

## **Appendix A: Residential Property Studies**

<b>Author</b>	Bottenmiller, S.C. and Wolverton, M.L. (2013)
<b>Title</b>	The Price Effect of HVTLs on Abutting Homes
<b>Source</b>	<i>The Appraisal journal</i>
<b>Publication Date</b>	Winter 2013
<b>Studied Geography</b>	Portland, Oregon area and Seattle, Washington area.
<b>Studied Transmission Lines</b>	No information on ROW width, structure types and sizes or line voltages except to indicate that there were in several cases multiple lines in the corridor.
<b>Additional Data Description</b>	Identification of about 150 abutting sales in each area and then select at least two, and sometimes three, non-abutting sales as similar as possible to each of the abutting sales.
<b>Studied Voltage</b>	115 kV, 230 kV, 345 kV and 500 kV.
<b>Number of Observations</b>	538 sales in the Portland area and 568 sales in the Seattle area.
<b>Studied Time Period</b>	2005 through first half of 2007.
<b>HVTL Measurements</b>	Sales were coded as abutting (treatment) or non-abutting (control).
<b>Methodology</b>	Statistical analysis. Log-linear regression model with adjusted $R^2=92.9\%$ for Portland study area and $93.5\%$ for Seattle study area.
<b>Independent Variables</b>	Abuts HVTL or not, sale quarter, living area, garage, lot size, slope, view, landscape quality, bedrooms, bathrooms, pool, barn, home quality, roof, cell tower visible.
<b>Dependent Variables</b>	Natural log of price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> This study measures the effect of proximity with a single variable that indicates whether the property abuts a HVTL ROW or does not abut a HVTL ROW. For both study areas, the effect of abutting a HVTL was statistically significant, but very small. For an average price home in the Portland area the effect of abutting was -1.65% and in the Seattle area it was -2.43%.</li> <li>2. <u>Visibility</u> Not investigated.</li> <li>3. <u>Encumbrance</u> The treatment properties abutted the HVTL ROW but none were crossed.</li> <li>4. <u>Other Issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of home value When the Seattle data are divided into “higher priced homes” (top quartile of sales with mean price of \$1,035,105) and “more typically priced homes” (bottom three quartiles of sales with a mean price of \$366,866), the higher priced homes that abut the HVTL ROW sell at a discount of 11.23% relative to the non-abutting homes. For the more typically priced homes there is no difference in pricing of the abutting relative to the non-abutting homes.</li> <li>b. Effect of HVTL on appreciation There was considerable appreciation in both study areas over the study period, but no difference in appreciation of abutting versus non-abutting homes.</li> <li>c. Effect of line voltage There was no apparent effect of line voltage on the market experience of abutting versus non-abutting homes.</li> </ol> </li> </ol>

<b>Author</b>	Chalmers, James A., and Frank A. Voorvaart (2009)
<b>Title</b>	High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects
<b>Source</b>	<i>The Appraisal Journal</i>
<b>Publication Date</b>	Summer 2009
<b>Studied Geography</b>	Connecticut and Massachusetts.
<b>Studied Transmission Lines</b>	345 kV lines supported by steel structures, steel lattice structures, or wooden H-frames; some lines were co-located with a second 345 kV line or a 115 kV line. Structure height varied with steel poles measuring 130 feet; easement width varied.
<b>Additional Data Description</b>	Sale transaction data was collected for nine individual sub-areas; however, for analysis purposes, these areas were aggregated into four study areas.
<b>Studied Voltage</b>	345 kV.
<b>Number of Observations</b>	1,286 sale transactions.
<b>Studied Time Period</b>	Jan 1, 1998 to Dec 31, 2007.
<b>HVTL Measurements</b>	Continuous distances as measured from the street curb opposite the front door of the property to the centerline of the transmission line; additional model was specified using distance zones: (1) 0-75 meters; (2) 75-150 meters; (3) more than 150 meters. Field data was collected by appraisers on visibility of the three nearest transmission line structures, latitude and longitude coordinates, and size of encumbrance (by the HVTL easement).
