REPORT TO LOUISIANA SENATE ON

SR NO. 182 OF 2021 PUBLIC MEETING

This report is submitted pursuant to Senate Resolution No. 182 of the 2021 Regular Legislative Session (SR 182). SR 182 requested that the secretary of the Louisiana Department of Natural Resources (LDNR) and the commissioner of the Louisiana Department of Agriculture and Forestry (LDAF) jointly conduct a public meeting not later than July 1, 2021, inviting representatives of specific organizations, associations, and agencies for the purpose of receiving public testimony on issues and concerns related to the development and production of solar energy in the state. Further, the secretary and commissioner are asked to provide guidance addressing the following issues and concerns: (1) the construction and operation of solar installations; (2) the production of solar energy; (3) the impact of solar installations on productive farmland and its long-term effects on the land; (4) mitigation for land preservation; (5) the impact on the value and assessment of the leased property and the surrounding properties; and (6) the impact on agricultural heritage areas. Finally, SR 182 urges and requests the secretary to submit a written report to the Louisiana Senate not later than thirty days after any public meeting authorized by the resolution, with the report including a copy of the minutes of the public meeting and recommendations on legislation needed to address the issues and concerns related to the development of solar energy.

Minutes and Summary of the Public Meeting

A public hearing was held pursuant to S.R. 182 in the LaBelle Room of the LaSalle Building, located at 617 North Third Street, Baton Rouge, Louisiana on June 29, 2021 at 1:30 p.m. Representatives of the following organizations were invited to the meeting: the Police Jury Association of Louisiana, the Louisiana Municipal Association, Louisiana Farm Bureau Federation, the Louisiana Landowners Association, the Louisiana Public Service Commission, the Louisiana Cattleman's Association, the investor-owned utilities, the privately owned utilities, and the Gulf States Renewable Energy Industry Association. In accordance with the Open Meetings Law (R.S. 42:11, et seq.), public notice of the meeting was posted and emailed to parties asking to be notified of the same. At the public meeting everyone present was provided an opportunity to speak or submit written comments. The public meeting was chaired by Jason Lanclos on behalf of the secretary of LDNR. Also present to receive comments or ask questions were: Blake Canfield of LDNR, Todd Parker on behalf of the commissioner of LDAF, Brandon Frey with the Louisiana Public Service Commission, and Senator Beth Mizell. After the meeting was called to order, Jason Lanclos provided a brief welcome, went over the format of the meeting, identified those running the meeting, and informed members of the public how they could request to speak. Next Senator Mizell spoke addressing the purpose behind SR 182, raising some of the concerns and issues associated with solar energy production on which guidance was needed, and thanked the members of the panel and of the public for their time and participation. Then Mr. Frey provided an overview of the role of the Public Service Commission in regulating utilities and how that fits within the process of energy production and distribution. Public comments were then received

from approximately twenty individuals. A summary of these remarks are set forth below. Following public comments, closing remarks were made by Senator Mizell and Mr. Lanclos. The meeting then adjourned. A copy of the transcript of the public meeting with the specific remarks and comments can be provided upon request. Additionally, approximately 27 written comments were received, which are also summarized below.

A summary of comments received at the June 29th public meeting:

- Several commented that they were concerned that solar energy installations may not be properly decommissioned at the end of their operational life;
    - Some commented that the cost of decommissioning may exceed the value of the equipment or of the project, thus leaving abandoned solar equipment on the property and restricting its future use;
    - Several stated that decommissioning plans and some form of financial security (bonds and escrows were specifically mentioned) from solar developers should be required to ensure proper decommissioning;
- Local zoning and land use planning were both cited as necessary, with specific mention being made of spacing, set-backs, and vegetative barriers;
    - Members of local parishes mentioned the need for guidance from those with expertise with solar energy installations;
    - Some members of the public recommended there be a moratorium on new solar installations until appropriate regulations or guidance was in place;
- Several commented on there being a need for statewide requirements for solar energy installations, including a state permit requirement;
    - Some members seemed to disagree as to the nature or breadth of such a program, with different levels of state involvement being discussed;
    - At least one representative of a Parish government asked that the state avoid a one-size fits all policy that would take away each parishes' ability to allow solar energy installations as they felt best met their parish's needs and situation;
    - The Louisiana Farm Bureau Federation recommended slowing the situation down regarding solar development in order to first put some best practices into place for the industry itself and to help put some guidelines into place for landowners
    - Representatives of some solar developers stated that they support reasonable regulations and guidance;
- The size of solar energy installations caused concern for some;
    - Several members feared that solar energy installations will take too much acreage currently used for ranching or farming out of commerce;
    - A specific concern was raised that if too much acreage currently used for sugar farming were taken out of particular geographically proximate areas, then the sugar mill serving those areas may face financial ruin;

