Appraisal, Development and Reporting, Standards Rule 6-7, Lines 1388-1390.

40. The Appraisal Institute in its book on valuation modeling comments as follows: "Most AVMs are good at estimating the value of properties with homogeneous property characteristics and location factors. With appraiser-based market estimate modeling, however, the valuation process that an appraiser uses can be more refined and meaningful because it may better reflect the concerns that the actual real estate market mechanism presents in a defined neighborhood."[32]

41. A number of academic researchers – including Professor Peter Colwell who was involved in both Kielisch Impact Study No. 1 and No. 2 -- have found that multiple regression modeling falls short when measured against the traditional sales comparison approach using an adjustment grid to determine values. Colwell, Cannaday and Wu in an early article in the *AREUA Journal* compared regression analysis to traditional adjustment grid methods used by appraisers. The authors' comparison "makes clear the superiority of the grid approach over a pure regression approach" in the analysis situation evaluated.[33]

42. The Colwell, Cannaday and Wu article, as well as an article by Professor Vandell,[34] attribute the superiority of properly weighted comparable sales over regression modeling to a fundamental problem of every multiple regression model – it cannot "solve" for every variable affecting the price and value of a particular property.[35]

43. A seminal article by Lentz and Wang attributed a "high standard error" as the central problem in relying on the output of regression modeling: "*The Real Problem*. One of the most serious problems involved with the application of the regression method to appraisals has yet to be adequately addressed in the literature: the large standard error of the regression estimate. The high standard error of estimates reported in most hedonic studies might render the fitted values useless (for example, see the standard errors reported in Vandell, 1991, Tables 2 and 3). Indeed, when the standard error of estimate is normally 10% to 30% of the estimated value of residential properties, we fail to see that the appraisal can contribute very much to the underwriting process."[36]

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[32] *A Guide to Appraisal Valuation Modeling*, Appraisal Institute (2000), p. 41.
[33] Peter F. Colwell, Roger E. Cannaday, and Chunchi Wu, "The Analytical Foundations of Adjustment Grid Methods," *AREUEA Journal*, Vol. 11, No. 1., 1983, 11, at 27. See also, Kerry D. Vandell, "Optimal Comparable Selection and Weighting in Real Property Valuation," *AREUEA Journal*, Vol. 19, No. 2., 1991, 213, at 236.
[34] Kerry D. Vandell, "Optimal Comparable Selection and Weighting in Real Property Valuation," *AREUEA Journal*, Vol. 19, No. 2., 1991, 213.
[35] "Pure regression prediction suffers from an omitted variable problem. . ." Colwell, Cannaday, and Wu, supra, at 26.
[36] George H. Lentz and Ko Wang, "Residential Appraisal and the Lending Process: A Survey of Issues," *Journal of Real Estate Research*, Vol. 15, Numbers 1/2, 1998, p. 19.

Regression Modeling and Standards of Professional Appraisal Practice

44. Standards of professional appraisal practice require a regression model to contain a sufficient number of sales to assure a statistically reliable multiple regression model.

A. The various textbooks, courses and seminars of the appraisal profession make it very clear that for a multiple regression model to be reliable, the number of sales -- also called the "number of observations," the "data set," or the "sample" -- "will have to be large enough to accommodate all of the variables you may need to include in the model."[37]

B. The 14th Edition of *The Appraisal of Real Estate* (p. 746) states that there is an important relationship between the number of observations (number of sales) and the number of independent variables specified in the model: "Since R^2 and the ability to generalize from a sample to a population are affected by the ratio of *n* [number of observations or sales] to *k* [number of independent variables], many researchers suggest that the minimum ratio should be in the range of 10 to 15 observations per independent variable, with a ratio of 4:1 to 6:1 as an absolute minimum."

C. The Appraisal Institute book entitled *An Introduction to Statistics for Appraisers* says the following about the proper relationship between the number of sales (observations or data set) and the number of independent variables in the model: "(T)he size of the data set puts constraints on how many variables that data set will accommodate. A good rule of thumb is to include at least 10 to 15 observations per independent variable. That is, $n/k \geq 10$ to 15. Hair, et al. suggest an absolute minimum of $n/k \geq 6$ to 10. When the ratio of n to k is too low, model fit and prediction statistics can be misleading. Therefore, caution is advised whenever $n/k < 10$. Dielman notes that 30 observations plus 10 to 20 per additional independent variable is also often suggested as a rule of thumb."[38]

Summary of Limitations and Errors in the Kielisch Impact Study No.1 and No. 2 Regression Models

45. Neither Kielisch Impact Study No. 1 nor Impact Study No. 2 contain a sufficient number of sales to support a statistically reliable multiple regression model.

A. The Kielisch Submission (page 84) states that his Impact Study No. 1 regression model uses a total of only 70 sales of which six involved sales of farmland crossed by a transmission line and

[37] Marvin L. Wolverton, PhD, MAI, *An Introduction to Statistics for Appraisers*, The Appraisal Institute, 2009, at p. 159.

[38] Marvin L. Wolverton, PhD, MAI, *An Introduction to Statistics for Appraisers*, The Appraisal Institute, 2009, Chapter 10, "Multiple Linear Regression Analysis," at pp. 323-324. The Hair, et al. reference is to J. F. Hair, R. E. Anderson, R. C. Tatham, and W. C. Black, *Multivariate Data Analysis with Readings*, 3rd Edition, Macmillan, 1992. The Dielman reference is to T. Dielman, *Applied Regression: Analysis for Business and Economics*, 3rd Edition, Duxbury/Thomson Learning, 2001).

64 did not.[39] [40] Mr. Kielisch initially specified the model with 21 independent variables and claims he tested the model[41] to see which of the variables "had a direct impact on value and only those data entries were then utilized in the final analysis."[42]

B. According to the generally accepted standards of professional appraisal practice cited above, a reliable regression model testing the impact on value of 21 variables would require a minimum of four to six sales (observations) per independent variable, or a data base containing at least 84 to 126 sales, and preferably, a data set containing 10 to 15 sales (observations) per variable or 210 to 315 sales to assure reliability. The data set utilized by Mr. Kielisch in Impact Study No. 1 was deficient.

C. Six sales on a transmission line barely meets the minimum number of "observations" required for a regression model and, as explained below, one of the six transmission line sales used by Mr. Kielisch is an "outlier" located adjacent to a coal fired power plant and contaminated coal ash disposal pond.

D. The Kielisch Submission (page 84) states that the Impact Study No. 2 Wisconsin regression model undertaken by Sanders and Colwell uses a total of only 91 sales of which sixteen involved properties with a transmission line.[43] There are 18 "explanatory" (independent) variables in the Sanders/Colwell model (Table 3, p. 20), or five "observations" per variable, which barely meets the minimum requirement of four to six observations per independent explanatory variable, and falls far short of the optimal standard of at least 10 to 15 observations per variable which would require a data set of at least 180 to 270 sales.[44]

46. Kiliesch Impact Study No. 1 involving central Illinois farmland contains an "outlier" located next to an electrical generating power station and coal ash waste pit that dramatically skews the outcome of the model. As defined in the 6th Edition of *The Dictionary of Real Estate Appraisal*, an "outlier" is "an observation with an extreme value (outside of the typical range)."

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[39] The regression model specified in the full 2015 Kielisch central Illinois study contained 71 sales of which he claims eight – not six – were reported to involve farm properties containing transmission lines. However, of the 71 sales, only seven – not eight – were traversed by transmission lines. Forensic Appraisal Group, "Central Illinois HVTL Study on Agricultural Land," April 15, 2015.

[40] The Kielisch Submission in this Missouri proceeding says his original 2015 study was updated in 2016 (Kielisch Submission, page 84).

[41] Mr. Kielisch has not provided the results of his test runs of the model.

[42] Forensic Appraisal Group, "Central Illinois HVTL Study on Agricultural Land," April 15, 2015, at 11.

[43] Peter F. Colwell and Jim L. Sanders, "The Impact of Electric Transmission Lines on the Value of Farmland," 2015

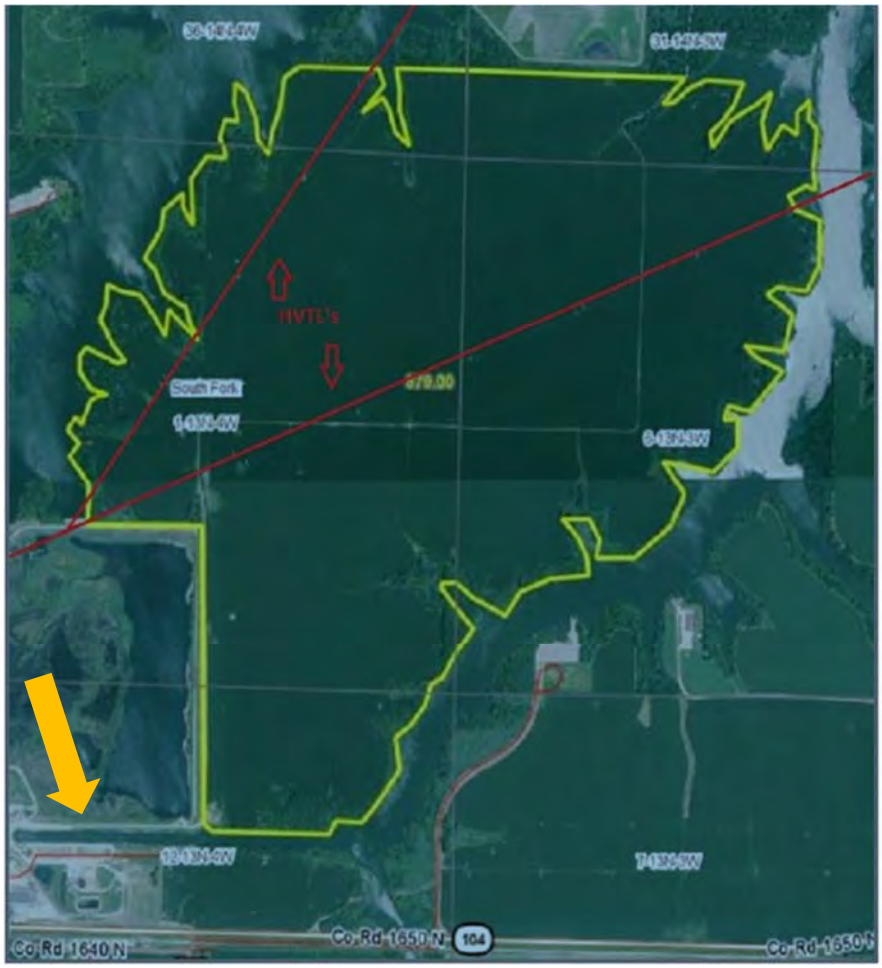
[44] Of the 18 variables in the Sanders/Colwell Wisconsin model, 11 involve county locations included to determine if farmland prices vary by county in Wisconsin. However, for five of the 11 counties included in the model specification, there are five or fewer sales included.

A. As indicated above, the Kielisch Impact Study No. 1 relies on seven sales of farmland crossed by transmission lines. The seven transmission line sales contained in his 2015 report, total acreage involved, the sale price per acre, date of sale, and their county location are shown in the following table organized by size from smallest acreage to largest.

Kielisch Central Illinois Study Transmission Line Sales				
Kielisch Sale ID No.	**Acres**	**$/Acre**	**Date of Sale**	**County**
Laenna-VA-007-H	30.0	$6,500	3/21/2011	Logan
Maroa-VA-011-H	77.750	$12,540	4/11/2014	Macon
Lanelle-VA-003-H	80.000	$13,500	5/3/2013	Sangamon
Laenna-VA-006-H	130.000	$9,500	4/27/2012	Logan
Mounurn-VA-003-H	166.500	$9,044	1/3/2014	Christian
Mounurn-VA-002-H	166.500	$9,009	3/24/2014	Christian
Soutork-VA-004-H	879.900	$5,876	12/26/2012	Christian

B. Note that the last sale in the table above contains 879.9 acres, or five times more acreage than the next largest transmission line sale, and eight times larger than the average of the acreage involved in the other seven sales, which makes it an "outlier" simply by comparison to the other seven transmission line related sales. Its status as an outlier is made especially clear by plotting its size compared to all 71 sales included in the data set used by Mr. Kielisch in his model, as shown below.

C. But there is another even more significant problem related to the 879.9 acre sale – it is located adjacent to a large coal fired power plant operated by Dominion Energy Services Company. Below is the map that appears in the Kielisch Submission showing the location of the sale identified by him as Soutork-VA-004-H in Christian County.



At the very bottom left corner of the map, the arrow points to the location of the Dominion Kincaid Generation Station, a coal fired power plant. It is a 1,319 MW power plant constructed in 1967 and 1968. Adjacent to the plant itself is the impoundment lagoon for the coal ash generated by the plant. According to SourceWatch, the Kincaid Generation Station is the 80th most polluting coal fired plant in the United States when measured by coal combustion waste stored in surface impoundments and in April of 2013, Dominion agreed to pay a $3.4 million civil penalty and spend $9.75 million on environmental mitigation projects to resolve Clean Air Act violations at the Kincaid power plant and two other coal-fired power plants in other states.[45] Below is a Google satellite map view and view of the plant from Highway 104.

[45] http://www.sourcewatch.org/index.php/Kincaid_Generating_Station

D. Although the description by Mr. Kielisch of the 879.9-acre farm parcel involved in his Sale No. Soutork-VA-004-H notes that "the land is located NE of substation and abuts a parcel in the SW that contains industrial waste," there is no mention of the power plant or the size or magnitude of the coal ash impoundment area that holds the industrial waste. A number of published studies have found significant impacts on land values due to proximity to coal fired power plants.[46]

E. Given the issues associated with that 879.9-acre transaction, Mr. Kielisch should not have used it as a transmission line sale.

[46] See, for example, Davis, Lucas W., "The Effect of Power Plants on Local Housing Values and Rents." May, 2010.; Blomquist, Glenn, "The Effect of Electric Utility Power Plant Location on Area Property Value." Land Economics, 1974. See also, Tolley, G.S., "Effects of the Proposed Indeck Facility on Property Values, Land Use and Tax Revenues," Unpublished paper, RCF Economic and Financial Consulting, Inc. Reports, 2000.

Conclusion Resulting from Correcting the Kielisch Errors in Impact Study No. 1

47. We have replicated the Kielisch regression model and rerun it without the sale adjacent to the Kincaid Generation Station. When that sale is excluded, and a linear regression model is run, it shows that the impact of transmission lines is only 0.91 times the value of the actual easement area -- not 2.47 times the value of the easement area as claimed by Mr. Kielisch.

48. That result of the corrected Kielisch central Illinois Impact Study No. 1 regression model would then indicate the following range of impacts on value to the entirety of acreage in each of the seven transmission line sales included in the Kielisch central Illinois study.

Kielisch Conclusion Compared to Corrected Central Illinois Regression Model							
Kielisch Sale ID No.	**Acres**	**Easement Acreage**	**Ratio of Easement to Entire Acreage**	**Kielisch Impact Conclusion**	**Kielisch % Impact on Value Conclusion**	**Corrected Regression Model Impact Result**	**Corrected Indicated Impact on Value of Entire Parcel**
Laenna-VA-007-H	30.0	1.00	3.33%	2.47	**-8.23%**	0.91	**-3.03%**
Maroa-VA-011-H	77.750	4.604	5.92%	2.47	**-14.62%**	0.91	**-5.39%**
Lanelle-VA-003-H	80.000	4.24	5.30%	2.47	**-12.09%**	0.91	**-4.82%**
Laenna-VA-006-H	130.000	1.73	1.33%	2.47	**-3.29%**	0.91	**-1.21%**
Mounurn-VA-003-H	166.500	12.70	7.63%	2.47	**-18.85%**	0.91	**-6.94%**
Mounurn-VA-002-H	166.500	12.70	7.63%	2.47	**-18.85%**	0.91	**-6.94%**
Soutork-VA-004-H	879.900	80.24	9.12%	2.47	**-22.53%**	0.91	**-8.30%**

49. The range in the corrected impacts is between -1.21% and -8.30%, with an average impact of -5.23% and a median impact -5.39%. By comparison, the average of incorrect calculations by Mr. Kielisch

is -14.07% and the median is -14.62%. As a result, Mr. Kielisch has overstated the impacts in central Illinois by more than 160%.

50. The Kielisch central Illinois Impact Study No. 1 has therefore dramatically overstated the effect on value of the presence of a transmission line on farm properties.

51. The corrected central Illinois study is in line with the published peer reviewed literature. More than half of the published research relating to potential impacts of transmission lines on property values has found no adverse impact on prices and values. When studies do find impacts, the range is typically between 1% and no more than 10%.

ANALYSIS AND CORRECTION OF THE ERRORS IN THE KIELISCH PAIRED SALES STUDIES

Introduction: Summary of the Problems and Errors in the Kielisch Paired Sales Studies

52. Kielisch Impact Studies No. 4 through No. 7 involved paired sales analysis, also called "matched pairs" analysis or "paired data analysis. The principal problems and errors in the Kielisch paired sales studies reviewed by us are as follows:

A. An insufficient number of sales to support a viable paired sales conclusion.

B. Lack of support for adjustments.

C. Comparing prices paid in one submarket area to prices paid in another submarket rather than in the same submarket.

Standards of Professional Appraisal Practice and Paired Data Analysis

53. Paired data analysis is defined in the 6th edition of *The Dictionary of Real Estate Appraisal* as follows: "A quantitative technique used to identify and measure adjustments to the sale prices or rents of comparable properties. To apply this technique, sales or rental data on nearly identical properties, or adjusted data, is compared to isolate and estimate a single characteristic's effect on value or rent."

