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When Green Energy Turns Brown: An Examination of the Insufficiencies in Louisiana's Current Solar Panel Decommissioning

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INTRODUCTION

Solar panels are a promising form of sustainable energy. The panels use photovoltaic cells to convert sunlight into electricity and can be scaled

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to supply residential, commercial, and industrial needs.[1] Solar panels have numerous benefits as a renewable energy resource: zero emissions (i.e., no sounds, toxins, pollutants, etc.) during energy production, lower energy costs for homeowners, low impact on water resources, increased energy independence, and more.[2] However, the energy industry constantly evolves, leaving no guarantee that solar panels will remain a viable large-scale energy source in the future. Solar panels have an average life expectancy of 30 years, leaving several states to face the overwhelming and immediate issue of how to properly regulate solar panel decommissioning for the numerous panels reaching the end of their life.[3]

Solar panel decommissioning is the process of removing a solar panel once it reaches the end of its life, followed by land remediation. Federal and state governments have implemented legislation regarding the decommissioning of solar panels. The Resource Conservation and Recovery Act ("RCRA") represents the primary body of federal law regulating solar panel decommissioning.[4] The RCRA governs the proper management of waste to protect the environment and human health,[5] giving the Environmental Protection Agency ("EPA") "the authority to control hazardous waste using a cradle-to-grave approach."[6] While most people view solar panels as a green source of energy, a solar panel at the end of its life can leak toxins, such as lead and cadmium, into the ground if not properly decommissioned.[7] Therefore, a non-functioning solar panel

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1. SOLAR ENERGY TECHS. OFF., *How Does Solar Work*, U.S. DEP'T OF ENERGY: OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/solar/how-does-solar-work [https://perma.cc/E4SJ-9AQX] (last visited Sept. 20, 2022).

2. Meghan McElligott, *A Framework for Responsible Solar Panel Waste Management in the United States*, 5 OIL & GAS, NAT. RES., & ENERGY J. 475, 486 (2020).

3. Stephanie Weckend et al., *End-Of-Life Management: Solar Photovoltaic Panels*, INT'L RENEWABLE ENERGY AGENCY 11 (2016), https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2016/IRENA_IEAPVPS_End-of-Life_Solar_PV_Panels_2016.pdf [https://perma.cc/5XF9-9F95].

4. McElligott, *supra* note 2, at 478.

5. *Id.*

6. *Summary of the Resource Conservation and Recovery Act*, EPA, https://www.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act [http://perma.cc/8J3Z-RF4Q] (last updated Sept. 12, 2022). A cradle-to-grave approach follows all steps of a product's life, starting from the extraction of raw materials to the disposal of the product. *See* Pierre Venter, *Why the Cradle to Grave Principle?*, ISOQAR (Mar. 1, 2020), https://www.isoqar.co.za/post/why-the-cradle-to-grave-principle [https://perma.cc/B25C-CEC6].

7. McElligott, *supra* note 2, at 488.

past its useful life becomes a hazardous waste subject to RCRA Subtitle C.[8] The RCRA provides a basic decommissioning structure for solar panel manufacturers and solar power consumers. However, the RCRA contains gaps that states should fill with their own legislation. For example, the "EPA's expanded regulatory definition of solid waste, pursuant to Subtitle C of the RCRA, includes recyclable material as 'other discarded materials,' which may inhibit recycling and resource recovery efforts" by many states.[9] Solar panels not only leak dangerous toxins into the ground if improperly removed, but also contain rare metals and recyclable materials with a strong potential for profitable recovery.[10] Thus, following federal solar panel decommissioning regulations results in a loss to both manufacturers and the environment.[11]

While many states have regulated solar panel decommissioning for several years, Louisiana is only just beginning to address this issue. On July 10, 2007, Louisiana implemented the Solar Energy Systems Tax Credit, incentivizing Louisiana businesses and residents to install solar systems in exchange for an income tax credit.[12] Several other states[13] with similar statutes incentivized the development and use of sustainable energy; however, Louisiana's tax credit remained the best at reducing solar

8. This section of the RCRA governs the regulation of hazardous waste. Because solar panels leach dangerous toxins into the ground if not properly decommissioned, entities that decommission solar panels must adhere, at a minimum, to this section. *See* Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq.

9. Taylor L. Curtis et al., *Solar Photovoltaic Module Recycling: A Survey of U.S. Policies and Initiatives*, ONREL 11 (2021), https://www.nrel.gov/docs/fy21osti/74124.pdf [https://perma.cc/XK55-GN7V]. This classification inhibits the recycling of solar panels because it causes confusion as to what constitutes "solid waste" under the expansive statutory provision. If solar panel manufacturers are unsure what category their product falls under, they may be deterred from recycling the solar systems at all. *Id.*

10. McElligott, *supra* note 2, at 495. Rare metals include indium, gallium, and germanium. *Id.* at 488. Recyclable materials include glass and aluminum. *Id.*

11. The manufacturers would miss the potential profit from recycling solar panels, which in turn negatively affects the environment, since new material must be found to replace the unrecycled material.

12. LA. REV. STAT. § 47:6030 (2007).

13. For a list of the best solar incentives by state, see Karsten Neumeister, *10 States With the Best Tax Incentives for Solar Energy*, ECOWATCH, https://www.ecowatch.com/top-states-for-solar-tax-incentives-2654465836.html [https://perma.cc/WVX7-EZSG] (last updated Aug. 4, 2022).

panel installation costs.[14] Because Louisiana enacted its tax credit incentive a little over a decade ago, the state has time to pass regulations for the solar industry before a majority of solar panels, commissioned in response to the tax credit, reach the end of their useful lives.

The current regulation governing the solar industry in Louisiana, Act. No. 301 ("the Act"), went into effect August 1, 2021.[15] The Act amended and reenacted Louisiana Revised Statute section 30:1154(A), (C) to create regulations for solar devices and solar leases.[16] The Act provides the Secretary of the Louisiana Department of Natural Resources (LDNR) with certain powers and duties for the purpose of creating a regulatory scheme regarding the leasing and decommissioning of solar panels in the state.[17] Apart from the Act's grant of authority to the Secretary of the LDNR (hereinafter "Secretary"), no other laws address solar panel decommissioning in Louisiana. This presents a disadvantage for those considering leasing land to solar energy investors coming to Louisiana. Absent adequate regulation, landowners will inevitably enter into lease agreements with billion-dollar solar energy companies without provisions acknowledging a landowner's rights and guarantees.[18] However, landowners can still reach a sound agreement with large solar companies—but the process of doing so becomes increasingly difficult,

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14. *See Solar Energy: State Incentives*, STATE OF LA. DEP'T OF NAT. RES, http://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=324 [https://perma.cc/D35F-T3H4] (last visited Sept. 20, 2022). Louisiana's Solar Energy Systems Tax Credit provided a 50% refundable tax credit for the purchase of solar electric and solar water heating systems installed at a Louisiana Residence *before* January 1, 2018. *See* LA. REV. STAT. § 47:6030. *But see* Solar Energy Techs. Off., *Homeowner's Guide to the Federal Tax Credit for Solar Photovoltaics*, OFF. OF ENERGY EFFICIENCY & RENEWABLE ENERGY, https://www.energy.gov/eere/solar/homeowners-guide-federal-tax-credit-solar-photovoltaics [https://perma.cc/VBE5-4B4E] (last visited Sept. 20, 2022). While Louisiana's tax credit no longer applies to solar panels installed after January 1, 2018, there are federal government tax credits available for solar panel installations. *Id.* However, the federal tax credit does not provide as much incentive as the Louisiana tax credit. *Id.*; *see* LA. REV. STAT. § 47:6030.

15. Act No. 301, 2021 Leg., Reg. Sess. (La. 2021) (amended and reenacted LA. REV. STAT. § 30:1154(A), (C) relative to solar energy).

16. *Id.*

17. *Id.*

18. For clarity, an example of "certain rights and guarantees" includes requiring lessees to provide some form of financial assurance in case the solar energy company goes bankrupt or becomes insolvent. Other rights and guarantees in addition to financial assurances are further discussed in the solution section of this Comment.

time consuming, and expensive. By entering into lease agreements without state and/or local guidance and oversight, solar farms open the door for contractual errors and lawsuits.