<b>Methodology</b>	Statistical Analysis: Log-log regression model with adjusted R <sup>2</sup> between 88% and 94%.
<b>Independent Variables</b>	Livable area; lot size; age at the time of sale; number of bathrooms; basement area; binary variables for; deck, garage, porch, central air conditioning, sale year, study sub-areas; size of easement; tower visibility; distance variables.
<b>Dependent Variables</b>	Natural log of sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> No evidence of systematic effects due to proximity to the 345 kV lines in either the continuous distance models or the models where distance was indicated categorically in zones.</li> <li>2. <u>Visibility</u> No evidence of systematic effects due to visibility of the HVTL structures.</li> <li>3. <u>Encumbrance</u> Encumbrance of the property by the HVTL easement did appear to have a small negative effect on value, although with varied statistical significance. For example, in the western Connecticut study area, a property of about an acre with a value of \$300,000 would experience a discount of about \$3,000 due to an encumbrance of 12,000 square feet.</li> <li>4. <u>Other Issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of home value The data were divided into two equal groups—those above the median value and those below the median. The results for these sub-samples did not differ from the aggregated sample suggesting that home value was not playing a role in determining sensitivity of property value to the HVTL.</li> </ol> </li> </ol>

<b>Author</b>	Colwell, Peter F. (1990)
<b>Title</b>	Power Lines and Land Value
<b>Source</b>	<i>Journal of Real Estate Research</i>
<b>Publication Date</b>	Spring 1990
<b>Studied Geography</b>	Holiday Hills and Windsor Village, Decatur, Illinois.
<b>Studied Transmission Lines</b>	Double-circuit 138 kV lines on lattice steel structures; transmission line corridor consists of a 50 foot easement.
<b>Additional Data Description</b>	The study is a follow-up analysis of a 1979 Colwell and Foley study and uses the same data set as the previous study.
<b>Studied Voltage</b>	138 kV.
<b>Number of Observations</b>	200 sale transactions of properties within 400 feet of the centerline of the transmission line corridor.
<b>Studied Time Period</b>	Jan 1, 1968 to Oct 31, 1978.
<b>HVTL Measurements</b>	Continuous distance to transmission center line from center of property. Distance to nearest structure. Categorical variable indicating whether the property is encumbered by the HVTL easement.
<b>Methodology</b>	Statistical Analysis: Log-log regression model with $R^2$ of 77%.
<b>Independent Variables</b>	Distance to transmission lines and towers; easement on property; time; lot size; building size; number of bathrooms; basement; garage size; and deck and neighborhood binary variables.
<b>Dependent Variables</b>	Natural log of sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> For observations toward the beginning of the study period, there was a negative proximity effect of about 6% at 100 feet from the center of the property to the center of the easement and 3% at 200 feet. But by the end of the study period, these effects had disappeared. The author offers no explanation for the change in result over the study period. Given that the HVTL had been in place for many years, this may indicate attitudinal shifts in the market over the period 1968-1978, changes in market conditions, changes in vegetative screening or some other explanation not yet identified.</li> <li>2. <u>Visibility</u> Visibility effects were not tested directly, but a variable measuring distance to the nearest structure was included in the models but had no statistically consistent effect on price.</li> <li>3. <u>Encumbrance</u> Encumbrance was entered as a categorical variable and indicated a systematic negative effect on sale price.</li> </ol>

<b>Author</b>	Des Rosiers, Francois (2002)
<b>Title</b>	Power Lines, Visual Encumbrance and House Values: A Micro-Spatial Approach to Impact Measurement
<b>Source</b>	Accepted for Publication in the <i>Journal of Real Estate Research</i>
<b>Publication Date</b>	January 2002
<b>Studied Geography</b>	Three residential neighborhoods in the city of Brossard, Greater Montreal area, Canada.
