EVERYTHING UNDER THE SUN: A GUIDE TO SITING SOLAR IN THE LONE STAR STATE

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I. INTRODUCTION

Encouraging energy production using renewable resources is a widely recognized public policy that is promoted by both the federal and state governments in the U.S., and with recent technological advances, renewable-electricity generation is rapidly becoming economically viable. The Energy Information Administration (EIA) forecasts that electricity production from all renewable sources will increase 72% between 2013 and 2040, with the renewable share of total U.S. electricity generation growing from 13% to 18%.[1] The future of solar power is especially bright, with a projected growth rate of 6.8% per year between 2013 and 2040.[2] If this projection holds true, solar power will far outpace the growth of

1. U.S. ENERGY INFO. ADMIN., DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 2015 ES-6, ES-7 (2015), http://www.eia.gov/forecasts/aeo/pdf/0383.pdf.

2. *Id.* at 16 (stating the growth rates of other renewable sources through 2040 are: geothermal at 5.5% per year, biomass at 3.1% per year and wind at 2.4% per year).

other renewables.[3] Combined with the Investment Tax Credit (ITC) introduced in 2006, rapid improvements in photovoltaic (PV) solar panel efficiency and dramatic reductions in PV costs are driving a veritable solar boom in the U.S.[4] In fact, the Solar Energy Industries Association (SEIA) reports a 73% decrease in the cost of installing solar since the implementation of the ITC, and anticipates an additional 20,000 Megawatts (MW) of solar generation capacity will come online in the next two years, doubling current U.S. solar capacity.[5] Likewise, the EIA projects that solar power will account for nearly half of the total 109,000MW of renewable-generation-capacity that is expected to be added to the U.S. electricity grid by 2040.[6]

A recent study conducted for First Solar, a prominent solar developer, concluded that utility-scale solar developments could actually be half the cost of residential-scale (i.e. rooftop) systems, when measured by the customer-generation costs per solar Megawatt Hour ("MWh").[7] In keeping with the findings of this analysis, the SEIA reports that approximately 26,000MW of utility-scale solar power projects are currently under development in the U.S.[8] Considering utility-scale solar developments can occupy anywhere from one to five acres per MW constructed, a 100MW facility can cover a substantial amount of land.[9]

With respect to natural resources and land that can accommodate utility-scale solar facilities, Texas is a particularly attractive state for development. In 2012, the Department of Energy released a study on U.S. renewable energy technical potential, which highlighted Texas as

3. *Id.*

4. MARK BOLINGER & JOACHIM SEEL, UTILITY-SCALE SOLAR 2014: AN EMPIRICAL ANALYSIS OF PROJECT COST, PERFORMANCE, AND PRICING TRENDS IN THE UNITED STATES 12–13 (2015), https://emp.lbl.gov/sites/all/files/lbnl-1000917.pdf (stating that the median installed costs for a sample of 170 PV projects totaling 5,874 Megawatts fell 50% to $3.1/Watt between 2009 and 2014; the lowest cost projects in the sample declined in cost from $3.2/Watt in 2013 to $2.3/Watt in 2014).

5. *Solar Industry Data,* SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/research-resources/solar-industry-data.

6. U.S. ENERGY INFO. ADMIN., *supra* note 1.

7. BRUCE TSUCHIDA ET. AL., COMPARATIVE GENERATION COSTS OF UTILITY-SCALE AND RESIDENTIAL-SCALE PV IN EXCEL ENERGY COLORADO'S SERVICE AREA 1 (2015), http://brattle.com/system/publications/pdfs/000/005/188/original/Comparative_Generation_Costs_of_UtilityScale_and_ResidentialScale_PV_in_Xcel_Energy_Colorado%27s_Service_Area.pdf?1436797265.

8. *Utility-Scale Solar Power,* SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/power-plant-development/utility-scale-solar-power (noting that the SEIA considers utility scale projects to include relatively small projects (e.g. 100 kilowatts), provided the project either sells electricity to, or is owned by, a utility).

9. *See* GREGORY S. FRIEND, PUT IT WHERE THE SUN DOES SHINE: A COMPARISON OF WIND AND SOLAR LEASE PROVISIONS AND IISSUES 8 (2012), http://www.sbaustinlaw.com/library-papers/aTab_004_Friend-Amato-Krebs-Wetsel.pdf; *see also* Sean Ong et al., *Land Use Requirements for Solar Power Plants in the United States*, NAT'L RENEWABLE ENERGY LAB., at v, (2013), http://www.nrel.gov/docs/fy13osti/56290.pdf (reporting values between 2 and 10 MWac per acre for utility-scale solar).

accounting for 14% of total U.S. technical potential for utility-scale PV, and 20% of the entire U.S. technical potential for utility-scale concentrated solar power (CSP).[10] Likewise, the Texas Solar Power Association boasts that Texas has the largest solar resource in the U.S., the largest electricity demand in the U.S., and sports a growing population and economy.[11] Given these considerations, the state has an idyllic combination of wide-open space with prime sunlight conditions, large markets, and broad-reaching transmission capacity that makes Texas a perfect place to build solar projects.

A number of developers are beginning to take advantage of the sunny prospects in Texas. Recently OCI Solar Power announced it was beginning construction on the next and largest part of a 400MW solar development being built throughout the state for CPS Energy.[12] This part of the project, dubbed Alamo 6, will be the largest single solar installation built in Texas to date, consisting of 110MW located on 1,200 acres of privately owned land.[13] Interestingly, as of May 2014, Texas had only about 200MW of solar panels installed throughout the state, including residential panels.[14] However, during 2014, 129MW of solar capacity was installed in Texas and $252 million was invested in solar installations throughout the state, marking a 45% increase over the previous year.[15] As of November 2015, 417 solar companies are located in Texas, employing 7,000 people throughout the value chain.[16] Though the state is ranked tenth highest among U.S. states for solar with 387MW of installed solar electric capacity,[17] 9,600MW of solar projects are currently under review for grid connection in Texas, and ERCOT projects more than 10,000MW will come online by 2029.[18]

Though Texas is ideally situated for solar development, the vast oil and gas resources underlying large areas of the state can complicate a developer's decision to build a solar project. Furthermore, Texas is the most prolific producer of wind energy in the country, and wind farms

10. ANTHONY LOPEZ ET AL., U.S. RENEWABLE ENERGY TECHNICAL POTENTIALS: A GIS-BASED ANALYSIS 8 (2012), http://www.nrel.gov/docs/fy12osti/51946.pdf.

11. *Why Solar for Texas*, TEX. SOLAR POWER ASS'N. (2016), http://www.txsolarpower.org/why-solar-for-texas.

12. *See OCI Solar Power Announces Construction on Texas' Largest Solar Plant*, BUS. WIRE (June 11, 2015), http://www.businesswire.com/news/home/20150611005874/en/OCI-Solar-Power-Announces-Construction-Texas%E2%80%99-Largest.

13. *Id.*

14. *See* Claire Foran, Jason Plautz & Patrick Reis, *Why is Texas Terrible at Producing Solar Power*, NAT'L J. (May 15, 2014), http://www.nationaljournal.com/energy/2014/05/15/why-is-texas-terrible-producing-solar-power.

15. *State Solar Policy: Texas,* SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/state-solar-policy/texas.

16. *Id.*

17. *Id.*

18. TEX. SOLAR POWER ASS'N, *supra* note 11.

occupy a considerable amount of both land and transmission capacity. Considering the density in which solar panels are arranged within a utility-scale solar project, any other surface uses are effectively precluded.[19] It follows that developers could face significant issues affecting the construction or operation of a solar facility should an oil and gas lessee assert its rights through the dominant estate doctrine or if a neighboring wind farm is constructed that casts a shadow over the solar facility. This paper will investigate the issues that arise in the context of conflicting surface use on or near utility-scale solar developments. In doing so, this paper will provide suggested methods for developers to manage the potential risks associated with building solar farms in Texas, the state with the most abundant energy resources in the country.

Considering the great potential for solar development in Texas, and the potential issues such a project could face with respect to oil and gas production or wind generation, this paper will analyze Texas solar development in three sections. First, the paper will discuss the stages of siting, leasing, and bringing a solar project online. This section will include a brief examination of the feasibility studies necessary to obtain financing for a potential project and a description of how developers can take advantage of tax incentives through tax equity investments. Then it will discuss aspects of solar leases and how they relate to the construction and operation of a solar power facility. In the second section, this paper will dive into the implications of siting a solar project, specifically with respect to competing surface uses like oil and gas production or wind generation. This section will explore methods by which a solar developer can protect itself through surface waivers, accommodation agreements, easements, and other arrangements. In this context, the second section will also discuss a novel approach to arguing that off-lease alternative drill sites should be acceptable alternatives under the accommodation doctrine. Finally, the last section of this paper will identify potential legal concerns regarding federal environmental laws. In studying these consequential matters, the authors hope to encapsulate everything under the sun that a solar developer could face when building a project in Texas and to demonstrate how even those hurdles will fail to slow the "green" gold rush in the Lone Star State.

II. STAGES OF SOLAR DEVELOPMENT

Solar developers must think through a number of issues when planning and constructing a utility-scale solar facility. The International Finance Corporation of the World Bank Group recently updated a useful publication that provides a comprehensive developer's guide to utility-

19. FRIEND, *supra* note 9.

scale solar projects.[20] This section, however, will outline just a few aspects of the development process that are relevant for the purposes of this paper. Specifically, this section will provide a brief explanation of the meteorological studies and other analyses necessary to identify prime locations for solar resource development. Next, it will discuss financing structures and tax incentives available for renewable energy projects. Finally, this section will explain the basic components of solar leases and the siting concerns relevant to utility scale development in Texas.

A. Feasibility

Before beginning construction of a solar project, developers must find an ideal project location. Though the amount of sunlight in a particular area is one such consideration, developers also must investigate whether a market exists for the generated electricity. If there is a market for the electricity, the developer needs to confirm that transmission capacity is available to deliver the electricity it produces to that market. In addition, developers should conduct environmental reviews and title research to confirm that a potential site will not reveal unexpected problems later in the project's life.

Accordingly, the first step is to identify where the most valuable solar resources are located. The National Renewable Energy Laboratory website publishes various modeling and analysis research that show solar resources across the U.S.[21] These maps rely on weather satellite data collected on daily snow cover and monthly averages of atmospheric water vapor, trace gases, and the amount of aerosols in the atmosphere to calculate the hourly total insolation, or radiation, falling on a ground-based horizontal surface.[22] Once ideal locations are identified, solar developers will need site specific data regarding the solar resource expected over the lifetime of a solar PV power plant. This data is necessary to entice investors and obtain financing, as well as to project the amount of electricity that will be available for delivery under a power purchase agreement (PPA). Typically, at least ten years of historical data is necessary to calculate variations in solar radiation to a reasonable degree of confidence.[23] Depending on the location, either satellite-derived data or ground-based data can be used to project average annual

20. *Utility-Scale Solar Photovoltaic Power Plants: A Project Developer's Guide*, INT'L. FIN. CORP., WORLD BANK GROUP 1 (2015), http://www.ifc.org/wps/wcm/connect/f05d3e00498e0841bb6fbbe54d141794/IFC+Solar+Report_Web+_08+05.pdf?MOD=AJPERES]hereinafter *Project Developer's Guide*].

21. *Solar Maps,* NAT'L RENEWABLE ENERGY LAB., http://www.nrel.gov/gis/solar.html (last visited Nov. 29, 2015).

22. *Solar Map Development – How the Maps Were Made*, NAT'L RENEWABLE ENERGY LAB, http://www.nrel.gov/gis/solar_map_development.html (last visited Nov. 29, 2015).

23. *Project Developer's Guide*, *supra* note 20, at 42.

electricity generation.[24] However, long-term historical data from ground-based measurements may not be available, in which case short-term ground-based resource monitoring can be used to supplement satellite data.[25] Supplementary ground-based assessments ideally monitor solar conditions for a minimum of twelve months, but a minimum of nine months can improve the estimation of a long-term mean value for solar radiation.[26]

While a solar developer evaluates different locations for solar resource potential, it must also consider whether the prospective sites have access to a market in which the developer can sell power. Most of the Texas power grid is managed by the Electric Reliability Council of Texas (ERCOT), which requires new electric generators of over 10MW to complete a registration process before selling electricity through the state's grid.[27] The Federal Energy Regulatory Commission (FERC) also requires a registration process for new electricity generators that will deliver electricity to grids aside from ERCOT, but aspects of FERC's process depend on where the project is being built.[28] Both ERCOT and FERC require an interconnection feasibility study of some kind, the purpose of which is to determine the impact the additional electricity to be delivered will have on the grid. Specifically, the studies analyze what, if any, system upgrades will be necessary to interconnect the proposed project to the grid, and what the associated cost and construction schedule of those system upgrades will be.[29]

The feasibility of a particular site for utility-scale solar also depends on whether environmental or title issues exist. Section III of this paper will provide a more detailed discussion of environmental laws that could affect a solar project in Texas. However, even if those laws are not applicable to a particular project site, developers should nonetheless conduct a baseline environmental study so that a basis is available against which any future environmental issues can be evaluated.[30] Details regarding the necessity for title reviews will also be discussed in more detail later in this paper.

Before a developer can obtain financing for a potential solar project, typically the developer will need to enter into a PPA with a power

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24. *Id.* at 44.
25. *Id.* at 45.
26. *Id.*
27. *New Generation Resources – Steps to Register*, ERCOT, http://www.ercot.com/services/rq/re/newgen-steps.html (last visited Nov. 29, 2015).
28. Abraham Ellis, Benjamin Karlson & Joseph Williams, *Utility-Scale Photovoltaic Procedures and Interconnection Requirements*, SANDIA NAT'L LAB. 3 (2012), http://energy.sandia.gov/wp-content/gallery/uploads/PV_Interconnection-SAND2012-2090.pdf.
29. *Id.* at 18.
30. *Project Developer's Guide*, *supra* note 20, at 1, 58.

purchasing entity, such as a municipal electric utility, electric co-op, retail electric provider, industrial consumer, or even companies like Google or Walmart.[31] PPAs define future project revenues, which provide a potential investor or lender with some guarantee that the project will generate a certain amount of money from which they can earn a return on their investment.[32] Without a PPA, a solar facility has no assured source of revenue, and without revenue, the project is essentially worthless. Therefore, developers should also check the creditworthiness of potential power purchasers to guarantee that even with a PPA, the risk of losing its customer to bankruptcy will be low. Once a PPA is signed and a solar developer has interested investors or lenders, it must consider the structure of its financing arrangement and how that structure will take advantage of available tax incentives.