Senate Resolution No. 182 of the 2021 Regular Legislative Session ("SR 182") requested the Secretary and Louisiana Department of Agriculture's Commissioner to hold a public meeting prior to the Act's passage.[19] The meeting collected thoughts and concerns on solar development and production in Louisiana from individuals and "representatives of specific organizations, associations, and agencies."[20] The solar industry's potential impact on farmers was a principal concern.[21] Louisiana is home to approximately 30,000 farms averaging 300 acres in size, most of which operate under lease agreements.[22] As a result, tenant farmers fear that property owners will transition the leased land from agricultural uses to renewable energy production upon a farming lease's expiration.[23]

This Comment evaluates the insufficiencies and gaps in Louisiana's current solar regulation. Given the sudden increase in solar panel commissioning throughout the United States, an analysis and comparison of solar regulations in other states provides insight for the development of Louisiana's own solar regulations. Presently, Louisiana's recently passed Act inadequately addresses general regulation of solar energy. At a minimum, Louisiana's solar regulations should consider: (i) requirements for lease agreements, including decommissioning directives, end-of-life obligations, and land remediation; (ii) proof of financial assurance prior to project approval; (iii) disposal and recycling processes and guidelines; and (iv) an emergency land remediation fund. Including these provisions in Louisiana's solar regulations represents a fundamental step towards providing the state with a green future before, during, and after a solar panel's lifetime.

Part I of this Comment offers an overview of the solar panel decommissioning process and the importance of its regulation, followed by an introduction and evaluation of Louisiana's only solar regulation—

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19. REP. TO LA. S. ON S. RES. NO. 182 OF 2021 PUBLIC MEETING (June 29, 2021) [hereinafter SR 182].

20. *Id.* at 1.

21. *See generally id.*

22. Linda F. Benedict et al., *Economic Profile of Louisiana Agriculture and Farming Households*, LSU AG CENTER (Sept. 12, 2012, 8:54 PM), https://www.lsuagcenter.com/portals/communications/publications/agmag/archive/2012/summer/economic-profile-of-louisiana-agriculture-and-farming-households [https://perma.cc/NH43-XHCS].

23. SR 182, *supra* note 19, at 2.

Act No. 301. Presently, the Act fails to adequately address solar panel decommissioning, leaving landowners susceptible to detrimental lease agreements. To prevent repeating "a similar issue Louisiana citizens are far more familiar with—the abandonment of orphan oil and gas wells," Part II analyzes the decommissioning regulations from Louisiana's oil and gas industry to the solar energy industry in other states.[24] Part II establishes a foundation for general decommissioning regulations which Part III uses to frame a solution for the Act's deficiencies. Part III's solution combines Louisiana's oil and gas regulations with other states' successful regulatory approaches to solar energy to create a comprehensive outline of the necessary provisions for solar decommissioning regulations in Louisiana, while abating local concerns raised by Louisianians. Lastly, Part IV recapitulates why Louisiana's current solar regulations are problematic and how the Secretary should approach this issue to ensure proper decommissioning throughout the state.

I. BACKGROUND

A. Solar Energy and Decommissioning—Generally

As mentioned above, solar panel decommissioning occurs once a solar farm reaches the end of its life. To physically remove a solar panel, one essentially conducts a solar installation in reverse.[25] However, certain considerations for solar farms, such as land remediation and where to send the removed materials, complicate the decommissioning process.[26] Depending on a solar farm's scale, costs associated with these preliminary considerations vary from thousands to millions of dollars—stressing the importance of accounting for these considerations at the project's outset.

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24. Cristian Soler & Caleb J. Madere, *Solar Leasing in Louisiana: Act 301 and Decommissioning Requirements*, LISKOW & LEWIS: THE ENERGY L. BLOG (July 15, 2021), https://www.theenergylawblog.com/2021/07/articles/energy/energy-natural-resources/solar-leasing-in-louisiana-act-301-and-decommissioning-requirements/#_ftn3 [https://perma.cc/Z7JB-U5H7].

25. Billy Ludt, *How to Decommission a Solar Array, and Why It's Important to Plan Ahead*, SOLAR POWER WORLD (Mar. 11, 2019), https://www.solarpowerworldonline.com/2019/03/how-to-decommission-a-solar-array-and-why-its-important-to-plan-ahead/ [https://perma.cc/Z4EP-H7P9].

26. *Id.*

There are two types of solar farms: utility solar farms and community solar farms.[27] Utility solar farms provide power to a utility company which, in turn, provides power to the company's customers.[28] Utility solar farms range from 1 megawatt ("MW") to 2,000 MW,[29] whereas community solar farms typically produce around 5 MW or less, since they provide power to a community of members who each pay for a share of the power.[30] Compared to rooftop solar systems, solar farms are easy to install and remove,[31] cost less than residential solar systems,[32] and are a competitive alternative to other energy sources,[33] resulting in utility companies moving toward solar farms to increase their electricity generation capacity.[34] Entergy, Louisiana's principal energy company, joined this movement, which is evidenced by its recent solar farm constructions in West Baton Rouge Parish and New Orleans East, totaling around $120 million in cost and 70 MW in energy production between the two facilities.[35] Entergy continues to solicit contracts with solar energy

27. Zeeshan Hyder, *What Is a Solar Farm? Costs, Land Needs & More*, SOLAR REVIEWS, https://www.solarreviews.com/blog/what-is-a-solar-farm-do-i-need-one#types [https://perma.cc/G55J-MKSF] (last updated May 19, 2022).

28. *Id.*

29. MW stands for megawatt. For an idea of how much power various sized solar farms can generate, see *How Many MWh of Solar Energy Comes from a MW of Solar Panels?*, FREEING ENERGY, https://www.freeingenergy.com/math/solar-pv-gwh-per-mw-power-energy-mwh-m147/ [https://perma.cc/HZG7-A98G] (last visited Sept. 20, 2022) ("1 megawatt (MW) of solar panels will generate 2,146 megawatt hours (MWh) of solar energy per year.").

30. Hyder, *supra* note 27.

31. Solar farms are easier to install and remove because they are located on a large plot of land, whereas residential solar systems are usually attached to a house or rooftop, making the installation and removal process more meticulous. *Id.*

32. *Id.* ("Solar farms are much cheaper to build and operate than rooftop solar systems. . . . Solar farm installation costs are typically between $0.89 to $1.01 per watt. . . . [while] residential solar panel systems . . . are typically . . . $3.06 per watt.").

33. Dominic Dudley, *Renewable Energy Costs Take Another Tumble, Making Fossil Fuels Look More Expensive Than Ever*, FORBES (May 29, 2019, 7:00 AM), https://www.forbes.com/sites/dominicdudley/2019/05/29/renewable-energy-costs-tumble/?sh=4834b5b6e8ce [https://perma.cc/W9PC-KRRZ].

34. Hyder, *supra* note 27; *see also What Is the Difference Between Electricity Generation Capacity and Electricity Generation?*, EIA, https://www.eia.gov/tools/faqs/faq.php?id=101&t=3 [https://perma.cc/6E5N-USS9] (last updated Apr. 12, 2022) ("Electricity generation capacity is the maximum electric output an electricity generator can produce under specific conditions.").

35. Kristen Mosbrucker, *There's a Solar Farm Movement Coming to Louisiana; Here's Where These Facilities Are Headed*, THE ADVOCATE,

businesses for additional utility solar farm projects, particularly in southeast Louisiana according to recent bid records.[36] Louisiana's flat landscape and sunny climate makes it a viable candidate for housing hundreds of solar facilities. Since Entergy announced its intent to purchase more solar power, the demand for solar farms in Louisiana continues to rise.[37]

Billion-dollar solar energy companies and solar farm developers have submitted bids for solar facilities across Louisiana with proposed investments totaling over $2 billion.[38] Louisiana Economic Development ("LED") Secretary, Don Pierson, stated:

> [S]olar projects represent an excellent community development opportunity for our rural parishes. The $100 million investment made by a single solar facility will generate very significant tax revenues for the parish, school board, and sheriff. Local elected leaders will direct these new tax revenues to meet their current or future needs.[39]

While the solar energy industry offers tremendous opportunity for Louisiana's economy, many rural residents, parish officials, state lawmakers, and regulators hesitate to welcome the industry due to aesthetic, farming, and tax concerns.[40] Conversely, economic development officials in rural parishes look forward to the replacement of

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https://www.theadvocate.com/baton_rouge/news/business/article_9eeb461c-1a0c-11eb-95ca-13b90f61f289.html [https://perma.cc/NKS2-LTGS] (last updated Nov. 25, 2020, 8:16 PM).

