Corridor Valuation

An Overview and New Alternatives

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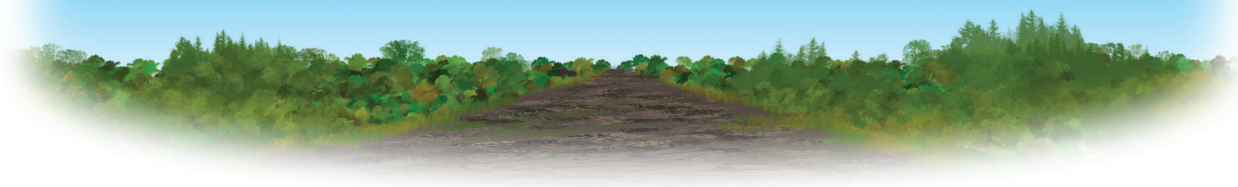
Chapter 9

Transmission Corridor Valuation and Renewable Generation: A North American Perspective

by Orell C. Anderson, MAI, Alexander R. Wohl, Stephen G. Valdez, and Valeo Schultz, MAI



The exploitation of wind, solar, and hydroelectric power depends on the geographic distribution of these resources. Climate, topography, latitude, and longitude—i.e., the factors that control the distribution of renewable resources—do not necessarily match the distribution of population centers, which tend to concentrate along coastlines, navigable rivers, harbors, and inland transportation hubs. In this way, renewable resource generation has more in common with natural gas, coal, and crude oil extraction than traditional electricity generation.

This chapter assesses how renewable energy generation impacts the theory and practice of corridor valuation. The discussions in this section are informed by independent research, interviews with energy industry professionals, and the combined experiences of the authors in corridor valuation assignments.

The presence of fossil fuels can stimulate local economies throughout North America, where those resources are stranded by accidents of geography. Technological advances in wind, solar, and hydroelectric generation have unlocked and expanded the capacity for electricity generation, but much of these resources are also located far from population centers. Some regions such as the Pacific Northwest and the Southwestern United States, as well as British Columbia and northern Quebec, have long been producing large quantities of electricity through hydroelectric dams, abundant wind, and solar power. Geo-

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thermal resources now provide even more opportunities for renewable electricity generation on a utility-level scale.

The electricity transmission system that developed in the twentieth century was a largely regional system. Electricity was generated, transmitted, and consumed within a certain region and accordingly regulated at a state level. However, recent developments in solar panels and wind turbines have left the sunniest and windiest states with stranded resources. In the United States, the state of North Dakota illustrates this problem: though it is considered to have the greatest wind capacity of any U.S. state, it is one of the least populated, with fewer than 1 million inhabitants. Feeding renewable resources into the U.S. and Canadian economies depends on the expansion and integration of existing transmission systems to deliver and market renewable energy. Electricity is shifting from regional generation to a mix of large-scale remote generation and small-scale distributed generation. Existing natural gas and petroleum distribution systems include pipelines that traverse several states and may even cross national boundaries, as is the case of the Keystone Pipeline connecting Alberta, Canada, to Texas and Oklahoma.

In the electricity market, Canada is a net exporter of renewable energy to the United States. More than 35 transmission lines connect the Canadian and U.S. grids. On both sides of the border, most of this clean energy is generated by hydroelectric dams. Power produced in Quebec is exported to New England, and Pacific Northwest electricity is sent to British Columbia and Alberta.

The past decade has seen year-over-year increases in transmission investment in North America, with over $20 billion spent in the United States every year since 2015. Much of this money is spent to build, upgrade, and renovate transmission corridors to accommodate the development of utility-scale renewable energy generation. The $6.6 billion MISO[1] Multi-Value Portfolio consists of 17 transmission projects to connect wind and Canadian hydroelectric power to demand centers. With projected completion in 2024, the $6 billion Energy Gateway project will add 2,000 miles to the Western Electricity Coordinating Council and improve reliability and access to wind, solar, and geothermal power.

Whether a successful transition to renewable generation occurs—and how and when it occurs—is a larger economic and political question. Much of the increased demand is driven by changes in consumer preferences for zero-emission energy and by international agreements such as the Paris Climate Accord. But in the meantime, investors and governments are developing renewable generation in resource-rich states and provinces.

The full market impact of these emerging technologies and increasing capacity is not yet clear. Questions of reliability, cost, demand, and other factors remain. So far there have been impacts both on the physical grid and on the economics of corridor markets.