B. Financing and Tax Incentives

After a solar developer obtains data from feasibility studies and selects ideal locations for a potential project, the developer must consider how to finance its endeavor. Obtaining traditional lender financing may be difficult or prohibitively expensive, particularly for developers without sizeable balance sheets and a strong history of development experience because of the perceived risk of solar company insolvencies.[33] As a result, utility-scale solar projects are ideally financed using a combination of private investment and government incentive programs commonly referred to as "tax equity" investments.[34] This subsection will first explain the most influential federal government incentive programs, and then will briefly describe the basic structure of tax equity investments reliant upon those programs. Then this subsection will discuss tax abatements and policy incentives in Texas, before concluding with an explanation of the

31. *See* Ben Miller, *Google Signs 240MW Texas PPA*, WIND POWER MONTHLY (Sept. 8, 2013), http://www.windpowermonthly.com/article/1212303/google-signs-240mw-texas-ppa; *see also* Michelle Froese, *Walmart Signs PPA with Akuo Energy USA for Texas Wind Project*, WINDPOWER ENG'G & DEV. (March 18, 2015), http://www.windpowerengineering.com/construction/projects/walmart-signs-ppa-with-akuo-energy-usa-for-texas-wind-project/.

32. *See Project Developer's Guide*, *supra* note 20, at 1, 11.

33. *See* Michael Mendelsohn et al., *The Impact of Financial Structure on the Cost of Solar Energy*, NAT'L RENEWABLE ENERGY LAB. 1 (2012), http://www.nrel.gov/docs/fy12osti/53086.pdf; *see also* Samantha Jacoby, *Solar-Backed Securities: Opportunities, Risks, and the Specter of the Subprime Mortgage Crisis*, 162 U. PA. L. REV. 203, 220 (2013) (pointing out a number of high-profile solar bankruptcies that raised questions about the solvency of the solar industry in general).

34. *See* Jacoby, *supra* note 33, at 208; *see also Success of the 1063 Treasury Program*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/finance-tax/1603-treasury-program ("Tax equity is the term used to describe the passive financing of an asset or project by large tax-paying entities that can utilize tax incentives to offset future tax liabilities.").

importance behind financing considerations as they relate to conflicting surface uses.

i. Federal Incentives

At the federal level, the Production Tax Credit (PTC) and the Investment Tax Credit (ITC) were the primary government incentive programs that drove exponential growth in the American solar industry. Both the PTC and ITC are tax credits, meaning they are each a dollar-for-dollar reduction in the income taxes that a person or company claiming the credit would otherwise pay to the federal government.[35] However, both the PTC and ITC were periodically subject to expiration, as will be described in more detail below.

The PTC initially provided an income tax credit of 2.2 cents/kilowatt-hour (adjusted for inflation over time) for production of electricity from utility-scale wind turbines, geothermal, solar, hydropower, biomass, and marine and hydrokinetic renewable energy plants.[36] Originally created under the Energy Policy Act of 1992, and reauthorized under various acts since its inception, the PTC extended into 2014 before Congress allowed it to expire.[37] In the Omnibus Appropriations Bill passed at the end of 2015, the PTC for wind energy, now amounting to 2.3 cents/kilowatt-hour, was extended through the end of 2016, after which it will decrease by twenty percent each year until its expiration in 2020.[38] Despite this extension, however, the PTC as it applied to solar expired at the beginning of 2006.[39]

The ITC is a federal tax credit based on 30% of the eligible expenditures made by the owners of any qualifying PV or CSP system constructed on residential or commercial properties.[40] Unlike the PTC, the entire value of the ITC is earned when the energy property is ready and available for its intended use (i.e. placed in service), and the credit

35. *Issues and Policies: Solar Investment Tax Credit (ITC)*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/finance-tax/solar-investment-tax-credit.

36. David W. Cooney, Jr., *Regulation of Specific Activities: Federal Law*, 46 TEX. PRAC., ENV. L. § 26:15 (2015).

37. *Id.*

38. *See* Consolidated Appropriations Act, 2016, 129 Stat. 2242, div. P, tit. III § 301 (2015); *see also* Cassandra Sweet, *Wind, Solar Companies Get Boost from Tax Credit Extension*, WALL ST. J. (Dec. 16, 2015), http://www.wsj.com/articles/wind-solar-companies-get-boost-from-tax-credit-extension-1450311501.

39. 26 U.S.C. § 45 (d)(4) ("in the case of a facility using solar energy placed in service before January 1, 2006").

40. *See* 26 U.S.C. § 48 (a)(2) for commercial tax credit; *see also* 26 U.S.C. §25D (a) for individual tax credit; *see also Business Energy Investment Tax Credit*, DEP'T OF ENERGY (2016) http://energy.gov/savings/business-energy-investment-tax-credit-itc (stating that the 30% ITC also applies to fuel cells and small wind turbines, and a 10% ITC is available for geothermal systems, micro turbines and combined heat and power systems).

can be carried back one year or carried forward 20 years.[41] The ITC has no maximum cap; however, it is subject to tax credit recapture if the project's owners do not retain the property for a five-year compliance period following the year the energy property is placed in service.[42] Before the 2016 Omnibus Appropriations Bill was passed, solar projects that were placed in service after December 31, 2016 would only have access to a 10% tax credit.[43] However, the 2016 Omnibus Bill extended the 30% ITC for commercial solar facilities that begin construction prior to December 31, 2019, after which it is reduced to 26% for projects that begin construction in 2020, and 22% for projects that begin construction in 2021.[44] Commercial solar facilities that meet these deadlines must be placed in service before January 1, 2024, otherwise they will receive only a 10% tax credit.[45]

Notably, businesses that own a renewable energy project also have the ability to claim accelerated depreciation deductions under the IRS's Modified Accelerated Cost Recovery System (MACRS). MACRS allows a business to recover its investments in solar energy properties through depreciation deductions that are based on a five-year, 20% double declining balance method.[46] As compared to the typical straight-line method used for other capital investments in property, MACRS allows a business to take advantage of the time value of money by recovering the project's tax basis over a much shorter period than would otherwise be available. An additional 100% bonus depreciation was also available for qualifying capital equipment placed in service by December 31, 2011. In 2013, Congress extended bonus depreciation, but only at 50%, thereby allowing a business to elect to depreciate 50% of the project's basis in the first year of service, while the remaining 50% would be depreciated under the MACRS schedule.[47] This reduced bonus depreciation was originally available only for projects placed in service before December 31, 2014, but the Protecting Americans from Tax Hikes Act of 2015 extended the 50% deprecation bonus through December 31, 2017, after which it will fall until it expires in 2020.[48] Altogether, federal tax incentives like the ITC/PTC, MACRS, and bonus depreciation treatment

41. *Public Welfare Investments in Solar Energy Facilities Using Renewable Energy Investment Tax Credit*, OFFICE OF THE COMPTROLLER OF THE CURRENCY 2 (2014), http://www.occ.treas.gov/topics/community-affairs/publications/fact-sheets/fact-sheet-solar-energy-invest-tax-credits-grants.pdf.

42. *Id.*, referencing 46 U.S.C. §50.

43. Jacoby, *supra* note 33, at 208.

44. Consolidated Appropriations Act, 2016, *supra* note 38, at §303.

45. *Id.*

46. OFFICE OF THE COMPTROLLER OF THE CURRENCY, *supra* note 41.

47. *Depreciation of Solar Energy Property in MACRS*, SOLAR ENERGY INDUS. ASS'N, http://www.seia.org/policy/finance-tax/depreciation-solar-energy-property-macrs.

48. *Id.*

provide an economic benefit that can represent roughly 50-60% of the installed cost of a solar project.[49]

ii. State Incentives

At the state level, Texas also provides some tax advantages and incentive programs to encourage renewable energy developments in the state. Texas does exempt from ad valorem taxes the increased value of property that results from installing solar devices. Unfortunately, the exemption applies only to systems built for on-site use.[50] Therefore, utility-scale projects designed to sell power to the grid will not qualify. However, it is possible to obtain tax abatements from local schools, counties, and governmental entities within each county, all of which levy annual property taxes on projects.[51] In order to grant a tax abatement, the county must follow a procedure governed by statute, which includes designating the project area as a reinvestment zone and holding various public hearings.[52] School districts must follow a different, but equally involved, process.[53] Needless to say, obtaining tax abatement agreements can be a lengthy and time-consuming process for a developer, and therefore necessitates significant lead-time in planning for the project.[54]

Texas also has a renewable portfolio standard (RPS) that features a renewable energy credit (REC) system. As part of the RPS, utilities are required to either generate or purchase a certain amount of energy from renewable sources, and if they cannot reach goals set by the Public Utility Commission, the utility must purchase credits generated by companies that produce renewable energy.[55] Though the system is designed to create additional "currency" for renewable energy companies, wind power facilities are generating far more RECs than are currently needed by the utilities.[56] As a result, unless the state legislature expands the RPS program, additional credits generated by non-wind renewables are devalued to the extent that they cannot be considered as part of the financial feasibility analysis for Texas solar projects.[57]

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49. Mendelsohn et al., *supra* note 33.

50. TEX. TAX CODE ANN. § 11.27(a) (2008 & sup. 2010).

51. ERNEST E. SMITH, RODERICK E. WETSEL, BECKY H. DIFFEN & MELISSA POWERS, WIND LAW §§ 1.01, 5.02 (2015).

52. *See* TEX. TAX CODE ANN. § 312.001 (West 2008); *see also* ERNEST E. SMITH, ET AL., *supra* note 51, at §§ 1.01, 5.03[2] (2015).

53. *See id.* at §§ 1.01, 5.03[3] (providing a detailed and practical approach to obtain tax abatements from school districts).

54. *See id.* at §§ 1.01, 5.03 (showing detailed and practical explanation of how to obtain tax abatement agreements).

55. *See id.* at §§ 1.01, 5.02[c].

56. Cooney, *supra* note 36.

57. *Id.*

iii. Utilizing Tax Incentives – Tax Equity and Investment Structures

Tax equity investors make investments in renewable energy projects to take advantage of these tax incentives and therefore will include the value of the tax credits in calculating their ultimate return. These entities utilize various financing arrangements to structure their investments in solar projects in particular, but often they are entitled to first priority on the tax credits generated by the project. As a result, tax equity investment returns can be substantially affected by reductions in electricity generation. Depending on the financing structure, tax equity investments can lower or eliminate altogether the amount needed from traditional debt sources to finance construction of a solar facility, thereby reducing the overall project financing costs of a solar development.[58] Furthermore, most developers do not have sufficient taxable income to fully utilize the tax credits and depreciation benefits themselves.[59] Therefore, utility-scale solar developers may prefer to structure their financing so as to include a single or series of tax equity investors with sufficient taxable income from other business activities, and the expertise necessary, to take full advantage of the federal incentives.[60]

In these arrangements, typically a limited liability company or limited partnership is formed to own the solar facility, and the tax equity investor will purchase an interest in that entity alongside the developer.[61] In turn, the investor is generally allocated the vast majority of tax credits, accelerated depreciation deductions, and taxable losses generated by the solar energy facility.[62] In "partnership flip" transactions, a common form of utility-scale solar financing, the developer will receive the vast majority of cash flow generated from the project until its investment is recouped, at which point the cash disbursements will "flip" to the tax equity investor.[63] After the tax equity investor's total returns earned from tax and cash benefits reaches a certain pre-negotiated internal rate of return, the cash distributions will be reallocated according to a pre-designed arrangement.[64] Typically, the flip point is designed to occur after the tax benefits have been fully realized and the five-year ITC recapture period has expired.[65] Sometimes the structure will also provide an option for the

58. *See* Mendelsohn et. al., *supra* note 33, at 21 ("[S]tructures with project-level debt . . . provide cost savings over their all-equity counterparts, despite the higher equity returns of 2%, or 200 basis points, required by tax investors when debt is introduced.").

59. *Id.*

60. *Id.*

61. OFFICE OF THE COMPTROLLER OF THE CURRENCY, *supra* note 41.

62. Mendelsohn et al., *supra* note 33, at 1, 6.

63. *Id.*

64. *Id.* at 7.

65. *Id.*

developer to buy-out the tax equity investor's interest after the flip point is reached.[66]

Though some projects are financed entirely through tax equity investments, others will also incorporate debt at the project level. However, debt is generally only available to very large projects or to a portfolio of projects, due to debt lenders' preference to engage in projects larger than $25 million.[67] Furthermore, it is difficult to negotiate debt-leverage arrangements when tax equity investors are involved, because the owners of the project may have to forfeit the tax incentives if a lender places a first lien on the project in the event of default or bankruptcy.[68]

Following the 2008 financial crisis, tax equity funding available for renewable energy projects dropped from a high of $6.1 billion to $1.2 billion in 2009.[69] In response, Congress created a treasury grant program to help finance renewable energy. In lieu of taking the ITC, the 1603 Treasury Program allowed commercial solar property owners to receive direct cash grants from the federal government equal to 30 percent of eligible project costs for a solar development.[70] This arrangement allowed taxpayers, particularly small businesses, to maximize their return on the value of existing tax incentives by allowing them to receive the grant regardless of their income tax liability.[71] In other words, because most developers would not have enough taxable income to take full advantage of the ITC or PTC, the 1603 Program simply granted, in cash to the developer, the same amount that would otherwise be earned under the ITC. As a result, solar developers were able to continue building projects despite the dearth of available investor equity. However, applicants for the program are only eligible if they commenced construction on projects by December 31, 2011, and complete construction by December 31, 2016.[72] A variety of other investment tools are also available for renewable energy projects on both private and federal lands through the Departments of Energy, Agriculture, Interior, and Defense, and include grants, loans, and loan guarantees.[73]

iv. Practical Notes

When considering how to finance a solar development, either through tax incentives, tax equity investments, debt, or some combination of the three, it is important to recognize that some government incentives are

66. *Id.*
67. *Id.* at 12.
68. *Id.*
69. Jacoby, *supra* note 33, at 211.
70. SOLAR ENERGY INDUS. ASS'N, *supra* note 34.
71. Jacoby, *supra* note 33.
72. SOLAR ENERGY INDUS. ASS'N, *supra* note 34.
73. *See* Cooney, *supra* note 36.

subject to expiration. As a result, significant changes to the construction timeline of a project may be necessary in order to qualify for a particular incentive program. If unexpected delays occur during construction, such as a lawsuit brought by a mineral owner or lessee for example, the project could fail to qualify for the ITC requirement that the project be placed in service by January 1, 2024.

Furthermore, other financing mechanisms, like payment schedules on debt or in partnership flips, are directly tied to energy production. As described in the previous subsection, project developers will account for weather variations and potential cloud cover in a capacity factor that estimates the power that will be generated by a solar PV array during any given year.[74] However, light blockages that arise after the panels are constructed can be disastrous for a project. Current PV technology and the price-competitive solar market drive developers to wire panels along a single circuit in order to save money.[75] Similar to Christmas lights, where an entire string of bulbs will cease to function if one bulb goes out, this means that the efficiency of a panel is decreased exponentially if even a small portion is blocked by a shadow.[76] In fact, "[s]ometimes as little as four percent or less of shading, such as a tree shadow across a portion of a panel, can take all of the panels in an array out of production completely."[77]

Considering developers and their financing partners will specifically model for a certain expected electricity yield over the course of a project's lifetime, shadows or other interruptions that reduce electricity generation can significantly affect an investor's return. Even more calamitous is the possibility that an interruption might reduce cash flows to the extent that a debt-leveraged project could default on its loan payments. Such an event might trigger the lender to place a lien on the project, which would result in a tax equity investor losing its tax incentive benefits. Thus, it is extremely important for developers to adequately protect not only the integrity of the surface in a project leasehold, but also neighboring properties where oil and gas lessees or other surface occupants could build tall structures that cast shadows on the PV array.