36. Kristen Mosbrucker, *New $98M Solar Farm Pitched in Louisiana as Utilities Look to Buy More Renewable Power*, THE ADVOCATE, https://www.theadvocate.com/baton_rouge/news/business/article_fc89377e-85a6-11eb-a2ab-8f770fd05470.html [https://perma.cc/DJ7Y-LTHS] (last updated Mar. 15, 2021, 3:20 PM).

37. *Id.*

38. Kristen Mosbrucker, *Who Owns All These Solar 'Farms' Across Louisiana? The Answers May Surprise You*, NOLA.COM, https://www.nola.com/news/business/article_f56004fe-de71-11eb-b161-c72a83856b8b.html [https://perma.cc/ 3PD2-NK6N] (last updated July 26, 2021, 9:42 AM).

39. Kristen Mosbrucker, *Rural Louisiana Could See 7 New Large-Scale Solar Projects Worth Nearly $1 Billion*, NOLA.COM, https://www.nola.com/news/business/article_b12870b8-db43-11eb-9f98-2bb2436f9e7d.html [https://perma.cc/D5J T-FAUF] (last updated July 2, 2021, 10:05 AM).

40. *Id.*

agricultural land with industrial taxes, while solar developers continue to assertively and fearlessly move in on Louisiana's solar potential.[41]

Several solar energy investors seek economic incentives, such as property tax abatements for manufacturing renewable power and jobs under Louisiana's Industrial Tax Exemption Program ("ITEP").[42] Louisiana's Board of Commerce and Industry ("LBCI") approved all solar farm projects for economic incentives under the ITEP until the summer of 2021, when the LBCI halted any further voting on economic incentives for solar projects due to the state's lack of solar regulation.[43] However, the LBCI later decided to continue "approv[ing] contracts to be reviewed at the local level for 10-year tax breaks."[44] This decision resulted in solar company Bayou Galion Solar Project, LLC ("Bayou Galion") successfully receiving economic incentive approval for its $98 million dollar solar farm project in Morehouse Parish.[45] Under the ITEP, Bayou Galion estimates over $1.1 million dollars in tax savings in the first year (of ten) in exchange for the new contracting and construction jobs the Morehouse Parish solar project creates.[46] With Entergy at the forefront of Louisiana's solar energy movement due to purchasing "electricity through long-term contracts with companies that are building and operating solar farms," the race for solar project bidding in Louisiana is on.[47]

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41. *Id.*

42. For information on tax abatement programs, see Amy Fontinelle, *Taking Advantage of Property Tax Abatement Programs*, INVESTOPEDIA, https://www.investopedia.com/articles/mortgages-real-estate/12/property-tax-abatement.asp [https://perma.cc/9FKE-PXQ5] (last updated Jan. 31, 2021) ("Tax abatement programs eliminate the amount of property tax owners pay on new construction, rehabilitation, or improvements."); Kristen Mosbrucker, *Louisiana Solar Farms Could See Millions in Incentives. Some Votes Head to Rural Residents.*, THE ADVOCATE (June 28, 2021, 1:26 PM), https://www.theadvocate.com/baton_rouge/news/business/article_5b651314-d83e-11eb-a20e-4326e3e31916.html [https://perma.cc/4NFZ-MRW2].

43. Mosbrucker, *supra* note 42; Mosbrucker, *supra* note 36.

44. Mosbrucker, *supra* note 39.

45. Mosbrucker, *supra* note 36.

46. Wesley Muller, *Louisiana Considers Solar Farm Regulations as Crop Farmers Voice Concerns*, LA. ILLUMINATOR (June 30, 2021, 7:00 AM), https://lailluminator.com/2021/06/30/louisiana-considers-new-solar-farm-regulations-as-crop-farmers-voice-concerns/ [https://perma.cc/7E77-WWKG].

47. Mosbrucker, *supra* note 35.

B. Louisiana's Solar Energy Concerns

With the Biden administration's aggressive goal of a zero-emissions America by 2035, the pressure to stay on top of the green energy movement while planning for the inevitable "brown" aftermath—i.e., solar panels reaching their end-of-life term—is only just beginning.[48] As the solar energy industry moves to Louisiana, "there could be enough solar generated electricity . . . to power 60,000 homes in a state rich with oil and gas and crisscrossed with pipelines."[49] Louisiana's transition from oil and gas to solar energy coincides with the Biden administration's goal of a 100% clean energy economy. However, without proper regulation governing the solar industry in Louisiana, legal issues are inevitable. Even with the solar industry's promising economic opportunities, many individuals and groups remain skeptical due to the lack of regulations and oversight. Most of Louisiana's skepticism stems from farming, land remediation, and tax concerns—all of which citizens raised at the June 2021 public meeting.

Landowners, farmers, and representatives from various organizations voiced their reservations about the state's rapidly-expanding solar industry as it pertains to the environment and agriculture.[50] Jennifer Brown, president of Louisiana's Beekeepers Association, mentioned how the use of chemicals and herbicides in preparation for solar farm installation damages the ground's future viability for farming and decreases biodiversity during and after construction.[51] Jim Simon, general manager of the American Sugar Cane League, expressed his doubts about the solar industry's economic opportunities compared to the agricultural industry in Louisiana: "[o]ne acre of sugar cane supports almost $5,000 of annual economic activity . . . [t]hirty acres of cane supports one local job in our small towns. Does solar do this?"[52] The Louisiana Farm Bureau Federation ("LFBF") stated that even with proper solar decommissioning, the land will permanently lose its crop base status under the USDA program, leaving the next tenant farmer ineligible for growing agronomic

48. *The Biden Plan to Build a Modern, Sustainable Infrastructure and an Equitable Clean Energy Future*, BIDEN HARRIS: DEMOCRATS, https://joebiden.com/clean-energy/ [https://perma.cc/6STT-ZNUA] (last visited Sept. 20, 2022) [hereinafter *The Biden Plan*].

49. Mosbrucker, *supra* note 35.

50. *See generally* SR 182, *supra* note 19.

51. *Id.* at 3; Muller, *supra* note 46.

52. Muller, *supra* note 46.

crops with USDA support.[53] The LFBF also expressed doubts about tenant farmers receiving compensation for losing their farming leases.[54] Conversely, Jeff Clark, president of Advanced Power Alliance, testified that the solar industry would allow farmers to remain on the land and diversify their income under a dual solar and farming arrangement.[55]

In addition to environmental and agricultural apprehensions, individuals—in their capacity as private landowners and/or farmers—raised their own misgivings about solar energy in Louisiana. Several individuals protested solar project incentives and questioned whether solar projects constitute manufacturing,[56] since eligibility for the ITEP's tax breaks only applies to manufacturers committed to creating jobs and payroll in that state.[57] Upfront, solar project proposals create hundreds of construction jobs; however, only a small number of jobs remain after project completion.[58] A West Baton Rouge Parish sugarcane and soybean farmer stressed the need to step back and work on implementing rules rather than continuing to approve and incentivize solar development without adequate regulation.[59] Conversely, a Louisiana Landowners Association representative argued that landowners with tracts suitable for solar projects are sufficiently sophisticated and competent to use their land as they wish.[60] Nonetheless, without proper regulation, landowners and farmers face potential land remediation complications in the future. For example, if a solar company goes bankrupt before decommissioning its solar farm, the abandoned farm eventually becomes an eyesore, environmental hazard, and somebody else's expensive clean-up project.

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53. SR 182, *supra* note 19, at 6 (agronomic crops are staple food groups, such as soybean, corn, rice, etc).

54. *Id.*

55. Muller, *supra* note 46 ("It is unclear whether this statement pertains to land owning farmers or tenant farmers. However, Clark explained that using the land for purposes besides crop production diversifies the farmers' income and allows for a "predictable source of revenue from renewables.").

56. Mosbrucker, *supra* note 42.

57. LA. ECON. DEV., *Industrial Tax Exemption Program*, OPPORTUNITY LA., https://www.opportunitylouisiana.com/business-incentives/industrial-tax-exemption [https://perma.cc/XA2F-MP3X] (last visited Sept. 20, 20221).