<b>Studied Transmission Lines</b>	A 2 mile, 200 feet wide 315 kV high voltage transmission line corridor with "Improved Visual Appearance" steel transmission line structures reaching, in most cases, between 155 and 175 feet in height.
<b>Additional Data Description</b>	
<b>Studied Voltage</b>	315 kV.
<b>Number of Observations</b>	507 sale transactions.
<b>Studied Time Period</b>	Feb 1991 to Nov 1996.
<b>HVTL Measurements</b>	Sales were categorized by distance from the easement, distance from the line, distance from the structures, view of the structures (limited, moderate or pronounced, and rear, side or front views) and view of the transmission line itself. For properties abutting the easement, lot position relative to the structures is also recorded (facing structure, located one, two, or three lots from structure, mid-span).
<b>Methodology</b>	Statistical Analysis: Log-linear and linear regression models with adjusted R-Squared between 86% and 97% (depending on model specification).
<b>Independent Variables</b>	Age; lot size; living area; basement area; type of siding, house style, landscaping, cabinetry, kitchen features, and flooring; central air conditioning; swimming pool; number of garage places; neighborhood location; property tax rate; service area; date of sale.
<b>Dependent Variables</b>	Sale price and natural log of sale price (for log-linear model).
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li><u>Proximity</u> Properties adjacent to the easement and facing a structure experience an average decrease in value of 9.6%. In the study area where the setback between the HVTL and the easement boundary is 50 feet, the effect averages 14% while for the area with a setback of 150 feet there is no decrease in value. Interestingly, for adjacent lots between the structure facing lot and the mid-span lot, the effects are positive ranging in value from 8.7% to 15.7%. The author attributes this to the benefits of enlarged visual field and increased privacy. At mid-span, the effect turns negative again ranging from -4.7% to -7.7% which the author attributes to the reduced height of the conductors (37 feet versus 63 feet at the structures). For non-adjacent properties, and holding visibility constant, negative effects of proximity are a maximum of -5% in a zone 165 to 325 feet from the HVTL, decline to -4% from 325 to 500 feet and disappear beyond 500 feet.</li> <li><u>Visibility</u> For non-adjacent properties, a view of the HVTL structures translates in most cases into higher values. The author attributes this to an enlarged view shed. These effects range on average from 3% to 7%.</li> <li><u>Encumbrance</u> No encumbered properties.</li> <li><u>Other Issues Investigated</u></li> </ol>

	<ul style="list-style-type: none"><li>a. Effect of home value There was some suggestion of greater sensitivity of sale price to the HVTL variables for higher valued properties.</li><li>b. Effect of the Swedish Health Effects Studies No evidence of increased sensitivity to the HVTL variables in 1993 and 1994 following publication of the Swedish health effects studies in 1993.</li></ul>
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<b>Author</b>	Hamilton, S.W. and Cameron Carruthers (1993)
<b>Title</b>	The Effects of Transmission Lines on Property Values in Residential Areas
<b>Source</b>	Research Paper
<b>Publication Date</b>	April 1993
<b>Studied Geography</b>	Five residential neighborhoods in Vancouver, British Columbia, Canada.
<b>Studied Transmission Lines</b>	Two neighborhoods with two 500 kV and one 230 kV lines on separate lattice steel structures in a 140 meter right of way; one neighborhood with a 60 kV line on wood poles; one neighborhood with two 230kV lines on lattice steel structures; and one neighborhood with unknown voltage.
<b>Additional Data Description</b>	Of the 15,663 transactions, 171 properties were partially within the right-of-way, and 289 properties were adjacent to, but not partially within the right-of-way. Further, 1,353 properties were within 120 meters of the transmission line.
<b>Studied Voltage</b>	500 kV, 230 kV, and 60 kV.
<b>Number of Observations</b>	15,663 sale transactions.
<b>Studied Time Period</b>	Jan 1, 1985 to Dec 31, 1991.