C. Siting and Leasing

Solar is considerably more unique, in terms of land usage, than is oil and gas development or wind-energy development. For example, wind development requires considerable acreage (20,000 to 100,000 or more

74. *See* K.K. DuVivier, *Symposium: Solar Skyspace B*, 15 MINN. J.L. SCI. & TECH. 389, 392 (2014).

75. *Id.* at 393.

76. *Id.*

77. *Id.*

acres), but after construction, the actual surface footprint is considerably smaller, with the unused acreage often being released back to the landowner via a retained acreage clause in the wind lease. Solar on the other hand, while smaller in size (1,000 to 6,000 acres), in fact has a much larger surface footprint. Generally speaking, one megawatt of solar requires between one to five acres of land. Therefore, the result of solar development, unlike wind-energy, is that the entire (or at least a substantial portion of the) leased acreage will be covered with panels and supporting infrastructure, effectively precluding all other surface uses. Picture that: 6,000 contiguous acres, rendered completely unusable for any other purpose because the surface has now been completely covered with solar panels and supporting infrastructure—a sizable footprint indeed. Therefore, as the preceding implies and as the section on competing surface uses will illustrate, it is critical that prospective developers complete a proper title search and review.

Obviously, to satisfy lenders, marketable title of the surface estate will need to be obtained. This is true in not only Texas, but everywhere. However, that is not of concern for this paper. What is of concern is establishing ownership of the mineral estate and, to a somewhat lesser extent, the wind estate.

In Texas, the mineral estate, and specifically the oil and gas minerals within that estate, is king. Courts imply a number of rights to which owners of Texas mineral estates are entitled. As a result, if those rights are not accounted for by a developer, a mineral owner or its lessee could conceivably sue to enjoin construction and/or operation of the project, hence the importance of a proper title review of the mineral (and wind) estate.

Although this step is generally taken after the land has been leased, it would behoove prospective developers to hire a landman or a title attorney to, at a minimum, perform a preliminary review of the mineral estate title. In fact, a lease is not required during title research, as title records can be freely searched in the County Clerk's office in the county where the land is located. The benefit to this approach is simple: it saves time and expense by allowing developers to determine the viability of the land for solar prior to taking a lease. For example, if this preliminary review shows that the mineral estate is highly fractionalized or subject to an existing oil and gas lease, developers who decide that the rewards do not outweigh the burdens can walk away with the only thing lost being the fee for having the review performed. Conversely, if the review is not performed until after the land has been leased, developers will either: (1) have to take additional steps, or (2) walk away—both costing substantially more than simply conducting the preliminary review in the first place.

However, if there is concern that a competing developer may lease the land, an exclusive option agreement could be obtained, thereby ensuring that the land is not leased while also allowing developers time to determine the viability of the land in light of the inherent conflicts with oil and gas exploration and development. While this is an added expense, it is still preferable to blindly leasing land. One method to consider is an exclusive option agreement to conduct studies and title research, as well as the exclusive right to negotiate a solar lease. A second method, which has proven successful for some wind companies, is to negotiate a lease that contains an option agreement, but also expressly states that the lease will not become effective unless the developer elects to exercise the option.

i. The Solar Lease

If the results of the title review (and, of course, the feasibility studies) indicate that the land is viable for solar, then developers need to consider the actual solar lease. In that regard, developers should consider the landowner with whom they are dealing and his or her concerns. The following is not meant to be an exhaustive review of standard lease clauses. Instead, it merely highlights those most critical to successfully siting in Texas.

1. Duration

Simplifying, a solar lease can be divided into two terms: initial and extended.[78] This is similar to the primary and secondary term seen in most modern oil and gas leases, and the development and operations term of modern wind leases. In that regard, typically the initial term will begin on the effective date of the solar lease and will continue until the earlier of the following to occur: (1) expiration of the initial term period, or (2) the generation commencement date, i.e., the date on which the facility begins generating commercial quantities of electricity. During this initial term, developers will complete any remaining due diligence studies and other incidentals, and then will begin actual construction of the solar farm. On the other hand, the extended term will typically become effective automatically upon the generation commencement date, and will continue for the duration of the lease (thirty to fifty years). It is during the extended term that solar energy is actually produced.

Similar to a typical wind lease, setting the length of a solar lease's initial term will depend in large part on the order in which the feasibility

78. Although the authors have seen other language used to describe the initial and extended terms (e.g., feasibility or development for the initial term, and operations for the extended term), for the purposes of this paper, they will not be used.

studies and the title review are conducted. If, for example, a lease is taken prior to these studies being performed or the title review being conducted, then quite naturally the length of the initial term will need to be considerably longer (5 to 7 years) than the length of the initial term in a lease taken, for example, pursuant to an option agreement (18 months to 3 years). It may be helpful to view the former as being conceptually equivalent to the standard development term in wind leases, and the latter as conceptually equivalent to the construction term seen in some wind leases.[79] Put another way, if the developer obtains an option agreement, then the initial term should be shorter because much of the preliminary work (e.g., environmental studies, title work) will be completed during that option period, and developers will need less time to bring the project online. On the other hand, if an option is not obtained, then the initial term will need to be longer to allow for the preliminary work to be performed prior to beginning construction and bringing the project online. In any event, the length of the term should be sufficiently long enough to allow developers adequate time to bring the project online, but no so long as to raise the ire of the landowner.

Basic logic suggests that landowners will resist lengthy initial terms. First, the landowner's use of his or her land is significantly restricted for the duration of the lease. Second, and more importantly, the landowner's monetary return is significantly lower during the initial term compared to the extended term (i.e., a flat per-acre fee versus a percentage of gross revenue). In that regard, should developers choose not to obtain an option agreement, which would allow for a shorter initial term, developers should consider providing for the extension of the initial term. Doing so will not only help ease concerns by the landowner regarding the length of the initial term, but it will also protect developers from accidental termination of the lease before the extended term becomes active, for example by construction delays. Therefore, the lease could provide for a relatively short initial term, but also allow the initial term to be extended by negotiating for several short extensions (e.g., three consecutive one-year terms) upon payment of an increased initial-term fee. The result is an end-run around the landowner's concern regarding the length of the term, and if the extensions are not needed, so much the better. Although the reasoning is slightly different, this same approach

79. For sake of explanation, all wind leases will have a development term, which allows the developer to ascertain the viability of the land for wind and to construct the actual wind farm; however, some wind leases will provide for a shorter development term (e.g., 3 years) and provide for a separate construction term (18 to 24 months) during which time the wind farm is built. *See generally* GREGORY S. FRIEND, RENEWABLE ENERGY LEASES FOR THE TRANSACTIONAL REAL ESTATE LAWYER (2011), http://www.sbaustinlaw.com/library-papers/Friend_LI11_paper.pdf.

can be used for negotiating and setting the length of the extended term as well.

2. *Rights*

It is critical that the lease properly addresses the rights of both parties to the lease. Doing so avoids conflicts. In that regard, language should be inserted into the lease making it expressly clear that the company is leasing the property for the sole purpose of generating solar power, and by accomplishing this purpose, the company shall have the exclusive right to generate solar power, as well as the right to make use of so much of the property as is necessary.[80] This will include, among other things, provisions for the use of roads owned by the landowner, as well as provisions allowing the company to obtain any additional easements on land owned by the landowner that is adjacent to the project. Moreover, the lease should address the construction or installation of any substations, operations and maintenance facilities, laydown yards, additional roads, and transmission lines, whether they will be built or not. Finally, water rights should be addressed, especially if the company is considering concentrated solar power.[81]

Although the reality may be that after construction the surface is rendered unusable for most other purposes, this is Texas, and landowners will want to ensure that they can continue to use their property. In that regard, developers should consider adding language to the lease stating that the landowner may continue to use his or her property in any manner that does not materially conflict with the use of the property for solar energy production. This will be especially important for exceptionally large tracts. In accomplishing this, developers should consider the impact that continued use of the surface by the landowner may have on the solar facility. Therefore, some form of noninterference or non-obstruct clause should be included establishing height restrictions on what a landowner can build, and buffer zones that prohibit certain activities within a specified radius of any solar panel. Doing so will help avoid shadows, which, as noted above, can drastically affect the efficiency and production of the panels.[82] Moreover, the lease should address damage to any of the landowner's crops, as well as damage to any fences or gates belonging to the landowner. Naturally, the company will need to compensate the landowner for any such damage.

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80. For example: "*Tenant shall use the Property for solar energy purposes and Tenant shall have the exclusive right to use the Property for solar energy purposes and for the transmission of electrical energy generated, at least in part, by the Solar Panels located on the Property.*"

81. *See* FRIEND, *supra* note 79.

82. *See supra* notes 56–59 and accompanying text.

Though it may surprise our friends from the northern states or from overseas, hunting should also be addressed in the solar lease. Unlike wind or oil and gas operations, where hunting can continue in a limited manner after construction, solar developers should give considerable thought to completely prohibiting hunting on the property for the duration of the lease (or at least severely restricting it, e.g., only through the use of bow and arrow). Naturally, hunting during the construction of the solar facility presents considerable risks, such as injury to company personnel or their equipment. However, after construction there remains the risk that the panels will be damaged by stray bullets or pellets. This is especially true with bird hunting, where the hunter shoots a spray of pellets at high velocity in an upward trajectory. The pellets that did not find their mark will eventually land somewhere, and companies will want to ensure that the "somewhere" is not on their panels. This can become problematic if the landowner routinely leases the land for hunting, which is often a considerable source of revenue for Texas landowners.

Finally, the lease must address oil and gas exploration and development, as well as wind energy development, both of which present substantial risks to the long-term success of a solar farm. As the following section will illustrate, the ultimate goal of a solar developer should be to preclude the land from being leased for oil and gas exploration and production, or for wind energy generation.

III. WHERE TO SITE AND THE IMPLICATIONS

A. Competing Surface Use

From the gushers at Spindletop to the turbines of West Texas, energy development has thrived in Texas for well over a century. With renewed interest in solar energy, Texas is poised to lead the next boom.[83] However, given the state's rich history in oil and gas development, as well as the recent influx of wind energy, solar developers need to be aware of potential conflicts with their energy brethren in the oil and wind industries.

i. Oil & Gas Development

As a general proposition, the oil and gas minerals beneath a particular tract of land are owned by the owner of that tract of land.[84] Perhaps surprising to those unfamiliar with oil and gas law, particularly Texas oil and gas law, the oil and gas minerals are treated as full interests in

83. *See* TEXAS SOLAR POWER, *supra* note 11 (noting that there is over 9,600 MW of solar currently under review by ERCOT).

84. *See generally* ERNEST E. SMITH & JACQUELINE LANG WEAVER, 1 TEXAS LAW OF OIL AND GAS § 2.1 (A) (2014) [hereinafter TEXAS OIL & GAS].

realty.[85] As a result, and of utmost importance to solar developers, a landowner may convey or reserve (i.e., sever) the oil and gas minerals beneath its tract, which creates a separate fee simple estate (the mineral estate) of equal dignity and with the same basic rights of use and disposition as any other fee simple estate.[86] This dynamic creates a three-tiered hierarchy to siting solar in Texas: Unsevered and Unleased Minerals; Severed but Unleased Minerals; and Leased Minerals.

1. Unsevered (and Unleased) Minerals

All things being equal, the ideal location for a solar project is on land where the minerals have not been severed. On those kinds of properties, also referred to as an intact surface estate, the owner of the surface owns and controls all the minerals beneath his or her land. Admittedly, after a hundred-plus years of oil and gas development, such land is becoming increasingly rare. But that aside, siting a project on land with unsevered minerals allows developers to more easily protect their investment from future oil and gas disturbance. That is to say that the rights of third parties who may own an interest in severed minerals do not have to be accounted for, and as a result, provisions can (and should) be inserted in the solar lease to prohibit the landowner from executing an oil and gas lease. If that is not possible, the developer should, at the very least, include provisions that severely restrict oil and gas development. However, once the minerals are severed (or leased), this becomes exponentially more difficult.

2. Severed (but Unleased) Minerals

Once a landowner severs his or her minerals (or if a landowner purchases a "surface only" tract of land),[87] that landowner no longer has the power to deal with the mineral estate.[88] That power becomes vested in the owner(s) of the mineral estate. Moreover, as stated above, once severed, the mineral estate has the same basic rights of use as does the surface estate. However, for those rights to be enjoyed, the owner(s) of the mineral estate must have access to the surface. Accordingly, Texas courts have adopted what has come to be known as the dominant estate doctrine, which gives the mineral estate an implied easement to the surface, and allows the owner(s) of the mineral estate, or its lessee, to

85. *See generally* Tex. Co. v. Daugherty, 176 S.W. 717 (Tex. 1915).

86. *See generally* TEXAS OIL & GAS, *supra* note 84.

87. For the purposes of this discussion, a complete severance will be assumed. If the severing landowner retained a fractional interest, then the landowner naturally has the power to deal with that interest. So too if a subsequent purchaser received a fractional share of the mineral estate. Regardless of this, however, the landowner's power to deal with and control mineral development is severely restricted.

88. *See generally* TEXAS OIL & GAS, *supra* note 84.

make use of so much of the surface (and the superjacent airspace) as is reasonably necessary to develop the minerals within the respective mineral estate.[89] This can be especially problematic for solar development, seeing as the best locations for solar development in Texas also tend to overlie oil and gas reserves (because of course, as the stereotype goes, every Texan has an oil well in their backyard).

At the risk of belaboring the point, solar development, for all intents and purposes, precludes the surface from being used for any other purpose.[90] As a result, the mineral estate is effectively robbed of its implied easement to access the surface to explore for and develop the minerals. Therefore, a solar developer will need to enter into an agreement with the owner of the mineral estate that waives the mineral owner's right to use the surface. What should be included in these agreements, as well as their effectiveness, will be discussed in a later section. Although this may seem academic, as the vast majority of mineral owners do not have the resources to independently develop the mineral estate, and it is extremely unlikely that an oil company would take a lease on land with an existing solar farm, the reality is that lenders will almost certainly require surface waivers from the mineral owners.

Compounding the issue further, the mineral estate itself is capable of being severed, which has led to many mineral estates becoming highly fractionalized with numerous mineral owners, all from whom a waiver of surface rights will be needed. However, what incentive does a mineral owner have to waive his or her rights? If the mineral owner does not also own an interest in the surface estate, such that he or she would benefit from a solar lease, the answer is none.

Obviously, obtaining these agreements will not be cheap, and a developer should not assume that a mineral owner would waive his or her rights without compensation. Accordingly, developers need to consider the history of oil and gas production in the area in which they are looking to build. A waiver from a mineral owner in an unproven or a historically unproductive area will be much easier to obtain than a waiver in a prolific area. That is to say, mineral owners in prolific areas will be much more resistant to waiving their surface rights, as they may believe that, in the long term, they would profit more from executing an oil and gas lease. On the other hand, owners in unproductive or unproven areas may be relieved that they are getting anything out of their interest. In the former circumstance, there are several options to consider.