54. The 14th Edition of *The Appraisal of Real Estate* (pages 398-399) provides the following warnings about "paired data analysis:"

A. "Paired data analysis should be developed with extreme care to ensure that the properties are truly comparable and that other differences do not exist, such as improvements made subsequent to the sale or additional approvals that had to be obtained."

B. "Although paired data analysis of sales or rents is a theoretically sound method, it may be impractical and produce unreliable results when only a narrow sampling of sufficiently similar properties is available."

C. "A lack of data can make quantifying the adjustments attributable to all the variables a difficult process."

D. "An adjustment derived from a single pair of sales is not necessarily indicative, just as a single sale does not necessarily reflect market value."

E. "Special care must be taken when relying on pairs of adjusted prices because the difference measured may not represent the actual difference in value attributable to the characteristic being studied. The difference may include other aspects of the property, not just the one characteristic being studied."

Errors in the Kielisch Impact Study No. 4

55. Kielisch Impact Study No. 4 involves an analysis of sales of rural residential, agricultural and recreational land in Marathon County, Wisconsin. The full Kielisch study[47] claims to measure the impact on property value due to the presence of a 345kV electric transmission line known as the Arrowhead-Weston line, linking Duluth, Minnesota to Wausau, Wisconsin.[48] The study identifies a total of five so-called "power line" sales and ten sales of land unencumbered by the power line between the years of 2003 and 2005.[49]

56. The Kielisch Marathon study (page 3) claims to include "all sales of comparable size and use that were not encumbered by the power line in the townships of the encumbered sales"[50] during the years studied. The study includes a total of eleven unencumbered sales but ultimately relies upon a total of ten unencumbered sales. To account for appreciating land values over the three-year study period, a 10% per

[47] *An Impact Study of a 345kV Electric Transmission Line on Rural Property Value in Marathon County, Wisconsin*. Kurt C. Kielisch, IFAS, of Appraisal Group One, Inc. Dated April 22, 2006.
[48] The Kielisch study acknowledges that the powerline did not yet exist in Marathon County during this time period, with construction occurring in Marathon County in 2007 and the line achieving energized status in early 2008. However, Kielisch states in his April 2006 study that sales along the powerline corridor occurred with full knowledge of the eventual placement of the transmission line. Easements allowing for the construction of the power line were generally in place before the property was transferred.
[49] The Keilisch study references nine sales, however, he assembles eleven sales and ultimately utilizes ten sales in his analysis. The discarded sale (at 15 acres) was presumably omitted because of its size.
[50] *An Impact Study of a 345kV Electric Transmission Line on Rural Property Value in Marathon County, Wisconsin*. Kurt C. Kielisch, IFAS, of Appraisal Group One, Inc. Dated April 22, 2006. Page 3.

year time adjustment is included.[51] The 15 sales in the Kielisch study range in size from 18 acres to 93 acres in size.

57. The claim by Mr. Kielisch that his study includes "all sales of comparable size and use that were not encumbered by the power line in the townships of the encumbered sales" is not accurate. Our investigation of the sales data obtained from the Marathon County land records website found seven additional sales during the Kielisch study 2003 to 2005 time period that were also not affected by the power line. These seven additional sales - located within the same townships as the power line sales[52] and in the same size range as the 10 Kielisch sales - sold at an average of $1,529 per acre (before time adjustment) and approximately $1,712 per acre when adjusted for their date of sale.[53] These unaffected value indications are nearly identical to the per acre average values of the power line sales, both on an unadjusted basis ($1,514 per acre) and after adjusting for time ($1,770 per acre).

58. By contrast, the ten unencumberd sales utilized by Kielish as "comparable" in "size and use" sold at an average price of $2,480 per acre, more than 60% higher than the sales that Mr. Kielisch should have, but did not, include in his study. The reason they sold at such a significantly higher price than the seven additional sales we found but not included by Mr. Kielisch is simple -- the 10 Kielisch unencumbered properties were generally superior to the power line properties in location, access, and intended use. For example, eight of the ten sales were purchased for construction of a single-family residence while only one of the power line sales was purchased for a homesite. One of the unencumbered sales was located adjacent to the Big Eau Plaine County Park in Green Valley township, well outside of the townships through which the power line corridor traverses. Two other sales are located in the southern reaches of Emmett Township between four and eight miles away along the Big Eau Plaine Resevoir and directly adjacent to a subdivision of expensive homes. Mr. Kielisch made no adjustments to account for differences in location, intended use, or development potential.

[51] The Kielisch study claims to have adjusted all sales to a common date of March 1, 2005, but our research and analysis is unable to confirm that such an adjustment was properly made. A date closer to October 2005 appears to be a more likely date based on our review of the data and charts included in the Kielisch study.
[52] And, in fact, located in close proximity to, yet not adjacent to, the power line corridor. The seven sales ranged from between 0.5 and 1.0 miles from the powerline.
[53] To account for appreciating land values over the three-year study period, Kielisch makes a 10% per year time adjustment. The Kielisch study claims to have adjusted all sales to a common date of March 1, 2005, but our research and analysis is unable to confirm that such an adjustment was properly made. A date closer to October 2005 appears to be a more likely date based on our review of the data and charts included in the Kielisch study.

59. By comparison, the seven unencumbered sales we found – and not considered by Mr. Kielisch – are located in the same townships as the power line sales and all but one not involve purchases for construction of a single-family residence. Their average price was $1,529 per acre (before time adjustment) and approximately $1,712 per acre when adjusted for their date of sale, nearly identical to the per acre average prices paid for the power line sales, both on an unadjusted basis ($1,514 per acre) and after adjusting for time ($1,770 per acre).

Conclusion Resulting from Correcting the Kielisch Errors in Impact Study No. 4

60. The Kielisch Impact Study No. 4, therefore, when corrected, indicates no effect of a transmission line corridor easement on prices and values.

Introduction to Kielisch Impact Study No. 5 and No. 6

61. Kielisch Impact Study No. 5 and Impact Study No. 6 both involve matched pairs analysis involving transmission line sales in Tuscola County, Michigan. In Impact Study No. 5, Mr. Kielisch compares the price paid for one 78.05-acre farmland sale with a transmission line to the prices paid for 12 farmland properties without a transmission line. In Impact Study No. 6, Mr. Kielisch compares the price paid for one 20-acre farm parcel with a transmission line to the prices paid for three nearby farm properties without a transmission line. When the two studies are considered together, they do not support the Kielisch conclusion of negative impacts on value between -16% and -20%.

Errors in Kielisch Impact Study No. 6

62. Kielisch Impact Study No. 6 involves the sale by a family trust of four farm properties in Fairgrove Township in Tuscola County, Michigan. Two of the parcels were transected by a 345kV electric transmission line while the other two were not. One of the two parcels with a transmission line also contained a wind turbine. One of the unencumbered properties had a small residence on it. The four properties were reported by Mr. Kielisch to have been sold "on the same day by competitive bid." (Kielisch Submission, p. 86)

63. Mr. Kielisch claims that he compared the prices paid for the two parcels with transmission lines to the prices paid for the two parcels that did not, and, "after making adjustments for the wind lease income and the residential improvement, the matched pair indicated the HVTL had a -20% impact on the overall property value." (Kielisch Submission, p. 86)

64. However, the file documentation produced by Mr. Kielisch to support his Impact Study No. 6 contains significant misrepresentations and errors:

A. The "Comments" to the "Matched Pairs Analysis" table produced by Mr. Kielisch claims he contacted the Seller's attorney, Mr. Henry Knier, who "stated that the HVTL did negatively influence the value of the land." To verify the accuracy of that statement, my Clarion colleague Mr. Charles T. Brigden called Mr. Knier on February 15, 2017, to confirm the Kielisch claims about the transactions. When Mr. Knier was asked whether the presence of the transmission lines negatively affected the prices, he said "No, not all." When asked if he recollected ever making representations in the past that the presence of the transmission lines affected the prices paid, he responded "Absolutely not." That directly contradicts the Mr. Kielisch claim that Mr. Knier believed the presence of the transmission lines affected the prices paid.

B. Despite the claim by Mr. Kielisch that he analyzed "two" sales of properties with transmission lines, the matched pairs table he produced contains only one of the two sales – the lowest priced 20-acre sale at $8,000 per acre. The table does not contain the second of the two sales – an 80-acre parcel split off from the 20-acre parcel and containing a wind turbine as well as a transmission line that sold for $9,125 per acre.

65. Mr. Knier in our call with him stated that the $8,000 price paid for the smaller 20-acre parcel was affected by its lack of access – the property only had appeal to an adjoining owner since the parcel was landlocked and lacked road access. As a result, the price paid was less than its market value if it had access. In our experience with farmland property, an appropriate upward adjustment for lack of access is typically 10%, and in many cases higher. Adjusting the $8,000 per acre price upward by 10% to reflect its lack of access results in an adjusted price of $8,800 per acre.

66. One of the two unencumbered sales has what Mr. Kielisch describes as a "small home + barn" and he assigns it a value of $25,500 which he deducts from the sale price. Below is a photo of the house and barn from Google maps street view.

67. Based on the photos and the assessor's description of the house and barn, we consider the 6% adjustment by Mr. Kielisch to be too low. We collected sales of other recent sales of older farmhouses in Tuscola County. Those sale prices and information about the properties is included in the table below:

Address	Sale Price	Date of Sale	Acreage	House Size	Comments
4183 Ringle Rd.	$45,000	12/17/16	NA	2,200 sq. ft.	Historic house. 4BR & 1BA
4994 Slack Rd.	$64,000	4/22/15	0.65	1,590 sq. ft.	Built 1940. 3BR & 2BA
4058 Bradleyville Rd.	$77,000	8/5/15	1.75	1,364 sq. ft.	Built 1920. 3BR & 1BA
2057 N. Kirk Rd.	$55,000	1/26/17	1.03	1,440 sq. ft.	3BR & 1 BA
147 N. Vassar Rd.	$47,000	12/4/16	1.21	1,600 sq. ft.	Built 1940. 3BR & 1BA
7960 W. Gilford Rd.	$55,620	4/12/16	1.2	1,450 sq. ft.	3BR & 1BA

68. Deducting $10,000 to $15,000 for the value of the acreage involved in each of the home sales indicates that the price paid for the improvements was between $30,000 and $62,000.

69. Those sales support more than a $25,500 downward adjustment for the contributory value of the farmhouse on one of the Impact Study No. 6 sale properties. A 10% downward adjustment, indicating a contributory value of the house and barn of $42,500, is more appropriate, resulting in an adjusted price per acre for that unencumbered sale of $9,563 per acre.

Conclusion Resulting from Correcting the Kielisch Errors in Impact Study No. 6

70. The average of the $9,125 per acre price paid for the 80-acre parcel with the transmission line and the adjusted $8,800 per acre price for the smaller 20-acre parcel is $8,963 per acre. When compared to the $9,782 average of the two unencumbered sales ($10,000 per acre and improvement adjusted $9,563 per acre), the indicated impact on value due to the presence of a transmission line is a negative -8.37% -- not negative 20% as indicated by Mr. Kielisch.

71. Even when corrected, Kielisch Impact Study No. 6 discussed above provides little support for any significant conclusion concerning transmission line impacts since it is based on such a limited set of sales. As noted earlier in this report, the 14th Edition of *The Appraisal of Real Estate* states that "(a)n adjustment derived from a single pair of sales is not necessarily indicative, just as a single sale does not necessarily reflect market value."

Errors in Kielisch Impact Study No. 5

72. The other Kielish paired sales analysis (Impact Study No. 5) in Tuscola County, Michigan, matches 12 unencumbered farmland sales with one transmission line sale. The conclusion by Mr. Kielisch is that the paired sales analysis in Impact Study No. 5 shows a -16% to -18% impact due to the transmission line. However, a document produced by Mr. Kielisch indicates that the 12 non-transmission line sales are located in six different townships in Tuscola County and Mr. Kielisch makes the following upward adjustments for "location" to seven of the 12 sales without providing any explanation of the basis for the adjustments:

A. Akron Township (2 sales) – upward adjustment of 10%;
B. Columbia Township (2 sales) – upward adjustment of 17%; and
C. Denmark Township (3 sales) – upward adjustment of 16%.

73. The property on the transmission line is located in Gilford Township. Mr. Kielisch makes no upward adjustment for location to the three sales in Gilford Township. However, Mr. Kielisch also makes

no upward adjustment for location to two other sales – one in Almer Township and the other in Juniata Township.

74. It is possible that the basis for the Kielisch upward adjustments is their relative distance from the one transmission line sale used in his Impact Study No. 5 paired sales analysis. The table below shows the Kielisch Submission sales number, the township, the location adjustment, and the distance of each sale from the Gilford township transmission line property.

Kielisch Sale No.	Township Location	Upward Location Adjustment	Distance from Transmission Line Sale Property
Akron-VA-001	Akron	10%	8.50 miles
Akron-VA-002	Akron	10%	7.75 miles
Almer-VA-001	Almer	0%	10.0 miles
Columbia-VA-002	Columbia	17%	12.10 miles
Columbia-VA-003	Columbia	17%	12.30 miles
Denmark-VA-001	Denmark	16%	7.10 miles
Denmark-VA-002	Denmark	16%	7.20 miles
Denmark-VA-003	Denmark	16%	7.50 miles
Gilford-VA-001	Gilford	0%	2.20 miles
Gilford-VA-002	Gilford	0%	2.60 miles
Gilford-VA-004	Gilford	0%	2.30 miles
Juaiata-VA-001	Juniata	0%	4.40 miles

75. The four sales located closest to the Gilford transmission line property received a 0% location adjustment, as did a sale located 10.0 miles distant in Almer Township. Yet five sales located closer than 10.0 miles received larger adjustments than the Almer Township sale. Mr. Kielisch provides no explanation of these discrepancies in the location adjustments.

76. But even if distance from the transmission line sale is the criteria, Mr. Kielisch provides no explanation as to why those sales must be adjusted upward. Does Gilford Township have higher farmland sales prices than the other townships in Tuscola County? Is there another reason? If so, he should have explained the basis.

Conclusion Resulting from Correcting the Kielisch Errors in Impact Study No. 5

77. If we exclude the unsupported location adjustment, the comparison of the 12 prices (using the Kielisch prices adjusted for changes in market conditions) would be as follows:

Kielisch Sale No.	Township Location	Sale Price ($/Acre)	Time Adjusted Sale Price ($/Acre)
Transmission Line Sale	Gilford	$6,278	$6,278
Akron-VA-001	Akron	$6,500	$6,795
Akron-VA-002	Akron	$6,270	$6,609
Almer-VA-001	Almer	$7,468	$7,350
Columbia-VA-002	Columbia	$6,250	$6,198
Columbia-VA-003	Columbia	$6,412	$6,359
Denmark-VA-001	Denmark	$6,250	$6,289
Denmark-VA-002	Denmark	$7,304	$6,792
Denmark-VA-003	Denmark	$5,500	$6,215
Gilford-VA-001	Gilford	$6,643	$7,725
Gilford-VA-002	Gilford	$6,497	$6,378
Gilford-VA-004	Gilford	$7,183	$7,387
Juniata-VA-001	Juniata	$5,860	$6,864
Average of 12 Unencumbered Sales		**$6,511**	**$6,747**
Indicated Impact Due to Transmission Line Easement			**-6.95%**

Conclusion Resulting from Properly Comparing Sales in Impact Study No. 5 and No. 6 in Tuscola County on a Township by Township Basis

78. We can also combine the results of the two Tuscola County Kielish case studies and analyze the indicated impact of transmission lines. The Fairgrove Township sales in Kielisch Impact Study No. 6 are between 3.89 and 4.3 miles from the Gilford transmission line sale, a distance for which no location adjustment was made in the analysis by Mr. Kielisch.

79. The table below combines the two Kielisch studies, adjusting all prices to the most recent 2/12/2015 date of sale of the two transmission line sales involved in Impact Study No. 6. It indicates that when all of the Tuscola County sales considered by Mr. Kielisch in his two Tuscola County impact studies are considered, there is no impact from the presence of a transmission line on farmland prices and values

Kielisch Sale No.	Township Location	Sale Price ($/Acre)	Feb. 2015 Time Adjusted Sale Price ($/Acre)
Transmission Line Sale	Gilford	$6,278	$7,814
Transmission Line Sale	Fairgrove	$8,800	$8,800
Transmission Line Sale	Fairgrove	$9,125	$9,125
Average of 3 Transmission Line Sales		$8,068	$8,580
Akron-VA-001	Akron	$6,500	$8,458
Akron-VA-002	Akron	$6,270	$8,226
Almer-VA-001	Almer	$7,468	$9,149
Columbia-VA-002	Columbia	$6,250	$7,715
Columbia-VA-003	Columbia	$6,412	$7,915
Denmark-VA-001	Denmark	$6,250	$7,828
Denmark-VA-002	Denmark	$7,304	$8,454
Denmark-VA-003	Denmark	$5,500	$7,736
Gilford-VA-001	Gilford	$6,643	$9,615
Gilford-VA-002	Gilford	$6,497	$7,939
Gilford-VA-004	Gilford	$7,183	$7,387
Juniata-VA-001	Juniata	$5,860	$9,195
No. 2	Fairgrove	$9,563	$9,563
No. 3	Fairgrove	$10,000	$10,000
Avg. of 14 Unencumbered Sales		**$6,979**	**$8,513**
Indicated Impact Due to Transmission Line Easement			**+0.01%**

Errors in Kielisch Impact Study No. 7

80. The Kielisch Submission (page 29) states that his Impact Study No. 7 involves a comparison of six transmission line sales in St. Clair County, Michigan, with 12 unencumbered sales in the same county. Mr. Kielisch reports that his analysis "indicated that fence line locations has a minimum of a -11% impact and bisections a -24% impact" with an average of a "-16% impact across the spectrum without differentiating between locations."