58. Mosbrucker, *supra* note 39.

59. Mosbrucker, *supra* note 42.

60. SR 182, *supra* note 19, at 4.

C. Act No. 301

After collecting various perspectives and concerns at the June 2021 public meeting, Louisiana enacted Act No. 301 on August 1, 2021.[61] The Act amends and reenacts Louisiana Revised Statute section 30:1154(A), (C), providing for regulation over solar devices and solar leases.[62] Most importantly, the Act grants the Secretary the authority and duty to create regulations for solar leasing and decommissioning.[63] Unfortunately, the Act only briefly mentions solar panel decommissioning as something to include in the "minimum requirements for property leases for the exploration, development, and production of solar energy."[64] This short reference to decommissioning offers landowners and solar developers zero guidance on end-of-life obligations for solar panels. Since the Act became effective August 1, 2021, the Secretary already falls behind on the regulatory timeline, given the solar industry's rapid integration into Louisiana.[65]

The Secretary intends to host additional public meetings before offering official regulations. Until such regulations are promulgated, the Louisiana legislature, parish governments, and interested parties are encouraged to reference the June 2021 public meeting report for guidance on the solar industry.[66] However, reading the Act and report together fails to resolve the concerns raised at the June 2021 public meeting, including land remediation issues associated with solar decommissioning. At most, the report provides surface level solutions for legitimate concerns, while the Act only authorizes the creation of solar regulations. Reviewing Louisiana's decommissioning failures and accomplishments in the oil and gas industry, as well as studying successful solar industry regulations in other states, highlight pitfalls to avoid and provides Louisiana with a foundation for its own solar regulations.

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61. Act No. 301, 2021 Leg., Reg. Sess. (La. 2021); (amended and reenacted as LA. REV. STAT. § 30:1154(A), (C) relative to solar energy).

62. *Id.*

63. *Id.*

64. *Id.*

65. *Id.*

66. SR 182 *supra* note 19, at 24.

II. ANALYSIS

A. Decommissioning in Louisiana's Oil and Gas Industry

As Louisiana continues familiarizing itself with the solar industry, the state understands the general concept and process of decommissioning, given its history with the oil and gas industry. Decommissioning in the oil and gas industry begins "when a field production cycle comes to an end and all the usable fuel has been processed."[67] Once production ends, the facility is deconstructed, and the surrounding land returns to its previous, or natural, condition.[68] Much like the solar industry in the state today, Louisiana struggled to regulate the oil and gas industry at first. The Louisiana Department of Conservation regulated the exploration activities in the state to the best of its ability; however, "the pace and scale of [exploration and production] . . . far exceeded the ability of the regulators to control pollution."[69] The search to exploit land rich with minerals resulted in a self-regulated industry that afforded little attention to the environment and land remediation following production.[70] Once landowners realized the extent of damage caused by the exploration and production on their lands decades later, a plethora of so-called "legacy lawsuits" ensued.[71] Louisiana reacted to these detrimental effects of self-regulation on the environment with more legislation.

In 1975, the Louisiana Legislature enacted the Louisiana Mineral Code ("LMC"), followed by the Louisiana Surface Mining and Reclamation Act ("LSMRA") in 1976. The LMC "developed jurisprudentially over the years by the courts analogizing situations arising in mineral transactions with specific situations covered in the Civil Code."[72] The LMC governs all minerals naturally produced in the state.[73]

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67. *Everything You Need to Know About Offshore Decommissioning*, NES FIRCROFT (July 3, 2019), https://www.nesfircroft.com/blog/2019/07/everything-you-need-to-know-about-offshore-decommissioning [https://perma.cc/4GUA-HMKR].

68. *Id.*

69. Jason P. Theriot, *Oilfield Battleground: Louisiana's Legacy Lawsuits in Historical Perspective*, 57 LA. HIST.: THE J. OF LA. HIST. ASS'N, 403, 405 (2016).

70. *Id.* at 404–05.

71. *Id.* at 404.

72. Charles G. Blaize, Jr., *The Louisiana Mineral Code*, LORMAN (Oct. 2, 2018), https://www.lorman.com/resources/the-louisiana-mineral-code-17351 [https://perma .cc/5478-ELWT].

73. *See* Paul D. Spillers, *Basic Mineral Law for Forest Landowners*, L. OFFS. OF THEUS, GRISHAM, DAVIS, & LEIGH, (Mar. 1, 2016), https://www.theuslaw .com/basic-mineral-law-for-louisiana-landowners/ [https://perma.cc/9FXN-F324].

The LSMRA regulates all surface coal mining production and its subsequent reclamation operation within the state.[74] Both authorities provide guidance on decommissioning regulations, land remediation, and lease agreements that apply to the solar industry.

Lease agreements represent the relationship between landowners and exploration and production operators by describing the duties, rights, and expectations of each party for the duration of the agreement.[75] The LMC provides lessees with the obligation to act as reasonably prudent operators, which Louisiana courts interpret to include surface restoration—even when the contract is silent as to restoration procedures.[76] The lessee's duty to restore the land to its previous condition is an economic balancing process,[77] applying "the standard of reasonableness [while] 'balanc[ing] the cost of perfect restoration against the value of the use to which the land is being put.'"[78] As landowners flooded Louisiana courts with legacy lawsuits in the decades following oil and gas operations on their lands, the courts applied the economic balancing process to determine the damages awarded to landowners.

In 2003, the Louisiana Supreme Court awarded millions of dollars in damages to a private landowner for past oil and gas activities in *Corbello v. Iowa Productionl*.[79] Cases like *Corbello*—granting landowners significant awards for damage to their land—led the Louisiana Legislature to enact Act 312 in 2006.[80] Act 312 limited landowners to use their court-

74. LA. REV. STAT. § 30:902(I) (2022).

75. "Exploration and production" shall refer to the oil and gas industry, surface mining industry, and other areas of the energy industry that entail perforating the earth for natural energy resources. *See generally* LA. REV. STAT. §§ 30:21, 30:29 (2022).

76. *See* LA. REV. STAT. § 31:122 (comment citing Smith v. Schuster, 66 So. 2d 430 (La. Ct. App. 1953) and LA. CIV. CODE arts. 2719 and 2720 as authority).

77. *Id.* (comment on restoration of surface).

78. Terrebonne Par. Sch. Bd. v. Castex Energy, Inc., 893 So. 2d 789, 797 (citing Rohner v. Austra Oil Exploration Co., 104 So. 2d 253 (La. Ct. App. 1953) (where a landowner sued the oil company for damages to crops destroyed as a result of exploration on property, in addition to damages for reconditioning the land)).

79. Theriot, *supra* note 69, at 406.

80. Kelly B. Becker & Laura S. Brown, *Overturning 8 Years of "Palpable Error," The Louisiana Supreme Court Limits Damages Available to Landowners in Oilfield Legacy Litigation*, LISKOW & LEWIS: THE ENERGY L. BLOG (July 1, 2021), https://www.theenergylawblog.com/2021/07/articles/litigation/appellate/overturning-8-years-of-palpable-error-the-louisiana-supreme-court-limits-damages-available-to-landowners-in-oilfield-legacy-litigation/ [https://perma.cc/YZ47-H

awarded damages to remediate their contaminated property back to current environmental standards.[81] In 2021, the Louisiana Supreme Court clarified that Act 312 does not give landowners the right to excess remediation damages absent a contractual provision stating otherwise.[82] Additionally, the trial court will determine the plan and costs for remediating the land at issue.[83] This clarification strongly encourages landowners to include a decommissioning provision(s) in their land lease agreements with exploration and production companies. Even though courts interpret these land lease agreements to imply the duty of land remediation, expressly including such a provision increases the amount of potential damages awarded to the landowner if the duty is breached.

The LSMRA, enacted in response to the abandoned surface mines throughout Louisiana, requires mine operators to provide a bond and file it with the Commissioner of Conservation (the "Commissioner") before mining operations begin. The bond acts as a prerequisite for a permit. The Commissioner must receive a reclamation bond from the applicant before project approval to ensure the availability of sufficient funds to reclaim the site, should the permittee fail to remediate the site.[84] Acceptance or rejection of an operator's mining permit application lies at the Commissioner's discretion.[85] Additionally, the Commissioner determines the bond amount by evaluating reclamation requirements and possible reclamation obstacles in light of the site's "topography, geology . . . hydrology, and revegetation potential."[86] These factors, along with other details and characteristics of the site, are located in the reclamation plan section of a miner's permit application.[87] The reclamation plan provides the Commissioner with thorough details regarding the land's characteristics, use before and after mining operations, engineering techniques for the mining operations, a timeframe and comprehensive description of each step in the decommissioning process, and other

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LBA] (quoting State v. La. Land & Exploration Co., 2021 La. LEXIS 1488 (La. 2021)).