89. *See e.g.*, Getty Oil Co. v. Jones, 470 S.W.2d 618, 621 (Tex. 1971); Texaco, Inc. v. Faris, 413 S.W.2d 147, 149 (Tex. Civ. App.—El Paso 1967, writ ref'd n.r.e.); *see also* Texas Oil & Gas, *supra* note 84.

90. FRIEND, *supra* note 81, at 8.

First, a developer could conduct a cost analysis to estimate what the mineral owner would be entitled to if the minerals were to be produced, and offer to pay that amount in exchange for the waiver. If that fails, or if such compensation would prove prohibitively expensive, a developer could consider granting the mineral owner an override in the solar project.[91] In the event that the mineral owner simply refuses to grant a waiver at any price (or at an exorbitant price), provided that lenders would sign off on it, developers could throw the proverbial Hail Mary. They could proceed without a surface waiver, praying that they will be protected by the accommodation doctrine (which will be discussed in more detail below), but more likely, blind luck. Although further discussion of the accommodation doctrine will be reserved for a later section, in the limited scenario described above, developers would be well advised to hire a petroleum geologist to determine the probable location of oil and gas minerals, and then create designated drill site areas in which mineral lessees can develop their mineral interests. Doing so would bolster the solar developer's accommodation doctrine argument, by placing them within the purview of *Texas Genco*, which held that directional drilling is a reasonable alternative that mineral lessees can pursue.[92]

As the above discussion illustrates, obtaining the requisite waivers will prove costly and time consuming. But it also raises the question: who needs to execute a waiver? The answer will turn in large part on the language in the instrument creating the mineral interest.

Simplifying, a severed mineral estate has three basic forms of ownership: a mineral-fee interest, a nonparticipating-mineral-fee interest,

91. The concept of an "override in the solar project," is derived from an oil and gas overriding royalty. As used in oil and gas parlance, the term overriding royalty is typically used to refer to a transaction in which a percentage or fraction of gross production is assigned to a person other than the landowner. For example, an oil and gas lessee might assign an interest in gross production (e.g., 1.00%) to a landman or geologist as a method of compensating them for their services. Alternatively, an oil and gas lessee might assign all of its interest in the leasehold and reserve an overriding royalty in gross production from the assigned acreage. While there may be countless variations, the overarching commonality is that the overriding interest is assigned or reserved out of the leasehold estate. As a result, the landowners share of gross production (i.e., the lessor's royalty) is not affected. Thus, a solar developer following this method could agree to assign a mineral owner a percentage of the developers' share of gross production in exchange for the mineral owner's waiver of surface rights. As a practical matter, the mineral owner will want to ensure that the waiver is only effective for the duration of the solar lease, or in the alternative will want to include an express savings clause in the assignment as typically an overriding royalty will not survive the lease because it is carved out of the leasehold estate. That is to say, if the waiver survives the solar lease and the mineral owner does not demand a savings clause, when the lease expires the waiver remains effective but the owner will not be compensated if further leases are taken. For a general discussion of overriding royalties, *see* TEXAS OIL & GAS, *supra* note 84 at § 2.4 (B) (3).

92. Tex. Genco v. Valence Operating Co., 187 S.W.3d 118 (Tex.App.—Waco 2006, pet. denied).

and a nonparticipating royalty interest. A mineral fee interest is a possessory fee simple interest with title to all of the minerals within the respective mineral estate, which carries with it all of the incidents of mineral ownership, including the right to deal with the mineral estate.[93] Conversely, a nonparticipating-mineral-fee interest is a mineral-fee interest that has been stripped of one of the incidents of mineral ownership: the executive right (i.e., the right to deal with the mineral estate). On the other hand, a nonparticipating royalty merely entitles its holder to a stated fraction of the lessor's royalty or a stated fraction of production.[94] This can be seen as equivalent "to the right to receive future rents on real property."[95] Quite obviously, because the owner of a mineral-fee interest has a full ownership interest in the mineral estate, his or her waiver must be obtained. The real question is whether a waiver must be obtained from an owner of a nonparticipating interest.

Technically, the answer should be no because neither the owner of a nonparticipating-mineral-fee interest, nor the holder of a nonparticipating royalty, have any right to lease the mineral estate. However, in light of a recent string of Texas Supreme Court cases,[96] the answer is less clear and it therefore may be advisable to seek a waiver in certain circumstances. To be clear, an individual that owns a nonparticipating interest should not sign a surface waiver. Rather, the nonparticipating interest owner should sign something equivalent to a recognition of their consent to the surface rights being waived. A guided overview of the executive right and the accompanying executive duty will help to illustrate this concept.

The executive right is one of the five basic incidents of mineral ownership.[97] In its narrowest sense, the executive right can be defined simply as the right to execute a lease. However, it in fact encompasses much more than that, and therefore can be defined more broadly as, "the right to take or authorize all actions that affect the exploration and development of the mineral estate."[98] As a result, when the mineral

93. In Texas, mineral ownership is commonly said to come with five basic rights: "(1) [T]he right to develop, (2) the right to lease (the executive right), (3) the right to receive bonus payments, (4) the right to receive delay rentals, [and] (5) the right to receive royalty payments." Altman v. Blake, 712 S.W.2d 117, 118 (Tex. 1986).

94. Lee Jones, Jr., *Non-Participating Royalty,* 26 Tex. L. Rev. 569, 573 n.17 (1948) (quoting A.W. Walker, Jr., Paper Presented to the Wichita County Bar Association (Dec. 14, 1946) (listing eight attributes of an NPRI)).

95. *Id.*

96. Briefly, the executive duty is a duty that the executive owes towards the nonexecutives (nonparticipating fee interest owners and nonparticipating royalty owners) within the respective mineral estate. If the executive breaches this duty, he or she can be sued by the nonexecutives. *See* In re Bass, 113 S.W.3d 735 (Tex. 2003); Lesley v. Veterans Land Bd. of State, 352 S.W.3d 379 (Tex. 2011); KCM Fin. LLC v. Bradshaw, 457 S.W.3d 70 (Tex. 2015).

97. *Altman,* 712 S.W.2d at 118.

98. TEXAS OIL & GAS, *supra* note 84, at § 2.6.

estate is burdened with both executive and nonexecutive (nonparticipating) interests, the executive owes each nonexecutive a duty of care to act with due regard towards the nonexecutives' interests. This is known as the executive duty, and a breach of this duty subjects the executive to liability. Although the scope of the executive duty has a tortured history in Texas jurisprudence,[99] generally speaking an executive owes his or her nonexecutives a duty of utmost good faith and fair dealing.[100] However, until recently it was unclear whether this duty could be breached prior to executing an oil and gas lease.

In *Lesley v. Veterans Land Board*,[101] the Texas Supreme Court held that a residential land developer had breached his duty as the executive by placing restrictive covenants on the land that prevented oil and gas development.[102] Significantly for solar developers, the Court cancelled the restrictive covenants. Four years later, the Court again addressed the executive duty, holding that an executive owes its nonexecutives a duty of utmost good faith and fair dealing, which prohibits the executive from engaging in acts of self-dealing that unfairly diminish the value of the nonexecutive interest.[103] These cases tend to suggest that a nonexecutive could possibly sue to have the surface waivers canceled. Admittedly, such a challenge would be very fact-specific, and would most likely have to occur during or prior to construction, as after the solar facility has been constructed it would be extremely unlikely that an oil company would take such a heavily encumbered lease. Nevertheless, the following example may prove useful for developers considering whether to obtain the nonexecutives' consent to the executive waiving the surface rights:

> J and A inherit their father's ranch. They voluntarily partition the ranch, with J taking the surface estate and the executive right, and A taking all of the minerals. X Solar Company leases the surface from J for solar development, and also obtains a waiver of surface rights

99. As first articulated, the executive duty was described as one of utmost good faith (or the ordinary, prudent landowner test). Schlittler v. Smith, 101 S.W.2d 543, 545 (Tex. 1937). For nearly fifty years, this remained the standard. *See e.g.*, First Nat'l Bank of Snyder v. Evans, 169 S.W.2d 754, 757 (Tex. Civ. App.—Eastland 1943, writ ref'd); Kimsey v. Fore, 593 S.W.2d 107, 111 (Tex. Civ. App.—Beaumont 1980, writ ref'd n.r.e.); Portwood v. Buckalew, 521 S.W.2d 904, 911 (Tex. Civ. App.—Tyler 1975, writ ref'd n.r.e.); Morriss v. First Nat'l Bank of Mission, 249 S.W.2d 269, 276 (Tex. Civ. App.—San Antonio 1952, writ ref'd n.r.e.). However, in the early 1980s, the Texas Supreme Court issued its opinion in *Manges v. Guerra*, and described the duty as fiduciary in nature. Manges v. Guerra, 673 S.W.2d 180 (Tex. 1984). Despite describing the duty as fiduciary in nature, cases subsequent to *Manges* generally have fallen far short of imposing a true fiduciary standard, which would require the executive to subvert its interest in favor of the nonexecutives. *See e.g.*, HECI Expl. Co. v. Neel, 982 S.W.2d 881 (Tex. 1998); *In re Bass*, 113 S.W.3d at 735; and *Lesley*, 352 S.W.3d at 490 ("We did not suggest in *Andretta*, *HECI*, or *Manges* that this requirement was part of the executive's duty").

100. *KCM Fin.*, 457 S.W.3d at 80–82.

101. 352 S.W.3d at 481.

102. *Id.* at 491.

103. *KCM Fin.*, 457 S.W.3d at 80–82.

> from J. Subsequently, a new oil play is discovered, part of which underlies the ranch. L Oil Company contacts J about leasing the minerals, but declines to do so after learning of the impending solar project.

These facts are conceptually analogous to the facts in *Lesley*. In *Lesley*, a residential developer acquired 4,100 acres of land, as well as the executive right, in the vicinity of the Barnett Shale.[104] Subsequently, the developer placed restrictive covenants on the land prohibiting oil and gas development, and then built a residential subdivision.[105] As a result, the nonexecutives sued, claiming the land developer violated his executive duty.[106] Relying on a prior Texas Supreme Court opinion,[107] the residential developer argued that he could not be liable for breaching the executive duty because he had not exercised the executive right by executing an oil and gas lease.[108] The *Lesley* court, however, expressly rejected this argument: "[The land developer] did not simply refuse to lease the minerals in the 4,100 acres; it exercised its executive right to limit future leasing by imposing restrictive covenants on the subdivision."[109] Moreover, the court held that although the developer had placed restrictive covenants on the land to protect its investment, its appropriate protection was the accommodation doctrine, not restrictive covenants.[110]

Based on this, it is now reasonably clear that depending on the facts, an executive can breach its duty without executing a lease. Thus, it would appear that in the example scenario described above, the executive could be held in breach of its duty for executing surface waivers, which may result in the waivers being canceled. This is further strengthened by the *Bradshaw* holding—an executive owes its nonexecutives a duty of utmost good faith and fair dealing, which prohibits the executive from engaging in acts of self-dealing that *unfairly diminish the value of the nonexecutive interest.*[111] In the example scenario, because J owned the surface estate, he would benefit from solar-energy development, which would require that he execute a surface waiver. This almost assuredly is an act of self-dealing that unfairly diminishes the value of A's nonexecutive interest. Consider another example:

> J and A inherit their father's ranch. They sell the ranch and reserve the minerals. J takes one-half of the minerals as well as the executive

104. *Lesley*, 352 S.W.3d at 481–82.
105. *Id.*
106. *Id.* at 490–92.
107. *See* In re Bass, 113 S.W.3d 735 (Tex. 2003)
108. *Lesley*, 352 S.W.3d at 490–92.
109. *Id.* at 491.
110. *Id.*
111. *KCM Fin.*, 457 S.W.3d at 80–82.

> right, and A takes the other one-half without any executive rights. X Solar Company gives J $250,000 for a waiver of surface rights.

The same analysis applies, and again J has likely unfairly diminished the value of A's nonexecutive interest. Would the same apply to a mere royalty owner? Yes, but the facts would have to be more specific. The most probable scenario would involve the executive being offered an oil and gas lease and declining to execute it in favor of waiving his or her surface rights. This would essentially be equivalent to the executive taking a shared benefit (an oil royalty) and converting it into a benefit that only the executive would share (the money for executing the surface waiver), which was at the heart of the *Bradshaw* holding.[112]

Keeping this in mind, although a solar developer would not technically be required to obtain a nonexecutive's consent, it is advisable for solar developers to consider the risks associated with not obtaining their consent. In that regard, if the project's proposed location were in or near a prolific oil and gas play, obtaining any nonexecutives' consent would further insulate developers from future interference from oil and gas development. Likewise, if the title review reveals only a few nonexecutives, the better approach would be to simply obtain their consent. In terms of mere royalty owners, however, unless there is evidence of a proposed oil lease, a solar developer can likely safely abstain from obtaining their consent.

3. Leased Minerals

While siting solar on unsevered or severed-but-unleased land presents problems for development, these issues are manageable. Siting a solar farm on land subject to an existing oil and gas lease, or on land with active production, however, is an entirely different animal; one that should be avoided if possible. Of particular concern to solar developers is that a mineral lessee can enjoin surface activities by the surface owner, as well as surface lessees, if those activities interfere with the lessee's right of reasonable surface usage.[113]

Thus, just as with severed minerals, surface waivers will be required when the minerals are leased. However, unlike severed minerals, a

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112. In *Bradshaw*, the allegation was that the executive right mineral owner had negotiated for an exceptionally high bonus and an artificially low royalty. Bradshaw, who merely owned a nonparticipating royalty, was not entitled to a share of the bonus, just a share of the royalty. As a result, Ms. Bradshaw argued that this was evidence of self-dealing, which unfairly diminished the value of her royalty. The Texas Supreme Court agreed. *Id.* at 90.

113. However, as explained further in the accommodation doctrine section below, obtaining an injunction on these grounds would be difficult, as the mineral owner would need to demonstrate that there is no other reasonable means of obtaining production from its minerals, and there is no other way for the mineral owner to be compensated for the damage done to the reservoir. *See infra* note 125.

prospective solar developer will not only need to obtain waivers from the actual mineral owners, but also from the mineral lessees. If waivers are acquired from both the owners and their lessees, the solar farm will be insulated from all future oil and gas disturbances. Since, however, a mineral lessee's waiver would only be effective as to that lessee, or its successors or assigns, once the oil and gas lease terminates, so does the surface waiver. Without an additional waiver from the mineral owner, the solar developer would be entirely unprotected and would need to obtain a waiver from subsequent oil and gas lessees. This can be obviated by simply obtaining waivers from both the mineral owner and its lessee. Doing so prevents future mineral lessees from taking a new oil and gas lease following termination of the lease then in effect, because the mineral owner has already waived its surface rights.