81. Kielisch Impact Study No. 7 contains the following significant problems:

A. He makes large unsubstantiated adjustments differences in location when comparing sale prices in one township to sale prices in another township.

B. He uses only a small sample of available sales prices in his matched pairs analysis – when other publicly available sales data is included, there is no need to make large location adjustments.

C. When the additional sales are added, and the location adjustments eliminated, the corrected Kielisch matched pairs analysis indicates a significantly lower impact on prices and values.

82. The six transmission line sales used in the Kielisch Impact Study No. 7 are located in four different townships within St. Clair County – Berlin (one sale), Casco (two sales), China (two sales), and Columbus (one sale).

83. Rather than undertake an analysis on a township by township basis, Mr. Kielisch simply compares the combined set of six transmission line sales to another group of 12 sales in 10 townships.

84. The adjustment table included in the Kielisch document production contains a column for location adjustment. The table indicates that Columbus and St. Clair townships are considered the baseline. In other words, the location of all 18 of the sales in the table are adjusted based on some unstated and unsupported comparison between each township and Columbus and St. Clair townships. The number of sales in each township and the location adjustment made is summarized in the table below:

Township	No. of Kielisch Sales	Adjustment for Location
Unencumbered Sales		
Berlin	1	+18%
Columbus	2	0%
Emmet	1	+43%
Grant	1	+47%
Greenwood	2	+30%
Mussey	1	+31%
Brockway	1	+39%
Transmission Line Sales		
Berlin	1	18%
Casco	2	0%

China	2	0%
Columbus	1	0%

85. Neither the Kielisch Submission nor the documentation produced provides any support for, or analysis of, the differences between the township locations that resulted in the upward adjustments.

86. The sizes of the upward adjustments – between 18% and 43% -- are quite large. The need for such large adjustments is typically considered to be evidence that the sales selected are not truly "comparable" to the "baseline" properties needing no adjustment.[54]

Conclusion Resulting from Correcting the Kielisch Errors in Impact Study No. 7

87. We have searched the publicly available sales data sources for St. Clair County and found additional unencumbered sales in three of the four transmission line townships that could have been compared to the transmission line sale prices in the same township.[55] The comparisons are shown in the table below.

Kielisch Sale No.	Township Location	Size (Acres)	Sale Price ($/Acre)	Time Adjusted Sale Price ($/Acre)
Kielisch Transmission Line Sale	Berlin	78.76	$3,652	$4,034
Kielisch Berlin VA-002	Berlin	77.59	$3,544	$4,727
Clarion Berlin No. 1	Berlin	40.0	$2,500	$3,487
Clarion Berlin No. 2	Berlin	14.26	$3,927	$4,801
Clarion Berlin No. 3	Berlin	115.0	$2,922	$3,519
Clarion Berlin No. 4	Berlin	66.79	$4,866	$5,406
Clarion Berlin No. 5	Berlin	28.41	$2,675	$2,969
Clarion Berlin No. 6	Berlin	34.01	$4,999	$3,987
Clarion Berlin No. 7	Berlin	15.16	$5,000	$3,974

[54] For example, see the FHA residential appraisal handbook, Appendix D: Valuation Protocol for mortgage underwriting. It includes the following statements: "Be careful that adjustments are reasonable and not excessive. If a property is overvalued, there is a high probability that the reason can be traced to an excessive adjustment (p. D-29) and "If any adjustment is excessive, review the comparable sales to determine if the best ones were selected. If the total adjustments appear excessive in relation to the sale price; the appraiser should reexamine the comparability of that sale" (p. D-31)

[55] Since Kielisch does not utilize sales smaller than approximately 15 acres, we have also only considered sales of approximately 15 acres or larger.

Clarion Berlin No. 8	Berlin	39.65	$3,279	$2,334
Average of 9 Berlin Township Unencumbered Sales			**$3,746**	**$3,911**
Negative Impact from Transmission Line on Prices				**+3.14%**
Kielisch Transmission Line Sale	Casco	74.90	$3,004	$3,998
Kielisch Transmission Line Sale	Casco	77.65	$2,962	$3,863
Clarion Casco No. 1	Casco	55.27	$2,352	$3,395
Clarion Casco No. 2	Casco	81.30	$2,989	$2,615
Clarion Casco No. 3	Casco	16.49	$6,186	$4,820
Average of 2 Casco Township Transmission Line Sales			**$2,983**	**$3,931**
Average of 3 Casco Township Unencumbered Sales			**$3,842**	**$3,610**
Negative Impact from Transmission Line on Prices				**+8.89%**
Kielisch Transmission Line Sale	China	15.66	$2,235	$2,611
Kielisch Transmission Line Sale	China	18.04	$3,326	$3,280
Clarion China No. 1	China	107.93	$4,000	$4,776
Clarion China No. 2	China	29.28	$1,708	$1,795
Clarion China No. 3	China	18.00	$3,167	$3,280
Average of 2 China Township Transmission Line Sales			**$2,781**	**$2,945**
Average of 3			**$2,958**	**$3,284**

China Township Unencumbered Sales				
Negative Impact from Transmission Line on Prices				**-9.93%**

88. As indicated above, when sales are analyzed on an individual township basis rather than across townships, two of the three townships show positive impacts on value between +3.1% and +8.9% while one shows a negative -9.9% impact.

REVIEW OF THE HENKE REBUTTAL TESTIMONY

89. We have been provided with the rebuttal testimony of Intervenors' Property Witness Charles (and Robyn) Henke dated January 24, 2017. That testimony claims that prices paid at a November 2, 2016 land auction prove that power lines adversely impact property values.

90. According to representations made by the Henkes, a tract of land traversed by a transmission line sold at a significant discount when compared to the other two tracts sold on the same day in the same auction.

91. Based upon the limited information provided by the Henkes, it is not possible to determine if the differences in price paid per acre are attributable to the presence of the power line, or to other factors such as differences in soil/crop productivity, farm improvements including fencing, barns or silos, property configuration and access, or percentage of tillable land vs. non-tillable woodlands, wetlands and drainageways.

92. As noted earlier in my expert report and declaration, the generally accepted standards of the appraisal profession recognize the limitations of a such a limited matched pairs analysis. The following two statements in the 14th Edition of *The Appraisal of Real Estate* (pages 398-399) apply to the information produced by the Henkes:

A. "An adjustment derived from a single pair of sales is not necessarily indicative, just as a single sale does not necessarily reflect market value."

B. "Special care must be taken when relying on pairs of adjusted prices because the difference measured may not represent the actual difference in value attributable to the characteristic being studied. The difference may include other aspects of the property, not just the one characteristic being studied."

SUMMARY AND CONCLUSIONS

93. My review and analysis of the published real estate appraisal and real estate economics literature indicates that more than half of the published research relating to potential impacts of transmission lines on property values has found no adverse impact on prices and values. When studies do find impacts, the range is typically between 1% and no more than 10%.

94. The published farmland impact literature generally indicates that transmission lines have no impact on the price of farmland they cross. One study in Wisconsin found a small- 2.1% to -3.4% negative impact based on 88 transactions.

95. My study of farmland prices on and off existing transmission corridors in Christian County, Illinois, found no more than about a -2.0% impact on prices. My Christian County study also found that farmland with two transmission lines actually sold at a higher median price than farmland with one line.

96. My research into Sugar Ridge and River Ridge detached single-family home neighborhoods in South Elgin, Illinois indicates that there has been no adverse impact since 1995 on the prices of homes located either adjacent to an existing transmission line corridor or with views of the power lines and that the addition of a second power line did not adversely impact property prices or values.

97. My research into three townhouse projects in the Chicago metro area (Coventry in Lake in the Hills, Concord Pointe in Carol Stream, and Hampton Park in Naperville) indicates there has been no impact on prices of townhomes located in proximity to the transmission line corridors and power lines located adjacent to them.

98. My review of the Kielisch Submission indicates the following:

A. The published professional real estate literature he references generally agrees with my research into the literature, in that it often finds no impact on prices and values, and when impacts are found, they are typically quite low. The Kielisch Submission summary of the literature contradicts the conclusions of higher negative effects in his impact studies.

B. The regression model used in Kielisch Impact Study No. 1 contains an outlier that should not have been included. When the model is run as a linear regression with the outlier, it does not support the conclusion by Mr. Kielisch that the impact of an easement significantly exceeds the value

of the easement area. Instead, the impact of the presence of the transmission line is less than the value of the easement area on the farmland parcel.

C. The four Kielisch paired sales analyses reviewed by us have significant errors. When the errors are corrected, they do not support the conclusions by Mr. Kielisch of negative impacts on property values. The conclusions of Mr. Kielisch and the corrected outcomes are shown below:

Kielisch Impact Study	Kielisch Impact Conclusion	Corrected Impact Conclusion
No. 1	Impact significantly greater than easement area value	Impact less than easement area value
No. 4	Negative impact of -15% to -34% depending on the manner in which the power line traversed the properties.	No impact
No 5 & No. 6	Negative impact of -16% to -20%	No impact to -7.0% impact
No. 7	Negative impact of -11% to -25% depending on manner in which the power line traverses the property and an average negative impact of -16%	Possible positive impact from transmission lines to no more than a -9.9% impact

99. The conclusion of Mr. Kielisch that the impact on value of a transmission line easement exceeds 100% of the value of the easement encumbered area of a farm property is not supported by his corrected impact studies.

100. The information submitted to support the testimony of Intervenors' Property Witness Charles (and Robyn) Henke alleges that a tract of land (traversed by a transmission line) sold at a discount when compared to the other two tracts sold on the same day at auction is insufficient to support their claim.

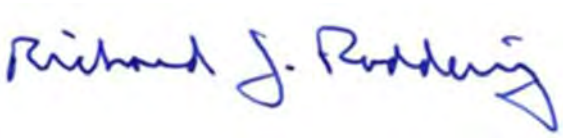
101. Because the impact on value of a transmission line easement is typically less than 100% of the market value of the area crossed by the easement, owners of farmland will receive adequate compensation from the Grain Belt Express proposal to pay 110% of the market value of each acre of farmland to be acquired. Grain Belt Express will also make additional payments for structures and impacts on farming operations resulting from construction and maintenance of the proposed transmission line. In addition, the Grain Belt Express project is unlikely to have any negative impact on prices or market value of adjacent lands including land with future development potential. Market value for purposes of the fee simple interest in property considered in this assignment is defined as follows: "Market value is the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would have sold on the effective date

of the appraisal, after a reasonable exposure time on the open competitive market, from a willing and reasonably knowledgeable seller to a willing and reasonably knowledgeable buyer, with neither acting under any compulsion to buy or sell, giving due consideration to all available economic uses of the property at the time of the appraisal." (Interagency Land Acquisition Conference, *Uniform Standards for Federal Land Acquisitions*, Washington, D.C. 2000, Section B-2, p. 30)

102. This expert report is subject to the Certification in the Addenda (Exhibit D).

103. I, Richard J. Roddewig, certify under penalty of perjury that this report and the items attached to it are true and correct.

By:



Richard J. Roddewig, MAI, CRE, FRICS

Date: February 21, 2017

NOTARY PAGE

State of Illinois
County of Cook
This instrument was acknowledged before me on the 21st day of February, 2017, by Richard J. Raddewig.

(SEAL)

DOUGLAS G. KOSKE
OFFICIAL SEAL
Notary Public - State of Illinois
My Commission Expires
December 10, 2017

Illinois Notary Public

EXHIBITS

EXHIBIT A:
RICHARD J. RODDEWIG, MAI, CRE, FRICS
GENERAL QUALIFICATIONS AND LIST OF PUBLICATIONS

GENERAL QUALIFICATIONS OF
RICHARD J. RODDEWIG, MAI, CRE, FRICS
CLARION ASSOCIATES, INC.

PROFESSIONAL HISTORY

Present	President - Clarion Associates, Inc.
Prior	Senior Principal - Pannell Kerr Forster, 1987-1988
	Senior Vice President - Shlaes & Co., Real Estate Counselors and Appraisers, 1986-1987
	Vice President and General Counsel, Shlaes & Young Information Systems, 1982-1986
	Consultant - Shlaes & Co., 1978-1986
	Attorney-at-law - Roddewig and Associates, 1976 to 1977; 1978-1987; 1988 to 1992.
	Research Attorney - Northeastern Illinois Planning Commission, 1977-1978
	Associate and Attorney - Ross & Hardies, Chicago, 1973-1976
	Staff Attorney and Consultant in Australia, International Comparative Land Use Project - The Conservation Foundation, Washington, D.C., 1974-1975
	Adjunct lecturer - Governors State University, Park Forest South, Illinois, 1978; Northeastern Illinois University, Chicago, Illinois, 1979; School of Urban Sciences, University of Illinois at Chicago Circle, 1979 to 1987; School of History of Art and Architecture, University of Illinois at Chicago Circle, 1985 to 1989; Department of Finance, DePaul University, Chicago, Illinois, 1990 to Present.

AREAS OF SPECIAL COMPETENCE

Real estate consulting practice concentrated on appraisals, feasibility studies, and market studies of larger residential, retail, commercial office, industrial, hotel and motel properties and vacant sites. Special concentration in valuation of historic structures, contaminated property, and special purpose properties. Legal experience in real estate, income tax, land use and zoning, and historic preservation.

REPESENTATIVE MAJOR PROJECTS

Real estate appraisal and consulting assignments on projects in more than 50 cities and 40 states.

Qualified as an expert witness before arbitration panels and in federal and state courts in Arizona, Colorado, Alaska, Minnesota, Illinois, Maryland, West Virginia, Tennessee, Mississippi, Louisiana, Florida, Texas and Pennsylvania.

Directed appraisal of 1300 miles of railroad right-of-way for federal bankruptcy trustee.

Consultant to City of Chicago Department of Planning on revisions to Chicago Zoning Ordinance.

Valuation of more than 100 historic preservation easements donations for private developers and the Internal Revenue Service.

Valuation consultant and expert witness for $20.0 million township open space acquisition program.

Analysis of impacts of contamination and environmental risks on neighborhoods, markets and properties in cities, towns and rural areas in approximately 25 states including Alaska, Hawaii, California, Washington, Wyoming, Colorado, Missouri, Minnesota, Wisconsin, Illinois, Michigan, Indiana, Ohio, Pennsylvania, West Virginia, Maryland, New Jersey, New York, Connecticut, Massachusetts, South Carolina, Georgia, Florida, Louisiana, Alabama and Mississippi.

Analysis of appropriate methodology for determining impact of Hurricane Katrina on property prices and values in New Orleans, Louisiana.

Consulting and expert testimony for Exxon concerning impact of *Exxon Valdez* oil spill on land markets and property values in Alaska.

Valuation of landfills in Colorado and Pennsylvania.

Valuation of water storage and irrigation district properties in Colorado and Alberta, Canada.

Valuation of all privately owned real estate at the South Rim of Grand Canyon National Park.

Valuation of the Saturn integrated automobile manufacturing and assembly plant in Spring Hill, Tennessee.

EDUCATION

Master of Arts - University of Chicago
Juris Doctor - University of Chicago
Bachelor of Arts (Summa cum Laude) - University of Notre Dame

PUBLICATIONS

Author, co-author, or contributor to fourteen books and more than fifty monographs and articles in publications such as Real Estate Review, The Appraisal Journal, Valuation, Urban Land, The Urban Lawyer, Real Estate Issues, and Real Estate Today. Featured speaker nationally on preservation law, environmental risk analysis, real estate economics, rehab feasibility, and appraisal practice.

PROFESSIONAL MEMBERSHIPS

Member, Appraisal Institute (designated MAI). Chair, Government Affairs Committee, Illinois Chapter, Appraisal Institute, 1991-92. Past Member, Regional Ethics and Counseling Panel. Member, Appraisal Institute Special Task Group for the Development of Standards for Determining the Acceptability of Applications for Statistical and Market Survey Techniques to the Valuation of Real Property, 2000. Member, Appraisal Institute Special Task Group on Conservation and Historic Preservation Easement Valuation, 2005 to 2006.

Currently licensed as a Certified General Real Estate Appraiser in following states: Illinois, License No. 553.000129; Michigan, License No. 1201070816; Wisconsin, License No. 1166; Indiana, License No. CG40400323; Ohio, License No. 2009003123; Maryland, License No. 31824; West Virginia, License No. CG535; Pennsylvania, License No. GA004159; Virginia, License No. 4001017454; South Carolina, License No. 7421; Tennessee, License No. 5455; Louisiana, License No. APR.0000002976-CGA; Florida, License No. RZ3166; Oklahoma, License No. 13043CGA; Colorado, License No. CG01319904; Minnesota, License No. 40094488; Mississippi, License No. GA-839; Alabama, License No. G00996; California, License No. 3004126; Nevada, License No. A.0207418-CG; Arizona, License No. 32168; Washington State, License No. 1102373; and Hawaii, License No. CGA-1157. Currently temporarily licensed in Georgia, Missouri, New York, and North Carolina.

Currently licensed as a Real Estate Broker in Illinois and formerly in Pennsylvania.

Member, Counselors of Real Estate (designated CRE). Chair, Midwest Chapter, 1991; Vice Chair, Midwest Chapter, 1992. Member, Editorial Board, *Real Estate Issues*, 2013-present.