1. Midcontinent Independent System Operator, Inc.

The traditional generation of electricity requires some fuel—whether coal, gas, or nuclear. Fossil fuels are dense forms of energy and may be transported cost effectively by truck, rail, ship, and pipeline from their points of extraction to power plants closer to population centers. The same is not true for generated electricity. Transporting electricity long distances by truck-mounted batteries remains cost-prohibitive except in small-scale, limited-use projects. Electricity requires a continuous physical medium to connect generation with demand. Thus, the transmission of electricity depends on the ownership in easement or in fee of vast land networks.

In a superficial sense, corridors carrying renewable energy do not differ from any other type of electricity transmission corridor. Easement descriptions generally do not put constraints on the generation sources of electricity passing through the easement. Wind and solar generation projects are often connected to the existing grid using generation ties, or "gen-ties." If there were no modification to the existing transmission system, gen-ties would perhaps be the only direct physical consequence of the shift to renewable sources. But public and private development has changed—and continues to change—the grid. To accommodate renewable generation, lines are being updated to higher voltages. Higher voltages usually mean taller and wider pylons, which in turn require wider easements.[2]

Beyond new siting, longer distances, and higher voltages, there are economic consequences that impact the supply and demand for corridor land and thus the valuation of corridor properties. Changes in state, provincial, and federal energy policies and associated eminent domain and expropriation statutes as well as the extension of siting powers, deregulation, and increases in the private financing of new corridor projects require a reassessment of the costs of assembling new corridors and the risks associated with those costs. Higher voltages, wider rights of way, and longer distances influence the land acquisition process, right of way negotiations, and hard and soft costs. The influence of renewable energy generation on corridor markets may also change assumptions about the allocation and mitigation of price risk among buyers and sellers.

Overall energy demand is expanding, and consumers are demanding cleaner or non-emission energy sources. Connecting these sources to the larger grid is the challenge, and it currently drives a significant part of the valuation needs involving corridors. The following section addresses some of the major issues that valuers will confront in these assignments.

Appraisal and Valuation Issues

As with any valuation assignment, the problem to be solved, the purpose of the appraisal, the scope of work, and the intended user determine how a corridor is to be appraised.

2. Easements should, in theory, accommodate the pylon fall line. In other words, the tower should be able to fall and remain within its own right of way.

Transmission corridors must be appraised for a variety of assignments driven by new acquisitions, financial reporting requirements, due diligence on purchase price allocation, litigation, and taxation purposes. Appraisers tasked with valuing transmission corridors face challenges common to real estate valuation in general, including illiquid markets, limited comparable sales, and few sources of reliable income data. These challenges are often exaggerated in corridor valuation assignments.

In the early twentieth century, the U.S. Interstate Commerce Commission imposed accounting procedures on railroad companies to make them value their land holdings within a given corridor. These procedures were combined with the everyday practices of right of way professionals in the field involved in the acquisition and assembly of transportation, energy, and communication corridors, leading to what is now referred to as the *across-the-fence*, or ATF, methodology. However, corridors transfer from one entity to another and these transfers can occur as a direct purchase and sale at the corridor level or at the company level. These transactions represent transfers of a unique economic unit and asset type with a singular highest and best use. By comparison, ATF methodologies deal with an amalgamation of portions of individual properties with differing highest and best uses.

The valuation of corridors requires a mastery of the three approaches to value. The development of a new corridor, from a valuation perspective, can be broken down into individual tasks. Appraising an existing corridor for sale, taxation, financial reporting, or litigation may require a different emphasis or methodology.

Cost Approach

The cost approach, in its simplest form, is a representation of the cost to develop a project. Land is acquired in easement or in fee, typically through eminent domain (or expropriation in Canada). For most appraisal assignments, the land valuation involves partial acquisitions necessitating valuation in both the before and after condition, damages to the remainder, and so on.

The assignment can also include the hard, soft, and entrepreneurial costs of constructing a functioning corridor. These costs should include costs for planning, design, entitlement, holding, land acquisition, tower construction, financing, and other expenses required to get a project off the ground. The land can be valued separately, but a corridor free from physical or economic obsolescence should represent something greater than the sum of the land values (typically ATF) derived through the acquisition process. With adequate data, a corridor factor can be derived that represents the value enhancement, if any, attributable to the assemblage of real estate into a functional corridor.