    - It was noted that less than 25% of land being farmed for sugar cane was owned by farmers and that for many farmers the loss of acreage can upset the current balance and thus shutter their business;
    - One rancher noted that 500 acres for a solar energy installation, could account for approximately 13,500,000 meals if it were instead used for cattle ranching;
    - One farmer mentioned that leasing his property for a solar energy installation provided the best opportunity to keep using the remainder of his property for dairy farming, which has not survived throughout most of Louisiana;
- Several commented that the jobs and economic benefits for a local area associated with farmland far exceeded the jobs and economic benefits associated with solar energy installations;
    - It was stated that 1 acre of sugar cane supports approx. $5,000 in annual economic activity for the rural community & 30 acres of sugar cane supports 1 local job – "solar doesn't do this;"
    - It was stated that regulators should understand the long-term effects of providing any kind of tax relief or financial incentives to industrial solar projects;
    - One person mentioned that solar energy installation would provide much needed taxes for parish and local governments;
    - One person mentioned that solar energy is one part of decarbonizing the oil & gas and petro-chemical industries so that they can sell products across the globe and retain or increase employment in the state;
- There were several comments concerned with negative environmental impacts or threats to human health from solar energy installations;
    - Several people mentioned concerns with the use of herbicides and other chemicals to kill vegetation around the solar panels and their potential impacts on ground and surface waters or on the future viability of the property for farming;
    - At least one person raised concerns with the heavy metals used in constructing solar panels and whether they might pose a risk to public health and the environment;
    - One person raised concerns with solar energy systems putting off electromagnetic rays that could negatively impact human health;
- Some commenters raised concerns about large solar energy installations negatively impacting plants and wildlife;
    - One person raised concerns that large solar energy installations may block movement of larger wildlife if not constructed properly;
    - One person raised concerns that large solar projects could destroy pollinators, most especially bees, by destroying the plants that they need to survive; when combined with the decrease of the honey bee colonies throughout the country this could have a devastating effect not only on the beekeeping and honey industry but on agriculture more broadly;

    - Solar energy developer representatives mentioned that following best practices such as constructing solar developments in such a way as to allow wildlife to travel through the property or planting native vegetation under and around the solar panels could address these concerns;
    - At least two members of the public recommended that a study similar to Environmental Impact Statements required by NEPA for federal projects should be required on all solar energy installations;
- Several people mentioned the importance of private property rights and that private landowners should be allowed to lease their property for solar energy systems if they desired;
    - The Louisiana Landowners Association stated that the landowners with tracts large enough for solar projects were sophisticated and the best stewards of their property, though he mentioned that they are willing to accept reasonable regulation;
- Concerns with storm-water runoff from solar energy installations and its impact on surrounding drainage and waters should be regulated;
    - One member stated that such regulation should be at the state level since watersheds do not respect parish boundaries;
    - Some worried that excessive runoff would degrade the quality of soil on properties where solar energy installations were located;
    - A representative of Tangipahoa Parish government raised concerns with clear-cutting timber and changing the grade of large tracts of property for solar energy installations could negatively impact drainage and result in flooding; additionally, she raised the particular concern that increased runoff could increase algae blooms in Lake Ponchartrain;
    - Solar energy developers pointed to best practices that could be implemented to reduce runoff from solar energy installations;
- At least two members of the public raised concerns about the ability of solar installations to survive storm-related winds, especially considering the significant number of hurricanes and other tropical storms that impact Louisiana every year;
    - A representative of solar energy developers mentioned that best practices in construction could address this concern;
- Several people mentioned that nearby solar energy installations have or would decrease the value of their residence or property and make selling their property more difficult;
    - At least one member suggested mandating a form of arbitration or mediation for claims of property value loss;
- Many members of the public raised concerns regarding the looks or aesthetics of solar energy installations, as well as the impact changes in traditional property usage will have on the culture or beauty of an area;

    - Several representatives of solar energy industry mentioned that these concerns can, at least, be partially addressed using best practices surrounding set-backs and vegetative screens.
- At least one person raised concerns with the noise from solar energy systems disrupting surrounding landowners and residents;
- Dr. Terrence Chambers of the University of Louisiana at Lafayette mentioned that many of the concerns raised at the meeting had previously been studied and best practices are already available for both public information and guidance to local government. Upon request by LDNR for more information, Dr. Chambers provided written information outlining previous studies on many of the issues raised. His written comments are summarized below.

<u>A summary of written comments received:</u>

Pointe Coupee Parish President Major Thibaut submitted comments based on his experience over the previous two years where his Parish considered adoption of ordinances for solar energy development. Mr. Thibaut pointed out the diversity and abundance of agriculture in Pointe Coupee Parish and noted that he shared many of the same questions raised by legislators regarding solar energy installations. He continued that in order to prevent the loss of substantial investment from solar energy development, Pointe Coupee Parish decided to address many of these issues at the local level via the adoption of ordinances. Mr. Thibaut states that Pointe Coupee Parish approved a 2,000 acre 30 MW solar energy installation on "mostly non-productive lands" but the Parish retained the authority to declare a moratorium on future development to preserve his parish's "rural feel and agricultural heritage." He highlighted the economic and fiscal impact the solar installation is likely to have in his parish, including roughly 400 construction jobs, ad valorem taxes on the land and approximately $200,000,000 in equipment, and a projected $ 7,000,000 in sales tax revenue. Mr. Thibaut supports studying ITEP and what other states offer without impacting those projects already in the pipeline. Mr. Thibaut supports reasonable solar energy development and thinks state regulation and guidelines that are revised over time are appropriate. Finally, a copy of Pointe Coupee's solar energy ordinance was attached to his comments.