Member of the Illinois Bar and American Bar Association.

American Bar Association: Chairman, Historic Preservation and Architectural Controls Subcommittee, 1984-1988; Vice Chairman, Land Use Law Committee, 1985-1987; Chairman, Land Use Law Committee, 1987-1990; Co-Chair, Waste Disposal and Land Use Law Subcommittee, 1991 to 1998; Member, Real Estate Damages Subcommittee of Environmental Litigation Committee, 2004 to present.

Member, Ely Chapter, Lambda Alpha International; Treasurer, 1987-1988; Vice President, 1988-1989; President, 1990.

Member, American Planning Association.

HONORS

Elected to Phi Beta Kappa, University of Notre Dame (1970).

Second Annual Richard Nickel Award, Professional Preservationist of the Year (1985), Landmarks Preservation Council of Illinois.

Sanders A. Kahn Award (1996) as the author who develops the best example of a thought-provoking presentation on concepts and practical problems facing the appraisal and real estate industries, for article in *The Appraisal Journal*, published by the Appraisal Institute.

Regular contributing columnist (Environment and the Appraiser Department), *The Appraisal Journal* (1996 to 2002).

George L. Schmutz Award (2012) from the Appraisal Institute for the "the most outstanding Appraisal Institute Publication of 2011" for the book entitled *Appraising Conservation and Historic Preservation Easements.*

Co-recipient (2013) of the William S. Ballard Award as the "author whose work best exemplifies the high standards of content maintained by *Real Estate Issues*, the professional journal published by The Counselors of Real Estate."

CIVIC INVOLVEMENT

Member, Board of Governors, Landmarks Preservation Council of Illinois, 1976-79 & 1982-85; Vice President, 1978-79 and 1983-84; Emeritus Board, 2017-2018.

Member, Illinois Historic Sites Advisory Council, 1979-1982.

Member, Illinois Governor's Advisory Task Force on Historic Preservation, 1985.

Member, Board of Trustees, Illinois Historic Preservation Agency, 1985-1991.

Member, Illinois Governor's Tourism Task Force, 1986-1987 (Chairman, Financing Subcommittee).

Board of Directors, Preservation Action, Washington D.C., 1988-1990.

Board of Directors, Frederick Law Olmsted Society of Riverside, Illinois, 1986-1988.

Member, Advisory Board, John Marshall Law School Center for Real Estate Law, 2009 to Present.

PUBLICATIONS BY RICHARD J. RODDEWIG

BOOKS (AUTHOR, CO-AUTHOR, EDITOR OR CONTRIBUTOR)

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BOOK REVIEWS

Federal Historic Preservation Case Law, Charlotte R. Bell, in The Appraisal Journal, Volume LIV, Number 2, (Chicago: American Society of Real Estate Appraisers, April 1986, p. 306).

Landmark Justice: The Influence of William J. Brennan on America's Communities, Charles M. Haar and Jerold S. Kayden, in The Urban Lawyer, Volume 21, Number 2, (Kansas City, Missouri: University of Missouri at Kansas City School of Law, Spring 1989, p. 399).

Icons and Aliens, John Costonis, in Inland Architect, Volume 34, No. 1, (Chicago: January/February 1990, p. 81).

Environmental Engineering Dictionary, 3d ed., compiled and edited by C.C. Lee, PhD., in The Appraisal Journal, Volume LXVII, Number 2, (Chicago: Appraisal Institute, April 1999, p. 224).

Richard J. Roddewig
Trial Testimony: 2010 - Present

BB&A Ventures, et al., vs. WWLD Hotel Investors, LLC, et al., Lease Arbitration Proceeding, No. 51-115 Y 001227-09 (Hearing Testimony given May 17 and 18, 2010)

Allison, et al. v. Exxon Mobil, et al., Circuit Court for Baltimore County, Maryland, Case No. 03-C-07-003809 (Testimony given in a Frye/Reed Hearing, November 3, 2010; Trial Testimony, June 1 and 2, 2011)

John Johnson, et al. v. Orleans Parish School Board, et al., State of Louisiana, Division M, CDC No. 93-14333 (Trial Testimony given April 29, 2013)

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John Navelski, et al. v. International Paper Company, United States District Court for the Northern District of Florida, Pensacola Division, Case No. 3:14-cv-00445 (Testimony given in a *Daubert* hearing, June 1, 2016)

EXHIBIT B:

POWER LINES AND PROPERTY PRICES

REAL ESTATE ISSUES, VOL. 39 NUMBER 2, 2014

FEATURE

Power Lines and Property Prices

BY RICHARD J. RODDEWIG, CRE, MAI, FRICS; AND CHARLES T. BRIGDEN, CRE, FRICS, ASA

THE POWER INDUSTRY TRANSFORMATION

THE AMERICAN ELECTRICITY GENERATING INDUSTRY HAS experienced a radical transformation during the past 20 years. Once a tightly regulated public utility consisting of a small number of large cap companies operating on a state-by-state basis, the electric industry has become a partially deregulated, semi-public utility consisting of dozens of large and small cap companies producing, buying, selling and distributing energy. Production facilities and distribution networks exist on a local, regional and even national basis.

Among the major issues, concerns and challenges still playing out in the regulatory and market arenas as the industry transforms itself are the following:[1]

- overcapacity in some states and regions and undercapacity in others, resulting in peak period power shortages, brownouts and blackouts;
- creation of a competitive national marketplace of buyers and sellers of generating capacity and power;
- competitive bidding by power companies to provide service to cities, neighborhoods and even individual consumers such as single-family homeowners and small businesses;
- creation of federal, state and even local tax incentives
- how to encourage "green and clean" energy production from such renewable energy sources as wind, solar, solid waste and landfill gases;
- more stringent environmental regulation of coal-burning power plants based on concerns about the environmental effects of smokestack emissions of sulfur, arsenic and other heavy metals;
- the contribution of power plant CO2 emissions to global climate change;
- how to protect the power generating and distribution system from terrorist attacks;
- the recognition that construction of additional nuclear power plants in the United States is no longer politically (and economically) feasible;
- a search for alternative—often less expensive and potentially more environmentally friendly—sources of fuel for power plants;
- how to balance the benefits of substituting natural gas for coal as a power plant fuel source—lower prices and lower CO2 and heavy metal smokestack emissions—with the concerns about the environmental impacts of recently developed fracking technology that can capture large amounts of previously untapped natural gas in shale formations

About the Authors

Richard J. Roddewig, CRE, MAI, FRICS, *is president of Clarion Associates, Inc., Chicago. Roddewig has more than 30 years of experience as a real estate counselor and works on counseling assignments across the United States. Much of his work is focused on expert testimony in large real estate-related litigation assignments. He has authored, co-authored, edited or contributed to 11 books and more than 50 articles in professional journals. A past chair of the Midwest Chapter of The Counselors of Real Estate, Roddewig has an undergraduate degree from the University of Notre Dame and both a juris doctor and a master of arts degree from the University of Chicago.*

Charles T. Brigden, CRE, ASA, FRICS, *is vice president of Clarion Associates, Inc., Chicago, and has nearly 20 years of experience in real estate counseling and development economics, including major real estate valuation and consulting assignments in more than 25 states. Brigden directs Clarion Associates' valuation and analytical efforts involving large-scale environmental contamination assignments. He holds a bachelor of science degree in architecture and a master of science degree in real estate, both from the University of Wisconsin.*

in many parts of the country including New York, Pennsylvania, North Dakota, Colorado and Texas;

- an aging and capacity constrained natural gas and petroleum pipeline system raising increased concerns about potential leaks and explosions;
- increasing reliance on rail shipments of crude oil;
- transformation of the system into a "smart grid" through a "modernization of the electricity delivery system so that it monitors, protects, and automatically optimizes the operation of its many interconnected elements."[2]

IMPLICATIONS OF THE INDUSTRY TRANSFORMATION FOR THE ELECTRICAL ENERGY DISTRIBUTION SYSTEM

Somewhat lost from public view (and policy discussion) in all of this is the power grid system itself. It too has been in the midst of a radical transformation as the electric industry attempts to not only meet future demands in high growth areas of the country but also to increase reliability, provide enhanced connectivity between Eastern and Western segments of the national grid, and connect the distribution grid to the best locations for generating renewable energy from wind and solar sources. Improving the reliability of the grid system has become a number one priority in the wake of highly publicized failures in the grid system, such as the 2003 Northeast blackout (the largest in history) that affected more than 50 million people in the U.S. and Canada and exposed systemic problems in the distribution system that create serious reliability issues.[3]

The power industry recognizes the magnitude of the distribution issues and is taking steps to address the nation's need for a significant upgrade to it. A 2011 technical report[4] prepared by the Electric Power Research Institute summarizes the situation as follows:

> "(t)he present electric power delivery infrastructure was not designed to meet the increased demands of a restructured electricity marketplace, the energy needs of a digital society, or the increased use and variability of renewable power production. As a result, there is a national imperative to upgrade the current power delivery system to the higher performance levels required to support continued economic growth and to improve productivity to compete internationally."

To cope with all of the changes in electrical energy fuel sources and meet the expected 26 percent increase in U.S. electricity demand by 2030,[5] the electric industry has started to significantly expand and reconfigure the power grid system for the 21st century. There are currently about 2.7 million miles of power lines in the United States[6] including more than 200,000 miles of high voltage (230 kilovolts and greater) transmission lines.[7] While growth in demand will generate significant additions to the transmission grid system in the next two decades, reconfiguration to enhance reliability and better connect to renewable energy sources will be the principal driver of new power line corridors and additions of new lines to existing rights-of-way.[8]

AESTHETICS, HEALTH, PROPERTY VALUES AND THE ELECTRICAL GRID SYSTEM

One result of the expansion and reconfiguration of the grid system is a revival of public concern and media attention about the effect of power lines and transmission corridors on property values. At least three types of property value impact issues are involved:

- First, what is the impact of power lines and transmission corridors on the value of adjacent properties, especially single-family homes?
- Second, what is the impact of power lines on properties, typically undeveloped land or rural agricultural properties, across which transmission rights-of-way must pass?
- Third, does the addition of a second or third line (and supporting towers) have an incremental adverse effect on home, land or farm prices even if the original line did not?

The property value impact concerns are inextricably linked to two other concerns: first, aesthetic concerns about the effect of overhead wires and supporting towers on views; and, second, concerns about the possible adverse health impacts associated with exposure to electromagnetic fields (EMFs).

Early real estate research in the 1960s and 1970s focused on the aesthetic and scenic impacts of power lines.[9] A 1982 summary of this research found 27 studies of which "ten found that transmission lines had no significant effect on land values, ten were inconclusive, and five concluded that the overall effect of transmission lines on land values was negative."[10]

In the 1980s and early to mid-1990s, however, concerns began to be raised about the connection between electromagnetic fields and cancer.[11] The concerns were

so significant that in 1991 Congress asked the National Academy of Sciences to review the research and issue a report. In particular, three Scandinavian studies concerning a possible linkage between EMF exposure and cancer published in 1993 and 1994 received widespread attention.[12] The National Academy of Sciences convened a special committee that reviewed the published health effects literature, and in its 1997 final report concluded "that the current body of evidence does not show that exposure to these [EMF] fields presents a human health hazard."[13] The National Institute of Environmental Health Sciences (NIEHS) also conducted an extensive review of the published health effects research. In its Working Group report published in June 1998, NIEHS concluded "that power line frequency magnetic fields are a possible cause of cancer."[14]

Childhood leukemia was the subject of a number of the studies done in the 1980s and 1990s. The U.S. Environmental Protection Agency sums up the state of the research related to childhood leukemia and EMFs as follows:

> "Many people are concerned about potential health effects. Much of the research about power lines and potential health effects is inconclusive. Despite more than two decades of research to determine whether elevated EMF exposure, principally to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence is weak and is 'not sufficient to establish a definitive cause-effect relationship.'"[15]

The increased public concerns in the 1980s and 1990s about possible health effects of exposure to EMFs generated a new round of real estate research related to power line impacts on real estate prices. As in the earlier round of studies, some found adverse impacts to property prices and values while others found no impact or statistically insignificant impacts despite the additional media attention given possible health effects of exposure to EMFs.[16] The same is true of the additional studies recounted in the published literature since the turn of the 21st century. For example, a study published in 2009 in The Appraisal Journal[17] involving residential sales from 1999 to 2007 in Connecticut and Massachusetts could find no significant impact on prices from proximity to, or visibility of, power lines. By contrast, an earlier Houston study in the early 1990s found that assessed values of 100 homes adjacent to power lines were between 12.8 and 30.7 percent lower than other homes in the same neighborhoods.[18]

One of the more recent reviews of the published real estate literature on power line impacts[19] summed up past studies of the effects of power lines on prices and values as follows:

> "Both the market interviews and academic literature show that the impacts of power lines on residential properties are varied and difficult to measure. The impacts from the power lines, as well as other negative externalities, depend on many factors, including market location, condition, and personal preference."[20]

REAL ESTATE IMPACT ISSUES RAISED IN A TYPICAL TRANSMISSION CORRIDOR APPROVAL PROCESS

Even in this new era of deregulation, proposals to create new transmission line corridors or upgrade or add lines to existing corridors require approval by state regulators. The approval process in each state typically involves public hearings and submission of written comments and reports by those proposing the expansion or upgrading as well as by opponents. These hearings can be extremely contentious. Although the power industry has the resources to hire experts to demonstrate the need for the proposed corridor or upgraded line and address the concerns of the public and residents along the rights-of-way, citizen groups and neighborhood-based organizations often have also been well organized in their efforts to present an opposing point of view. Among the major power line corridor expansion controversies around the country are the following:[21]

- New York Governor Andrew Cuomo in 2012 unveiled an "Energy Highway" initiative involving a multi-billion-dollar reconfiguration of the state's grid system to provide improved connectivity between electricity-surplus areas in western New York State and Albany, and ultimately New York City where demand is greatest. Although the plan has received consensus support and legislative approval, the identification of the necessary new or expanded right-of-way corridors has resulted in considerable opposition from coalition groups of municipalities and organizations.[22]
- A number of power line proposals in California have been opposed by a variety of property owner and environmental groups in recent years. For example, California Gas & Electric has spent more than a decade unsuccessfully seeking approval of a 117-mile, $1.9 billion transmission line corridor that

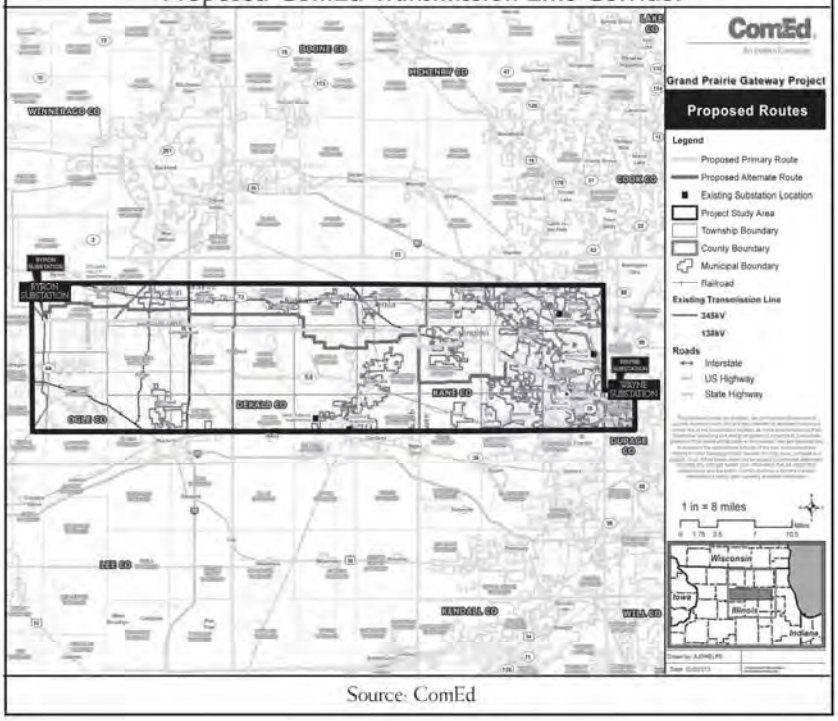
would connect the San Diego metro area with significant solar and geothermal renewable energy resources in the Imperial Valley east of San Diego; and in March of 2014, the California Public Utility Commission failed to approve a much shorter 3.5-mile transmission line that would cut through parts of the communities of Thousand Oaks, Moorpark and Simi Valley, and improve substation connectivity.[23]

- And in Kansas and Missouri, the proposed 750-mile route of the so-called "Grain Belt Express," a $2.0 billion project to carry Kansas wind energy to Illinois, Indiana and other eastern states is encountering opposition from many farmers.[24] The Missouri Public Service Commission is scheduled to hold hearings on its section of the corridor in 2014.

While much of the technical discussion in such hearings focuses on the need for the proposed line or upgrade, its costs and the effect on electricity prices to the consumer, the most emotional discussion often focuses on the potential health effects of exposure to EMFs and whether health effect concerns will translate into an adverse effect on property prices and values if the proposed corridor or upgrade is completed.

A proposed transmission line corridor in Illinois illustrates the property value issues likely to arise as the nation expands and upgrades the grid system. In 2013 ComEd, the principal electricity generator and distributor for the Chicago metropolitan area and much of northern Illinois, proposed to construct and operate an approximately 60-mile 345kV transmission line between its Byron nuclear generating plant in western Illinois and the rapidly growing western Chicago suburbs. State regulations equired ComEd to hold public meetings concerning the proposal in the communities along the proposed right-of-way. In December of 2013, following conclusion of the community meetings, ComEd officially filed for Illinois Commerce Commission approval to construct and operate the line. In the filing, both a primary and an alternate route were identified as shown in Figure 1.