81. *Id.*

82. State v. La. Land & Exploration Co., 2021 La. LEXIS 1488 (La. 2021) (*see* headnote 12).

83. *Id.*

84. *Reclamation Bonds*, OFF. OF SURFACE MINING RECLAMATION AND ENF'T, https://www.osmre.gov/resources/bonds.shtm [https://perma.cc/LR2E-Z2Q4] (last visited Sept. 20, 2022).

85. LA. REV. STAT. § 30:909(A) (2022).

86. *Id.*

87. *See generally id.* § 30:908 (2022).

important information.[88] While the amount of detail required from surface mining applicants appears aggressive, these regulations protect the environment and landowners from the adverse effects of unremediated energy production projects. Even though exploration and production of the earth's natural resources is far more environmentally invasive than solar farms, the decommissioning regulations and reclamation plan requirements from the LMC and LSMRA can adapt to fit Louisiana's solar industry needs. Thus, the Secretary should consider the LMC and LSMRA's decommissioning regulations and reclamation requirements when creating Louisiana's solar regulations.

B. Solar Decommissioning Regulations in Other States

While various aspects of the oil, gas, and surface mining industries' decommissioning regulations can transfer to the solar industry, evaluating the decommissioning regulations of other states' solar industries provides a better understanding of the gaps in Act No. 301. Given the similarities between Texas and Louisiana as big oil and gas producing states, this section first analyzes Texas's approach to solar decommissioning, followed by New Mexico and New York. All three states have established solar regulations in place and offer creative approaches for resolving solar decommissioning issues.

1. Texas

Texas, like Louisiana, is well acquainted with the oil and gas industry and its accompanying regulations. However, the structural and material differences between solar energy collection and mineral extraction made it difficult for the Texas Legislature to pass effective laws for solar regulation in a state dominated by the oil and gas industry. For example, solar farms require 10 times the amount of materials and up to 100 times the amount of land compared to hydrocarbon equipment producing the same energy output.[89] Convincing a state that thrives on the oil and gas industry to welcome a form of energy requiring significantly more material and land proved to be challenging.

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88. *Id.* § 30:908(A) (2022).

89. Tyler Corder, *Neglecting Decommissioning Standards Risks Undoing Green Energy Process*, TEX. PUB. POL'Y FOUND. (Mar. 2, 2021), https://www.texaspolicy.com/neglecting-decommissioning-standards-risks-undoing-green-energy-progress/ [https://perma.cc/QH9C-9MSZ].

Prior to the state's current solar regulations, the Texas Legislature proposed bills banning or limiting tax incentives for solar development,[90] complicating the process of connecting solar farms to local power grids.[91] Senate Bill 1610 required landowners with new solar facilities to "enter into a decommissioning agreement with the county."[92] Until then, a local government or school district could not grant any tax breaks to the landowner, and the Public Utility Commission could not authorize the solar farm's connection to the transmission grid.[93] However, limiting a landowner's ability to receive tax breaks only punishes the landowner, not the solar developer. Senate Bill 829 and House Bill 2372 aimed to prevent solar companies from "sit[ting] on land and get[ting] tax breaks for it," and make room for non-solar energy companies to compete in Texas's energy industry.[94] Texans in favor of these bills described them as "pro-taxpayer and pro-environment piece[s] of legislation," since they removed unfair incentives for the solar industry and required solar operators to restore the land at the end of the project's life.[95] These bills ultimately failed as the struggle to pass favorable legislation on solar energy in an oil and gas producing state continued. In February 2021, Texans labeled solar energy as outright unreliable after Winter Storm Uri left thousands powerless.[96]

Finally, on June 14, 2021, Texas successfully passed legislation regulating solar decommissioning: Senate Bill 760 ("SB 760"), effective

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90. Joshua Pierce, *Legislators Seek to End Subsidies for Unreliable Energy*, TEX. SCORECARD (Mar. 1, 2021), https://texasscorecard.com/state/legislators-seek-to-end-subsidies-for-unreliable-energy/ [https://perma.cc/AZ2N-8P88].

91. Carine Martinez, *SB 1610 No Waste Left Behind: Decommissioning Solar Power Facilities*, TEX. PUB. POL'Y FOUND. (Mar. 2019), https://www.texaspolicy.com/wp-content/uploads/2019/03/2019-03-BA-Martinez-ACEE-SB-1610.pdf [https://perma.cc/6VVV-9VW3].

92. *Id.*

93. *Id.*

94. Pierce, *supra* note 90.

95. *Id.*

96. The storm, infamously known as Winter Storm Uri 2021, left thousands of Texans without power for nearly a week. Approximately 90% of the state's population relies on the Electric Reliability Council of Texas (ERCOT) for electricity services. ERCOT relies on power generation companies to provide for its customers. ERCOT's energy comes from a variety of sources including natural gas, wind, coal, nuclear, and solar. *See* Jess Donald, *Winter Storm Uri 2021*, COMPTROLLER.TEXAS.GOV (Oct. 2021), https://comptroller.texas.gov/economy/fiscal-notes/2021/oct/winter-storm-impact.php [https://perma.cc/X32C-6EPU].

September 1, 2021.[97] Under SB 760, lease agreements between landowners and solar companies vest the grantee (i.e., the solar company) with the responsibility of removing its solar farm.[98] The grantee must provide the landowner with proof of financial assurance at least equal to the estimated costs for decommissioning and land restoration at the time of the agreement.[99] In addition to requiring financial assurance, SB 760 requires the lease agreement to include specific restoration obligations for the grantee.[100] However, to trigger the grantee's obligation to clean, clear, and remove rocks and roads, the landowner must *reasonably request* such restoration no later than 180 days following the end of commercial level energy production or the landowner's receipt of the grantee's written notice of intent to decommission.[101]

Texas's successful legislation reflects a few requirements mentioned in the LMC and LSMRA, as discussed above. Specifically, SB 760's requirement for financial assurance and decommissioning obligation provisions in the lease agreement parallels the LSMRA's reclamation bond and detailed land reclamation plan prerequisites.[102] Interestingly, the solar industry in Texas owes the success of SB 760 to the state's wind energy regulations passed in 2019.[103]

2. New Mexico

While Texas struggled to balance sustainable energy legislation with an oil and gas driven economy, it was not the only state that found a creative way to regulate solar energy. Congress granted new states entering the Union trust lands, which support essential public institutions

97. *Bill: SB 760*, TEX. LEG. ONLINE, https://capitol.texas.gov/BillLookup/History.aspx?LegSess=87R&Bill=SB760 [https://perma.cc/7N2F-AKJ4] (last visited Sept. 20, 2022).

98. *Id.*

99. TEX. UTIL. CODE § 302.0001-0005 (2021).

100. Jennifer Pier et al., *Texas Legislature Expands Decommissioning Requirements to Solar Power Facility Agreements with Enactment of SB 760*, HUSCH BLACKWELL: EMERGING ENERGY INSIGHTS (Aug. 24, 2021), https://www.emergingenergyinsights.com/2021/08/texas-legislature-expands-decommissioning-requirements-to-solar-power-facility-agreements-with-enactment-of-sb-760/ [https://perma. cc/67U5-7J4K] (the new law requires the lease agreement to provide for, as the grantee's responsibility, the clearing, cleaning, and removal of all solar energy devices, transformers, substations, overhead lines, foundations, buried cables, roads, and rocks). *Id.*

101. *Id.*

102. *Id.*; s*ee generally* LA. REV. STAT. § 30:909 (2022).

103. Pier et al., *supra* note 100.

(the beneficiaries) such as schools, universities, and hospitals.[104] Similarly, New Mexico affords solar energy companies the opportunity to lease its state trust lands to the benefit of the trusts' beneficiaries.[105] Making these lands available for solar energy allows New Mexico to act in both public and private capacities through the Commissioner of Public Lands (the "Commissioner").[106] Interested solar companies must apply for a business lease,[107] subject to Rule 9 of the New Mexico Administrative Code ("NMAC"), and receive the Commissioner's approval.[108] New Mexico's approach decreases the potential for land disputes while supporting communities and taxpayers. The NMAC provides straightforward instructions regarding business leases, improvements and removals on the leased land, and land restoration procedures.