Nevertheless, it is extremely unlikely that a mineral lessee will simply waive its surface rights. The more likely reality is that the mineral lessee will require some form of accommodation.[114] In that regard, commentators have suggested creating designated drill sites and easement areas, located within the proposed project area, that allow the mineral lessee the exclusive right to explore for and develop the mineral interests.[115]

Although these designated drill site areas can theoretically be placed anywhere on the tract, including along the boundaries, developers need to consider whether the drill site is feasible from the mineral lessee's perspective. For example, the Railroad Commission (the agency in charge of regulating oil and gas development in Texas) enforces spacing and density requirements on oil and gas operators that regulate how close to lease lines an operator can drill, as well as the minimum distance between wells.[116] Moreover, if the tract is exceptionally large, several designated areas will need to be established in order to allow the oil and gas operator to effectively and economically develop the minerals located under the actual solar farm. In that regard, developers should consider creating one or two large areas in the middle of the tract. Doing so ensures the operator will be in compliance with any spacing and density requirements.

Regardless of where the designated drill sites are located, the mineral lessee will need routes of ingress and egress. If these routes are to be shared with the solar developer as well, then all parties using the road

114. David Sewell & Brent Stahl, *Mineral Issues' Impact on Solar Energy Development in Texas and Other States*, STAHL, BERNAL, & DAVIES 1, 10–11, http://www.sbaustinlaw.com/library-papers/Solar%20Energy%20-%20Mineral%20Estate%20Issues.pdf.

115. *Id.*

116. 16 TEX. ADMIN. CODE §§ 3.37–38 (2016).

should enter into a road maintenance agreement. For example, minimization of dust needs to be considered by the solar developer. If left unchecked, the dust may coat the solar panels, thereby reducing their efficiency and production. Likewise, language needs to be included detailing which party is responsible for repairs to the roads. In the end, what goes into these accommodation agreements, including the particulars of any drill site areas, will require considerable consultation and negotiation with the mineral lessee. But what if the mineral lessee simply refuses to waive its rights?

In such a situation, the unfortunate reality is that the project is probably dead in the water without the mineral lessee's acquiescence. It is true that a developer could proceed without surface agreements, similar to the process discussed in connection with severed minerals above. However, whereas lenders may sign off on proceeding without waivers with unleased minerals, it is a near certainty that lenders would not similarly agree to forego waivers if the land has already been leased, and especially if there is active production. Hence, the need to avoid siting solar on land with leased oil and gas minerals.

4. Minerals Subject to the Relinquishment Act

A final concern associated with oil and gas development involves siting solar on land subject to the Relinquishment Act.[117] From September 1, 1895, to August 21, 1931, any land sold by the State of Texas with a mineral classification or mineral reservation reserved title in all of the minerals beneath the land to the State of Texas.[118] However, for each tract sold, the actual landowner is the primary individual responsible for leasing the minerals. Unlike the typical landowner (or an executive rights mineral owner), a landowner subject to the Relinquishment Act is subject to a true fiduciary standard.[119] Therefore, a landowner most likely cannot execute a solar lease without consulting the Texas General Land Office. Doing so would almost certainly be a conflict of interest, as the solar farm would preclude the State of Texas's minerals from being developed. Thus, developers considering siting on mineral classified land subject to the Relinquishment Act should contact the Texas General Land Office to ascertain whether a solar farm is feasible on the property, and if so, what steps will be required.

117. *See* TEX. NAT. RES. CODE ANN. §§ 52.171–190 (West 2016).
118. *Id.*
119. TEXAS OIL & GAS, *supra* note 84, at § 2.3.

5. Legal Protections and Limitations – The Accommodation Doctrine

In Texas, oil and gas law is much more developed than the law surrounding the relatively new renewable energy industries, like wind or solar. Although confrontations between oil and gas lessees and renewable resource developers have not yet devolved into litigation in Texas, it is only a matter of time, as such litigation is occurring in other states.[120] However, common law doctrine tends to favor mineral lessees over renewable energy developers, at least in theory. Arguably the most impactful of these doctrines is the dominant mineral estate theory, and the derivative doctrine of "reasonable use" or "due regard," otherwise known as the accommodation doctrine.

The accommodation doctrine in its modern form was first articulated in the case of *Getty Oil v. Jones*.[121] In that case, the Texas Supreme Court determined whether an oil and gas lessee would be required to utilize a costlier alternative pump-jack design to accommodate an irrigation system that the surface owner erected before the wells were drilled.[122] In holding that the mineral lessee should accommodate the surface owner's use of the surface, the Court reaffirmed the dominance of the mineral estate, while also instituting a balancing test requiring mineral owners to accommodate existing surface uses:

> [W]here there is an existing use by the surface owner which would otherwise be precluded or impaired, and where under the established practices in the industry there are alternatives available to the lessee whereby the minerals can be recovered, the rules of reasonable usage of the surface may require the adoption of an alternative by the lessee.[123]

Notably, the *Getty* Court respected the dominance of the mineral estate by recognizing that if there is only one method of surface use by which the mineral owner can produce its minerals, then the mineral owner has the right to pursue that use regardless of surface damage without compensating the surface owner.[124] Numerous cases interpreting "due regard" for the surface have since followed, both refining and, in some cases, expanding the doctrine. Generally, the accommodation doctrine test is thought to include three essential elements: 1) there is a pre-existing use of the surface; 2) the mineral owner is interfering with this use; and 3) the mineral owner has other reasonable alternatives

120. Paul Monies, *Oil Company Files Suit Against Kingfisher Wind Farm*, OKLAHOMAN (Mar. 19, 2015), http://newsok.com/article/5402630.

121. 470 S.W.2d 618 (Tex. 1971).

122. *Id.* at 620–21.

123. *Id.* at 622.

124. *Id.*

available to conduct its operations.[125] Throughout this discussion, the terms mineral owner and mineral lessee will be used interchangeably, as a mineral lessee is deemed to be the effective owner of the minerals while the lease is in effect. Likewise, the term surface owner will be used throughout this section, but such references are intended to include any of the surface owner's lessees, such as a solar developer.

a. Existing Surface Use is Precluded or Substantially Impaired

First, the surface owner must prove that it has an existing use of the surface, and that its use will be precluded or substantially impaired by the mineral lessee's proposed use.[126] Determining exactly what constitutes an existing use can be challenging. A pair of somewhat recent Texas appellate cases adopted a more expansive interpretation of "existing use" than was previously considered applicable. The court in *Texas Genco v. Valence* found that, at least in certain circumstances, a presently planned, future use of the surface for a project that was physically underway could satisfy the existing use element.[127] In those very similar cases, Valence sought to drill wells within the boundaries of a solid waste landfill operated by Texas Genco.[128] One of the wells was to be drilled in a landfill cell that Texas Genco was not using, and did not intend to use for seven to 10 years.[129] Nonetheless, the court found that evidence supported the jury's finding that Texas Genco had an existing surface use that would be substantially impaired.[130] Regarding whether an existing use is precluded or substantially impaired, Texas cases have held that a showing of substantial inconvenience or added expense resulting from the oil and gas lessee's activities is not enough to satisfy this element.[131] However, the surface owner may meet its burden by demonstrating that the financial difficulties associated with continuing the existing use by an alternative method is so great as to make it unreasonable.[132]

125. Courtney R. Potter, *The Accommodation Doctrine Revisited: Implications in Law and in Policy*, 46 ST. MARY'S L.J. 75, 88 (2014).

126. *See* Merriman v. XTO Energy Inc., 407 S.W.3d 244, 249 (Tex. 2013).

127. Carroll Martin, *The Right of the Mineral Owner to Use of the Surface*, 59-14 CAIL ANN. INST. ON OIL & GAS L. § 14.02 (2014).

128. Tex. Genco, LP v. Valence Operating Co. 187 S.W.3d 118, 120 (Tex. App.—Waco 2006, pet. denied) [hereinafter *Texas Genco I*].

129. *Id.* at 121.

130. *See id.* at 124 ("Although waste is not currently being disposed of in cell 20, cell 20 is indisputably part of the deed-recorded and state-registered landfill. Clay has been mined from cell 20, and topsoil is being stored there. If a well were drilled there, Genco would have to redesign other cells and lose the use of others.").

131. *See* Davis v. Devon Energy Prod. Co., 136 S.W.3d 419, 424 (Tex. App.—Amarillo 2004, *no pet.*); *see also Merriman*, 407 S.W.3d at 249, 252.

132. *See Merriman*, 407 S.W.3d at 249 ("Rather, the surface owner has the burden to prove that the inconvenience or financial burden of continuing the existing use by the alternative method is so great as to make the alternative method unreasonable.").

The Court in *Merriman v. XTO* recently articulated the requirement that, in conjunction with proving the surface owner's existing surface use will be substantially impaired, the surface owner must also show that there is no reasonable alternative method available by which the existing surface use can be continued.[133] This particular element is debated by academics as a recent departure from the traditional doctrine, as it requires the *surface owner* to prove that *he or she* does not have a reasonable alternative, a burden previously thought to fall exclusively on the mineral lessee regarding its proposed surface use.[134] However, the Court's phrasing could also simply be a restatement of the established principal that substantial inconvenience or added expense borne by the surface owner does not alone demonstrate a precluded surface use.[135] In articulating the burden that a surface owner must prove that he or she has no reasonable alternative, the Court echoed language drawn from other opinions, and added that "the surface owner has the burden to prove that the inconvenience or financial burden of continuing the existing use by the alternative method is so great as to make the alternative method unreasonable."[136] Such references suggest that the Court intended no substantial changes to the traditional balancing test. Regardless of whether *Merriman* introduces a new element to the accommodation doctrine, the Texas Supreme Court continued to use the same construction in the only accommodation doctrine analysis it conducted since initially restating the test.[137]

b. Reasonable, Customary, and Industry-Accepted Alternative Methods

Finally, assuming the surface owner proves that its existing surface use is effectively precluded, it must show that there are reasonable, customary, and industry-accepted alternative methods available to the

133. *Id.*

134. *See* Potter, *supra* note 125 at 76–77, 88–89 (arguing that *Merriman* departs from the traditional three element model by requiring an analysis as to whether the surface owner had reasonable alternatives for its surface use).

135. *See* Brandy R. Manning & Pat L. Weaver, *Texas Supreme Court Refines Application of the Accommodation Doctrine in Texas*, BURLESON LLP ATT'YS & ADVISORS (June 26, 2013), http://www.burlesonllp.com/?t=40&an=22700&format=xml (noting that the *Merriman* Court "relied on its prior decisions in *Getty Oil* and *Haupt*, which suggests no intent to change existing law.")(referencing Tarrant Cnty. Water Control & Improvement Dist. No. One v. Haupt, Inc. 854 S.W.2d 909, 911 (Tex. 1993); [hereinafter *Tarrant Cnty..*]; *Getty Oil*, 470 S.W.2d at 621.

136. *Merriman* 407 S.W.3d at 249 (referencing *Getty Oil*, 470 S.W.2d at 628).

137. Key Operating & Equip., Inc. v. Hegar, 435 S.W.3d 794, 800–01 (Tex. 2014) ("Under the accommodation doctrine, a surface owner may obtain relief on a claim that the mineral lessee failed to accommodate an existing surface use by proving that the existing use is precluded or substantially impaired by the mineral lessee and no reasonable alternative method is available to continue the existing use.").

lessee that will allow the surface owner to continue its existing use.[138] Given how rapidly changing technology employed by oil and gas companies during the recent shale revolution has reshaped the way companies extract oil, techniques like directional drilling are quickly becoming "reasonable alternatives." In fact, Texas courts and commentators are beginning to recognize that directional drilling is likely an industry-accepted alternative.[139] However, just because an alternative method is common in the industry does not mean that the method will also be reasonable in every situation, particularly when the cost of the alternative effectively destroys the value of the mineral estate.[140] As if altering the interpretation of an existing surface use was not enough, the *Texas Genco* court contemplated upending yet another generally accepted aspect of the accommodation doctrine when it pondered in dicta the possibility that an off-lease drill site could be a reasonable alternative.

c. An Off-Lease Reasonable Alternative?

Since *Sun Oil Co. v. Whitaker* was decided, a mineral lessee's reasonable alternative surface use in the accommodation doctrine context was generally thought to be restricted to the leased premises. In that case, the Texas Supreme Court applied the then newly-articulated accommodation doctrine to a dispute between a surface owner that was sourcing water from an underlying aquifer for its farming operations, and a mineral lessee that claimed it had a leasehold right to effectively drain the aquifer for its use in a secondary recovery water-flood project.[141] The Court held that even though the aquifer was part of the surface estate, the mineral lessee could not be required to purchase water from other sources or owners of other tracts in the area.[142] Therefore, the mineral lessee was permitted to use the aquifer for reasonable and necessary purposes to facilitate production, even if doing so involved draining the

138. *Merriman*, 407 S.W.3d. at 249, (referencing *Tarrant Cnty.*, 854 S.W.2d at 911–12).

139. *See, e.g. Texas Genco I*, 187 S.W.3d at 124 ("[S]ufficient evidence supports the jury's finding that directional drilling is a reasonable, industry-accepted alternative."); Haupt, Inc. v. Tarrant Cnty. Water Control & Improvement Dist. No. One, 870 S.W.2d 350, 355 (Tex. App.—Waco 1994, no pet.) ("Certainly, directional drilling and platform drilling over water are generally accepted methods of production in the oil and gas industry.") [hereinafter *Haupt*]; *see also* Bret Wells, *The Dominant Mineral Estate in the Horizontal Well Context: Time to Extend Moser Horizontally*, 53 HOUS. L. REV. 193, 212 (2015) ("[D]irectional and horizontal drilling that utilize monitoring-while-drilling and logging-while-drilling capabilities now make it possible for the surface location to be adjusted without preventing the operator from perforating a wellbore at the exact desired location within the formation.").

140. *See Haupt*, 870 S.W.2d at 354–55 (requiring an economic analysis in assessing the reasonableness of an alternative and determining whether the difference in cost between planned versus suggested alternative methods would effectively destroy the value of the minerals).

141. Sun Oil Co. v. Whitaker, 483 S.W.2d 808, 809–10 (Tex. 1972).

142. *Id.*

aquifer to the detriment or destruction of the existing surface use. In holding as much, the Court refined the *Getty* Court's doctrine, "Our holding in *Getty Oil Co.*... is limited to situations in which there are reasonable alternative methods that may be employed by the lessee *on the leased premises* to accomplish the purposes of the lease."[143] However, the *Texas Genco* court in dicta found a possible means to distinguish the *Sun Oil* holding from its own analysis of reasonable alternatives.[144]

In the *Texas Genco* case, the surface owner and operator of a landfill (Texas Genco) offered various alternative well locations for Valence (the mineral lessee) to drill, one of which was located on an adjacent mineral lease.[145] For that off-lease alternative drill site, Texas Genco obtained written consent from the adjacent mineral lessee allowing Valence to drill through the adjacent leasehold estate in order to access Valence's minerals under Texas Genco's landfill.[146] Though the court acknowledged Valence's complaint that allowing an off-lease accommodation would be a questionable extension of the doctrine, the court quickly dismissed the issue because it found sufficient evidence that Texas Genco also suggested several on-lease alternative locations that would not interfere with the landfill.[147] However, in a footnote, the court referenced the on-lease limitation expressed in *Sun Oil*, and added:

> *Sun Oil* is distinguishable, however, because it did not involve conflicting uses of the surface between the surface owner and mineral owner; rather, it involved whether the mineral owner was entitled to freely use subsurface water owned by the surface owner or whether it should be required to purchase water from someone other than the surface owner.[148]

Indeed, the *Sun Oil* dissent was adamant in its claim that the *Getty* accommodation doctrine should not be limited to alternatives involving only the leased premises in all future cases.[149] However, the *Sun Oil* Court disapproved of otherwise reasonable alternatives that require the mineral lessee to purchase a *resource* from off-lease sources.[150] Evidence showed that the mineral lessee would be forced to purchase water from off-lease sources if it was not allowed to produce water from the

143. *Id.* at 812 (emphasis in original) (citation omitted).