Income Approach

Corridors are typically assembled or bought as part of an income-producing project. Ideally, the risks inherent in assembling a corridor and the profits necessary to entice developers to take those risks would be best captured by capitalizing rental rates or through an allocation of net income on a per-mile or per-linear-foot basis. Though demand for corridor land may be driven by the expectation of future benefits, it is usually difficult—although not impossible—to allocate net income to specific corridor segments. The primary difficulty is a lack of readily obtainable, reliable data. Electricity, like any commodity, is shipped at a cost. Transmission costs can vary by time of day, the amount transmitted, and other considerations such as the duration and quality of the contracts.

To the extent that corridors become privatized or are "spun off" by utilities, as has occurred in the pipeline industries, the income approach will become increasingly important in valuing an operational transmission corridor. The main question to be addressed is like the issue posed by any special use property: Is the value inherent in the transmission system as a whole or do individual segments contribute differently to the value? To put it differently; Are all the links in the chain worth the same, or is the chain's value equal to its weakest link? The current marketplace has yet to reach a consensus on these topics. However, the privatization of lines and technological advances in metering will lead to more refinement in income valuation. The process will likely unfold in a manner similar to the events that occurred after the deregulation of the telecommunications industry and the rise of data centers, which now have become their own asset class.

Sales Comparison Approach

By evaluating sales of transmission corridors, a unit of value can be determined and applied to the corridor being appraised. While the situation is improving, finding comparable data on transmission corridor sales can be difficult. If a unit of measurement can be found and applied, the results can be compared to the results of both the cost and income approaches to estimate corridor factors and financial rates of return.

ATF and the Corridor Factor

The ATF methodology requires an appraiser to divide a corridor into segments corresponding to the distinct market areas it traverses. The appraiser considers sales of comparable non-corridor properties near each segment and applies a market-derived corridor factor to arrive at an indication of market value. This corridor factor serves as a linear scale factor of fee simple land value to corridor value. In theory, it captures the value of the corridor as a corridor—as an assemblage connecting two end points. This ratio is usually greater than one given the synergistic effects provided by full corridor assemblage, and thus the corridor factor is sometimes referred to as the *enhancement factor*.

However, it need not be greater than one. Properly derived, this factor reflects the costs and risks of the land purchase, legal fees, title fees, and surveying fees as well as the timing and risks of the land acquisition process.

If an appraiser uses the ATF method, the selection of transactions used to derive the corridor factor requires a careful examination of comparability. Like the sales comparison approach, the corridor factor should accurately reflect the equilibrium point of supply and demand in the corridor market. In an ATF valuation, however, this equilibrium point is not approached directly as in a traditional sales comparison approach, where the comparables are selected from the same market. ATF does not compare corridors to corridors. Rather, the ATF approach uses local non-corridor land values adjusted by a scale factor derived from the corridor market.

Costs and Risks

The increase in renewable energy generation in North America has economic, political, and legal implications, which influence both the costs and the risks associated with these costs. These are important considerations for appraisal professionals valuing transmission corridors, whether they are choosing the most appropriate methodology or deriving a corridor factor for use in the ATF method.

According to the principle of substitution, the buyer of a corridor segment would pay only as much as the value of an equally suitable substitute segment. The ATF method commonly used in corridor valuation is a variation of the traditional cost approach—where a land value indication is derived from sales comparison and then added to the depreciated cost of the improvements plus entrepreneurial profit. The consideration of corridor costs must account for land, improvements, potential severance damages, legal fees, and general project and overhead costs. Each cost carries associated risks.

Effect of Policy

Policies to encourage reliance on renewable energy generation have exaggerated the unequal distribution of renewable resources throughout North America by inflating demand in more densely populated coastal states with a limited appetite or resources for renewable generation. Though there has been plenty of debate at the national level over energy policy, many of the most successful policies have occurred at the state level. The U.S. Congress attempted and failed to pass a federal renewable portfolio standards (RPS) program in 2009. Opposition to this program cited the unequal distribution of renewable resources.[3] In contrast, 33 states have implemented RPS programs.