The Louisiana Farm Bureau Federation submitted written comments outlining their policy on solar energy on agricultural areas. The Federation supports: 1) the "establishment of state standards for commercial solar energy conversion systems that protect private property rights and allow for reasonable development of projects"; 2) "ensuring adequate funds are in place for decommissioning"; 3) "allowing landowners the option of terminating a solar lease agreement if solar panels fail to produce energy for a period longer than 12 consecutive months"; and 4) "efforts to locate solar energy projects on marginal or underused lands." The Louisiana Farm Bureau Federation highlights the potential threat solar installations pose to tenant farmers in the event significant acreage they currently lease for farming were instead to be used for solar energy generation. A major concern raised in their comments is if solar installations are concentrated in

a specific area, they could impact sugar cane mill operations should they convert too many acres from sugar cane farming to solar energy generation. Such an impact to mill operations could then leave the remaining acres being farmed without a mill to service them. The Farm Bureau Federation warns that even if a solar energy installment is properly decommissioned at the end of its life, the acreage will have permanently lost its USDA program crop base designation meaning that it would no longer be eligible for USDA support for growing agronomic crops such as soybeans, corn, rice, cotton, and grain sorghum. Additionally, some crop land that qualifies as Prior Converted croplands are allowed to remain in crop production under the federal Clean Water Act and stand to lose that designation should the acreage be converted to solar energy use instead. The Federation also raised the concern of many landowners that their acreage may be subject to a higher property tax rates following use as a solar plant, potentially not being able to regain the agriculture use valuation rate following decommissioning of the solar energy installation. The loss of business and employment at the local level are also raised as concerns should large portions of farm acreage be converted to solar energy generation. The Farm Bureau Federation is concerned that tenant farmers will not receive just compensation for the loss of their farming leases. Additional guidance similar to the Louisiana Mineral Code to resolve disputes surrounding solar energy developments is supported. Finally, the Federation raises concerns about damage that may be caused by storms to solar installations and from the movement of related equipment onto adjacent property.

Mr. Andy Kowalczyk wrote in support of solar energy development as a way to promote the public good. Mr. Kowalczyk points out the numerous steps and significant investments required to construct and operate solar energy installations. Combined with the highly distributed location of potential solar projects, he points out that even if all proposed projects were constructed, which is unlikely, less than 2% of agricultural land would be impacted.

Mr. Benson Langlinais commented that focus for future solar development should be on rooftop solar since residences are already connected to the grid. He stated that he doesn't think agricultural production should be in competition with energy generation.

Several comments were received in support of investments in solar energy and lessening the state's dependence on fossil fuels. Many also stated that they believed the concerns raised in the resolution and other legislation can be ameliorated. Several raised concerns that the state would over-regulate solar developments to the point of discouraging solar energy in the state.

Several comments were received supporting state regulation of utility-scale solar development and specifically recommending a statewide cap on the size of solar energy installations. Some written comments were received opposing large-scale clear-cutting to construct solar energy installations due concerns about their environmental and ecological impacts.

Jessica Hendricks, the state policy director for the Alliance for Affordable Energy, wrote in support of solar energy development in the State and believes that agricultural use and solar

energy installations can complement one another. She pointed out the existence of best practices already implemented in other states addressing the issues raised in opposition to solar energy development. Ms. Hendricks highlighted that under-resourced residents in Louisiana can pay upwards of 20% of their monthly income on energy and she states that with no fuel costs solar energy can help keep energy bills low for Louisiana's consumers. Finally, she states that Louisiana is at am energy transition crossroads and that solar energy generates clean power, creates jobs, and attracts new industry.

Written comments were received from an adjacent landowner and resident to a proposed solar energy installation. She raised concerns surrounding drainage from the solar installation onto or near her property and a decrease in property value or interested purchasers due to the proximity to the solar energy installation. A separate commenter mentioned utilizing a company specializing in relocating residents wishing to move away from solar energy installations.

One commenter submitted an article titled "Texans and Californians learn that wind and solar are neither reliable nor affordable."

Simon Mahan, Executive Director of the Southern Renewable Energy Association ("SERA"), submitted written comments in support of renewable energy project development. He states that renewable energy prices have declined by 70-90% since 2009. He further states that renewable energy is now cost competitive against traditional energy resources in many parts of the country and highlights the many corporations demanding renewable energy options. Recent announcements of RFPs by utilities in Louisiana are then provided. These announcements would man billions of dollars of investment in Louisiana over the next decade. Mr. Mahan highlights and his group supports the recommendation by the Center for Planning Excellence to develop model ordinances for municipal and parish governments regarding renewable energy siting and decommissioning rules. Through such model ordinances, he states, local governments can choose general best practices based on local needs. Mr. Mahan references and includes copies of a zoning ordinance on renewable energy from Tunica County, Mississippi and model ordinances from Indiana University's Environmental Resilience Institute; the North Carolina Clean Energy Technology Center through North Carolina State University; and Georgia's Model Solar Ordinance by Georgia Tech, Emory Law School and the University of Georgia. Mr. Mahan notes that adopting a "one-size-fits-all siting mandate" will strip local governments of their siting and zoning rights, and Home Rule Charter authorities. Mr. Mahan states that solar developments pay landowners so they do not have to sell their farm, help them diversify their crops to protect against crop prices and natural disasters, and can be constructed to maximize existing local infrastructures like farm roads, pathways, and drainage to minimize disruptions to the land. He states that solar installations can provide steady tax income for local and state governments, while requiring little to no additional governmental services. Mr. Mahan states that "the key to good siting principles is to protect private property owner rights while balancing the needs of the general public. Setting onerous or arbitrary restrictions on renewable energy development in Louisiana will strip private property owners of their rights to develop their own land as they see fit while also harming the

general public by slowing down the transition to renewable energy resources." He concludes by encouraging funding to support CPEX's efforts to develop model ordinance for renewable energy siting.