144. *See* Valence Operating Co. v. Tex. Genco, LP, 255 S.W.3d 210, 217 (Tex. App.—Waco 2008, no pet.) [hereinafter *Texas Genco II*].

145. *Id.* at 216.

146. *Id.*

147. *Id.* at 217.

148. *Id.* at 217 n.7; *cf.* Owen L. Anderson, *Geophysical "Trespass" Revisited*, 5 TEX. WESLEYAN L. REV. 137, 182 n.200 (1999) ("Under the Texas accommodation doctrine, for an alternative to be reasonable, *it must be available on the land in question.*") (emphasis added).

149. *Sun Oil Co.*, 483 S.W.2d at 820–21.

150. *See id.* at 812.

overlying surface estate, and the Court felt such a holding would subvert the dominant mineral estate.[151] However, the *Sun Oil* holding does not necessarily address whether an off-lease drilling site could be considered a reasonable alternative for the purposes of the accommodation doctrine, particularly in the context of a horizontal well that produces from more than one separate tract. Following the advent of efficient horizontal drilling techniques, several shifts recently occurred in Texas's longstanding oil and gas common law.[152] These revisions could form the basis for a potentially successful argument that an off-lease drill site can be a reasonable alternative for a proposed horizontal well in an accommodation doctrine case.

Mineral leases typically grant a lessee the right to produce minerals from a specified location or tract. The purpose of the dominant estate doctrine, as discussed above, is to grant a mineral owner or its lessee the implied right of ingress and egress over the surface in order to access those minerals.[153] However, because any particular mineral severance or lease is restricted to specified boundaries, the owner of a mineral tract "has the right to go upon the surface of *that* land . . . and also the incidental rights necessary for *that* production and removal."[154] In other words, a mineral owner's implied rights to use the surface exist to the extent that the mineral owner's surface use is reasonably necessary for the purposes of obtaining production from that tract.[155] Similarly, a mineral lessee's implied rights also extend to the surface of pooled tracts.[156] This analysis fits comfortably in the vertical well context, where the well must be drilled almost directly above a target formation, and will be bottomed only on that leased tract. Horizontal wells, on the other hand, complicate the application of this rule because they often utilize one surface location to produce minerals from multiple tracts.

Horizontal wells are now drilled with lateral extensions that can reach over two miles away or more from the drill site.[157] In order to

151. *Id.*

152. *See generally* Wells, *supra* note 139.

153. *See id.* at 200 (explaining that the original common law underpinnings of the dominant estate doctrine require that the mineral owner has access to the surface located vertically above the desired target location in order for the development right to have any meaning).

154. Key Operating & Equip., Inc. v. Hegar, 435 S.W.3d 794, 798 (Tex. 2014) (emphasis added).

155. *Id.*

156. *See id.* at 800 ("The right of ingress and egress includes the right to ingress and egress over the surface of any pooled acreage for the purpose of producing minerals from any part of the pooled acreage.").

157. *See, e.g.*, Aldo Svaldi, *Colorado Oil, Gas Rule-Making Hearings Hang Up on Giving All a Voice*, DENVER POST (Nov. 24, 2015), http://www.denverpost.com/business/ci_29157658/colorado-oil-gas-rule-making-hearings-hang-up-giving ("Operators are drilling wells with longer and longer horizontal bores and prefer a

accommodate such long laterals, horizontal wells will often cross lease lines and produce from multiple tracts, even if they are not pooled. In Texas, horizontal wells that cross lease lines without pooling agreements are often referred to as allocation wells, because the mineral lessee(s) that drills the well must "allocate" production from the well among the various tracts along the producing segments of the lateral wellbore.[158] Furthermore, it is not uncommon that only a few perforations in the wellbore will be located on the lease on which the drill site is located, in which case the vast majority of the well's production will be attributable to tracts other than the tract underlying the drill site.[159] It is also possible that no production whatsoever will be attributable to the tract on which the drill site is located, because the first take-point may be located on another tract.[160] A drill site used to support production from other tracts in this manner would seem to be in direct contravention of the rule limiting implied surface rights to that access necessary for production on one particular tract. However, if drilling a horizontal well is reasonably necessary for the lessee to produce minerals from a tract, then a drill site on that tract would not be an excessive use of the surface of that tract, even if the drill site is used to produce from a horizontal well that also traverses, and obtains production from, other tracts.

Given that multiple horizontal wells producing from other tracts can be located on a single surface site, it is not only possible, but quite likely, that one surface owner will bear the majority of the surface use burden associated with drilling activity, even though the wells on that drill site will produce primarily or entirely from adjacent tracts.[161] In that sense, the surface owner of a multi-well drill site might be disproportionately burdened with a use of the surface that could primarily be for the purposes of production on other tracts. However, because the *Sun Oil* Court objected to forcing a mineral lessee to purchase a resource from

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definition that doesn't lock them into certain lengths. One mile used to be the standard, but 2 miles is now more common and 3 or 4 miles may be in the future.").

158. *See* John McFarland, *Herein of "Production Sharing Agreements" and "Allocation Wells"*, OIL AND GAS LAWYER BLOG, (Nov. 10, 2012) http://www.oilandgaslawyerblog.com/2012/11/herein-of-production-sharing-a.html.

159. *See* Eric Roach, *Well Completion 101 Part 2: Well Perforation*, DRILLINGINFO, (Oct. 7, 2014), http://info.drillinginfo.com/well-completion-101-part-2-well-perforation/.

160. Production can only be obtained from a take point; *see* Manning Wolfe, *Take Points: Horizontal Drilling – What and Where is the Point?*, MANNING WOLFE, (Feb. 3, 2015), http://manningwolfe.com/take-points-horizontal-drilling-point/ ("A take point in a horizontal well is a point along a horizontal drainhole where oil or gas can be produced from the reservoir or defined field.").

161. Upwards of eight individual wells, reaching in different directions and bottomed at different depths, can now be located on a single well pad. In order to support these multiple wells concentrated on a single site, the activity, equipment and resources needed are often significantly more intensive than what is typically required for conventional vertical drill sites. *See* Wells, *supra* note 139, at 197.

off-lease in order to develop its minerals, it would appear contradictory to assume that the dominant estate doctrine nonetheless obligates a *surface owner, in support of production from other leases,* to carry an unexpectedly large burden by allowing the mineral owner to use more surface acreage than would be used for a horizontal well drilled completely on one tract. In other words, if it is unreasonable to force a mineral owner to accommodate a surface owner by drilling from an off-lease location, it should also be unreasonable to force a surface owner to accommodate a well producing from adjacent un-pooled leases—assuming, of course, that the horizontal well is not reasonably necessary for the lessee to produce minerals from the tract underlying the surface owner's land. However, if the *Sun Oil* holding merely applies to the purchase of off-lease *resources*, as the *Texas Genco* court suggests, then surface owners have ground from which to argue that the accommodation doctrine balancing test should allow an off-lease drill site as a reasonable alternative to a proposed allocation well.

In the alternative, a surface owner could argue that a mineral owner must pay surface damages for a proposed allocation well. Such an argument may give a solar developer leverage in negotiating a surface use agreement with mineral owners, as the potential surface damages owed could be enough to make the well uneconomic. Obligating a surface owner to support production from other tracts through a drill site on its property may be as objectionable as requiring a mineral lessee to purchase water from other leases to support production on its tract. However, no excessive use claim should lie if the drill site that supports a horizontal well that crosses lease lines and produces from multiple tracts uses no more surface acreage than would be used for a horizontal well drilled completely on one tract.

d. Accommodation Doctrine Applied

For a solar developer, such a rule would be particularly useful. Assume a mineral owner or its lessee attempts to designate a horizontal drill site in a location that will interfere with a developer's solar facilities. The developer could argue under the accommodation doctrine that the disruption to its existing solar project will destroy the value of the facility. If the project is under construction, the developer could attempt to argue that under the *Texas Genco* holdings, the partially constructed solar project is nonetheless an existing surface use because altering its construction plans would result in the project missing contractual deadlines, losing financing or some other substantial economic effect that destroys the value of the project.[162]

162. *See Tex. Genco I*, 187 S.W.3d at 124.

After proving that its existing surface use will be effectively precluded, the solar developer would need to demonstrate that industry-accepted, reasonable alternative methods are available for the mineral owner. Assuming a non-interfering drill site is unavailable on the lease, which is not unlikely given the extent to which a solar farm precludes other surface uses, the solar developer could present an off-lease drill site as a reasonable alternative. In doing so, the developer could show that either an off-lease or an on-lease proposed horizontal well location will produce from multiple un-pooled tracts. As such, interpreting the *Sun Oil* holding to apply only to the purchase of off-lease *resources* would not be unreasonable because the traditional interpretation would otherwise subject the solar developer to a disproportionate burden of surface uses that are attributable to production from other tracts. In other words, the solar developer, as the *per se* surface owner under its surface lease, would suffer the loss of its investment in the solar facility by accommodating a drill site that produces from other leases, which is an unreasonable use of the surface. Thus, an off-lease drill site, being the only reasonable and balanced alternative, should be considered an appropriate accommodation.

The accommodation doctrine was originally conceived to create balance between a mineral owner's right to use a reasonable amount of the surface in order to access its minerals, and the surface owner's right to make use of the land. If the most effective use of the surface is, for example, a utility-scale solar development, a solar developer that contemplates and prepares alternate drilling locations should not be castigated simply because common law surrounding oil and gas is more developed. A utility-scale solar farm will effectively be destroyed in the event that even small portions of the project are taken out of production to accommodate oil and gas operations. Furthermore, with modern drilling technology, solar developers should be allowed to argue in court that an off-lease alternative drilling location could be acceptable even though it is not within the leased premises.

The arguments outlined above, though nuanced in that they apply primarily to horizontal wells, are nonetheless important to consider due to the prevalence of horizontal versus vertical drilling in today's oil and gas industry. Considering a large majority of wells drilled in Texas last year were horizontal, which is the latest evidence of a dramatic trend away from vertical drilling, common law arguments accounting for nuances presented in the horizontal context are increasingly well-received in court.[163] As a result, Texas courts have shown signs of their

163. Bret Wells, *Allocation Wells, Unauthorized Pooling, and the Lessor's Remedies*, 68 BAYLOR L. REV. 1, 5 (2016).

willingness to rework longstanding oil and gas common law to account for new and changing technologies.[164] Unfortunately for solar companies and their proponents, common law is nevertheless slow to develop, so the solar industry is left no choice but to negotiate private arrangements with little court-backed leverage.

6. Other Limitations on Dominant Estate Implied Easements

Several cases also support the proposition that a surface owner has greater control over horizontal well placement under implied easement law than is afforded to surface owners under the accommodation doctrine in the vertical context. In *Robinson v. Robbins Petroleum*, the Texas Supreme Court held that the surface owner's permission is required when the surface of one tract is used to support oil and gas development on adjacent tracts.[165] Another very recent Texas court of appeals case bolstered the surface owners' authority under *Robinson*.

In *Lightning Oil Co. v. Anadarko*, the court analyzed the extent to which a mineral owner or its lessee may control the subsurface.[166] In that case, Anadarko and Lightning Oil each leased minerals on adjacent tracts.[167] Anadarko approached the surface owner overlying Lightning's tract, and obtained a waiver to drill from the surface through Lightning's leasehold in order to horizontally access Anadarko's neighboring tract.[168] Lightning argued that its consent was required for Anadarko to bore through its mineral leasehold, but the court disagreed.[169] In holding that the surface owner is the exclusive party from whom permission to drill through the underlying minerals must be obtained, the court explained, "[A]bsent the grant of a right to control the subterranean structures in which the oil and gas molecules are held, the mineral estate owner does

164. Wells, *supra* note 139, at 196 ("These remarkable decisions signal a willingness on the part of the Texas courts to rework longstanding oil and gas common law to ensure that justice and sound public policy are promoted . . .") (*referencing* Coastal Oil & Gas Corp. v. Garza Energy Tr., 268 S.W.3d 1, 9–17 (Tex. 2008) (refusing to apply traditional notions of trespass to hydraulic fracturing), and Browning Oil Co. v. Luecke, 38 S.W.3d 625, 642, 646 (Tex. App.—Austin 2000, pet. denied) (refusing to apply the longstanding non-apportionment rule and the Rule of Capture in a case where a horizontal well had not been validly pooled and yet produced from multiple tracts)).

165. Robinson v. Robbins Petroleum Corp., 501 S.W.2d 865, 868 (Tex. 1973) ("[The surface owner] is entitled to protection from uses thereof, without his consent, for the benefit of owners outside of and beyond premises and terms of the [underlying mineral lease]."); *cf.* Key Operating & Equip., Inc. v. Hegar, 435 S.W.3d 794, 800 (Tex. 2014) (drawing a distinction between pooled tracts versus adjacent un-pooled tracts in applying the *Robinson* rule prohibiting surface use of one tract for production on adjacent tracts without the surface owner's consent).

166. Lightning Oil Co. v. Anadarko E & P Onshore LLC, 480 S.W.3d 628, 638 (Tex. App.—San Antonio 2015, pet. filed Jan. 29, 2016).

167. *Id.*

168. *Id.*

169. *Id.*

not control the mass that undergirds the surface of the conveyed land."[170] However, the court conditioned its holding on the assumption that Anadarko would not open or bottom the wellbore on Lightning's lease without its permission.[171] As a result, surface owners have the ultimate authority over where an adjacent mineral lessee may place an off-lease drill site on the surface owner's land, provided the well produces exclusively from the adjacent mineral lessee's tracts.

Read together, these cases clearly indicate that a mineral owner that wishes to drill on one tract in order to produce solely from another tract must obtain permission from the surface owner. However, the question remains whether a surface owner's permission is also required for a mineral lessee to locate a horizontal well on the surface of a tract from which only a small minority of the well's production will be allocated. For example, assume two tracts, A and B, are owned by different surface owners but by the same mineral lessee. If the surface location of a well is on Tract A, but 95% of the production will be from Tract B, does the surface owner of Tract A have any authority over where the well may be placed?

Another example that could be particularly concerning for solar companies involves the potential that other tall facilities used to facilitate oil and gas production, like frac sand silos or oil tank batteries, may cast shadows on the solar facility. As explained earlier, even small disruptions to PV arrays can drastically affect efficiency and productivity, which can thereby substantially affect a project's financial returns.[172] Provided the sand silos or tank batteries do not service production from the underlying tract, the above analysis concluding that the surface owner's consent is required would likely apply considering these facilities support oil and gas production. However, such a scenario is highly unlikely, as tank batteries or sand silos are often used to support production on several tracts, including the underlying tract on which they are located. As such, the same concern outlined above applies: does the surface owner have any authority over where to place support facilities that will be used to facilitate production from the underlying tract as well as other tracts?