The RPS model is a market-based regulatory mechanism that requires suppliers to generate a specified percentage of electricity from

3. Edison Electrical Institute

renewable resources such as wind, solar, biomass, and geothermal energy. The RPS programs are tailored to each state. California, for example, initially required its suppliers to increase their renewable energy portfolios by 1% per year until they reached 20%. The goal has been increased to 33% by 2020 and 50% by 2025. Texas developed an RPS system in 1999, which was overturned by voters in 2015.

The U.S. Department of Energy has cited RPS programs as contributing to transmission congestion.[4] The RPS apply to generation, but they generally do not include incentives for transmission investment. In addition, goal-setting in the policy arena does not necessarily correspond to generation capacity. Washington, D.C., for example, has a 50% renewable generation goal but no utility-scale generation capacity.

A northeastern state with little onshore generation capacity and no appetite for offshore wind turbines may opt to buy out-of-state energy to meet their renewable portfolio standard. And the out-of-state supplier may not be a neighboring state. For example, states in New England have attempted to tap into wind resources in upstate New York. This results in corridors that cross entire states, where the affected communities and landowners are neither the primary consumers nor the primary producers of the renewable energy. It is difficult to persuade state eminent domain courts that the land needed for the line is for public use when that public use is in a different state. In some cases, affected states along the path of renewable energy corridors have refused to grant condemning authority to out-of-state utilities, forcing developers to either abandon the project or negotiate across the entire state on a parcel-by-parcel basis.

There have been attempts to address this problem at the federal level. The Federal Energy Policy Act of 2005 expanded the authority of the Federal Energy Regulatory Commission (FERC) over the utility industry. The stated goal was to increase competition and attract investment. Included in the legislation was the requirement that FERC enact incentives for transmission companies such as more favorable rates, cost recovery assurances, and more attractive returns for investors. Also included in the policy were requirements that FERC encourage underground cables and other new technologies.

Perhaps most significantly, the legislation permitted FERC to designate "national interest electric transmission corridors" to alleviate congestion and constraints on transmission capacity. This provision gave FERC authority to override state courts and issue permits granting condemning authority to applicants. This provision was not used until 2016, when the Department of Energy approved the Clean Line Energy Partners Plains & Eastern Clean Line Project, a 705-mile line stretching from Oklahoma, across Arkansas, and to the border shared with Tennessee. This partnership was ended when the Oklahoma portion of the corridor was sold to NextEra in late 2017. Despite the expanded

4. Source: National Electric Transmission Congestion Study, U.S. Department of Energy, 2015.

Canada's grid is pretty clean by world standards: two-thirds of Canada's electrical power comes from renewable sources, largely hydropower, and Canada is a top five generator of renewable electricity in the world. That said, quite a few Canadian provinces have a renewable electricity mandate.

Canadian provinces with a renewable portfolio standard (RPS):

- British Columbia: 93%, effective 2010 (Clean Energy Act)
- Alberta: 30% by 2030 (Climate Leadership Plan)
- Saskatchewan: 50% by 2030 (SaskPower announcement and infographics)
- Manitoba: None, but 99.6% of electricity generated in Manitoba is derived from renewable sources, mainly hydropower
- Ontario: None
- Quebec: Renewable energy target of 61% by 2030 for electricity, heating and cooling, and transportation. Currently, 99% of Quebec's electricity comes from renewable sources
- New Brunswick: 40% by 2020 (New Brunswick Energy Blueprint)
- Nova Scotia: 40% by 2020 (Electricity Act)
- Prince Edward Island: 30% by 2013 (Prince Edward Island Energy Strategy)
- Newfoundland: None, but 85% of electricity generated in Newfoundland is derived from hydropower

Source: Keane Gruending, "Which Canadian provinces have a renewable portfolio standard?" April 28, 2016, www.keanegruending.com

The regulatory targets or Renewable Portfolio Standards (RPS) being adopted by many Canadian jurisdictions mandate that a certain portion of electricity should be generated from renewable sources by a certain date. They include requests for proposals (RFPs) specifically for renewable power projects and feed-in tariffs (FITs), which usually offer standardized long-term contracts. Standing offer programs (SOPs) for renewable projects allow entrants to apply at any time the program is in effect and provide guaranteed payments. Contracts for differences are types of contracts in which the sellers and buyers agree to a fixed price, but the producer sells electricity in an open market and receives whatever price the market is offering. Net-metering programs allow end-users to generate their own electricity and either sell their excess production to the grid or use it to offset purchased power. Renewable energy credits or certificates (RECs) are tradable energy commodities which represent the environmental attributes of renewable power.