With approximately "nine million acres of land available for lease to renewable energy companies," the New Mexico State Land Office makes it easy for solar companies to apply for a business lease.[109] Interested parties must provide a legal description of at least forty acres of the prospective state trust land for the solar farm.[110] The Commissioner may require conditions in the lease agreement including restrictions on the land's use, obtaining local government approval prior to development, and provisions regarding a secure return of the land to the trust.[111] Unless the Commissioner provides otherwise, rent shall be paid in advance through annual installments, ensuring the lessee's financial stability and reserving the Commissioner's right of first lien on the property and/or its improvements in the event the lessee fails to pay.[112] Ultimately, all aspects of the business lease agreements between solar companies and the

104. Susan Colp & Joe Marlow, *Conserving State Trust Lands: Strategies for the Intermountain West*, LINCOLN INST. OF LAND POL'Y (2015), https://www.lincolninst.edu/sites/default/files/pubfiles/conserving-state-trust-lands-full.pdf [https://perma.cc/4EZ9-RXFG]; OFF. OF RENEWABLE ENERGY, *Renewable Energy*, N.M. STATE LAND OFF., https://www.nmstatelands.org/divisions/commercial-resources/renewable-energy/ [https://perma.cc/PY28-9ARY] (last visited Sept. 20, 2022).

105. OFF. OF RENEWABLE ENERGY, *supra* note 104.

106. N.M. CODE R. § 19.2.2.1 (2022).

107. A business lease for purposes of this Comment means "a written lease of trust lands issued under . . . 19.2.9 NMAC . . . for surface uses that are not otherwise provided for under other state land office rules." N.M. CODE R. § 19.2.9.7(E).

108. *Id.* § 19.2.9.9(A) (2022).

109. OFF. OF RENEWABLE ENERGY, *supra* note 104.

110. N.M. CODE R. § 19.2.9.12(A)(1) (2022).

111. *Id.* § 19.2.9.12(A)(1), (C) (2022).

112. *Id.* § 19.2.9.12(E) (2022).

Commissioner lie at the Commissioner's discretion. By structuring its lease agreements this way, New Mexico puts the interests of its state trust land—and its beneficiaries—first.

The Commissioner also oversees the commissioning and decommissioning of solar farms on state trust lands. The NMAC's language suggests there is little tolerance for abandoned or improperly decommissioned solar farms on state trust lands.[113] For example, provisions governing the removal of improvements require solar farm operators to remove the solar structure from the land at the end of the lease.[114] Failure to comply with these provisions results in the solar farm "remain[ing] the property and liability of the [operator] and shall constitute a nuisance until removed or abandoned."[115] Furthermore, the Commissioner reserves the right to decommission the solar panels and subject the operator to the decommissioning costs while also holding the operator solely liable for the land's restoration—an obligation which survives the termination of the business lease.[116] To prevent incomplete or no decommissioning, the Commissioner may require the solar lessee to provide a bond certifying the lessee's ability to pay for all decommissioning and land restoration costs prior to approving the business lease agreement.[117]

Requiring a solar company to provide financial assurance before finalizing the business lease agreement guarantees that payment for land remediation will not fall on the community and taxpayers, should the solar company become financially unstable. However, in the event of solar farm abandonment, the NMAC establishes a State Trust Lands Restoration and Remediation Fund ("Remediation Fund").[118] The Remediation Fund collects one percent of the money received from leases or projects on New Mexico's state trust lands.[119] Therefore, if a solar farm operator fails to timely fulfill his post-lease obligations, the Remediation Fund will pay the restoration costs while the Commissioner works to recover the amount owed by the liable lessee.[120]

The Remediation Fund ultimately works to preserve state trust land when a lessee neglects his duty to pay for land remediation, cannot afford

113. *See generally id.* § 19.2.9.16-17 (2022).
114. *Id.* § 19.2.9.7(A) (2022).
115. *Id.* § 19.2.9.17(A)(3) (2001).
116. *Id.* § 19.2.9.17(A)(3), (B) (2022).
117. *Id.* § 19.2.9.16 (2022).
118. *Id.* § 19.2.23 (2022).
119. *Id.*
120. *Id.* § 19.1.11(B)–(C) (2001).

to pay for land remediation, or abandons the site altogether.[121] This benefits communities surrounding the leased state trust land in two ways. First, it prevents solar farms from becoming long-term eyesores or environmental hazards since the Remediation Fund covers the clean-up costs as the Commissioner works to recover those costs from the liable lessee. Second, it eliminates the burden on taxpayers or local communities of paying the restoration costs. As a result of New Mexico's creative approach for regulating and incorporating solar energy, the state ranks "second in the nation for potential solar-generated electric power production."[122]

3. New York

Local governments throughout the northeast United States require solar facility developers to have a decommissioning plan in place before moving forward with a solar project.[123] New York proactively educates individuals, businesses, and local governments interested in the solar industry through its *New York State Solar Guidebook*, which covers basic aspects of the solar industry.[124] The guidebook provides "information, tools, and step-by-step instructions for local governments managing solar energy in their communities."[125]

Offering educational resources on solar energy to individuals and businesses interested in the industry is an effective way to prevent issues that may accompany the construction, facilitation, and decommissioning of a solar farm. In fact, New York's guidebook features an entire chapter on solar farm decommissioning, ranging from abandonment rules to estimated removal costs.[126] The decommissioning section provides suggestions and requirements for solar system decommissioning by the three solar system tiers. Tiers 1 and 2 consists of relatively small solar systems typically located at private residences or on building rooftops. The guidebook encourages decommissioning plans for Tiers 1 and 2 but

121. *See generally id.* § 19.2.23 (2022).
122. OFF. OF RENEWABLE ENERGY, *supra* note 104.
123. Ludt, *supra* note 25.
124. *See generally* N.Y. STATE, *New York State Solar Guidebook*, NYSERDA, https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Siting/Solar-Guidebook [https://perma.cc/LNU4-PSLB] (last visited Sept. 20, 2022).
125. *Id.*
126. Ludt, *supra* note 25.

suggests requiring decommissioning plans for Tier 3 solar systems, which include utility-scale solar farms.[127]

Similar to Texas and New Mexico, New York urges landowners to require proof of financial assurance and include a decommissioning provision in land lease agreements before finalizing anything with solar companies. A decommissioning provision in a land lease agreement is essential for assuring land remediation after the solar facility reaches the end of its life. The guidebook provides examples of decommissioning provision language, such as requiring the "solar project developer to remove all equipment and restore the land to its original condition after the end of the contract, or after generation drops below a certain level."[128] The more specific the provision, the easier it will be to enforce. The guidebook also mentions buyout options, which would allow the landowner to continue using the solar equipment to generate electricity for himself.[129] Most importantly, the guidebook stipulates the need for decommissioning clauses to address the possibility of abandonment and non-compliance.[130]

To prevent non-compliance or abandonment and ensure land remediation after solar operations end, the guidebook offers numerous financial assurance mechanisms a landowner may require a solar company to provide. Initially, the guidebook suggests a decommissioning trust or escrow account, which entails a solar developer creating a "cash account or trust fund for decommissioning purposes."[131] The developer would make deposits into the account until it reaches the estimated decommissioning costs.[132] The landowner, or third party, would oversee account management with payment terms included in the lease agreement.[133] While this financial assurance provides the landowner with

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127. A Tier 1 solar facility includes solar panels mounted on roofs and/or integrated onto buildings. Tier 2 solar facilities can be either

> a ground-mounted solar system (i) with a system capacity up to 25 kW AC that generates no more than 110% of the electricity consumed on the site over the previous 12 months, or (ii) with a total surface area of all solar panels on the lot of up to 4,000 square feet that generate up to 110% of the electricity consumed on the site over the previous 12 months. Tier 3 solar systems are all solar systems not included in Tier 1 or 2.

N.Y. STATE, *supra* note 124, at 170.

128. *Id.* at 163.

129. *Id.*

130. *Id.*

131. *Id.*

132. *Id.*

133. *Id.*

account management, the fact that the decommissioning funds do not exist at the outset of the land lease agreement presents a major drawback.