Figure 1
Proposed ComEd Transmission Line Corridor



Source: ComEd

Along some portions of the proposed route, the 345kV line would be constructed in existing transmission line corridors or in railroad rights-of-way where ComEd already had negotiated corridor agreements. But in some areas, acquisition of easements would be necessary across either undeveloped land zoned for future development or across rural land in agricultural use.

All written public comments and public testimony as well as briefs and filings by law firms representing ComEd and various interveners were posted on the Illinois Commerce Commission website as soon as they were received.[25] Many of the public comments[26] and some of the submitted testimony involved health concerns related to EMFs, property value impact concerns, or both.

The public comments and testimony raising concerns about power line impacts on property values were submitted by homeowners, agricultural land owners, a school district official, and even a suburban mayor. They were personal opinions, typically unsupported by data or studies, concerning the potential impact of the proposed corridor on property values. The opinions and testimony included the following:

- One statement submitted claimed it was "self evident" that there will be a 10 to 30 percent impact on single-family home values.[27]
- Another homeowner claimed that the construction of the power line will "most certainly destroy our property values."[28]
- A school district official stated that the proposed corridor "will have a negative effect on the value of numerous properties within the District."[29]

No study or other price impact support accompanied any of those three statements. Many others made similar statements or expressed similar concerns but again did not provide any sales data studies in Chicago, elsewhere in Illinois, or anywhere else in the United States to support the opinions.

One intervener stated that published studies indicated "a 15 to 50 percent drop in values of nearby homes because of overhead high voltage transmission lines" and, as support, referenced a British study allegedly showing a 38 percent drop in values of homes within 328 feet, and a Canadian study showing a 16 to 29 percent impact on farmland that has an easement for a power line corridor. However, the British and Canadian studies were not submitted with the intervener's testimony and in response to a data equest, the intervener provided only website links.[30] Both of those links referenced the British and Canadian studies but did not include copies of the studies referenced.

The real estate impact questions raised in power line controversies will vary from one public hearing situation to the next. In the case of ComEd in Illinois, however, the questions raised by the public comments and submissions included the following:

- What are the recognized and generally accepted methods for determining if a proposed power line corridor will adversely impact home prices and values?
- Do power lines always adversely impact the prices and values of adjacent homes?
- Does the addition of a second line to an existing corridor create an incremental adverse impact on prices and values?
- When a corridor is built in a rapidly growing market area, can sound land use planning techniques diminish the possibility of adverse impacts on home prices?
- Do health effect concerns related to EMFs translate into any special impact on prices in age-restricted communities?
- How do power lines affect farmland operations and rural land prices?

The authors of this article were asked to address those and other issues raised by the public comments and submissions in the Illinois proceedings. In answering those questions, we also reviewed the real estate literature referenced in the comments and submissions and did our own comprehensive review of the published literature. We then studied the effects of existing power lines on home prices in the Chicago area to determine the likely impacts of the proposed transmission line corridor on prices and values. The remainder of this article presents our findings and our conclusions, beginning with a review of how appraisers evaluate the effects of environmental conditions on real estate prices and values.

WHAT ARE THE RECOGNIZED AND GENERALLY ACCEPTED METHODS FOR DETERMINING THE IMPACT OF POWER LINES ON PRICES AND VALUES?

The real estate appraisal profession has more than four decades of experience in analyzing the impacts of power lines on prices and values. As a result, the profession has

developed recognized and generally accepted techniques for determining the impact of potential "detrimental conditions" on real estate prices and values. Power lines and their associated EMFs also can be characterized as a potentially "adverse environmental condition." The Appraisal Standards Board in Washington, D.C., has issued specific guidance for determining the impact of "adverse environmental conditions" on prices and values.[31] Its Advisory Opinion 9 (AO-9) deals with the appraisal of properties affected by such adverse environmental conditions. Among the elements of AO-9 important to a consideration of the potential impact of proposed power line corridors on property prices and values are the following:

- AO-9 states that every analysis of the potential impact of an environmental condition on property value "must be based on market data, rather than unsupported opinion or judgment."[32]
- AO-9 also states that estimating the effect of such environmental conditions "involves the application of one or more specialized valuation methods" that must be applied "consistent with the requirements related to the valuation approaches in USPAP [the Uniform Standards of Professional Appraisal Practice]."[33]

The courses and peer-reviewed publications of the appraisal profession define the generally accepted methodology for determining the impact of environmental conditions on real estate markets, property prices, market rents and market value.[34] Those courses and publications have long recognized the following:

- Proximity to a source of an adverse environmental condition does not automatically cause an adverse impact to prices and values of nearby properties.[35]
- While opinions of homeowners and other non-real estate professionals may have some relevance to understanding a marketplace, such opinions are not a substitute for analysis of actual sales prices.[36] As a publication of The Appraisal Institute puts it: "the impact [of power lines] on real estate is determined by the market and not by scientific analysis [related to possible health effects]."[37]

As a result, before arriving at an opinion concerning the likely impact of a proposed power line on real estate prices and values, licensed real estate appraisers are required to investigate actual sales transaction in other communities or neighborhoods with power lines.

DO POWER LINES ALWAYS ADVERSELY IMPACT PRICES AND VALUES OF ADJACENT SINGLE-FAMILY HOMES?

Review of the Published Real Estate Literature

The real estate appraisal and real estate economics literature has long been clear that power lines do not automatically adversely impact the value of adjacent properties and in some cases may actually enhance values.[38] Some studies have found adverse impacts while others have found no impacts. Pitts and Jackson in 2007 summarized the published appraisal and real estate economics literature as follows:

> "While most research indicates that HVTL [high voltage transmission lines] have no significant impact or a slight negative impact on residential properties, some studies have shown that lots adjacent to or with views of an HVTL right-of-way actually sell for a premium over more distant lots."[39]

Among the more recent studies in the real estate appraisal and real estate economics literature are the following:

- A July 2003 study in *The Appraisal Journal* that compared prices paid for 296 abutting properties to 296 comparable but non-abutting properties in Portland, Oregon; Seattle, Washington and Vancouver, British Columbia. The authors could find no significant difference in prices between the two sets of sales. They also could find no effect on price appreciation rates from power line proximity.[40]
- A Fall 2007 *Appraisal Journal* article said the following:

  > "Many studies indicate that the HVTL (high voltage transmission line) have no significant effect on residential property values. More recently, however, an increasing number of studies do show a small diminution in value attributable to the close proximity of these lines.
  >
  > "When negative impacts are evident, studies report an average discount of between 1 and 10 percent of property value."[41]

- An *Appraisal Journal* Summer 2009 article looked at the previously published literature and, specifically, at what the authors called the 16 studies that form the "core of the professional literature." The authors summarized the key conclusions from those 16 articles as follows:

- "Over time, there is a consistent pattern with about half of the studies finding negative property value effects and half finding none;
- When effects have been found, they tend to be small; almost always less than 10 percent and usually in the range of 3 to 6 percent;
- Where effects are found, they decay rapidly as distance to the lines increases and usually disappear at about 200 to 300 feet (61 meters to 912 meters);
- Two studies investigating the behavior of the effect over time find that, where there are effects, they tended to dissipate over time;
- There does not appear to have been any change in the reaction of markets to high-voltage transmission line proximity after the results of two widely publicized Swedish health effects studies were preliminarily released in 1992."[42]

- A Winter 2012 article in *The Appraisal Journal* summarized the published literature as typically indicating either no effect on prices, or a relatively small effect when there are impacts. It then commented as follows: "(T)heir [high voltage transmission lines] presence is apparently not given sufficient weight by buyers and sellers of real estate to have had any consistent material effect on market value."[43] That article ended with the following statement about the published literature: "the findings in the published literature (are) that property value effects cannot be presumed and are generally infrequent."[44]

The literature confirms the conclusion of the appraisal profession that power lines do not always or automatically adversely impact prices and values of adjacent or nearby properties.

THE TRANSMISSION LINE CORRIDOR IN ILLINOIS: ANALYSIS OF SINGLE-FAMILY HOME PRICES IN SOUTH ELGIN

A number of the interveners, as well as many of those submitting public comments to the Illinois Commerce Commission, lived in the Sugar Ridge and River Ridge subdivisions in South Elgin, a western suburb in a fast-growing part of the Chicago metro area. These two adjacent single-family home neighborhoods were developed in the early 1990s. There is a transmission line right-of-way along the south border of the two neighborhoods. That corridor was authorized in a 1994 Illinois Commerce Commission proceeding[45] and the 138kV line constructed on 95- to 110-foot monopoles with eight cross arms was energized on August 1, 1996. The transmission line corridor also is part of a railroad right-of-way.[46] In the 2014 proceedings, many Sugar Ridge and River Ridge residents expressed concern that the addition of a second line in the corridor would intensify an adverse effect of power line proximity on prices and values.

Residents of the two neighborhoods had opposed the earlier 1994 power line corridor. During that earlier proceeding, residents submitted a report from an appraiser who studied prices there as well as in eight other subdivisions near power lines and concluded that the proposed corridor would reduce home values by about five percent.[47]

As experts for ComEd, we were asked to analyze the history of home prices in those two neighborhoods since 1994 to determine if the existing power line was adversely impacting the neighborhood. We collected and analyzed multiple listing sales data between 1994 and 2013 in Sugar Ridge and River Ridge. We then undertook two types of analyses. First, we analyzed the average price each year for homes located within 500 to 700 feet of the transmission line corridor. We compared the average prices for those homes to the average price for other homes located further away in the same subdivisions. Prices were analyzed based on price paid per square foot of home area in order to eliminate any effect from differences in home size on the absolute sale price paid.

The map in Figure 2 shows the sales in the area within 500 to 700 feet from the transmission line corridor compared to sales in the rest of the subdivision. The existing transmission line is shown by the dashed line.

The northern edge of Area 1 on the map is located between 500 feet and 700 feet north of the northern edge of the transmission line corridor.

The comparison of average sale prices between 1994 and 2013 is shown on the graph in Figure 3.

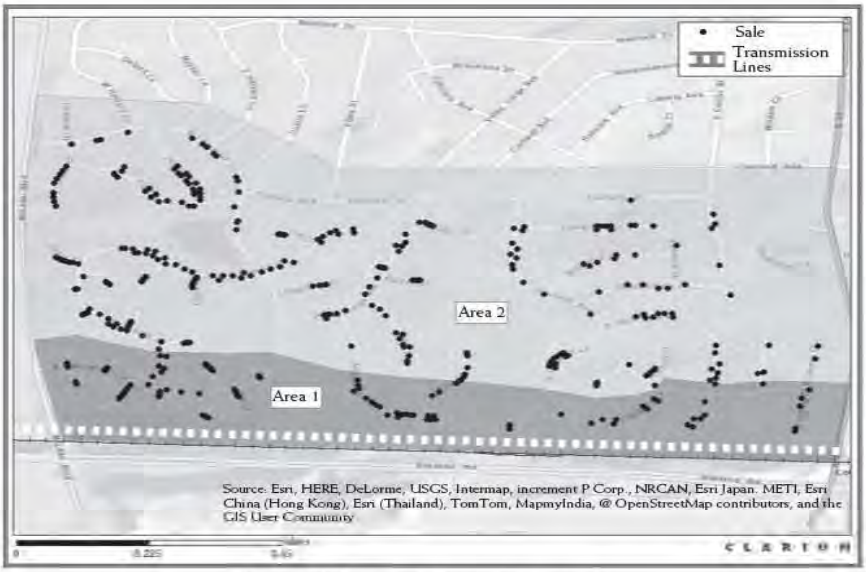
In 15 of the 20 years studied, the average price of a home in the area located closest to the transmission line corridor was higher than in the rest of the Sugar Ridge and River Ridge neighborhood. Overall, the average price per square foot paid for homes in the portions of the subdivisions closest to the transmission line corridor was about 3.5 percent higher than the average price paid for homes not located in proximity to the transmission line corridor.

FEATURE

Power Lines and Property Prices

Figure 2

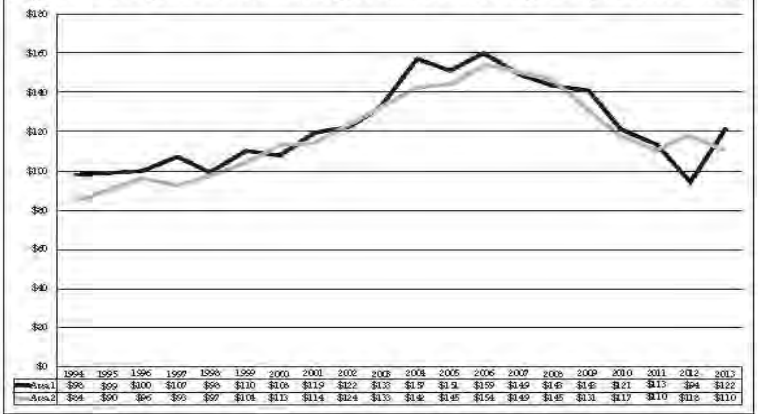
Map of Sales of Homes in Sugar/River Ridge Subdivision near the Transmission Line Corridor (1994 to 2013)



Source: ESRI.com and Clarion Associates, Inc.

Figure 3

Sugar/River Ridge Subdivision Average Annual Sale Price per SQ. Ft. (1994-2013)



Source: Clarion Associates, Inc., 2014

We also used a paired sales analysis involving primary pairings[48] to determine if prices were lower for homes that either backed up to the existing transmission line corridor or had clear views of the power lines and supporting poles. We compared the rate of appreciation for those homes in the paired sales analysis to the average rate of appreciation for homes in Sugar Ridge and River Ridge that sold over the same period of time but were far enough away from the transmission line corridor not to be affected.

The paired sales analysis involved 17 sales and subsequent resales involving 12 homes.[49] The locations of the homes are shown in the satellite maps in figures 4 and 5.

The sale/resale comparisons are as indicated in Figure 6.

Figure 4
Sugar Ridge Subdivision

Source: Google Maps and Clarion Associates, Inc., 2014

Figure 5
River Ridge Subdivision

Source: Google Maps and Clarion Associates, Inc., 2014

Power Lines and Property Prices

Figure 6
Analysis of Sale and Resale Comparisons

Address	First Sale Year	Second Sale Year	ROW Annual Compound Rate of Appreciation	Non-ROW Sugar Ridge Rate of Appreciation	ROW to Non-ROW Appreciation Rate Worse
7 Lenox Ct.	1997	2008	3.70%	4.10%	Same
9 Lenox Ct.	1995	2002	4.60%	4.70%	Better
11 Lenox Ct.	1996	2004	5.80%	5.00%	Better
	1999	2004	8.27%	6.40%	Better
15 Lenox Ct.	1996	2005	5.80%	4.70%	Same
17 Lenox Ct.	1997	2004	6.30%	6.20%	Better
11 Longbow Ct.	1993	2005	6.60%	5.10%	Better
	2003	2005	7.50%	4.40%	Better
17 Longbow Ct.	1996	2004	5.80%	5.00%	Better
	1996	2013	0.90%	0.60%	Better
	2004	2013	-4.60%	-2.90%	Worse
7 Lilac Ct.	1996	2013	2.10%	0.90%	Better
11 Lilac Ct.	2003	2009	4.90%	-0.30%	Worse
19 Lilac Ct.	2001	2003	8.20%	8.00%	Better
15 Locust Ct.	2003	2010	-0.80%	-1.80%	Better
25 South Conway Ct.	2008	2011	-4.10%	-8.80%	Better

Source: Clarion Associates, Inc.

The data in Figure 6 indicate that homes either backing up to the right-of-way (ROW) or with clear views of power lines appreciated at a rate either equal to or better than non-ROW homes in Sugar Ridge and River Ridge in 13 of the 16 sale/resale comparisons. In other words, homes immediately adjacent to the power lines outperformed the rest of the market in Sugar Ridge and River Ridge.[50]

DO HIGH-VOLTAGE POWER LINES AFFECT PRICES AT NEW SUBDIVISIONS DEVELOPED ADJACENT TO THEM?

Some of the comments and testimony submitted to the Illinois Commerce Commission claimed that constructing a power line through undeveloped suburban areas zoned (or planned) for future development would adversely affect future development and prices. Our experience as zoning and planning consultants, however, has indicated that residential development can be planned in such a way as to minimize conflicts between power lines and planned developments. For example, required open space, stormwater detention ponds, surface parking or even garages can be planned in such a way as to minimize the visibility and proximity of power lines.

To test the effect of power line construction in rapidly growing suburban areas, we investigated development along a McHenry County transmission line corridor between Huntley and Algonquin, two rapidly growing communities in northwest metropolitan Chicago.[51] The corridor had been acquired and developed by ComEd and energized in 2001[52] and is one of the most recent transmission line corridors developed in the Chicago metro area. The corridor contains a 138kV double circuit line on 64- to 99-foot monopoles. When it was developed, there was considerable undeveloped land adjacent to the right-of-way. Much of the land has subsequently been developed with new residential housing since the date of completion of the power line installation.

We investigated the route of the Huntley to Algonquin line that was the subject of a prior 1996 Illinois Commerce Commission approval proceeding.[53] We identified the Coventry development, a townhouse project at the northwest corner of the intersection of Haligus Road and Wildspring Road in Lake in the Hills, Illinois, as a good test case.[54] The townhouses were developed after the creation of the power line corridor and installation of the line.