<b>HVTL Measurements</b>	Continuous distance and distance zones from the centerline of the transmission line corridor; 0-120 meters, 120-170 meters, 170-220 meters, 220-270 meters, and greater than 270 meters (as control group). Categorical variables for abutting properties and for properties encumbered by the HVTL easement. Number of structures visible is also included.
<b>Methodology</b>	Statistical Analysis: Log-log regression models with either continuous or zone distance with adjusted R <sup>2</sup> of 84%.
<b>Independent Variables</b>	Age of improvements; lot area; number of rooms, bedrooms, and bathrooms (full and partial); floor area; number of fireplaces; number of rooms in basement; binary variables for: pool, garage, time of sale, neighborhood, within or adjacent to right-of-way; distance variables; visibility (and number) of transmission line structures.
<b>Dependent Variables</b>	Natural log of sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> Properties within 120 meters of the HVTL appear to sell at an average 2-3% discount as compared to control area properties. Overall, a systematic, statistically significant negative price effect is limited to the 0 to 120 meter zone. Adjacent properties are not differentially affected relative to non-adjacent properties within the 120 meter zone.</li> <li>2. <u>Visibility</u> Neither the categorical variables, lines or structures visible, nor the number of structures visible had any apparent effect on price.</li> <li>3. <u>Encumbrance</u> The categorical variable for properties crossed by the HVTL easement had a small positive sign indicating a 2.5% advantage over unencumbered properties in the 120 meter zone. The authors attribute this to the enhanced view shed associated with the open space of the ROW.</li> </ol>

<b>Author</b>	Hamilton, S.W. and Gregory M. Schwann (1995)
<b>Title</b>	Do High Voltage Electric Transmission Lines Affect Property Value?
<b>Source</b>	<i>Land Economics</i>
<b>Publication Date</b>	November 1995
<b>Studied Geography</b>	Four residential neighborhoods in Vancouver, British Columbia, Canada.
<b>Studied Transmission Lines</b>	Two neighborhoods have a 140 meter right of way with two 500 kV lines and one 230 kV line on steel structures; one neighborhood has two transmission lines of unknown voltage on steel structures; and one neighborhood has one 60 kV line on wood poles.
<b>Additional Data Description</b>	The final sample include 12,907 sales transactions of single detached properties of which 2,364 properties were within 200 meters of the transmission line and 426 were adjacent to, or partially within, the transmission line right-of-way.
<b>Studied Voltage</b>	500 kV, 230 kV, and 60 kV.
<b>Number of Observations</b>	12,907 sale transactions.
<b>Studied Time Period</b>	Jan 1, 1985 to Dec 31, 1991.
<b>HVTL Measurements</b>	Distance was measured as a continuous variable from the property to the centerline of the right-of-way. Categorical variables were used to indicate properties adjacent to the ROW or crossed by the ROW. Number of structures visible was recorded as was a variable to indicate if any part of the HVTL was visible.
<b>Methodology</b>	Statistical Analysis: Box-Cox/translog model with maximum likelihood estimation.
<b>Independent Variables</b>	Distance to center of right-of-way; number of towers visible; binary variables for: abutting or within right-of-way, line visibility, garage, pool, public sewage, curb or corner lot; age at time of sale; number of fireplaces, basement rooms, bedrooms, and bathrooms; size of lot.
<b>Dependent Variables</b>	Box-Cox transformed sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> Adjacent properties suffer a -5.8% decrease in value relative to other properties within 100 meters. Non-adjacent properties within 100 meters suffer a -2.8% decrease in value relative to properties between 100 and 200 meters.</li> <li>2. <u>Visibility</u> For adjacent properties there is a -5.7% effect due to structure visibility relative to adjacent properties from which no structures are visible. For non-adjacent properties, there is no effect due to structure visibility. For adjacent properties with towers visible, there is a combined effect of -6.3% relative to a non-adjacent property within 100 meters with no structure visible.</li> <li>3. <u>Encumbrance</u> No encumbered properties.</li> </ol>

<b>Author</b>	Ignelzi, Patrice C. and Thomas Priestley (1991)
<b>Title</b>	A Statistical Analysis of Transmission Line Impacts on Residential Property Values in Six Neighborhoods
<b>Source</b>	Southern California Edison – Environmental Affairs
<b>Publication Date</b>	May 1991
<b>Studied Geography</b>	Eight residential subdivisions in Vallejo and Fairfield, Solano County, Northern CA.