Dr. Terrence Chambers was requested to provide additional information on the studies and reports he mentioned at the June 29, 2021 meeting. In response to this request Dr. Chambers submitted a written document expanding on his verbal comments at that meeting, which has been attached to this report. Dr. Chambers states that "[w]hen deployed properly, according to all applicable codes and standards and industry best practices, solar energy is a safe and cost-effective way to provide reliable, low-cost, pollution free electricity." Attached to his comments, are a document titled "Solar Information for Louisiana Residents" and "Solar Planning Resources for Local Governments." In these documents many of the issues raised at the June 29th hearing and in written comments are addressed. Some of these issues include: dangers to public health from hazardous materials associated with solar panels, end of life recycling and decommissioning of solar energy installations, vegetation control around solar energy installations, hurricanes and construction requirements, electromagnetic fields associated with solar energy installations, fire hazards associated with solar energy installations, noise concerns, land-use and farming in relation to solar energy installations, and property values and solar energy installations. In addition, these documents provide references to applicable codes and standards for solar energy installations, as well as reports on studies and research on solar energy.

Background Information on Solar Energy Production

Solar photovoltaic (PV) devices, often referred to as solar cells, transform sunlight directly into electricity.[1] According to the Energy Information Agency, solar energy has two main benefits: 1) solar energy installations do not produce air pollution or carbon dioxide and 2) solar energy installations on buildings have minimal effects on the environment.[2] Solar energy has some limitations 1) the amount of sunlight that arrives at the earth's surface is not constant and 2) the amount of sunlight reaching a square foot of the earth's surface is relatively small, so a large surface area is necessary to absorb or collect a useful amount of energy.[3] Supporters of increased solar energy generation, note that solar panels are one of the best resources available to fight climate change. Furthermore, supporters highlight that solar energy does not contaminate the environment, provides a renewable and inexhaustible energy resource, and solar panels can be recycled. Finally, supporters of solar energy tout the significant decrease in carbon emissions from using solar panels, by pointing to estimated reductions from solar energy to date.[4]

[1] Based upon specific references at the public meeting and elsewhere, it is clear that PV solar energy systems and not either solar thermal (water heating) systems or concentrated solar power (CSP) systems should be the focus of the public meeting and this report.

[2] See https:// www.eia.gov/energyexplained/solar (accessed on 7/17/2021 at 8:16 a.m.).

[3] *Id.*

[4] Using the IRENA calculator and data from 2014, Ecotality reports, "experiences in the US have shown that around 17.5 million tons (MT) of CO2 can be avoided which translates into 22,000 GWh of electricity. China also made

Solar energy makes up a very small percentage of current energy generation in Louisiana. All renewables compose just 3.5% of Louisiana's energy generation as of 2019, ranking Louisiana 49th in the United States for renewables production.[5] Of the 3.5%, solar energy composes just 1.3%, or 0.046% of Louisiana energy production.[6] Louisiana ranks 34th in consumption of solar energy with 2.251 BTU consumed.[7] PV devices may be installed on the ground or on other structures, such as buildings and may be for residential or commercial purposes. Most commercial PV solar energy installations require construction at a substantially larger scale than residential applications. Therefore, commercial solar energy installations take up a larger footprint than residential ones. Technological capabilities of PV devices are constantly improving meaning that over time larger amounts of energy can be produced from fewer panels, thus allowing solar installations with smaller footprints. Based on the types of comments made and issues of concern raised related to solar energy installations, it seems clear that large utility-scale PV solar energy installations should be the focus of this report.

To bring a utility-scale solar energy installation to production, requires a solar developer to progress along three interrelated but separate paths roughly concurrently. These are 1) land or property acquisition, 2) interconnection to the power grid, and 3) entering into an agreement with a customer to purchase the solar energy to be produced. Failure at any stage along one of these three pathways means the project cannot reach energy production. Because of the significant economic investment required to progress down these paths and to construct a commercial-scale solar energy installation, construction of such a solar energy installation is exceedingly unlikely without final approvals by the parties and governmental agencies involved along each of these paths. Land acquisition: a solar developer needs the right to access, construct, and operate a solar energy system on land that is suitable to generate the amount of energy being sought. These rights can be gained by outright purchase of the property or by lease or acquiring other rights of use. Often the agreements for these rights begin as an option to purchase or lease, as the solar energy system cannot be constructed and operated unless the other two paths mentioned earlier are completed. Land is often selected by a developer based upon the cost to develop it for the solar energy installation. This cost is decreased if the property is located near the power grid so as to limit the cost of transmitting the energy to be produced and if it is located on property requiring minimal dirt work or complex engineering. In order to make solar energy installations economic, most projects require significant acreage and thus either large tracts or several smaller tracts adjacent to one another is required. Finally, the developer must find landowners of property in these locations willing to allow development of their property for solar energy generation. For all of these reasons, the land where solar energy projects are likely to be located is limited.

incredible contributions that reach 20 MT of CO2, and 25,000 GWh of energy injected to the grid. Germany was the greatest contributor in that year with 29 MT avoided and over 35,000 GWh produced. This can be translated into 18 million tonnes from coal sources, 3.38 million from natural gas, and 9 million from oil sources." See: https://ecotality.com/climate-change-report-how-advantages-of-solar-energy-help

[5] 2019 EIA State Energy Data System (SEDS).