We collected and analyzed Coventry sales data between 2004 and 2013. First, prices on the south and west side of Wildspring Road immediately adjacent to the transmission line right-of-way (areas A and B in the map below) were compared to prices on the other side of Wildspring Road (Area C in the map below). The average sale price between 2004 and 2013 was exactly the same. Second, sale prices for the townhouses on both sides of Wildspring Road (areas A, B and C) were compared to prices in the rest of the townhouse complex (Area D) located away from the right-of-way.

Figure 7
Coventry Subdivision

Source: Google Maps and Clarion Associates, Inc., 2014

The average price for the Wildspring Road townhouses was 8.3 percent higher than for townhouses in the rest of the development. And townhouses on the south and west side of Wildspring Road located immediately adjacent to the transmission line right-of-way sold at an average price about 8.6 percent higher than in the rest of the development. The analysis indicated there has been no adverse impact from proximity to the transmission line on the townhouse sale prices at Coventry. And note the configuration of the townhouse clusters closest to the power line corridor—they were oriented in such a way as to minimize the views of the towers and power lines, an example of how good site planning for new subdivisions adjacent to power lines can minimize the potential for adverse impacts on prices and values.

DO MULTIPLE SETS OF ADJACENT POWER LINES AND SUPPORT TOWERS ADVERSELY IMPACT PRICES AND VALUES?

Some of the opponents of the proposed corridor were concerned that even if a single power line might not affect prices and values, the addition of a second power line adjacent to the Sugar Ridge and River Ridge subdivisions in South Elgin would adversely impact home prices. To understand if a double line corridor automatically adversely impacts prices and values, we studied prices at the Concord Pointe development in Carol Stream, Illinois, another western Chicago suburb. The expert report submitted by the South Elgin residents who opposed the 1995 Illinois Commerce Commission proceeding involving the original transmission line to be constructed in the railroad right-of-way adjacent to Sugar Ridge had included an analysis of townhouse prices at Concord Pointe. That 1995 expert report stated that the Concord Pointe townhouse developer was offering $3,500 discounts to purchasers of the units located immediately adjacent to the transmission line right-of-way.[55]

That right-of-way adjacent to Concord Pointe consists of a double set of open lattice towers. One of the lattice towers supports two 138 kV lines and the other supports two 345 kV lines.[56] To understand the impact of the double set of power lines, we collected Northern Illinois Multiple Listing Service sales data from 1995 to 2013. Sale prices per square foot for townhouses located adjacent to the transmission line corridor (Area A in the map below) were compared to prices paid for other Concord Pointe townhomes not located adjacent to the power lines (Areas B and C in the map below). Some of the townhomes in Area B have views of the tops of the two sets of lattice towers. The map below shows three areas in Concord Pointe—areas A, B and C—defined by their relative proximity to the transmission line corridor located adjacent to the south end of the development.

Figure 8
Concorde Pointe Subdivision

Source: Google Maps and Clarion Associates, Inc., 2014

Power Lines and Property Prices

Figure 9
Comparisons of Average Annual Sales Price per Square Foot

Area A v. Area B & C				Area A & B v. Area C			
Year	Area A	Areas B & C	% Difference	Year	Area A B	Areas C	% Difference
1995	$107	$95	12.7%	1995	$107	$95	12.7%
1996	$78	$98	-20.2%	1996	$81	$106	-23.4%
1997	$102	$100	1.6%	1997	$99	$103	-3.6%
1998	$99	$97	1.8%	1998	$97	$98	-0.8%
1999	$99	$98	1.3%	1999	$98	$98	0.8%
2000	$99	$103	-3.4%	2000	$101	$103	-1.8%
2001	$115	$112	2.3%	2001	$113	$113	0.0%
2002	$118	$122	-3.2%	2002	$122	$121	1.0%
2003	$122	$136	-10.4%	2003	$130	$134	-2.8%
2004	$152	$140	8.8%	2004	$139	$141	-1.9%
2005	$155	$150	3.7%	2005	$155	$148	4.3%
2006	$145	$157	-7.5%	2006	$151	$156	-3.3%
2007	$163	$156	4.4%	2007	$162	$155	4.1%
2008	$157	$150	4.0%	2008	$157	$148	6.2%
2009	$143	$127	12.6%	2009	$135	$127	5.9%
2010	$112	$113	-1.2%	2010	$119	$112	5.9%
2011	$92	$110	-16.2%	2011	$98	$113	-13.6%
2012	$110	$99	10.7%	2012	$104	$100	3.5%
2013	$111	$106	5.5%	2013	$105	$108	-3.6%
		Average	0.4%			Average	-0.5%

Source: MRED LLC and Clarion Associates, Inc.

As indicated in the Figures 9, the average price differentials when comparing Area A to areas B and C, and then comparing areas A and B to Area C, were less than one percent.

The comparison indicates there has been no adverse impact on average prices at Concord Pointe from proximity to the power lines. The good buffering of the power line corridor by vegetation may have contributed to the lack of impact. The sales data also indicates the original $3,500 price discount given in 1995 was not warranted.

IS AGE-RESTRICTED SENIOR HOUSING MORE SIGNIFICANTLY AFFECTED BY POWER LINE PROXIMITY THAN OTHER TYPES OF HOUSING?

Many of the comments and statements in opposition to the proposed corridor linking the Byron power plant and the western Chicago suburbs were filed by residents of the 55-and-over age-restricted Bowes Creek townhome community in Elgin. The proposed power line would be constructed in a railroad right-of-way that ran adjacent to a portion of that development. Many of their comments in opposition referenced studies indicating that power lines can interfere with the operation of implanted pacemakers.[57]

Hampton Park in Naperville, Illinois, is an age-restricted senior development adjacent to a power line corridor. It reportedly was developed between 2005 and 2008[58] long after the installation of the adjacent monopole transmission line corridor. The location of those townhomes (and the transmission line adjacent to it) is shown in Figure 10.

Figure 10
Hampton Park 55-Plus Active Adult Community

Source: Google Maps and Clarion Associates, Inc., 2014

Figure 11
Hampton Park 55-Plus Active Adult Community

Source: Richard Roddewig, Clarion Associates, Inc., 2014

The map and photo in figures 10 and 11 show a Google Maps Street View of some of the Hampton Park townhomes showing the monopole power line with four cross arms behind them.

Sale prices in Hampton Park for the years between 2005 and 2013 were collected from the multiple listing services and analyzed. Prices paid per square foot for townhomes adjacent to the transmission line corridor were compared to prices in the rest of the community. Townhomes adjacent to the transmission line corridor sold on average for 4.3 percent more than townhomes in the rest of the community, as shown in Figure 10.

Figure 12

Area A v. Area B			
Year	Area A	Areas B & C	% Difference
2005	n/a	$190	n/a
2006	$208	$200	4.2%
2007	$215	$226	-4.9%
2008	n/a	n/a	n/a
2009	n/a	$150	n/a
2010	$170	n/a	n/a
2011	n/a	$130	n/a
2012	$184	$157	17.1%
2013	$170	$169	0.8%
		Average	4.3%

Source: MRED LLC and Clarion Associates, Inc.

ARE FARMS CROSSED BY (OR ADJACENT TO) POWER LINE EASEMENTS ADVERSELY AFFECTED IN VALUE?

Some portions of both the preferred and alternative Illinois transmission line corridors would require acquisition of easements across farmland. Many of the comments received by the Illinois Commerce Commission involved concerns about the effect of transmission line corridors on agricultural operations[59] and farmland prices and values.

A number of published articles going back to the 1970s discuss the effect of power line easements and corridors on rural and farm land property values. For example, "Impact of Electric Power Transmission Line Easements on Real Estate Values," authored by Louis E. Clark, Jr., MAI, and E. H. Treadway, Jr., MAI, and published in 1972 includes the following statement at page 19:

> "If a farm contains 150 to 200 acres or more, as many do now, the loss of a fraction of an acre in tower sites cannot be considered critical. This factor is continually demonstrated in farm sales throughout the country. Of course, few farmers want power lines on their farms. However, studies are not based upon popularity polls, but upon sociological interactions between an informed buyer and an informed seller, each acting without duress in negotiating a sale price for a farm. When one examines a farm sale dispassionately, he often finds that even though few sellers want to have a transmission line on their farm, when selling fewer still are willing to accept a reduced price for their property (reduced even by the amount paid them by the utility). As a result, with this type property little empirical evidence can be found to show conclusively that price reductions are incurred because of transmission lines."

A 2012 *Appraisal Journal* article involved an analysis of 19 transactions involving "Production Agricultural Lands" in Montana. The analysis indicated that "there was no market evidence to support a claim of adverse effect of the transmission lines on sale prices."[60] That research also involved investigation of whether farmers and ranchers made an adjustment to their asking prices when selling productive agricultural properties with transmission line easements:

> "Interestingly, there was no indication of adjustment to the sale price for the extent of the encumbrance of the property by the transmission line easement. The implication is that the owner at the time of construction gets compensated for the easement by the utility, but does not have to make a corresponding adjustment in the subsequent sale of the property. Presumably this is because the overall agricultural productivity of the property is not affected by the transmission lines."[61]

The 2012 *Appraisal Journal* article studying rural western land values looked at a variety of other situations in which power lines are located close to rural western land. The author concluded that "the research reported here is certainly consistent with the findings in the published literature that property value effects cannot be presumed and are generally infrequent."[62]

That 2012 *Appraisal Journal* article also referenced two other farm land impact studies. The first found "no negative influence on [the] number of towers or the presence of HVTL (high voltage transmission lines) relative to otherwise similar parcels without HVTL."[63] The second was a study of 88 rural land transactions between 2002 and 2008 in Wisconsin that were "encumbered by a transmission line easement."[64]

According to the author of the 2012 *Appraisal Journal* article, that Wisconsin study indicated a "small (1.1 to 2.4 percent), but statistically insignificant effect for the sale of properties crossed by HVTL relative to uncrossed properties" and that when the author of the Wisconsin study grouped the sales by location, "edge locations showed no effect, while properties crossed by the line showed a small price effect of -2.1 to -3.4 percent."[65]

SUMMARY AND CONCLUSIONS

The power industry is going through a radical transformation that raises many issues and includes a significant expansion and reconfiguration of the distribution grid to meet the new challenges of providing electricity in the 21st century. One result will be the construction of thousands of miles of new power lines either in existing rights-of-way or in new corridors. In the public approval processes mandated by law and regulation in every state before transmission corridors can be upgraded or constructed, long-standing public concerns about the effect of power lines and transmission corridors on property values typically will be raised.

The real estate appraisal profession has developed generally recognized and accepted methods for determining the impact of power lines on property prices and values. These methods are all based on analysis of actual prices paid for properties either on or adjacent to power lines. The appraisal profession has long recognized that proximity to a source of an adverse environmental condition such as EMFs from power lines does not automatically cause an adverse impact to prices and values of nearby properties and that while opinions of homeowners and other non-real estate professionals may have some relevance to understanding a marketplace, such opinions are not a substitute for analysis of actual sales prices.

And the real estate appraisal profession has been studying those prices since the 1960s. Some of the many published studies have found adverse impacts to property prices and values while others have found no impact or statistically insignificant impacts despite media attention given possible health effects of exposure to EMFs. When price impacts are found, they typically are rather small.

As examined in this article, a recent proposal related to a new 60-mile corridor in Illinois generated significant public comments and submissions about possible adverse impacts to prices and values of single-family homes, age-restricted townhomes, and farmland. Studies of detached single-family and attached townhouse prices in the Chicago suburbs submitted in the proceedings by the authors of this article, who were retained by the electric utility company, found no adverse impact on attached or detached home prices or on prices paid for age-restricted townhomes. The studies also found that sound land use planning and subdivision layout procedures can eliminate any adverse impact on prices. ■

The authors would like to acknowledge Ms. Anne S. O'Connell, real estate analyst in the Chicago office of Clarion Associates, for her assistance in the preparation and analysis of the sales data that went into many of the charts in this article.

ENDNOTES

1. See, for example, PwC Annual Global Power & Utilities Survey, "Energy transformation: The impact on the power sector business model," October 2013, and Yuan Liao, "Transformation of Electric Power Grid into Smart Grid," International Journal of Advance Innovative Thoughts and Ideas, 2013.
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4. "Estimating the Costs and Benefits of the Smart Grid. A Preliminary Estimate of the Investment Requirements and the Resultant Benefits of a Fully Functioning Smart Grid," Electric Power Research Institute, Palo Alto, California, 2009.
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6. Martin, Chris, Mark Chediak and Ken Wells, "Why the U.S. Power Grid's Days Are Numbered," *Bloomberg Businessweek.com*, Aug. 22, 2013.
7. Evans, Peter, "Power of Networks in an Age of Gas," 2013 EIA Energy Conference, June 17-18, 2013, Washington, D.C.
8. For an excellent summary of the issues related to future planning of the distribution grid system, see "The Future of the Electric Grid: An Interdisciplinary MIT Study," Massachusetts Institute of Technology, 2011.
9. See, for example, Louis E. Clark, Jr. and Felix H. Treadway, Jr., "Impact of Electric Power Transmission Line Easements on Real Estate Values," American Institute of Real Estate Appraisers, 1972.
10. Lita Furby, Robin Gregory, Paul Slovic and Baruch Fischhoff, "Electric Power Transmission Lines, Property Values, and Compensation," *Journal of Environmental Management*, Vol. 27 (1988), 69, at p. 10; Furby, Lita, Robin Gregory, Paul Slovic and Baruch Fischhoff, "Electric Power Transmission Lines, Property Values, and Compensation," *Journal of Environmental Management*, Vol. 27, 1988, p. 72, referencing G. Fridricksson, M. MacFayden and K. Branch, "Electric Transmission Line Effects on Land Values: A Critical Review of the Literature," Mountain West Research, 1982.

11. A 1996 article cites 1979 as a turning point year due to publication of one of the first studies to link EMFs to health effects. See, R. Gregory and D. von Winterfield, "The Effects of Electromagnetic Fields from Transmission Lines on Public Fears and Property Values," *Journal of Environmental Management*, Vol. 48, pp. 201–214. The 1979 study they cite is N. Wertheimer and E. Leeper, "Electrical Wiring Configurations and Childhood Leukemia in Rhode Island," *American Journal of Epidemiology*, Vol. 109, pp. 273–284.

12. Olsen, J.H., A. Nielsen, and G. Schulgen, "Residence Near High-Voltage Facilities and the Risk of Cancer in Children," *British Medical Journal*, Vol. 307, pp. 891–895; P. K. Verkasalo, E. Pukkala, M. Y. Hongisto, J.E. Valjus, P. J. Drvinen, K. V. Heikkil, and M. Koskenvuo, "Risk of Cancer in Finnish Children Living Close to Power Lines," *British Medical Journal*, Vol. 307, pp. 895–899; and M. Feychting and A. Ahlbom, "Magnetic Fields, Leukemia, and Central Nervous System Tumors in Swedish Adults Residing Near High-Voltage Power Lines," *Epidemiology*, Vol. 5, pp. 501–509.

13. National Research Council, Committee on the Possible Effects of Electromagnetic Fields on Biologic Systems, "Possible Health Effects of Exposure to Residential Electric and Magnetic Fields," National Academy Press, Washington, D.C., 1997, p. 2.

14. *www.epa.gov/radtown/power-lines.html.*

15. Ibid.

16. A 2010 article in the *Journal of Real Estate Research* references six such studies of actual sale prices. See Thomas O. Jackson and Jennifer Pitts, "The Effects of Electric Transmission Lines on Property Values: A Literature Review," *Journal of Real Estate Research*, Vol. 18, No. 2, 2010, p. 239.

17. Chalmers, James A. and F. A. Voorvaart, "High-Voltage Transmission Lines: Proximity, Visibility and Encumbrance Effects," *The Appraisal Journal*, Summer 2009, pp. 227–245.

18. Bolton, David R., "Properties Near Power Lines and Valuation Issues," Southwestern Legal Foundation Institute on Planning, Zoning and Eminent Domain, November 17–19, 1993, p. 13.

19. We have not attempted in this article to summarize or reference all of the published literature on the subject of power line impacts on property prices and values. And we have focused on the studies of power line impacts in North America. There have been many studies conducted in Europe and Australia as well that are not referenced here. Many of the articles referenced or cited in this article, however, contain detailed lists and summaries of the published literature in cluding some of overseas studies. Readers are encouraged to review those citations for more detail about the various past studies that have been done.

20. Pitts, Jennifer M. and Thomas O. Jackson, "Power Lines and Property Values Revisited," *The Appraisal Journal*, Fall 2007, p. 323. Professor Jackson was a member of the Appraisal Standards Board that promulgated Advisory Opinion 9 (AO9).

21. For information on a variety of power line proposals around the United States and the opposition they have created, see *http://www.energyjustice.net/powerlines.*

22. See, for example, Sarah Imboden, "State's Power Line Plan Electrifies Local Opposition," *The Observer*, Nov. 27, 2013, *www.rhobserver.com/20700/states-power-line-plan-electrifies-opposition/.* Barring local acceptance, the new corridors will need to be acquired via use of the government's power of eminent domain.

23. Matthew L. Wald, "Power Line Project Faces Challenges in California Valley," *The New York Times*, Nov. 27, 2010. In March of 2014, the California Public Utility Commission failed to approve a much shorter 3.5-mile transmission line that would cut through parts of the communities of Thousand Oaks, Moorpark and Simi Valley, and improve substation connectivity.