To ensure that a solar developer finances decommissioning and land restoration, a landowner should require a more secure form of financial assurance, such as removal or surety bonds. Bonds are a form of security that would guarantee fund availability for solar system removal.[134] However, in order for the landowner to have guaranteed payment for decommission, he must make sure the bond equals the estimated decommissioning and land remediation costs and "remain[s] valid until the decommissioning obligations [are] met."[135] Landowners should remain wary of issues or complications arising during the solar facility's construction or operation that may affect decommissioning and reclamation costs, which would require an updated bond amount.[136]

Another financial assurance mechanism the guidebook suggests is a letter of credit.[137] A letter of credit is a document issued by a bank that guarantees payment, subject to certain conditions, up to a specified amount.[138] The document must "clearly state the conditions for payment, supporting documentation landowners must provide, and an expiration date."[139] Until the completion of all decommissioning obligations, the letter of credit must be regularly updated or replaced in order to stay current.[140] Though letters of credit require more attention than removal or surety bonds, they offer a sound source of financial security backed by a bank. Therefore, if a solar developer fails to remove a solar system, the landowner can claim up to the specified amount on the letter of credit to cover decommissioning and remediation costs.[141] While these financial assurances are only suggestions, requiring solar developers to provide some form of financial assurance before project development begins holds developers responsible for the aftermath of their endeavors.

Other sections in the guidebook, such as the chapter on "Model Solar Energy Local Law," provide sample forms and provisional language as a resource for anyone working with solar companies, investors, operators, or on solar regulations.[142] Currently, the New York State Senate is working to pass Senate Bill S5447, known as the Solar Panel Collection Act

134. *Id.*
135. *Id.*
136. *Id.*
137. *Id.*
138. *Id.*
139. *Id.*
140. *Id.*
141. *Id.*
142. *Id.* at 170.

("SPCA"), which would oversee and regulate solar decommissioning in New York to prevent environmental consequences from improper decommissioning.[143] The SPCA requires solar panel manufacturers to follow a cradle-to-grave approach in order to do business in New York.[144] Presently, the bill awaits approval in the Environmental Conservation Senate Committee.[145] If the SPCA passes, opportunities for development on the other side of the solar industry will open up.[146] That is, requiring solar manufacturers to follow a cradle-to-grave approach creates a need for the development of collection and recycling operations for inoperable solar facilities.[147] Not only does this provide more job opportunities, but it mandates the proper recycling of solar panels. New York's work on the SPCA and the *New York State Solar Guidebook* represents a significant step towards keeping green energy as green as possible—even when it turns brown.

III. SOLUTION

Much like Texas, Louisiana is experiencing some difficulty with the initial regulation of its solar industry. However, unlike Texas, Louisiana has yet to implement any solar energy regulations. Therefore, the Secretary should consider the creative ways other states regulate their solar industry, as well as making his own. Whereas Texas drew influence from

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143. Gene Kelly, *State Legislature Considers Regulations for Decommissioned Solar Panels*, JD SUPRA (Aug. 7, 2019), https://www.jdsupra.com/legalnews/state-legislature-considers-regulations-17053/ [https://perma.cc/3TJJ-5 XSY].

144. A cradle-to-grave approach requires generators of hazardous waste—in this case, the solar panel manufacturers—to be liable for the proper handling of the waste at every stage of the management process. For solar panel manufacturers, this includes the creation of the solar panels, transportation of the solar panels to their facility site, treatment and upkeep of the solar panels during their lifetime, decommissioning/removal of the solar panels, and their proper disposal. *See What Is a Cradle-to-Grave Analysis?*, KIWI ENERGY (Aug. 19, 2020), https://kiwienergy.us/what-is-a-cradle-to-grave-analysis/ [https://perma.cc/Z3N V-X2ZA]; Kelly, *supra* note 143.

145. Thomas F. O'Mara, *Senate Bill S5477*, THE NY STATE SENATE, https://www.nysenate.gov/legislation/bills/2021/S5447 [https://perma.cc/64DW-JWBV] (last visited Sept. 20, 2022).

146. The "other side" of the solar industry involves recycling and disposing of decommissioned solar systems. Opportunities on the back end of the solar industry include opening up recycling centers—which in turn provides even more jobs.

147. Kelly, *supra* note 143.

its wind energy regulation, Louisiana's solar regulations should borrow concepts from the LMC and LSMRA, specifically as it pertains to land remediation plans, expenses, solar facility engineering, applications for solar construction requiring approval, and more. Should the Secretary struggle with organizing, structuring, or creating regulation, New York's guidebook provides an exhaustive checklist for decommissioning plans.[148] To avoid solar farm abandonment, the Secretary can adopt New Mexico's emergency land remediation fund to shield landowners from solar companies failing to perform their project's end-of-life obligations.

A. Financial Assurance Requirements

Because the greatest issue following the end of almost any energy source's lifetime involves its removal, financial assurance requirements ("FARs") should be at the forefront of the Secretary's agenda in drafting solar energy regulations pursuant to Act No. 301. As seen in the oil and gas industry, "end-of-life obligations to be completed in the future, sometimes decades after being imposed, exposes society and the environment to the risk of the operator becoming bankrupt in the interim or simply not having the financial capacity or inclination to undertake the works when required."[149] Thus, Louisiana's solar regulations should require developers to provide proof of financial security prior to a state or local authority approving a solar project. This ensures decommissioning and land remediation fund availability, regardless of the operator's financial position at the end of the solar facility's life.

Requiring financial assurance coincides with the Biden administration's green agenda. FARs implement safeguards that hold solar developers accountable for facility decommissioning.[150] As mentioned above, contractors and landowners often fail to sufficiently consider the particulars following the end of energy production. The devastating effects of surface mining and mineral exploration on Louisiana's environment

148. N.Y. STATE, *supra* note 124, at 164.

149. Colin Mackie & Laurel Besco, *Rethinking the Function of Financial Assurance for End-of-Life Obligations*, 50 ENV'T L. REP. 10573, 10574 (July 2020).

150. The Biden administration's green agenda plans to achieve a net-zero emissions economy by 2050, which is fifteen years later than the administration's initial goal of a net-zero emissions economy advertised in September 2021. *See The Biden Plan, supra* note 48; *see also* Corder, *supra* note 89.

decades after production illustrate why this is a harmful mistake.[151] Requiring solar developers to produce some form of financial assurance *before* authorizing any solar project protects landowners from finding a rotting solar farm on their land with no funds for removal.

The best method for ensuring the success of this solution follows the surface mining application procedures of the LSMRA. Essentially, the Secretary's solar regulations would require solar developers to submit a detailed plan for solar development, operation, decommissioning, and land remediation. Upon review, the Secretary uses his discretion to either reject the application for solar development or determine the base amount of the developer's financial assurance. Following the LSMRA's considerations for reaching a dollar amount, the Secretary should examine the land's topography, geology, hydrology, and revegetation potential—all of which the solar developer must provide during the application process.

The Secretary also benefits from the oil and gas industry's jurisprudential development in Louisiana. While the court applied an economic balancing test to determine damages owed to landowners for land reclamation, the Secretary can apply the same test in configuring the minimum financial assurance amount for solar developers. The only drawback this approach may present is that it requires landowners to know what the land will be used for after the solar farm's removal. Alternatively, solar lease agreements could include a default land use presumption for unsure landowners. Nevertheless, the court's economic balancing test can still apply in litigation, should the financial assurance amount be insufficient for unforeseen reasons.

Whether the FAR is a performance, reclamation, surety, or removal bond, trust instrument, cash escrow, etc., the likelihood of landowners bringing land disputes to court—as seen with the oil and gas legacy suits—decreases. If a solar company becomes bankrupt or insolvent at any point, the FAR provided to the landowner at the outset of the solar project will cover decommissioning and land remediation costs. Additionally, requiring financial security reminds involved parties of the need to include a decommissioning provision in the land lease agreement. Even though courts often interpret land lease agreements to imply land remediation obligations, the absence of a decommissioning and land remediation provision can likely be supplemented by the developer's financial assurance obtained at the outset of the project.

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151. Note, however, that the environmental consequences of surface mining and mineral exploration were not well known following the end of a well's lifetime.

Mandating solar developers to provide financial security prior to project approval eliminates many of the issues raised at the June 2021 public meeting, including effects on property value, abandoned solar facilities, bankrupt solar companies, etc. However, some fear FARs will dissuade solar developers from coming to Louisiana, since FARs require solar companies to pay a large sum of money up front for the clean-up of a project that has yet to produce energy and make money. While a valid concern, it should not discourage the Secretary from requiring solar developers to provide financial assurance. Most states implementing solar energy require some form of financial security before development starts. Alternative sources of energy production also require financial assurances for project decommissioning and land remediation following the end of production, as seen above with the LSMRA and LMC. Therefore, Louisiana's solar regulations should require solar companies to deliver a detailed application for their solar development to the Secretary, and, if approved, provide financial assurance of no less than the amount stipulated by the Secretary or other appropriate authority.