[6] *Id.*

[7] *Id.*

Interconnection into the grid: for most of Louisiana the power grid is overseen and regulated by the Midcontinent Independent System Operator ("MISO"), which must approve interconnection to the power grid by energy generators.[8] This generator interconnection process requires an application that must work its way through three sequential phases, each requiring involved studies and substantial financial investment.[9] A list of proposed generators in the process or "queue" for interconnection can be found on the MISO website.[10] Most generators that apply for interconnection do not complete the process and are therefore unable to connect to the power grid. In the vast majority of cases, failure to receive approval to interconnect means the project is never constructed. A Customer: agreements with utilities to purchase power from a proposed solar power project are often needed. At the end of the day, a solar energy developer needs to be sure that he can get a customer to pay a price that covers his costs to construct the project, including the price to deliver the power to a customer, and that his project will be profitable. While there may in some cases be options to either sell such solar energy directly to an energy user or sell directly into the grid, most likely, economic considerations require selling solar power to a utility. When a solar energy developer wishes to sell their power to a utility, then such an agreement must be approved by the Louisiana Public Service Commission, the City of New Orleans, or other city/parish governments in the case of publically owned utilities. When a willing customer at an acceptable price cannot be found or such an agreement cannot be approved by the appropriate governmental entities, the proposed project will not be constructed.

Failure to succeed at any one of the three phases mentioned above means that the solar energy installation will not progress. It is therefore, important to keep in mind that not every proposed solar energy installations project that is trying to acquire property rights or in the MISO queue will be constructed. The vast majority of the proposed solar projects in the MISO interconnect queue will never be constructed. Given the vast upfront cost and need for development to make significant upfront arrangements for the interconnection piece with utilities, it appears that most developments will focus on large tracts of property with favorable locations near existing tie-ins. Therefore, the number of potential site locations for solar development in Louisiana is again reduced.

Summary of Existing Laws Connected to Solar Energy Production

Act No. 301 of the 2021 Regular Legislative Session amended La. R.S. 30:1145 authorizing the regulation of solar leases "for the exploration, development, and production of solar energy." Such regulation is to be developed by the Department of Natural Resources following consultation with "affected utility, agricultural, and solar industries, landowners and consumer

[8] A portion of Northwest Louisiana is instead managed and regulated by the Southwest Power Pool ("SPP") a different independent system operator.

[9] A flow-chart of this process can be accessed on the MISO website here: https://cdn.misoenergy.org/GI%20Process%20Flow%20Diagram106549.pdf

[10] See: https://www.misoenergy.org/planning/generator-interconnection/GI_Queue/

representatives." According to La. R.S. 30:1145, the regulations must be "designed to encourage the development and use of solar energy and to provide maximum information to the public concerning solar devices." The regulations may include standards for testing, certification, inspection, capacity, setbacks, and spacing of solar devices. Specific to solar leases, the regulations may further include minimum acreage, access, maintenance, decommissioning, and site closure requirements. Act No. 301 states that LDNR cannot preclude the purchase, installation or use of solar devices on private property for residential use. Finally, the act states that the rules are to promulgated by the secretary of LDNR, but not implemented until the secretary identifies funding through "fees, federal grants, or other sources."

Promulgation of rules pursuant to Act No. 301 requires consultation with interested parties and, as is the case with promulgating any rule, following the procedural requirements found at La. R.S. 49:953. Not taking into account the time necessary to gather information and consult with interested parties prior to undertaking an initial draft, the rulemaking process takes approximately six (6) months at a minimum to complete and is contingent on responding to public comments and participation in Legislative hearings, if called. Additionally, potential funding sources have not yet been identified as required in order for the requirements to be implemented. The appropriate funding source may differ depending on the specific regulations adopted. LDNR is currently working towards draft regulations pursuant to Act No. 301, but it is too early to state what the outcome of that process will be.

Nevertheless, in order to provide guidance in the interim, the remainder of this section attempts to identify existing laws, governmental programs and authorities that may be implicated by commercial solar energy system construction, operation, and decommissioning. Please note that the federal and state laws and governmental programs referenced here are not comprehensive. This list was put together in an attempt to introduce broad federal and state policies which may affect some phase of solar installation development. Particular note is made at the state level of: the LDEQ requirements on waste disposal and their impact on decommissioning of solar facilities; PSC's role in approving solar energy contracts with utilities; LDAF's primacy over regulation of pesticides, herbicides, and fertilizers; LDAF's soil and water conservation program which can provide guidance to landowners on how best to manage their properties so as to avoid excess topsoil runoff; and LDNR's state and local coastal resources management program for regulations addressing activities in Louisiana's coastal zone.

FEDERAL			
Law	Permit/Review	Government Agency	Description
BLM-management of public lands 43 U.S.C. 1764(i)	Approval of solar right-of-way on federal lands	Bureau of Land Management (BLM)	The BLM has a policy for approving utility-scale solar developments on BLM manage lands. BLM

			requires solar right-of-way holders to post a bond that covers environmental liabilities during operation, decommissioning and disposal, and site restoration.
National Historic Preservation Act of 1966 16 U.S.C. §470	Section 106 Consultation	Advisory Council on Historic Preservation	If there is a federal action, requires federal agencies to review potential impacts to sites on the National Register of Historic Places. Consultation with the State Historic Preservation Officer/Tribal Historic Preservation Officer recommended. If the action will result in an adverse effect, will be resolved through mitigation and/or avoidance.
National Environmental Policy Act (NEPA) 42 U.S.C. § 4331	– Environmental Assessment (EA) – Finding of No Significant Impact (FONSI) – Environmental Impact Statement (EIS)	Lead Agency varies by project	Requires federal agencies review environmental impacts of proposed federal action, for example when siting on federal lands, accessing federally owned transmission lines, receiving federal grants, or obtaining a federal permit.
Clean Water Act (CWA) 33 U.S.C. § 1342	– Section 402 National Pollution Discharge Elimination System (NPDES) Storm water Permit	Environmental Protection Agency (EPA), delegated to Louisiana Department of Environmental Quality	Regulates discharges of pollutants into waters of the United States and the quality of surface waters. A permit is required when there is potential for storm water to discharge pollutants from construction that disturbs 1 or more acres.
Clean Water Act (CWA) 33 U.S.C. § 1344	– 404 Permit	U.S. Army Corps of Engineers	Regulates discharge of dredged or fill material into waters of the United States. Activities that impact federal waters,