24. For various points of view about the project, see *www.grainbeltexpresscleanline.com/site/home* and *http://www.blockgbe.com/.*

25. Information and filings related to this corridor proposal can be found at *www.icc.illinois.gov/docket/CaseDetails.aspx?no=13-0657.*

26. As of May 9, 2014, after the official close of public testimony, the Illinois Commerce Commission website had posted 289 comments from the public.

27. Direct Testimony of John Tomasiewicz, Tomasiewicz Ex. 1.0, 4: 57–64.

28. Direct Testimony of Robert Mason, Mason Ex. 1.0, 3: 36–37.

29. Direct Testimony of Jeffrey King, Chief Operations Officer, School District U-46, Ex. 1.0, 4: 83–84.

30. One website link (no longer accessible) was to *http://www.brucepmc/Fact.9.pdf.* On that website was a "Fact Sheet # 9" dated Jan. 30, 2010. The intervener also referenced the website *http://burythecable.ie/askon.pdf* referencing an ASKON Consulting Group "Media Information Pack" dated Oct. 9, 2008, and published in Ireland.

31. In the aftermath of the federal bailout of the savings and loan industry in the 1980s, Congress passed legislation establishing an Appraisal Standards Board to develop a set of professional standards for the real estate appraisal profession. Congress also required all states to establish a process for licensing real estate appraisers and to require all licensed appraisers to follow the Uniform Standards of Professional Appraisal Practice (USPAP) promulgated by the Appraisal Standards Board.

32. USPAP 2014-2015 Advisory Opinions, p. A-20, lines 177–178. This is echoed in many publications of the Appraisal Institute including "Real Estate Damages: Applied Economics and Detrimental Conditions," Second Edition, 2008, which at p. 238 says the following: "In the analysis of detrimental conditions, it is important that the appraiser be knowledgeable about the available tools, properly select and apply those tools, avoid unproven or suspect methodologies, and ultimately have relevant market data to support opinions and conclusions."

33. USPAP 2014–2015 Advisory Opinions, p. A-20, lines 181–183.

34. USPAP requires licensed appraisers to complete the research and analyses "necessary to develop credible assignment results." USPAP, 2014-2015 Edition, Scope of Work Rule, p. U-14, lines 429-430. The Scope of Work Rule in USPAP then says that the acceptability of the research and analysis is measured based on what "an appraiser's peers' actions would be in performing the same or a similar assignment." USPAP, 2014–2015, Scope of Work Rule, p. U-14, lines 433–434. The phrase "an appraiser's peers" is defined in USPAP as "other appraisers who have expertise and competency in a similar type of assignment." USPAP, 2014–2015, Definitions, p. U-1, line 32. The answer to USPAP Frequently Asked Question 160 entitled "Judging the Actions of An Appraiser's Peers" states that "journals and publications, professional meetings and conferences, education through courses and seminars, and appraisal discussion groups" (USPAP, 2014-2015, supra, FAQ 160, p. F-73) are the sources of knowledge about what an appraiser's peers would do in a similar assignment.

35. "The fact that a property is impacted by a detrimental condition does not automatically mean that it has a material impact on the property's value. Detrimental conditions may or may not cause a material impact on value. Frequently, detrimental conditions have no material impact on value whatsoever." Randall Bell, with contributing authors Orell C. Anderson and Michael V. Sanders, "Real Estate Damages: Applied Economics and Detrimental Conditions," Second Edition, The Appraisal Institute, 2008, p. 238.

36. As with many detrimental conditions, subjective fear of hazard does not necessarily equate to objective evidence of diminished property value.

37. Op. cit. at 35, p. 110.

38. See, for example, Clark, op. cit. at 9, pp. 11–12: "Many persons have indicated by their actions a preference for a specific property, even though encumbered by an easement, as compared to other properties which are not. The reason for their actions is not as important as the effect, individually and collectively, on values... few within the real estate profession have factual knowledge of the impact of these easements on the value of real estate. Some appraisers rely on, and frequently express, opinions with no factual foundation. Thus, transmission line easements and their effects, if any, on adjacent or nearby properties are controversial subjects."

39. Pitts and Jackson, op. cit., p. 324.

40. Wolverton, Martin L. and Steven C. Bottemiller, "Further Analysis of Transmission Line Impact on Residential Property Values," *The Appraisal Journal*, July 2003, p. 244.

41. Pitts and Jackson, op. cit., p. 323.

42. Chalmers and Voorvaart, op. cit., p. 229.

43. Chalmers, James A., "High Voltage Transmission Lines and Rural Western Real Estate Values," *The Appraisal Journal*, Winter 2012, p. 31.

44. Ibid., p. 44.

45. Petition of COMMONWEALTH EDISON COMPANY for a Certificate of Public Convenience and Necessity, under Section 8-406 of the Illinois Public Utilities Act to construct, operate and maintain a new electric transmission line in Kane and DuPage Counties, Illinois, Docket No. 94-0179.

46. As part of the prior authorization of the 138kV line, a previously existing distribution line on wooden poles was relocated within the existing corridor.

47. See Illinois Commerce Commission Order, dated Aug. 9, 1995, 1995 Ill. PUC LEXIS 501, *15-*16. We also presented expert testimony in that prior proceeding. As it related to Sugar Ridge, our 1994 work reviewed the expert report prepared for residents. In our sales analysis in 1994, we found no discernible adverse effect on Sugar Ridge home prices from the announcement of the proposed transmission line project.

48. The 14th Edition, 2013, of The Appraisal of Real Estate, p. 399, defines "paired data analysis" as "a quantitative technique used to identify and measure adjustments to the sale prices or rents of com parable properties; to apply this technique, sales or rental data on nearly identical properties except for one characteristic is analyzed to isolate the single characteristic's effect on value or rent." It then defines "pure pairings" as "pairs of sales or rental data from properties that are identical except for the single element being measured."

49. There were 17 sales but only 12 homes because some of the homes sold more than once.

50. In this case, the width of the power line right-of-way provided additional buffering of the homes from the towers and the lines.

51. The population of Huntley increased from 5,953 in 2000 to 24,291 in 2010, a 308 percent increase, while Algonquin grew more than 30 percent from 22,989 to 30,046 persons during the same decade. *http://censusviewer.com/cities/IL*.

52. Application of COMMONWEALTH EDISON COMPANY for a Certificate of Public Convenience and Necessity, under Section 8-406 of the Illinois Public Utilities Act, and for an Order, under Section 8-503, of the Illinois Public Utilities Act, authorizing and directing ComEd to construct, operate and maintain new electric transmission lines in Kane and McHenry Counties, Illinois, Docket No. 96-0410.

53. Application of COMMONWEALTH EDISON COMPANY for a Certificate of Public Convenience and Necessity, under Section 8-406 of the Illinois Public Utilities Act, and for an Order, under Section 8-503, of the Illinois Public Utilities Act, authorizing and directing ComEd to construct, operate, and maintain new electric transmission lines in Kane and McHenry Counties, Illinois, Docket No. 96-0410.

54. Townhouse developments make excellent case studies for this type of proximity impact studies. Unlike single-family home developments, townhouse developments more frequently involve the same type of unit with the same number of bedrooms, bathrooms, garage spaces, square footage and finishes.

55. As part of our review of that expert report in 1995, we interviewed a sales agent at Concord Pointe who indicated that even though some potential buyers were not concerned about the proximity of some of the units to the transmission line or did not even mention proximity to power lines as a concern, the sales technique for the townhomes located adjacent to the transmission line was to automatically tell the purchaser that a $3,500 discount will be provided if the buyer takes one of those units. There was no bargaining involved, and the discount was a sales promotion device. Such a discount amounted to about a two to three percent discount from the average sales price in 1995. (Rebuttal Testimony of Richard J. Roddewig, MAI, CRE, President, Clarion Associates, Inc., Docket No. 94-0179.)

56. The 345 kV lattice towers adjacent to Concord Pointe are approximately 135 to 170 feet in height, and the 138 kV lattice towers are approximately 110 to 160 feet in height.

57. See, for example, Alexandre Trigano, MD, et al., "Clinical Study of Interference with Cardiac Pacemakers by a Magnetic Field at Power Line Frequencies," *Journal of the American College of Cardiology*, Vol. 45, No. 6, March 2005, pp. 896–900.

58. *http://www.55places.com/illinois/communities/hampton-park.*

59. Dairy farmers seemed to be especially concerned. "Stray voltage" that can be produced by power lines and other sources has been found in some studies to affect dairy cow behavior and milk production. See, for example, Public Service Commission of Wisconsin, Environmental Impacts of Transmission Lines, p. 22. In Minnesota, dairy farmers have sued utility companies alleging that their cows have produced less milk and even died as a result of proximity to power lines. See, for example, *www.postbulletin.com/business/capx-court-case-to-test-minnesota-s-buy-the-farm/article_3c6af2d0-8bf1-58d0-9c63-6007dc5a3f30.html.*

60. Chalmers 2012, op. cit., p. 35.

61. Ibid.

62. Ibid., p., 44.

63. Brown, Dean I.A., "The Effect of Power Line Structures and Easements on Farm Land Values," *Right of Way*, December 1975/January 1976, pp. 33–38.

64. Jackson Thomas, "Electric Transmission Lines Is There an Impact on Rural Land Values?" *Right of Way*, November/December 2010, pp. 32–38.

65. Chalmers 2012, op. cit., p. 31.

EXHIBIT C:
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EXHIBIT D:
CERTIFICATION

CERTIFICATION

I certify that, to the best of my knowledge and belief:

-the statements of fact contained in this report are true and correct;

-the reported analyses, opinions, and conclusions are limited only by any reported assumptions and limiting conditions contained in the report and are my personal, impartial, and unbiased professional analyses, opinions, and conclusions;

-I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved;

-I **have not** performed previous services, as an appraiser, regarding the property that is the subject of this report within the three-year period immediately preceding acceptance of this assignment;

-I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;

-my engagement in this assignment was not contingent upon developing or reporting predetermined results;

-my compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal;

-my analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice*;

-I have not made a personal inspection of the proposed Missouri right-of-way that is the subject of this report, nor of the sales in the various Wisconsin and Michigan markets discussed in this report; but I have undertaken an exterior inspection of the northeastern Illinois developments and the Christian County farmland sales that are the subject of our prior work that is discussed in this report;

-that significant real property appraisal assistance was provided by the following: Mr. Charles T. Brigden, CRE, ASA, and Ms. Annie O'Connell of Clarion Associates, Inc. who collected sales data related to property prices and organized and presented that data in charts and maps;

-the reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute;

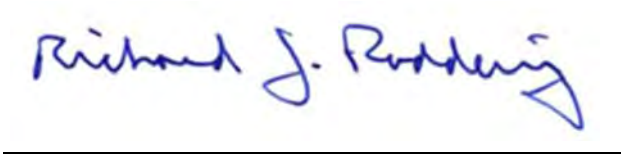
-the use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives;

-as of the date of this report, I have completed the continuing education program of the Appraisal Institute.

Respectfully submitted,

Electronic PDF Copy

CLARION ASSOCIATES, INC.



Richard J. Roddewig, MAI, CRE, FRICS
President

MISSOURI REAL ESTATE APPRAISER
Temporary Certificate/License Number 2017002891
(EXPIRATION: JULY 30, 2017)

Date of Report: February 21, 2017

EXHIBIT E:
CHICAGO METRO AREA RESEARCH INTO THE IMPACT OF TRANSMISSION LINES ON ADJACENT HOME PRICES

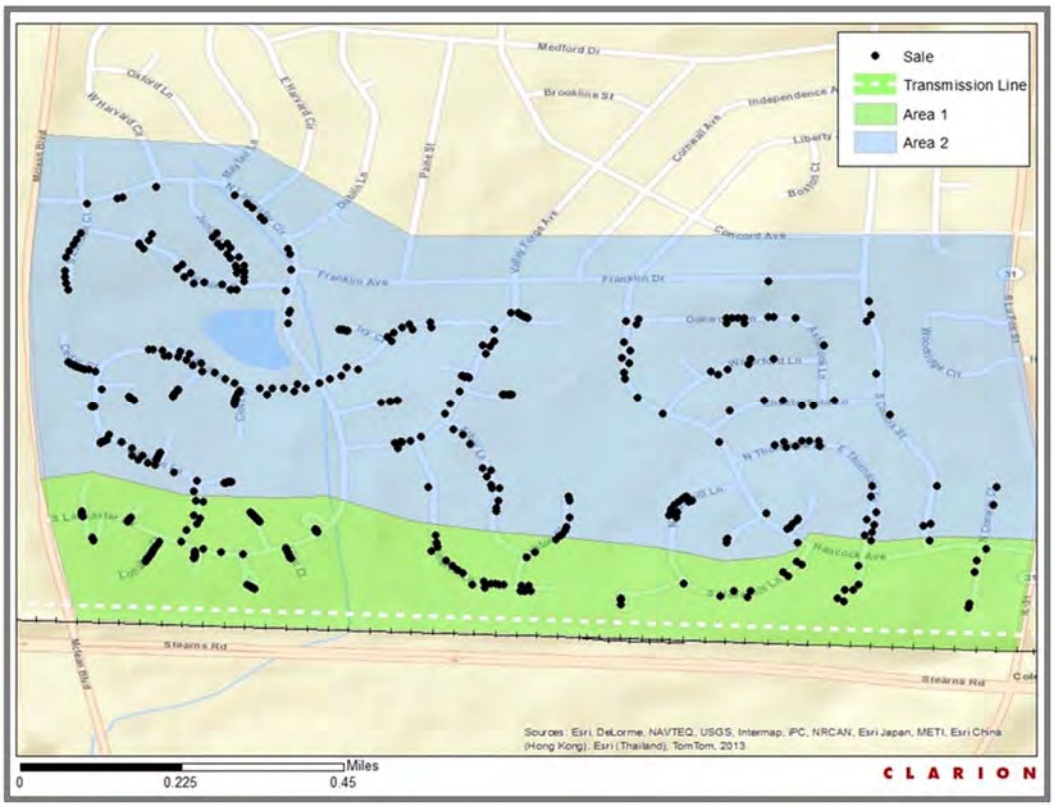
ANALYSIS OF SALES DATA AT SUGAR RIDGE AND RIVER RIDGE IN SOUTH ELGIN, ILLINOIS

Portions of the proposed Grain Belt Express transmission line corridor in Missouri will be in locations where there is a pre-existing transmission line in close proximity. I have done prior research at two subdivisions in the Chicago metro area to determine if the addition of a second power line adversely impacts home prices.

The subdivisions with two power lines are Sugar Ridge and River Ridge in South Elgin, Illinois. They are adjacent single-family home neighborhoods developed in the early 1990s. There is a transmission line right-of-way along the south border of those two neighborhoods. That corridor was authorized in a 1994 Illinois Commerce Commission proceeding[56] and the 138kV line on 95 to 110 foot monopoles with eight cross arms was energized on August 1, 1996. The transmission line corridor is also part of a railroad right-of-way. As part of the prior authorization of the 138kV line, a previously existing distribution line on wooden poles was relocated within the existing corridor.

I presented expert testimony in that 1994 proceeding. I concluded there were enough sales in Sugar Ridge to determine the effect of the proposed transmission line on Sugar Ridge prices. In 1994, I found no discernible adverse effect on Sugar Ridge home prices from the announcement of the proposed transmission line project.

In 2014, I updated my prior Sugar Ridge and River Ridge sales price analysis. My staff and I collected and analyzed multiple listing sales data between 1994 and 2013 in Sugar Ridge and River Ridge. We then undertook two types of analyses. First, we analyzed the average price each year for homes located within 500 to 700 feet of the transmission line corridor. We compared the average prices for those homes to the average price for other homes located further away in the same subdivisions. Prices were analyzed based on price paid per square foot of home area in order to eliminate any effect from differences in home size on the



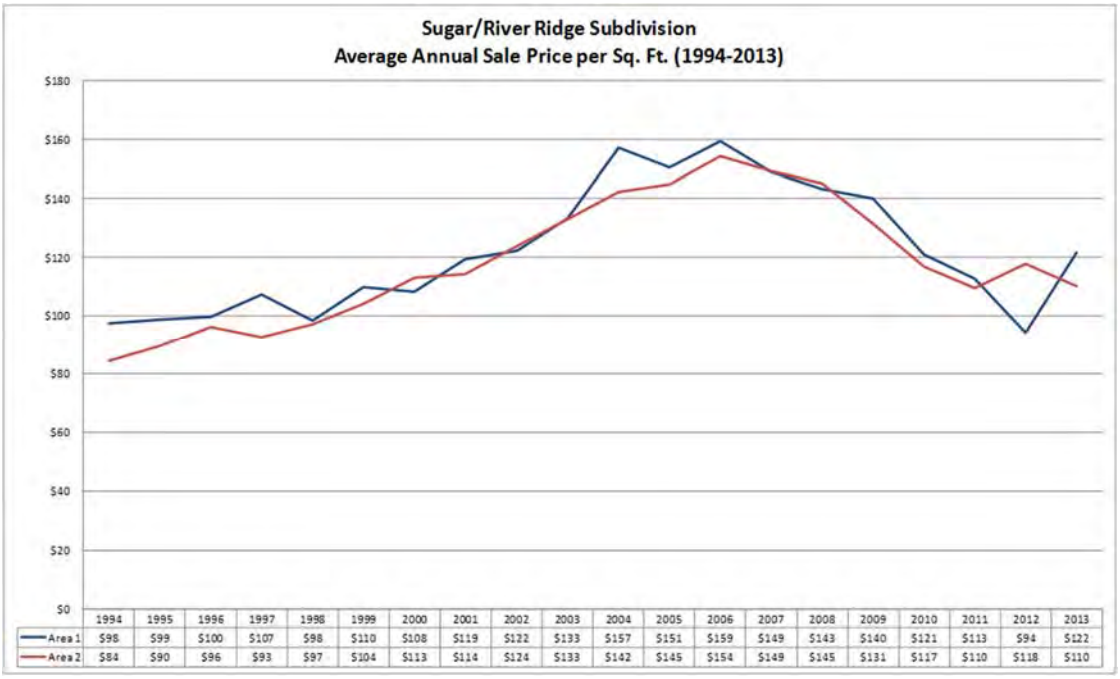
[56] Petition of COMMONWEALTH EDISON COMPANY for a Certificate of Public Convenience and Necessity, under Section 8-406 of the Illinois Public Utilities Act to construct, operate and maintain a new electric transmission line in Kane and DuPage Counties, Illinois, Docket No. 94-0179.

absolute sale price paid.