<b>Studied Transmission Lines</b>	Two neighborhoods are crossed by 115 kV lines; one neighborhood is crossed by a 230 kV line; three neighborhoods are crossed by a 115 kV line and a 230 kV line upgraded during the study period from a 115 kV line on 60 foot steel lattice structures to 115 kV and 230 kV lines on 165 foot tubular steel structures. Two of those three neighborhoods were fully developed prior to the upgrade. The remaining two studied neighborhoods are comparison areas without any transmission lines. All transmission lined are either on 165 foot tubular steel structures or 60 foot lattice steel structures.
<b>Additional Data Description</b>	A comprehensive database that includes property and neighborhood specific data, area-wide macroeconomic variables, and transmission line related variables.
<b>Studied Voltage</b>	230 kV and 115 kV.
<b>Number of Observations</b>	1,816 property sales.
<b>Studied Time Period</b>	1976 to 1989.
<b>HVTL Measurements</b>	Five distance zones: (1) 0-300 feet; (2) 301-600 feet; (3) 601-900 feet; (4) 901-1,500 feet; and (5) over 1,500 feet. Categorical variables to indicate whether properties are adjacent or crossed. Size of easement. Number of structures visible and whether ROW is landscaped.
<b>Methodology</b>	Statistical Analysis: Lin-log regression model with an adjusted R-Squared of 84%.
<b>Independent Variables</b>	Lot size; interior square footage; age of house; binary variables for: pool, flag lot, cul-de-sac lot, panoramic views, property located to non right-of-way open space; slop of the street; subdivision and neighborhood quality; number of building permits issued 6-18 months before sale; yearly price trend; property adjacent to right-of-way; property crossed by right-of-way; easement size; distance to right-of-way; number of transmission towers visible; property in neighborhood with landscaped right-of-way.
<b>Dependent Variables</b>	Sale price adjusted to 1982 values.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> HVTL effects of existing lines were less than 1% of sales price for most properties.</li> <li>2. <u>Visibility</u> Tower and Line visibility appears to have no effect on sales price.</li> <li>3. <u>Encumbrance</u> Encumbrance has a negative effect on sale price estimated to be about \$0.45 per square foot measured in 1982 dollars.</li> <li>4. <u>Other issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of HVTL Construction Construction of an upgrade in a developed neighborhood has a significant adverse effect lowering property values by 4-9% on average. This effect diminishes over time and largely disappears after four years.</li> <li>b. Effect of ROW landscaping The net effect of integrating the ROW into subdivision landscaping appears to increase average property sale prices by 2-5%.</li> </ol> </li> </ol>

<b>Author</b>	Kinnard William N., Mary Beth Geckler, and Phillip S. Mitchell (1988)
<b>Title</b>	Effects of Proximity to High-Voltage Electric Transmission Lines on Sales Prices and Market Values of Vacant Land and Single-Family Residential Property: January 1978-June 1988
<b>Source</b>	Real Estate Counseling Group of Connecticut, Inc.
<b>Publication Date</b>	1988
<b>Studied Geography</b>	Penobscot County, Maine.
<b>Studied Transmission Lines</b>	345 kV line; 10 years after construction.
<b>Additional Data Description</b>	
<b>Studied Voltage</b>	345 kV.
<b>Number of Observations</b>	828 sales of single-family residential properties and 582 sales of vacant land suitable for residential development.