Questions like these are yet to be answered, but they do carry a benefit for solar developers. On one hand, the developer can place some comfort in knowing that an oil and gas developer will likely seek its permission before it drills a horizontal well that will traverse multiple tracts, or before it locates supporting facilities on the surface. Practically speaking, most oil and gas companies would prefer to avoid litigating surface rights,

170. *Id.*
171. *Id.*
172. *See* DuVivier, *supra* note 74, at 393.

and would rather reach private agreement to avoid court. Provided the solar developer includes some reference to its authority over conflicting surface uses in its solar leases, the solar developer is effectively deemed the surface owner with rights to negotiate the location of a proposed horizontal drill site. The developer also gains leverage in negotiations with mineral owners and lessees for waivers or other agreements because it has unquestionable authority over placement of wells producing exclusively from other tracts, and potential authority over placement of wells that will produce in part from the underlying tract.

On the other hand, if the mineral leases underlying a solar development are pooled, the solar developer loses essentially all benefits and authority extended by common law over the placement of proposed horizontal wells, with the exception of the limited rights granted under the accommodation doctrine. In addition, even though the vast majority of new wells drilled in Texas are horizontal, some vertical drilling still occurs, which drastically reduces the authority a surface owner is afforded under common law. This analysis leads to the conclusion that, whenever possible, solar developers should attempt to reach private arrangements in lieu of litigation.

ii. Wind Energy Development

Wind energy presents an interesting question for solar development. Unlike oil and gas law, which has been developed by over a century's worth of case law, wind-energy law has largely yet to be made. Indeed, as one of the co-authors has noted, it is the proverbial wild west of Texas jurisprudence.[173] However, given the parallels to oil and gas development, it would not be surprising for the courts to apply aspects of oil and gas law, adjusting as the facts and circumstances dictate.[174] That notwithstanding, solar developers need to be aware of potential conflicts with wind energy.

A very significant conflict is severed wind rights. The main conflict, however, is not that the wind rights have been severed. Rather, it is the fact that in Texas there is no legal authority for severing wind rights. Although several commentators have noted that it is unlikely that a severance of wind rights would be held invalid in Texas,[175] several states, including Oklahoma and Colorado, have statutorily prohibited wind

173. JACOB R. LEDERLE, TEXAS WIND SEVERANCE: ADDRESSING THE PRACTICAL CONSEQUENCE OF SEVERING WIND RIGHTS (2015) (on file with author).

174. *See id.* (discussing how oil and gas law could be adapted to address wind-energy).

175. *See, e.g.,* Lisa Chavarria, *The Severance of Wind Rights in Texas,* STAHL, BERNAL, & DAVIS, LLP 4–5 (2009) https://sbaustinlaw.com/library-papers/Chavarria-The_Severance_of_Wind_Rights%20(Final).pdf (advising landowners and attorneys to "sever with caution").

rights from being severed.[176] Until this issue is settled in Texas, solar developers should avoid building on land subject to a wind severance. However, if it cannot be avoided, the safest approach is to treat the severed wind estate just like a severed mineral estate, which, as discussed above, will require the proper waiver of surface rights.

Although it is extremely unlikely that a wind company would take a lease on land with an existing solar farm—*where would they build?*—Murphy's Law suggests planning for the unexpected. In that regard, if the wind estate has not been severed, provisions should be inserted into the solar lease either (1) expressly prohibiting wind development, or (2) creating buffer zones and height restrictions (or similar language aimed at severely restricting wind development).

iii. Off-Lease Obstructions

While many, if not all, obstructions that occur on the leased acreage or on adjacent land owned by the landowner can be mitigated by taking the appropriate steps described above, there remains considerable risk from obstructions that occur "off-lease," on land owned by a landowner not in the project. Generally, these off-lease risks will come in the form of shadows cast by infrastructure near the boundary of the solar facility. Remember, studies indicate that, depending on the technology used, "[s]ometimes as little as four percent or less of shading, such as a tree shadow across a portion of a panel, can take all of the panels in an array out of production completely."[177] Therefore, if there is oil and gas activity or a wind farm on a neighboring tract of land, this will necessarily affect the layout of the solar facility. To avoid these unwanted shadows, developers should consider constructing the solar farm in such a manner that the actual panels are, relatively speaking, located in the center of the leased acreage with any supporting infrastructure located along lease boundaries. However, these off-lease risks are exponentially greater if they do not occur until after the solar farm has been built. In such circumstances, short of taking a lease on the adjacent land, a company's only alternative may be to argue that it has an implied easement over the unleased property for the purpose of providing unobstructed solar access. However, Texas courts are generally very hesitant to restrict the free use of land through implied easements, so solar developers are best advised to obtain express easements over adjacent land where either oil and gas or wind facilities could cast a shadow on the solar facility.

176. COLO. REV. STAT. ANN. § 38-30.7-103 (1) (West, 2012); OKLA. STAT. ANN. § 820.1 (2011).

177. DuVivier, *supra* note 74, at 393.

iv. Considerations for Surface Waivers and Accommodation Agreements

As the length and complexity of the foregoing attests, mineral and wind development stands ready to slay the unwitting or unprepared solar developer. This fact is unlikely to change for the foreseeable future. Wind developers faced similar obstacles; however, by taking the appropriate steps, conflicts with competing mineral development have been largely nonexistent. In fact, despite these obstacles, Texas leads the nation in wind generation.[178] It is too early to tell whether solar will have the same success; but given Texas's prime solar conditions, if appropriate steps are taken to mitigate the inherent conflicts with mineral (and wind) development, it would not be unlikely to see Texas leading the nation in solar power within a few short years. In that regard, prospective solar developers should keep the following suggestions in mind when negotiating and executing waivers of surface rights and accommodation agreements.

1. Waivers of Surface Rights

Search the title records in the county where the land is located to see if any of the mineral owners have previously executed a surface waiver.[179] If they have, ensure that the waivers are still effective.

Every mineral owner with executive rights and every mineral lessee must sign a waiver; otherwise, the waiver will not effectively insulate solar developers from future mineral development.

Although owners of a nonexecutive-mineral-fee interest are not required to sign a surface waiver, there is precedent suggesting they would have a cause of action against the executive mineral owner. Therefore, prospective solar developers should consider obtaining the nonexecutive's acknowledgement of consent to the surface waiver. Conversely, unless there is evidence that the executive mineral owner is signing the waiver despite an offer to lease (or similar scenarios) developers can safely proceed without the consent of royalty owners.

After the waivers and consents are obtained, present them to the County Clerk to be recorded.

178. *Texas Wind Energy,* AMERICAN WIND ENERGY ASS'N (2016), http://awea.files.cms-plus.com/FileDownloads/pdfs/texas.pdf.

179. David Sewell et al., *Mineral Issues' Impact on Solar Energy Development in Texas and Other States*, STAHL, BERNAL, & DAVIES, at 10–11, (2011), http://www.sbaustinlaw.com/library-papers/Solar%20Energy%20-%20Mineral%20Estate%20Issues.pdf.

2. *Accommodation Agreements & Designated Drill Site Areas*

Hire a petroleum geologist to ascertain the probable locations of oil and gas minerals. This will aid in establishing any necessary designated drill site areas, as well as the potential for future development (if there are already active oil and gas operations on the land).

Consider including a road maintenance agreement (or entering into a separate agreement), detailing who is responsible for dust, dirt, and rock control, and who is responsible for repairs to the road(s).

Ensure that all of the mineral owners and lessees sign surface waivers for those areas of the surface where the proposed solar farm will be built.

Consider the impact that shadows from the mineral lessee's infrastructure will have on the efficiency of the panels.

If the solar facility is located close enough to its lease lines to be affected by shadows cast by facilities located on any adjacent lands, obtain express easements limiting the height of any buildings or facilities on those lands.

After an agreement has been reached (including any incidental agreements), present the agreement for recording with the County Clerk in the county where the land is located.

B. Environmental Considerations

A thorough environmental assessment of a project's proposed location is critical. Often touted as the long-term solution to fossil fuels, there is a growing misconception that solar is completely environmentally friendly. As many commentators have been quick to point out, the negative environmental consequences of utility-scale solar abound.[180] Therefore, a developer who fails to properly consider these consequences is not only subjecting himself to potential liability, but also to ruin, as lenders generally will not fund a project without a complete assessment of the project's potential environmental impact.[181]

Unlike oil and gas, where the main concern is pollution, solar does its damage by adversely affecting the ecosystem and the wildlife surrounding the facility. Until this point the immense surface footprint of solar has been referenced in relation to competing surface uses; however, its secondary effect is the complete alteration of the surrounding environment. In fact, it is tantamount to an ecological disaster—the wildlife is displaced; the plant-life is extinguished; and the microclimate is

180. *See, e.g.*, Sarah Pizzo, *When Saving The Environment Hurts The Environment: Balancing Solar Energy Development With Land And Wildlife Conservation In A Warming Climate*, 22 COLO. J. INT'L ENVTL. L. & POL'Y, 123 (2011).

181. Stephen J. Humes, *Solar Energy Project Development Issues: Preliminary Considerations*, PRACTICAL LAW, http://us.practicallaw.com/7-522-8476 (last visited Nov. 11, 2016).

destroyed. Dramatics aside, the reality is that the ecosystem is forever altered, placing what wildlife that remains in a perilous position—adapt to an ever-shrinking habitat or abandon historic breeding grounds in search of a new source of subsistence. As one commentator has noted, the net result of this disruption of the ecosystem and fragmentation of the habitat is a serious decrease in biodiversity leaving wildlife susceptible to extinction.[182]

i. Endangered Species

As should be clear from the above discussion, if the environmental assessment reveals the presence of an endangered species in the project area then a solar company faces considerable liability if the correct steps are not taken.

Under the Endangered Species Act, it is unlawful for anyone to, among other things, "take" an endangered species.[183] The Act defines take as to "*harass, harm*, pursue, hunt, shoot, wound, *kill*, trap, capture, or collect, or to attempt to engage in any such conduct."[184] In the seminal case interpreting the Act, the U.S. Supreme Court upheld a regulation issued by the Department of the Interior further defining harm to include actions that cause significant habitat modification or degradation, which "actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."[185] It is hard to imagine another action, except for perhaps logging, that would so clearly be subject to the ESA, under a habitat modification or degradation theory, than solar development.

Consider: Prior to beginning construction, depending on the site's geography, the surface will need to be "scraped" of all vegetation and trees, and then re-contoured to produce a level building site.[186] Once the project has been constructed, the result is a considerable swath of land almost entirely covered with panels and infrastructure.[187] The result: The ecosystem surrounding and beneath the solar farm is completely altered (*habitat modification and degradation*), and prevented from recovering.[188] Correspondingly, there is an ever-decreasing supply of food (*feeding*), a

182. *See* Pizzo, *supra* note 180, at 135–38.

183. 16 U.S.C.S. § 1538(a)(1)(B) and (c) (2016). *See also* 16 U.S.C. § 1533(d) (2016) (providing the Secretary discretion to extend the take provision to threatened species).

184. 16 U.S.C. § 1532(19) (2016) (emphasis added).

185. *See* Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687 (1995); *see generally* 50 C.F.R. § 17.3 (1994).

186. *See* Pizzo, *supra* note 180, at 135–36 (noting that, "many existing utility-scale facilities have a regular program of herbicide application to keep the area under the collection devices free of any growth that may block sunlight from reaching the mirrors").

187. FRIEND, *supra* note 79, at 8.

188. *See* Pizzo, *supra* note 180, at 135–38.

loss of viable mates (*breeding*), a loss of adequate shelter (*sheltering*), and finally extinction (*actual death or injury*). This is clearly a take.

Therefore, to avoid liability a solar company would need to apply for an incidental take permit, which allows for the limited taking of endangered species; provided that the taking is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity."[189] To obtain such a permit, an applicant must create a habitat conservation plan, detailing the following:

> the impact which will likely result from such taking; what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps; what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized; and such other measures that the Secretary may require as being necessary or appropriate for purposes of the plan.[190]

Developers should also be aware that Texas maintains a separate endangered species act, which applies to species listed as endangered or threatened within Texas, but which are not listed under the federal act.[191] If a species with a statewide designation is located within the project area, developers should contact the Texas Parks and Wildlife Habitat Assessment Program for guidance in obtaining any necessary permits.

ii. Migratory Birds

Although the ESA unquestionably presents the biggest environmental obstacle for solar development, in the wake of recent reports suggesting abnormal increases in bird fatalities around solar facilities,[192] developers need to be aware of potential liability surrounding migratory birds. In fact, according to a report prepared by Texas Parks and Wildlife, over

189. 16 U.S.C. § 1539(a) (2016).

190. 16 U.S.C.S. § 1539(a)(2) (2016).

191. *See generally* TEX. PARKS AND WILDLIFE CODE ch. 67 & 68 (2016).

192. *See* James Meier, *Ivanpah Solar Project Kills 3,500 Birds*, DESERT SUN (Apr. 23, 2015), http://www.desertsun.com/story/tech/science/greenenergy/2015/04/23/ivanpah-solar-plant-bird-deaths/26273353/ (reporting that over 3,500 bird carcasses, totaling 83 different species, were found in the Ivanpah project-area); Ellen Knickmeyer and John Locher, *Solar Plant Near Nevada Border Scorches Birds Mid-Air*, ASSOCIATED PRESS (Aug. 18, 2014), http://lasvegassun.com/news/2014/aug/18/solar-plant-near-nevada-border-scorches-birds-mid-/ (reporting that California officials have observed birds igniting when flying over a solar plant located in the Mojave Desert, and noting that annual bird fatalities at this facility range as high as 28,000); David Danelski, *Blythe: Toxic Ponds Uncovered At Solar Plant Where Birds Died*, PRESS ENTER. (Oct. 29, 2014), http://www.pe.com/articles/birds-753040-plant-ponds.html (reporting that over 60 birds died after landing in a solar facility's waste-water evaporation ponds); *See generally* Pizzo, *supra* note 180, at 123, 133 and 138 (discussing how concentrated solar power (CSP) systems work, and noting that the air above facilities employing CSP systems can be heated to as high as 800-degrees, which allegedly causes birds to be "cooked in flight").

half of Texas's bird population qualifies as migratory.[193] Admittedly, a solar company's liability is significantly less than that faced by wind companies, where turbines are often in the glide path of many migratory birds. However, depending on the project's location and the technology used, a solar company could theoretically be subject to the Migratory Bird Treaty Act ("MBTA")[194] and the Bald and Golden Eagle Protection Act ("BGEPA").[195] While there may be other examples, it would appear that any potential liability would involve something akin to an indirect taking or killing based on a habitat modification or degradation theory, or, if proven, a claim that solar companies, employing concentrated solar power ("CSP") systems, are illegally taking or killing migratory birds as a result of the birds being killed in flight due to the intense heat emitted from these systems.[196]

1. Migratory Bird Treaty Act

From the outset, it should be noted that after the Fifth Circuit's recent opinion in *CITGO*,[197] solar developers looking to build in Texas are largely insulated from MBTA liability. Simplifying the facts, CITGO was convicted on three counts of violating the MBTA, after several birds were found in two uncovered equalization tanks at the company's Corpus Christi refinery.[198] On appeal the Fifth Circuit reversed, holding that for an unlawful taking[199] to occur there must have been a "deliberate act[] done directly and intentionally to migratory birds," such as unlawful hunting or trapping.[200] This brings the Fifth Circuit (*i.e.,* Texas) in line with several cases from the Ninth[201] and Eighth Circuits, which have likewise held that MBTA liability will not attach unless there is some

193. *See* Clifford E. Shackelford et. al., *Migration and the Migratory Birds of Texas: Who They Are and Where They Are Going*, TEX. PARKS & WILDLIFE (2005), https://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0511.pdf.