The map on the prior page shows the sales in the area located within 500 to 700 feet from the transmission line corridor compared to sales in the rest of the subdivision. The existing transmission line is shown by the dashed line.

The northern edge of Area 1 colored in green on the map above is located between 500 feet and 700 feet north of the northern edge of the transmission line corridor.

The comparison of average sale prices between 1994 and 2013 is shown on the graph below.



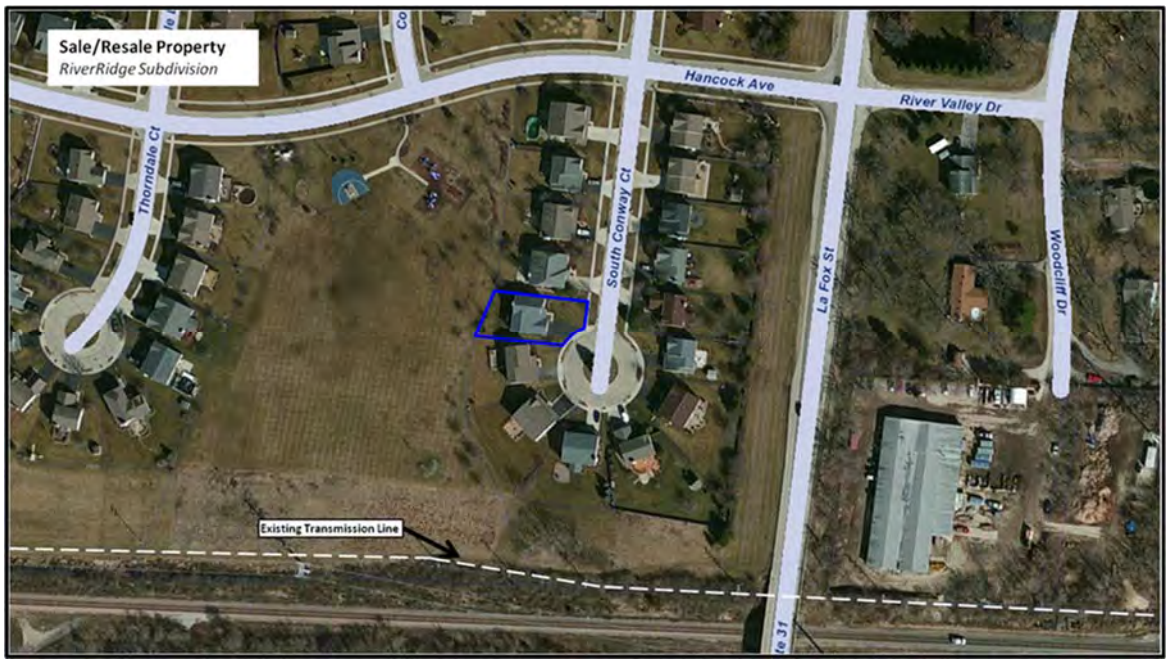
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Area 1	$98	$99	$100	$107	$98	$110	$108	$119	$122	$133	$157	$151	$159	$149	$143	$140	$121	$113	$94	$122
Area 2	$84	$90	$96	$93	$97	$104	$113	$114	$124	$133	$142	$145	$154	$149	$145	$131	$117	$110	$118	$110

In 15 of the 20 years studied, the average price of a home in the area located closest to the transmission line corridor (Area 1) was higher than in Area 2, the portion of the Sugar Ridge and River Ridge neighborhood located further than 500 to 700 feet from the transmission line corridor. Overall, the average price per square foot paid for homes in the portions of the subdivisions closest to the transmission line corridor was about 3.5% higher than the price paid for homes not located in proximity to the transmission line corridor.

We also studied prices paid for homes that either backed up to the existing transmission line corridor or had clear views of the power lines. We compared the rate of appreciation for those homes to the average rate of appreciation for homes in Sugar Ridge and River Ridge that sold over the same period of time but were far enough away from the transmission line corridor not to be affected.

We performed a "paired sales analysis" involving primary pairings. We found 17 sales and subsequent resales of a home that we could analyze. These involved 12 homes. Some of the homes sold more than once. The homes were located on Lenox Court, Longbow Court, Lilac Court, Locust Court and Conway Court as shown on the map below.


Sale/Resale Properties
Sugar Ridge Subdivision
Lancer Ct
South Lakewood Ct
West Camden Ln
Lincoln Ct
South Lancaster Cir
Linden Ct
Lilac Ct
Locust Ct
Longbow Ct
Lenox Ct
Existing Transmission Line


Sale/Resale Property
RiverRidge Subdivision
Hancock Ave
River Valley Dr
Thorndale Ct
South Conway Ct
La Fox St
Woodcliff Dr
Existing Transmission Line

The sale/resale comparisons are as indicated in the table below.

Address	First Sale Year	Second Sale Year	ROW Annual Compound Rate of Appreciation	Non-ROW Sugar Ridge Rate of Appreciation	ROW to Non-ROW Appreciation Rate
7 Lenox Ct.	1997	2008	3.70%	4.10%	Worse
9 Lenox Ct.	1995	2002	4.60%	4.70%	Same
11 Lenox Ct.	1996	2004	5.80%	5.00%	Better
	1999	2004	8.27%	6.40%	Better
15 Lenox Ct.	1996	2005	5.80%	4.70%	Better
17 Lenox Ct.	1997	2004	6.30%	6.20%	Same
11 Longbow Ct.	1993	2005	6.60%	5.10%	Better
	2003	2005	7.50%	4.40%	Better
17 Longbow Ct.	1996	2004	5.80%	5.00%	Better
	1996	2013	0.90%	0.60%	Better
	2004	2013	-4.60%	-2.90%	Worse
7 Lilac Ct.	1996	2013	2.10%	0.90%	Better
11 Lilac Ct.	2003	2009	-4.90%	-0.30%	Worse
19 Lilac Ct.	2001	2003	8.20%	8.00%	Better
15 Locust Ct.	2003	2010	-0.80%	-1.80%	Better
25 South Conway Ct.	2008	2011	-4.10%	-8.80%	Better

As indicated in the table above, homes either backing up to the right-of-way or with clear views of power lines appreciated at a rate either equal to or better than non-ROW homes in Sugar Ridge and River Ridge in 13 of the 16 sale/resale comparisons. In other words, homes immediately adjacent to the power lines outperformed the rest of the market in Sugar Ridge and River Ridge.[57]

[57] This is consistent with some of the published research in the professional literature. For example, the Tatos, et al. Summer 2016 Appraisal Journal article concluded that "homes abutting 345 kV corridors often benefit from open space unavailable to other homes" that is available for on home prices within 50 meters was likely due to the "benefit of open space" that creates a "greenway." Tatos, et al., ibid., at 213.

ANALYSIS OF SALES DATA AT COVENTRY IN LAKE IN THE HILLS, ILLINOIS

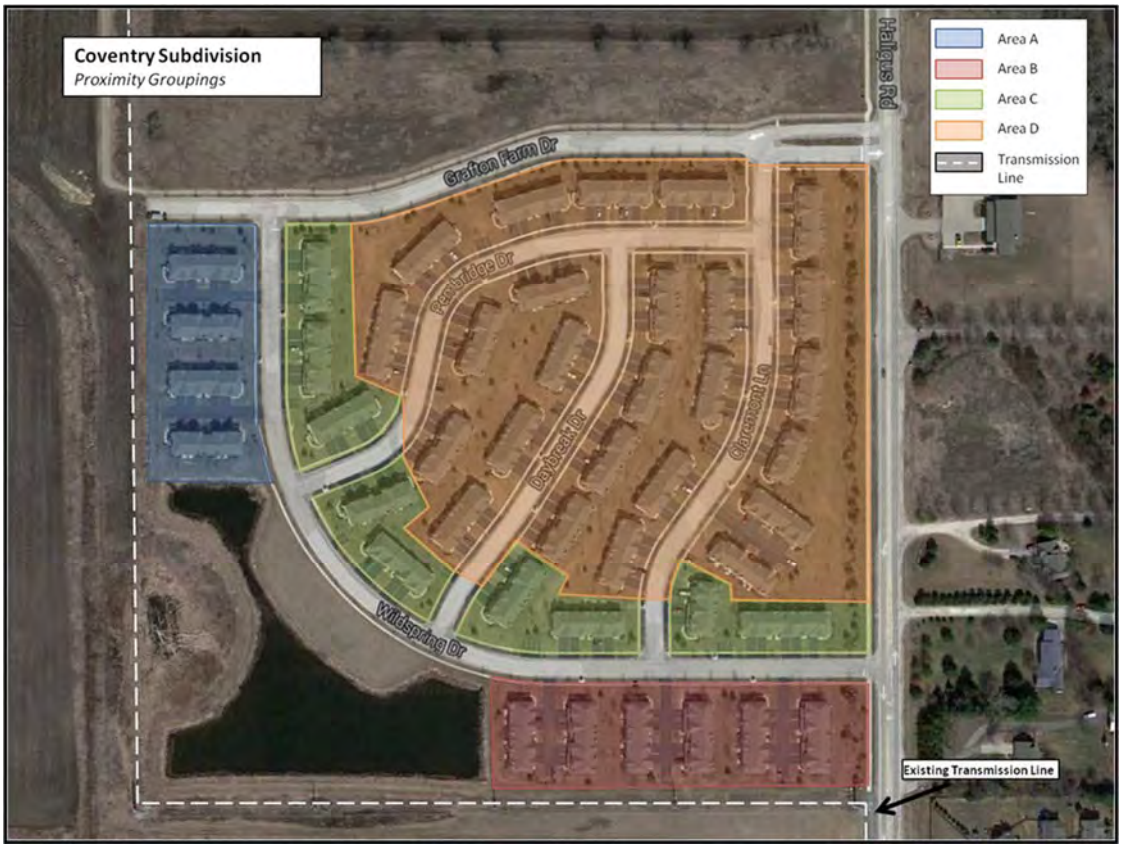
I have also studied the subsequent development of vacant land in proximity to a recently developed transmission line corridor in McHenry County, Illinois.

In 2014, my staff and I investigated the new construction that occurred on adjacent land subsequent to the acquisition of a ComEd transmission line corridor between Huntley and Algonquin that was acquired and developed by ComEd and energized in 2001. It is one of the more recent transmission line corridors developed in the Chicago metro area and was the subject of a 1996 Illinois Commerce Commission proceeding[58] at which I also presented testimony. The approved corridor contains a 138kV double circuit line on 64 to 99 foot monopoles. When the corridor was created and energized, there was considerable undeveloped land adjacent to the right-of-way. Much of the land has subsequently been developed with new residential housing since the date of completion of the power line installation.

Our 2014 research involved the Coventry townhouse development project at the northwest corner of the intersection of Haligus Road and Wildspring Road in Lake in the Hills. The general location of the Coventry development is shown in the map below.

We collected Coventry sales data between 2004 and 2013 to understand the effect, if any, of a recently approved transmission line corridor on the development of vacant land. We first compared prices on the south and west side of Wildspring Road immediately adjacent to the transmission line right-of-way to prices on the other side of Wildspring Road. The average sale price between 2004 and 2013 was exactly the same. We then also compared sale prices for the townhouses on both sides of Wildspring Road to prices in the rest of the townhouse complex located away from the right-of-way.

[58] Application of COMMONWEALTH EDISON COMPANY for a Certificate of Public Convenience and Necessity, under Section 8-406 of the Illinois Public Utilities Act, and for an Order, under Section 8-503, of the Illinois Public Utilities Act, authorizing and directing ComEd to construct, operate, and maintain new electric transmission lines in Kane and McHenry Counties, Illinois, Docket No. 96-0410



The average price for the Wildspring Road townhouses (Areas A, B, and C above) was 8.3% higher than for townhouses in the rest of the development (Area D). And townhouses on the south and west side of Wildspring Road (Areas A and B) located immediately adjacent to the transmission line right of way sold at an average price about 8.6% higher than in the rest of the development (Areas C and D). There has been no adverse impact from proximity to the transmission line on the townhouse sale prices at Coventry.

ANALYSIS OF SALES DATA AT CONCORD POINTE IN CAROL STREAM, ILLINOIS

Another study that I have done in the Chicago metro area involved townhouse prices at the Concord Pointe development in Carol Stream. That right-of-way consists of a double set of open lattice towers. One of the lattice towers supports two 138 kV lines and the other supports two 345 kV lines.

In 2014, my staff and I researched impacts of the transmission line on prices at Concord Pointe by collecting and analyzing Northern Illinois Multiple Listing Service ("MLS") sales data since 1995. We compared sale prices per square foot paid for townhouses located adjacent to the transmission line corridor (Area A) to prices paid for other Concord Pointe townhomes not located adjacent to the power lines (Areas B and C). Some of the townhomes in Area B have views of the tops of the two sets of lattice towers. The map below shows three areas in Concord Pointe – Areas A, B and C – defined by their relative proximity to the transmission line corridor located adjacent to the south end of the development.


Concord Pointe Subdivision
Proximity Groupings
North Ave
64
Area A
Area B
Area C
Transmission Line
Andover Dr
Andover Ct
Amber Ct
Amber Ln
Concord Ln
Harbor Ct
Kingston Ct
Elaine Dr
President St
Fairfield Ln
Existing Transmission Line
Great Western Trail

As indicated in the tables below, the average price differentials when comparing Area A located closest to the transmission line corridor to Areas B and C, and then comparing Areas A and B to Area C is less than 1.0%.

Area A v. Areas B & C			
Year	**Areas A**	**Areas B & C**	**% Difference**
1995	**$107**	$95	12.7%
1996	**$78**	$98	-20.2%
1997	**$102**	$100	1.6%
1998	**$99**	$97	1.8%
1999	**$99**	$98	1.3%
2000	**$99**	$103	-3.4%
2001	**$115**	$112	2.3%
2002	**$118**	$122	-3.2%
2003	**$122**	$136	-10.4%
2004	**$152**	$140	8.8%
2005	**$155**	$150	3.7%
2006	**$145**	$157	-7.5%
2007	**$163**	$156	4.4%
2008	**$157**	$150	4.0%
2009	**$143**	$127	12.6%
2010	**$112**	$113	-1.2%
2011	**$92**	$110	-16.2%
2012	**$110**	$99	10.7%
2013	**$111**	$106	5.5%
		Average	0.4%

Source: MRED LLC and Clarion Associates, Inc.

Areas A & B v. Area C			
Year	**Areas A & B**	**Area C**	**% Difference**
1995	**$107**	$95	12.7%
1996	**$81**	$106	-23.4%
1997	**$99**	$103	-3.6%
1998	**$97**	$98	-0.8%
1999	**$98**	$98	0.8%
2000	**$101**	$103	-1.8%
2001	$113	$113	0.0%
2002	**$122**	$121	1.0%
2003	**$130**	$134	-2.8%
2004	**$139**	$141	-1.9%
2005	**$155**	$148	4.3%
2006	**$151**	$156	-3.3%
2007	**$162**	$155	4.1%
2008	**$157**	$148	6.2%
2009	**$135**	$127	5.9%
2010	**$119**	$112	5.9%
2011	**$98**	$113	-13.6%
2012	**$104**	$100	3.5%
2013	**$105**	$108	-3.6%
		Average	-0.5%

Source: MRED LLC and Clarion Associates, Inc.

The comparison in those tables indicates that there has been no adverse impact on average prices at Concord Pointe from proximity to the power lines.

ANALYSIS OF SALES DATA AT HAMPTON PARK IN NAPERVILLE, ILLINOIS

The Hampton Park townhouse project in Naperville, Illinois was reportedly developed between 2005 and 2008[59] long after the installation of the adjacent 345Kv monopole transmission line corridor. The location of those townhomes (and the transmission line adjacent to it) is shown in the map below.

The photo below shows a Google maps street view of Hampton Park townhomes with the monopole power line with four cross arms behind them.

[59] http://www.55places.com/illinois/communities/hampton-park.

We investigated sale prices in Hampton Park for the years between 2005 and 2013. We compared prices paid per square foot for townhomes adjacent to the transmission line corridor to prices in the rest of the community. Townhomes adjacent to the transmission line corridor sold on average for 4.3% more than townhomes in the rest of the community, as shown in the table below.

Area A v. Area B			
Year	**Area A**	**Area B**	**% Difference**
2005	n/a	$190	n/a
2006	**$208**	$200	4.2%
2007	**$215**	$226	-4.9%
2008	n/a	n/a	n/a
2009	n/a	$150	n/a
2010	$170	n/a	n/a
2011	n/a	$130	n/a
2012	**$184**	$157	17.1%
2013	**$170**	$169	0.8%
		Average	4.3%

Source: MRED LLC and Clarion Associates, Inc.