			including wetlands, may require permits.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) 42 U.S.C. § 9601	– Environmental Site Assessment	Environmental Protection Agency (EPA)	Governs liability with respect to contaminated properties. If hazardous waste or other pollutants contaminate the property, an assessment is needed to discern liability and develop a remediation plan.
Safe, Efficient use, and Preservation of the Navigable Airspace 14 C.F.R. Part 77	– Airspace Review	Federal Aviation Administration (FAA)	Lays out standards for determining obstructions to air navigation, the notice requirements, and the process to petition the FAA for review. Generally applicable to installations on or near airport property or flight path.
Endangered Species Act (ESA) 16 U.S.C. § 1531	– Consultation – Incidental Take Permit	U.S. Fish and Wildlife Service (FWS)	Regulates activities affecting threatened or endangered species. Consultation is always recommended for activities that may result in take or harm to species and/or their critical habitat, such as site clearing.
Migratory Bird Treaty 16 U.S.C § 703	-Consultation -Possibly a permit	U.S. Fish and Wildlife Services (FWS)	Makes it illegal for anyone to harm, possess, or take any migratory bird species, nests, and eggs. Consultation is recommended when there is a potential impact to migratory bird species protected by the Act.
LOUISIANA			
Law	Permit/Review	Government Agency	Description
Threatened and Endangered Species Conservation Act La. R.S. 56:1101, et seq.	-Consultation -Studies -Restrictions as adopted by Rule	Louisiana Department of Wildlife & Fisheries; and Louisiana Wildlife & Fisheries Commission	Requirements based on State protection statuses: State statuses are found in Title 56 of the Louisiana Revised Statutes as well as relevant rules and regulations adopted by the Louisiana Wildlife and Fisheries Commission and

			the Secretary of LDWF. The Secretary is authorized to implement additional restrictions in emergency situations in order to protect fish and wildlife resources.
Louisiana Water Quality Regulations LAC 33:Chapter IX	Water discharge permits	Louisiana Department of Environmental Quality	Louisiana's Water Quality Regulations (LAC 33: Chapter IX) require permits for the discharge of pollutants from any point source into waters of the state of Louisiana. This surface water discharge permitting system is administered under the Louisiana Pollutant Discharge Elimination System (LPDES) program. LDEQ became a state delegated to administer the NPDES Program in August of 1996. (Official LPDES Program Assumption Documents are available on the EPA Region 6 website.)
State and Local Coastal Resources Management Act La. R.S. 49:214.21, et seq.	Coastal Use Permit required for uses and activities in the Coastal Zone	Louisiana Department of Natural Resources	The Louisiana Coastal Resources Program is administered by the Department of Natural Resources through the Office of Coastal Management (OCM). The primary authority for the LCRP is the State and Local Coastal Resources Management Act of 1978 (SLCRMA), as amended (Act 361, La. R.S. 49:214.21 et seq). The law seeks to encourage multiple uses of resources and adequate economic growth while minimizing adverse impacts of one resource use upon another without imposing

			undue restrictions on any user. The OCM regulates development activities and manages the resources of the Coastal Zone, especially those which have a direct and significant impact on coastal waters. It is the function of Office of Coastal Management, through its staff, to maintain, protect, develop, and restore or enhance the invaluable coastal region of the state of Louisiana.
Solid and Hazardous Waste Permit Programs LAC 33:VII and LAC 33:V	-Waste permits required -Restrictions as to types of waste that can be disposed of at solid-waste landfills	Louisiana Department of Environmental Quality	The Solid and Hazardous Waste Permits section authorizes permits administered under the Solid Waste and Hazardous Waste Regulations. These regulate proper disposal of certain waste types and permitted disposal operations.
Soil & Water Conservation Districts La. R.S. 3:1201, et seq.	Provides soil & water conservation planning and education for landowners within the district	-LDAF - Soil & Water Conservation District Boards of Supervisors	Soil & Water Conservation Districts (SWCDs) are established at the request of resident landowners from within the proposed SWCD. Each SWCD is governed by board of 5 supervisors. These supervisors are landowners or farm operators from within the SWCD and represent local conservation needs and concerns. SWCD employees assist in carrying out conservation planning, office administration, conservation program administration,

			conservation education, and similar duties. Louisiana's 44 SWCDs are assisted by the USDA Natural Resources Conservation Service (NRCS) via formal Cooperative Agreement in delivering conservation programs and related technical assistance on private lands. Through this unique federal-state-local partnership, a wide range of management practices are planned and implemented to protect soil health, water quality and to enhance the state's natural resources. The enhancement and protection of Louisiana's natural resources are paramount to the health, safety, livelihood, and general welfare of Louisiana's citizens.
Pesticides/Local Regulations La. R.S. 3:3224	Preemption of local regulation of pesticides	-LDAF	The Louisiana Department of Agriculture and Forestry (LDAF) is designated as the state's lead agency in the regulation of pesticide use and application. R.S. 3:3224 provides for the preemption of the regulation of pesticides. The governing authority of a political subdivision is prohibited from adopting any ordinance in any way affecting the registration, sale, or application of pesticides, or the disposal of pesticide wastes, except as provided in the statute.
Fertilizers/Local Regulations La. R.S. 3:1423	Preemption of local regulation of fertilizer	-LDAF	R.S. 3:1423 provides for the preemption of the regulation of fertilizer. No municipality, parish,