<b>Studied Time Period</b>	1/1/1978 to 6/30/1988.
<b>HVTL Measurements</b>	Distance zones: <ul style="list-style-type: none"> <li>• Centerline to 300 feet;</li> <li>• 301 to 2,000 feet;</li> <li>• 2,001 to 4,000 feet; and</li> <li>• 4,001 feet or more.</li> </ul>
<b>Methodology</b>	Statistical Analysis: Linear regression model with R-Squared of 57%.
<b>Independent Variables</b>	Selected property descriptors from tax cards and MLS.
<b>Dependent Variables</b>	Sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> No evidence of statistically significant negative effects on value of proximity to HVTL.</li> <li>2. <u>Visibility</u></li> <li>3. <u>Encumbrance</u></li> <li>4. <u>Other Issues investigated</u> No effects on days on market.</li> </ol>

<b>Author</b>	Kinnard, William N., Mary Beth Geckler and Jake W. DeLottie (1997)
<b>Title</b>	Post-1992 Evidence of EMF Impacts on Nearby Residential Property Values: Price Effects from Publication of and Widespread Publicity About the Floderus and Ahlborn-Feychting Studies in Sweden (Nevada Study)
<b>Source</b>	Real Estate Counseling Group of Connecticut, Inc.
<b>Publication Date</b>	April 1997
<b>Studied Geography</b>	Sun City, Las Vegas, Nevada.
<b>Studied Transmission Lines</b>	138 kV line with 3 double circuits on 90 foot concrete Structures. Line is in the middle of an arterial street and is visible throughout Sun City. The line was completed in August 1991.
<b>Additional Data Description</b>	Studied time period includes data for 9 quarters prior to the release of the Swedish health studies, and 19 quarters after the release of the Swedish health studies. Similarly, the study period contains a period before and during construction of the HVTL and a post-construction period.
<b>Studied Voltage</b>	138 kV.
<b>Number of Observations</b>	4,269 sale transactions.
<b>Studied Time Period</b>	Apr 1, 1989 to Mar 31, 1996.
<b>HVTL Measurements</b>	Sales were categorized by distance zones: (1) 0-200 feet; (2) 201-400 feet; (3) 401-800 feet; (4) 801-1,320 feet; (5) 1,321-2,640 feet; and (6) greater than 2,641 feet. Distance zone (6) served as the Control Area. Before/after construction.
<b>Methodology</b>	Statistical Analysis: Log-log regression model with adjusted $R^2$ of 92%.
<b>Independent Variables</b>	Age; living area; lot size; garage; number of baths; type of heating; number of stories; and frame type; time of sale variables; basement; distance zone; visibility of structures; "before/after" publication of the Swedish health studies; distance variables.
<b>Dependent Variables</b>	Natural log of sale price.
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> Two different distance zone models were specified. Even though one model showed a small effect on value (approximately 1%) of homes in the 0-200 feet zone, the effect was not consistent (the effect was statistically insignificant in an alternative model specification). Overall, the authors concluded that proximity (to the HVTL) had no systematic effect on sale price.</li> <li>2. <u>Visibility</u> Not studied.</li> <li>3. <u>Encumbrance</u> None of the properties were crossed by the easement.</li> <li>4. <u>Other Issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of HVTL Construction There was no apparent change in the sensitivity of sale price in the before construction period relative to the post construction period.</li> <li>b. Effect of Swedish Health Effects Studies There was no apparent change in sensitivity of sale price subsequent to publication of the Swedish Health Effects Studies.</li> </ol> </li> </ol>

<b>Author</b>	Kinnard, William N., Mary Beth Geckler and Jake W. DeLottie (1997)
<b>Title</b>	Post-1992 Evidence of EMF Impacts on Nearby Residential Property Values: Price Effects from Publication of and Widespread Publicity About the Floderus and Ahlborn-Feychting Studies in Sweden (Missouri Study)
<b>Source</b>	Real Estate Counseling Group of Connecticut, Inc.