Source: National Energy Board, Government of Canada, www.neb-one.gc.ca/nrg/sttstc/lctrct/rprt/2016cndrnwblpwr/plcncntv-eng.html

authority of FERC, the decisions to grant condemning authority have been largely decided in state courts.

Cost Avoidance

Many of the costs associated with corridor assembly are soft costs with a high level of associated risk depending on the type of corridor and the regulatory status of the parties involved in the transactions. If a corridor developer has condemning authority, the process may resemble a private utility negotiating on a parcel-by-parcel basis, but the costs and associated risks are not the same.

Expropriation in Canada deals with property rights in the same manner as eminent domain in the United States. Where there is a condemning authority in the United States, there is an expropriating authority in Canada.

In the language of options, eminent domain acts as a kind of call option where the strike price is the fair market value as determined by an eminent domain court plus associated project delay costs and legal fees. This "strike price," however, is the price to the seller, not to the buyer, since most eminent domain laws require the exclusion of project influence. This means that the price does not reflect the potential cost and risk avoidance for the buyer. In general, this is desirable, since an appraisal of market value seeks to determine the value to a typically motivated buyer. When most buyers in a market are heavily insured against downside price risk, however, this mitigation of risk is reflected in the transaction data. If an appraiser is relying on market data from sales negotiated between a landowner and a utility with condemning authority, then the derived corridor factor may not reflect the true risk component.

This theoretical perspective reflects the authors' experience. Public and quasi-public utilities with eminent domain authority negotiate using an easement-to-fee-value ratio. For example, much like many real estate buyers, the company may offer less than fee value to start and the right of way agent usually has a margin of 10% to 15% to negotiate. Private utilities without the power of eminent domain, on the other hand, begin by quoting market-derived values based on local transactions per acre to acquire land from local owners. They may then negotiate upward with corridor factors that are greater than one depending on business motivation and alternative cost analysis. To generate returns and lower project costs, the private utility is motivated to buy land quickly, even if it means paying positive multipliers above its estimated non-corridor fee value.

Increases in renewable generation will likely increase interstate and interprovince transmission projects. Those developing these projects may have more difficulty convincing state and provincial courts and landowners that they serve a public need and thus may face more organized opposition at a community level or even experience the loss of eminent domain authority when crossing state lines. The potential costs and risks involved may discourage investment in transmission projects that would otherwise seem financially attractive. Valuations that better account for both the demand and supply side of the transaction—the value to the seller and the value to the buyer—could lessen the potential political risks. Current valuations are likely influenced by data extracted from transactions reflecting the impact of eminent domain on price risk and the lack of sophistication among sellers. These risks may instead be allocated as up-front costs and reflected in the higher corridor factors paid or lead to the expensive underground installation of cables to avoid landowner opposition.

Underground lines are popular with the public, but they are expensive. They require an insulation system for cooling and to prevent contact with electricity potentials in the surrounding earth. For overhead lines, air acts as a free and effective insulator. Underground insulation systems can result in high costs. Reported multipliers range from four to ten times the cost of equivalent lines above ground.[5] Underground lines present additional problems as they are harder to repair, and thus can result in longer blackouts and service interruptions. They are also harder to modify to accommodate new demand, alternate routes, and changes in above-ground title. However, companies are sometimes willing to pay the costs and put up with the inconveniences if it means appeasing landowners and securing an otherwise politically or financially infeasible route. The good optics of underground lines benefit a few property owners but add a direct cost to all end-users in the region in the form of increased energy rates.

Concluding Thoughts

The changes brought about by the increase in renewable energy generation may also reflect the increase in private capital investors and merchant builders developing transmission projects without established purchase power contracts. Such investors are essentially speculating that there will be buyers of electricity and hoping for higher returns than those achieved by utilities. The entrance of these merchant builders has already led to a loosening of the return on equity restrictions imposed by public utility commissions to keep utilities competitive. Further deregulation could also lessen the incentive these companies have to add improvements to increase their rate base and thus their returns under current regulations. Such an inflow of private capital could have widespread impacts on the costs and risks of assembling new corridors. These changes would, in turn, influence avoidance costs and valuations of existing corridor segments.

5. Based on interviews with industry professionals and a 2003 report by ATC, which cites a cost multiple of four times overhead lines.