			local government entity, or governing authority of any group or association, private or public, having jurisdiction over a specific geographic area shall enact ordinances, laws, subdivision restrictions, or regulations regarding fertilizers that in any way affect the registration, sale, or application of fertilizer, except as provided in the statute.
State-owned land management LAC 43:V.921	Granting of lease for solar energy installations on state-owned land	Louisiana State Mineral & Energy Board LDNR – Office of Mineral Resources	Solar energy lessees required to submit a decommissioning plan when installations are to be located on state-owned land.
Public Service Commission La. Const. art. IV, sec. 21.9	-Regulates utilities to ensure safe, adequate, and reliable service	-Louisiana Public Service Commission	The Louisiana Public Service Commission's (LPSC) overall goals are to ensure a regulatory balance that enables utilities to provide customers with safe, adequate and reliable service, at rates that are just and reasonable, equitable and economically efficient, and that allow utilities an opportunity to earn a fair rate of return on their investment. The Commission has jurisdiction over utilities providing electric services, as well as all the electric cooperatives in Louisiana. The companies under the Commission's jurisdiction must obtain approval before instituting new rates, issuing stocks and bonds, transferring assets, and undertaking major construction projects such as

			additional power plants, transmission lines, etc. Municipally owned utilities are not under the jurisdiction of the Commission.
Home Rule Charter Authority; Local Zoning and Land Use Authority La. Const. art. VI, §§ 4 – 10 & 17	Local governments authorized to structure, organize and distribute powers and functions of its government; authorized to adopt zoning and land-use regulations	Local government subdivisions/ Parish governments	Local government subdivisions may 1) adopt regulations for land use, zoning, and historic preservation, 2) create commission and districts to implement these regulations, 3) review decisions of such commissions, and 4) adopt standards for use, construction, demolition, and modification of areas and structures.

Guidance on Solar Energy Production Regulation

As stated previously, creation of a new solar program will take time and additional study and opportunities for interested parties to participate. A review of solar energy regulation in other states remains ongoing. Unfortunately, this means that specific legislative recommendations are premature at this time. But in an attempt to help identify existing resources that may be of use to legislators, the public, and parish governments interested in regulation of commercial solar developments, below is a list of laws, model ordinances, studies and reports from other states, jurisdictions, and institutions, with links to those documents where available. Many of the issues related to solar energy installations listed previously in this report are directly addressed in the following documents. The limited review of other state laws conducted to date show that the vast majority of states allow for local regulation of solar energy installations through zoning and land use planning, with more generalized state laws instead regulating specific activities that may or may not be associated with the construction, operation, and decommissioning of solar installations. A 2016 working paper on state regulation of solar decommissioning by the North Carolina Clean Energy Technology Center, for instance, found that "[a] total of 41 states plus the District of Columbia leave solar decommissioning fully to local governments. … Another five states do not have statewide decommissioning rules, but require a decommissioning plan to be submitted under certain circumstances. In Louisiana a plan must be submitted for solar facilities on state-owned lands. In Nebraska and Oklahoma a plan must be submitted in order to receive a solar easement. In New Hampshire and Vermont, a plan must be submitted for solar facilities over a certain size, …"

It is hoped that an understanding of how the issues raised are being handled by other states and localities will improve as LDNR continues to develop its program pursuant to Act 301. Below is a table attempting to summarize some of the general and specific regulatory programs affecting solar energy in other states. This list used information from the North Carolina Energy Technology Center decommissioning report as a starting point and amended it with additional and updated information. Next is provided a list of model solar energy ordinances identified so far. Finally, a list of relevant studies and reports on solar energy is also provided.

State Laws

STATE	LAW(S)	DESCRIPTION	INFORMATION/ RESOURCES
California	Environmental Quality Act; California Energy Commission	Environmental Impact Report required for projects requiring government permit or using government funding when generating more than 50MWs Department of Toxic Substances Control has the authority to subject PV modules that are hazardous waste to the state's universal waste management. Local governments may require financial security for site restoration when a perpetual solar-use easement. To obtain a term or self-renewing solar-use easement, a performance bond or other restoration security must be posted.	https://www.energy.ca.gov/programs-and-topics/programs/environmental-and-engineering-services Cal Health & Saf Code § 25259 Cal Gov Code § 51191.3
Florida	Power Plant Siting Act; FL Public Utility Commission; Department of Environmental Protection	10 year site plan and siting certification for >75 MW facility with involvement with county and municipality agencies still involved	https://www.dms.myflorida.com/content/download/56812/239864/file/Renewable_Energy_Regs.pdf
Hawaii	State permit; Department of Land and Natural Resources &	Solar energy facility that generates > 1MW must first receive state permit then state	HRS § 205-4.5