<b>Publication Date</b>	April 1997
<b>Studied Geography</b>	Portions of St. Louis and St. Charles Counties, Missouri.
<b>Studied Transmission Lines</b>	Four study areas were centered around electrical substations. A fifth study area surrounded a 138 kV line on 90 foot steel structures. These facilities were only visible to portions of the study areas and all were built before Jan 1, 1990.
<b>Additional Data Description</b>	
<b>Studied Voltage</b>	138 kV.
<b>Number of Observations</b>	1,377 sale transactions.
<b>Studied Time Period</b>	Jan 1, 1990 to June 30, 1996.
<b>HVTL Measurements</b>	Sales were categorized by distance zones: (1) 0-200 feet; (2) 201-400 feet; (3) 401-800 feet; (4) 801-1,320 feet; and (5) 1,321 feet or greater. Sale properties were also categorized by whether HVTL or substations were visible.
<b>Methodology</b>	Statistical Analysis: Log-log regression model with R <sup>2</sup> between 72% and 96% (depending on study area).
<b>Independent Variables</b>	Age; living area; lot size; garage; number of baths; type of heating; number of stories; and frame type; time of sale variables; basement; distance zone; visibility of structures; "before/after" publication of the Swedish health studies; distance variables.
<b>Dependent Variables</b>	Natural log of sale price. (Nearly identical results were obtained when the dependent variable was price per living area square foot.)
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> No consistent pattern of negative impacts on sale price associated with proximity to the HVTL.</li> <li>2. <u>Visibility</u> No pattern of visibility effects on sales price.</li> <li>3. <u>Encumbrance</u> Not studied.</li> <li>4. <u>Other Issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of Swedish Health Effects Studies No increased sensitivity of sales price to HVTL variables after publication of the Swedish health effects studies in 1993.</li> </ol> </li> </ol>

<b>Author</b>	Wolverton, Marvin L., and Steven C. Bottemiller (2003)
<b>Title</b>	Further Analysis of Transmission Line Impact on Residential Property Values
<b>Source</b>	<i>The Appraisal Journal</i>
<b>Publication Date</b>	July 2003
<b>Studied Geography</b>	Portland, Oregon; Seattle, Washington, and Vancouver, Washington.
<b>Studied Transmission Lines</b>	16 high voltage transmission lines varying between 115 kV and 500 kV. One line with concrete structures, one line with H-frame wood structures, and 14 lines with lattice steel structures; either the structures or the conductors were clearly visible from the subject properties.
<b>Additional Data Description</b>	300 sales transactions abutted an HVTL, while 412 sales transactions served as control area sales (i.e., these sales did not abut an HVTL).
<b>Studied Voltage</b>	500 kV to 115 kV.
<b>Number of Observations</b>	712 sales transactions.
<b>Studied Time Period</b>	1989 to 1992.
<b>HVTL Measurements</b>	Sales were characterized as either subject (abutting the transmission line) or control (not abutting a transmission line right-of-way).
<b>Methodology</b>	Statistical Analysis: Both log-linear and linear regression models with adjusted R <sup>2</sup> of 85%.
<b>Independent Variables</b>	Date of sale; site and site improvement variables; location variables; building improvement variables; abutting transmission line variable.
<b>Dependent Variables</b>	Sales price and natural log of sale price (for log-linear model).
<b>Summary/Result</b>	<ol style="list-style-type: none"> <li>1. <u>Proximity</u> No evidence of any impact of the HVTL on abutting properties relative to non-abutting properties.</li> <li>2. <u>Visibility</u> Not studied.</li> <li>3. <u>Encumbrance</u> No encumbered properties.</li> <li>4. <u>Other Issues Investigated</u> <ol style="list-style-type: none"> <li>a. Effect of HVTL on Appreciation No evidence of differential appreciation rates over time for properties abutting HVTL ROW as compared to non-abutting properties.</li> </ol> </li> </ol>