194. 16 U.S.C. § 703 (2004).

195. 16 U.S.C. § 668 (1972).

196. The latter claim may prove to be more academic than anything as utility-scale solar farms using photovoltaic technology appears to have far surpassed CSP systems as the preferred technology, with the majority of CSP powered facilities, as of 2013, located in Arizona and California. *See* Ong et. al., *supra* note 9, at 7 fig. 2.

197. United States. v. CITGO Petroleum Corp., 801 F.3d 477 (5th Cir. 2015).

198. *Id.* at 479–81.

199. In dictum, the court also indicated that had the issue of killing been before the court it would have likewise required a direct and deliberative act for MBTA liability to attach. *See id.* at n.10.

200. *Id.* at 488–89.

201. There is conflicting precedent in the Ninth Circuit. For example, in 1978 the Ninth Circuit upheld the conviction of a defendant who sprayed pesticide on an alfalfa field leading to the death of several migratory birds. *See* U.S. v. Corbin Farm Serv., 444 F.Supp. 510 (E.D. Cal. 1978), *aff'd*, 578 F.2d 259 (9th Cir. 1978). However, in 1991 the same court held that the MBTA did not apply to takings that may occur because of habitat modification or destruction. *See* Seattle Audubon Soc'y. v. Evans, 952 F.2d 297 (9th Cir. 1991).

evidence of a deliberate and intentional act aimed directly at migratory birds.[202] It should be noted, however, that several other courts—mostly in the Second and Tenth Circuits—have taken a contrary position.[203] Thus, with the increased attention being paid to bird fatalities (as a result of wind turbines), and the increased circuit split created by the *CITGO* decision, the issue of indirect MBTA liability seems far from settled with a decision from the U.S. Supreme Court not unlikely. Therefore, a brief overview of the MBTA and its potential impact on solar development may nonetheless prove useful to developers considering the ramification of siting solar in Texas.

Enacted to implement a treaty signed by the United States and Great Britain (*acting on behalf of Canada*), in which both sides agreed to protect migratory birds from perceived overexploitation by hunters and poachers, the MBTA makes it unlawful to, among other things, "take, [or] kill . . . any migratory bird . . . or any part, nest, or egg thereof."[204]

Considering the original purpose of the act—preventing the unlawful hunting and killing of migratory birds—it seems unlikely that a solar company would be held liable for violating the MBTA under a theory of habitat modification or degradation. A similar theory was advanced by an environmental organization[205] looking to halt logging activities; however, noting that the differences between the ESA and the MBTA are "distinct and purposeful," the Ninth Circuit categorically rejected this theory.[206] A similar theory—that conducting logging operations during nesting season would lead to a direct take—has likewise been rejected.[207] Although these theories have not been tested in the Second or Tenth Circuits—who have been more willing to extend the scope of the MBTA—it seems

202. *See e.g.*, *Seattle Audubon Soc'y.*, 952 F.2d at 297, and Newton County Wildlife Ass'n v. U.S. Forest Serv., 113 F.3d 110 (8th Cir. 1997); Mahler v. U.S. Forest Service, 927 F.Supp. 1559 (S.D. Ind. 1996); United States. v. Brigham Oil and Gas, LP, 840 F.Supp. 2d 1202 (D.N.D. 2012).

203. *See e.g.*, United States. v. Union Tex. Petroleum, 1973 U.S. Dist. LEXIS 15616 (D. Colo. July 11, 1973) (finding an oil company liable under the MTBA after several birds died after landing in a sludge pit); United States. v. Corbin Farm Serv., 444 F.Supp. 510 (finding Corbin liable for spraying pesticides that resulted in the death of several migratory birds); United States. v. FMC Corp., 572 F.2d 902 (2d Cir. 1978) (finding FMC liable after several birds died after landing in a wastewater storage pond); *See also* United States v. Apollo Energies, Inc., 611 F.3d 679, 684 (10th Cir. 2010); United States v. Moon Lake Elec. Ass'n, 45 F.Supp.2d 1070 (D. Colo. 1999).

204. 16 U.S.C. § 703 (a) (2012).

205. Unlike the ESA, the MBTA does not provide for citizen suits; however, environmental organizations have been moderately successful—as far as standing is concerned—in bringing an action under different statutes, e.g., the ESA, and tacking on an MBTA claim. Compare *Seattle Audubon Soc'y.*, 952 F.2d at 303 with Flint Hills Tallgrass Prairie Heritage Found. v. Scottish Power, 2005 U.S. Dist. LEXIS 2772 (D. Kan. 2005), *aff'd*, 2005 U.S. App. LEXIS 19330 (10th Cir. 2005).

206. *Seattle Audubon Soc'y.*, 952 F.2d at 303.

207. *See, e.g.*, Newton County Wildlife Ass'n v. U. S. Forest Serv., 113 F.3d 110 (8th Cir. 1997); *Mahler*, 927 F. Supp. 1559.

doubtful that it would fare much better in those courts. For starters, the definition of take in the MBTA is fundamentally different from the definition given to the term in the ESA (or for that matter the BGEPA). In both the ESA and the BGEPA, take is modified by terms—harm and disturb respectively—that allow for the imposition of liability if an individual indirectly kills or injures a species or eagle by modifying their habitat to such a degree that their normal behavioral, breeding, or sheltering patterns are significantly altered. Conversely, take is defined in the MBTA as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect."[208] It is conceptually difficult to imagine how take or kill could be interpreted to include a habitat modification theory of liability without similar modifiers; in fact, the presence of those modifiers in the ESA and the BGEPA, but their absence in the MBTA is suggestive in and of itself.

On the other hand, without the protection provided by cases such as *CITGO* and *Brigham Oil*,[209] developers considering concentrated solar power have an increased potential for liability. And if the recent reports prove to be true—that birds are being cooked in mid-flight—then solar companies employing concentrated solar power would be directly within the purview of *Apollo Energies*[210] and *Moon Lake*,[211] which held companies strictly liable for the indirect and unintentional killing of several migratory birds. Can liability be avoided? Unlike the Endangered Species Act and the Bald and Golden Eagle Act, the Migratory Bird Treaty Act does not have a permitting system for incidental takes. Therefore, if a solar company's environmental assessment indicates that migratory birds might be affected by the prospective solar farm, then the best approach may be to develop a site-specific Bird and Bat Conservation Strategy,[212] which demonstrates, among other things, how the company intends to avoid and minimize the solar farm's impact on migratory birds.[213] This same approach has been recommended by co-author Ernest Smith as a method wind farms could use to avoid MBTA liability.[214]

208. 50 C.F.R. § 10.12 (2016).

209. *Brigham Oil and Gas, LP*, 840 F. Supp. 2d at 1202.

210. *Apollo Energies, Inc.*, 611 F.3d at 679.

211. *Moon Lake Elec. Ass'n*, 45 F. Supp. 2d at 1070.

212. Although the guidelines were developed with wind energy in mind, the FWS's Land-Based Wind Energy Guidelines could easily be altered to address a solar company's potential take.

213. *See generally Interim Guidelines For the Development of a Project Specific Avian and Bat Protection Plan for Wind Energy Facilities,* U.S. FISH AND WILDLIFE SERV. PAC. SW. REGION 1, 2 (2010), https://www.fws.gov/southwest/es/TexasCoastal/docs/Interim_Guidelines_Avian_and_Bat_Protection_Plan.pdf (noting that the FWS has indicated that it will consider a company's good faith efforts to avoid taking migratory birds when deciding whether to pursue charges).

214. SMITH, *supra* note 51, at § 10.02.

2. *Bald and Golden Eagle Protection Act*

While solar companies are reasonably insulated from liability under the Migratory Bird Treaty Act, the same is not necessarily true of the Bald and Golden Eagle Protection Act (BGEPA). Thus, if a company's environmental assessment indicates the presence of eagles in the project's proposed location additional steps may be required. This is true not just in Texas, but anywhere that eagles populate.

Under the BGEPA, it is unlawful for anyone to "knowingly, or with wanton disregard for the consequences of his act, *take* . . . at any time or in any manner, any bald eagle . . . or any golden eagle . . . or any part, nest, or egg thereof."[215] The act's accompanying regulations further define "take" as to "kill . . . destroy, molest, or *disturb*."[216] Disturb is further defined as:

> agitat[ing] or bother[ing] a bald or golden eagle to a degree that causes, or is likely to cause . . .
> (1) injury to an eagle,
> (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or
> (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.[217]

Perhaps due to the bald eagle's status as a national symbol, the take provision under the BGEPA is significantly broader than it is under the ESA (or the MBTA). Indeed, under the ESA, as previously discussed, take includes harm or harassment that "*actually* kills or injures wildlife."[218] The Eagle Act, however, merely requires a likelihood of disturbance.

In any event, as discussed in connection with the Endangered Species Act, the surface footprint of utility-scale solar farms can drastically alter the surrounding environment, leading to a loss in biodiversity and ultimately habitat fragmentation; thus, siting in known eagle locations would almost certainly qualify as a take under the BGEPA, whether through nest abandonment or via a decrease in productivity. However, unless it can be shown that an eagle was actually injured or killed because of the fragmentation, it seems unlikely that a solar company would be penalized. That is to say, whereas the ESA provides for citizen suit to enforce the act, the BGEPA does not provide for citizen suit; hence, an enforcement proceeding seems rather unlikely for speculative takes. Thus, it would appear that liability would only arise if, for example, an

215. 16 U.S.C. § 668(a) (2016) (emphasis added).
216. 50 C.F.R. § 22.3 (2016) (emphasis added).
217. *Id.*
218. 50 C.F.R. § 17.3 (2016) (emphasis added).

environmental organization were able to challenge agency action on an unrelated matter and tack on a BGEPA claim. A similar approach was recently taken in Maine, where an environmental organization tried to enforce the BGEPA against a proposed wind farm by claiming the Army Corp of Engineers, in issuing a Section 404 permit under the Clean Water Act, failed to adequately consider the impact on eagles.[219] Although the court admitted that it found the argument persuasive, it noted that there was no evidence that eagles would *actually* be affected by the issuance of the 404 permit.[220] This dynamic creates an incentive for solar companies to ignore the BGEPA, so long as their operations do not actually lead to an eagle being killed or harmed.

On the other hand, an eagle being cooked in mid-flight is a clear violation of the BGEPA; provided, however, that the solar company acted knowingly or with wanton disregard. It seems clear that if a company knew a proposed location was within the territory of a gold or bald eagle and nonetheless built a concentrated solar power facility, that, at the very least, would constitute wanton disregard.

Fortunately, unlike the MBTA, the Eagle Act does provide a permitting system for the incidental takings of bald and golden eagles.[221] Unfortunately, it is far from simple. To qualify for a permit, an applicant must show:

> (1) that the take is compatible with the preservation of the bald eagle and the golden eagle;
> (2) that it is necessary to protect an interest in a particular locality;
> (3) that it is associated with but not the purpose of the activity; and
> (4) for a standard permit, that the take cannot be practicably avoided; or for a programmatic permit, that the take is unavoidable even though advanced conservation practices are being implemented.[222]

Advanced Conservation Plans (or Eagle Conservation Plans), in general, are site-specific plans developed by the applicant and the Service, that at a minimum will demonstrate how the applicant will avoid, minimize, and mitigate the take.[223]

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219. *See* Friends of the Boundary Mts. v. U.S. Army Corps of Eng'rs, 24 F. Supp. 3d 105 (D. Me. 2014).

220. *Id.* at 119–121.

221. For an excellent discussion of the permitting process, see Brooke Wahlberg, *The Curious Problem of Eagles*, 44 TEX. ENVTL. L.J. 51 (2014).

222. 50 C.F.R. § 22.26(a) (2016).

223. *See* Eagle Permits; Take Necessary to Protect Interest in Particular Localities, 74 Fed. Reg., 46, 842. (Sept. 11, 2009) (codified at 50 C.F.R. §§ 13, 22 (2016)).

C. *Miscellaneous and Related Concerns*

Aside from the environmental concerns discussed above, solar developers, like all energy developers, need to be cognizant of other federal environmental statutes that may be implicated depending on the project. For example, if a solar project is to be sited in or near a wetland, then the developer should consider its obligations under the Clean Water Act. The same is true of state law as well. For example, if it is determined during the assessment period that historical or cultural resources will be impacted by the solar farm, the developer should consider its obligations, if any, under the Texas Historical Commission[224] and the Antiquities Code[225] as well as any other local or state laws governing historical and cultural remains.

IV. CONCLUSION

There is no bigger risk to utility-scale solar development in Texas (or for that matter, most any other major oil and gas producing state) than competing oil and gas development. Texas, like many other states, adheres to the dominant estate doctrine, which gives the mineral estate an implied easement to use so much of the surface as is reasonably necessary to develop the minerals. As a result, if solar developers do not take the proper steps to address oil and gas development, their solar project is at considerable risk of project-killing litigation. Although developers may be able to rely on the accommodation doctrine, as this paper discussed, there is no guarantee that solar developers will be protected. Therefore, to sufficiently insulate a project from oil and gas production-related disruption, it is advisable for developers to complete a preliminary title review and obtain any necessary surface waivers and surface-use-accommodation agreements prior to committing any significant investments in time or money. Likewise, wind-energy development presents many of the same risks. In particular, the lack of statutory or common law guidance in Texas regarding wind energy creates additional risk. In the authors' opinion, until the Texas Legislature or courts define the legal contours of wind energy, solar developers should proceed with caution when faced with competing wind-energy development. However, if developers are left with no other choice, the best approach may be to treat wind like oil and gas.

Aside from the oil and gas (and wind) related issues, solar developers also need to be aware of environmental concerns. As the discussion above illustrated, the most likely environmental problems presented involve endangered and threatened species, both nationally and in Texas.

224. Tex. Gov't Code Ann. § 442 (West 2012).
225. Tex. Nat. Res. Code Ann. § 191 (West 2010).

Nevertheless, if developers are considering using concentrated solar power, those developers should also pay heed to any potential liability for harm caused to migratory birds, including bald and golden eagles.

In conclusion, with the recent extension of the Investment Tax Credit, the United States is primed for a solar-energy boom, and Texas is poised to lead the way. In that regard, it has been the goal of this paper to highlight potential issues that developers are likely to encounter, as well as to suggest solutions for mitigating their impact. Taking these issues into consideration and following the steps outlined in this paper should aid developers in maximizing the immense solar potential found in the Lone Star State.