To further dispel concerns relating to FARs and land remediation, the Secretary should consider following New Mexico's approach and create an emergency land remediation fund. Louisiana can do this by solar leasing its own state trust lands—like New Mexico—or by establishing a small state tax on solar developers operating on privately owned land. All proceeds from this tax would be allocated to the emergency land remediation fund for use in case of decommissioning complications or FAR failure. With FARs implemented and enforced in Louisiana's solar regulations, decommissioning complications pertaining to funding are unlikely to occur. If an issue with decommissioning surfaces, the state can intervene and use the emergency remediation funds to remove the solar system and restore the land until the issue gets resolved. Emergency land remediation funds should not function to replace FARs but instead to operate as a temporary solution in order to prevent toxins from inoperative solar systems leaking into the ground.

B. Reducing, Reusing, and Recycling Solar Panels

While concerns regarding the disposal of solar panels were not raised at the June 2021 public meeting, federal and state governments understand the need to instruct, regulate, and encourage proper disposal of solar panel materials. Louisiana's solar regulations should provide instructions regarding solar panel waste to avoid potential environmental harm. Solar panels not only introduce dangerous toxins into the ground if improperly disposed of but also contain profitable rare metals and recyclable

materials.[152] Unfortunately, the composition of a solar panel makes recycling a difficult and expensive task.[153] Good recycling behavior and proper disposal of solar materials will likely require encouragement through incentives such as tax credits or rebates. Should these incentives prove successful, everyone benefits: recyclers earn money, solar panels avoid landfills, and rare metals are repurposed.[154] Additionally, imposing statutory damages for failure to properly dispose of solar panels further prevents environmental harm while simultaneously encouraging recycling.

Actors exclusively in the business of removing solar systems often line up prospective buyers to purchase used solar panels before permanently disposing of them.[155] A solar removal contractor in New York explained that once the metal components of the solar arrays are scrapped, "the panels are often sold to do-it-yourselfers, rural farmers, or customers in countries like Kenya and the Dominican Republic who attach the used panels to battery-units and power water pumps and homes."[156] Because many solar companies prefer not paying up front for the last phase of a solar project, companies may be more inclined to abide by FARs if Louisiana provides certain recycling requirements and incentives for decommissioned solar materials. Therefore, the Secretary of the LDNR should include a provision for solar system disposal and recycling in Louisiana's solar regulations.

Educating prospective solar industry actors—such as operators, landowners, and investors—on the potential profit at the decommissioning stage helps the environment and makes FARs less intimidating.[157] Just as New York offers a guidebook to educate interested parties on the solar

152. McElligott, *supra* note 2, at 495.

153. To properly recycle a solar panel, the recycler must separate the materials comprising the solar panel and recycle each one accordingly. *See* Jacob Marsh, *Solar Panel Recycling: What You Need to Know*, ENERGYSAGE (Sept. 15, 2021), https://news.energysage.com/recycling-solar-panels/ [https://perma.cc/A9UF-ZM9F] ("[T]hey are constructed from many parts all used together in one product.").

154. A study conducted by the International Renewable Agency in 2016 estimated $15 billion worth of rare, expensive metals in solar panels could be recovered by 2050 through recycling. *Id.*

155. Ludt, *supra* note 25.

156. *Id.*

157. One of the main concerns regarding financial assurance requirements is the potential turnoff they pose to solar facility investors. For example, by requiring solar investors to provide a bond worth at least the minimum cost for land remediation, landowners fear solar investors will look to install their solar facilities where FARs are not mandated.

industry, Louisiana would benefit from similar proactive measures. Mechanisms for providing educational resources throughout the state can be as intensive as a 200-page guidebook on solar power or as basic as a simple website. The more Louisiana learns about the advantages and disadvantages of solar energy, the less solar energy will appear as a threat to the state's present industries.

C. Green Energy Can Co-Exist with Green Vegetation

While solar energy seeks to help the environment, many Louisianians fear its potential impact on the agricultural industry. Attendees of the June 2021 public meeting raised concerns about the solar industry outbidding the job opportunities and economic benefits the agricultural industry offers.[158] This concern illustrates one of several misconceptions surrounding the solar industry. Solar does not take away from the agricultural industry's job opportunities and economic benefits; rather, it adds job opportunities and boosts Louisiana's economy. Furthermore, since 2008, studies researching the compatibility of agriculture with solar energy reveal that the two industries can successfully co-exist while benefiting the landowners, farmers, and solar developers.[159] This co-existence combines solar systems—called agrivoltaics—with farming by harnessing the sun twice to create solar energy and grow plants.[160] Agrivoltaics provide a dual benefit to Louisiana farmers: the solar panels shield crops from tropical storms and tenant farmers can continue farming the land. For landowners, agrivoltaics provide self-generating energy, two streams of income, and promote soil health.[161] Encouraging adoption of agrivoltaics can eliminate farmers' fear of losing their land lease agreements to major solar investors, especially since it provides landowners the opportunity to receive two separate sources of income from the same land. For solar developers, agrivoltaics requires far less time spent on preparing the land for solar installation because most farms are

158. SR 182, *supra* note 19, at 3.

159. Emily Folk, *How Solar Energy Can Coincide with Crop and Animal Agriculture*, RENEWABLE ENERGY MAG. (Nov. 19, 2020), https://www.renewableenergymagazine.com/emily-folk/how-solar-energy-can-coincide-with-crop-20201119 [https://perma.cc/2MKY-WLDJ] ("The panels block the wind and limit soil erosion to maintain soil health.").

160. *Agrivoltaics: What Is It and How Does It Work?*, N-SCI TECH. (Dec. 5, 2019), https://nsci.ca/2019/12/05/agrivoltaics-what-is-it-and-how-does-it-work/ [https://perma.cc/QJ9J-DRVF].

161. Folk, *supra* note 159 ("The panels block the wind and limit soil erosion to maintain soil health.").

already on level ground.[162] Solar developers can completely discard the typical approach for preparing land for solar development, which consists of covering the ground with gravel.[163]

Louisiana's solar decommissioning regulations should include agrivoltaics for several reasons. First, it resolves the concern of solar energy taking over the agricultural industry in a creative and adaptive way. Second, Louisiana's characteristically flat landscape and potential for tropical storms makes it a perfect candidate for agrivoltaics, since agrivoltaics can provide shelter to crops that hurricanes and strong storms would otherwise destroy. Third, the push for green energy will only continue to grow; Louisiana, a state known for its fossil fuel industry, has the opportunity to be at the forefront of the solar energy movement. Including agrivoltaics in Louisiana's solar energy regulations eliminates the need to repeat this solar regulation process. Lastly, the less intrusive nature of agrivoltaics suggests that FARs for agrivoltaic facilities will cost significantly less than their traditional large-scale solar facility counterparts. Therefore, agrivoltaics presents a competitive and viable option for Louisiana's solar industry. Agrivoltaics offer a creative solution for the Secretary to consider in Louisiana's solar regulations, in addition to the innovative approaches taken by other states in regulating their solar industry.

CONCLUSION

Although decommissioning is the last phase of a solar project, landowners and solar farm developers must plan for decommissioning at the outset of every solar project. Should a landowner or solar developer fail to do so, the landowner could wind up with an out-of-service solar farm decaying on his land, ruining the soil for future use. To prevent these situations from occurring, states must have proper solar regulations in place for both landowners and solar developers to follow. As bids for solar projects in Louisiana continue to grow, so must the narrow scope of Act No. 301.

Given that investment proposals for solar farm bids in Louisiana currently total in the billions of dollars, the Secretary's regulations must provide guidance and rules to prevent a plethora of abandoned solar farms and solar legacy lawsuits in the future. Implementing solar regulations before more lease agreements are signed and bids are accepted will prevent

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162. *Id.*

163. *Benefits of Agrivoltaics Across the Food-Energy-Water Nexus*, NREL (Sept. 11, 2019), https://www.nrel.gov/news/program/2019/benefits-of-agrivoltaics-across-the-food-energy-water-nexus.html [https://perma.cc/U4D8-6U5W].

a repeat of Louisiana's history with its other energy resources. At a minimum, Louisiana's solar regulations should consider: (i) requirements for lease agreements, including decommissioning directives, end-of-life obligations, and land remediation; (ii) proof of financial assurance prior to project approval; (iii) disposal and recycling guidelines; and (iv) an emergency land remediation fund. Including these basic provisions in Louisiana's solar energy regulations constitutes a fundamental step in providing Louisiana with a green future before, during, and after a solar panel's lifetime.