	Department of Health	facilitates county permitting policy. If a solar installation is located on Class B or C agricultural land and received a special use permit must be decommissioned at the owner's expense within twelve months of the conclusion of operation or useful life. Proof of financial security to decommission the facility must be provided to the county planning commission.	
Indiana	Proposed law – HB 1381	State requirements on solar energy facilities >10MW preempts local ordinances when local requirements are more stringent	http://184.175.130.101/legislative/2021/bills/house/1381#document-6ddbc7c6
Minnesota	Guidelines; Department of Natural Resources	State provides statewide guidelines and policy to be implemented at local level	https://files.dnr.state.mn.us/waters/watermgmt_section/shoreland/siting-solar-power.pdf
Montana	Decommissioning plan and bonding; Department of Environmental Quality	>2MW required to submit a decommissioning plan, follow decommissioning requirements, and obtain surety bond	https://leg.mt.gov/content/Committees/Interim/2019-2020/EQC/Meetings/may-2020/hj-38-wind-solar-may-2020.pdf
Nebraska	Solar easements statewide	A description of decommissioning plan is required	R.R.S. Neb. § 66-911.01
New Hampshire	Public Utility Certificate; Public Utility Commission	>30MW solar energy facility required to provide decommissioning bond in order to receive required certificate	https://www.puc.nh.gov/Sustainable%20Energy/Renewable_Energy_Source_Eligibility.htm RSA 162-H
New Jersey	New Jersey Farmland Preservation Program; Department of Agriculture	Solar energy facilities required to receive permit if planned for protected farmland and must be decommissioned in accordance with a conservation plan designed to address the	https://www.nj.gov/agriculture/sadc/farmpreserve/ N.J.A.C. § 2A.12

		impacts of the decommissioning process. :76 - 22Decommissioning is subject to local ordinances	
New Mexico	Office of Renewable Energy; State Land Office	Archeological Survey required; specific regulatory requirements for solar energy developments on state-owned/managed land	https://www.nmstatelands.org/divisions/commercial-resources/renewable-energy/about-office-of-renewable-energy/
New York	Department of Environmental Conservation	Joint state and local zoning; environmental impact statements required unless the solar energy facility is <25 acres and located on brownfields/landfills	https://www.dec.ny.gov/permits/357.html
North Carolina	North Carolina Utilities Commission	Certificate of public convenience & necessity, and special use permit may be required; Legislature currently considering possible new regulatory programs	https://www.ncuc.net/Reps/reps.html
Oklahoma	Statewide for solar easements	A description of the decommissioning plan is required to obtain a solar easement.	60 Okl. St. § 820.1
Texas	Department of Environmental Quality	Conditional Use Permit for large scale solar energy facilities not included in local ordinances	
Vermont	Department of Public Service – Certificate of Public Good (CPG)	CPG preempts local zoning, but provides "substantial deference to localities." Applications for solar installations greater than 1 MW must include a decommissioning plan.	https://puc.vermont.gov/sites/psbnew/files/doc_library/Siting-Cases-Section%20248-v11_0.pdf CVR 30-000-056
Virginia	Department of Environmental Quality – Natural Resources Impact Summary	NR Impact Summary required for facilities >3MW; required to plan fencing and construction so as to	https://www.deq.virginia.gov/permits-regulations/environmental-impact-review/-fsiteid-1 Va. Code Ann. § 67-103

		avoid impact on wildlife passage. No statewide decommissioning rules, but local ordinances addressing the siting of solar facilities must also address decommissioning.	
Washington	Energy Facility Site Evaluation Council	In lieu of any other state or local permits, solar energy facilities may opt into receiving a certification from the EFSEC; requires site restoration and financial security	https://www.efsec.wa.gov/ WAC 463-72

Model Ordinances

• American Planning Association, *Planning for Solar Energy Briefing Papers* (2013).
• Emory Law School – Turner Environmental Law Clinic, Georgia Tech Strategic Energy Institute, and University of Georgia Agriculture Technical Assistance Program, *The Georgia Model Solar Zoning Ordinance Guide*, Version 1.0 (July 2018).
• California County Planning Directors Association, Model Solar Energy Facility Permit Streamlining Ordinance and Model Solar Energy Facility Permit Streamlining Guide(Feb. 2012),
• Cumberland County Planning Department, *Solar Energy Systems Model Ordinance* (Apr. 2011).
• Delaware Valley Regional Planning Commission, *Renewable Energy Ordinance Framework: Solar PV* (Feb. 2015).
• Indiana University, Environmental Resilience Institute and the Great Plains Institute, *Model Solar Ordinance for Indiana Local Governments*, included in written comments attachment to this report, (December 2020).
• Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center, *Clean Energy Results, Questions & Answers Ground-Mounted Solar Photovoltaic Systems*(June 2015).
• Massachusetts Executive Office of Energy and Environmental Affairs, *Model Zoning for the Regulation of Solar Energy Systems* (Dec. 2014).
• Minnesota Department of Commerce, Division of Energy Resources, *From Policy to Reality: Updated Model Ordinances for Sustainable Development, Solar Energy Standards - Urban Communities and From Policy to Reality: Updated Model Ordinances for Sustainable Development, Solar Energy Studies - Counties*(Feb. 2014).
• Great Plains Institute, *Grow Solar Local Government Solar Toolkit Minnesota* (Aug. 2017).
• NC Sustainable Energy Association and NC Clean Energy Technology Center, Template Solar Energy Development Ordinance for North Carolina (Oct. 2016).
• Pace Law School, Land Use Law Center, *Zoning for Solar Energy: Resource Guide(2015).*
• Sabin Center for Climate Change Law at Columbia Law School, *Model Small-Scale Solar Siting Ordinance* (2012).

• Go Solar Florida, *Model Zoning Ordinance* (Sept. 2014).
• Sustainable Jersey, *Guidance for Creating a Solar Friendly Zoning Ordinance* (Apr. 2017) ("New Jersey Model"),
• Sustainable CUNY, *New York State Model Solar Energy Law* (May 2016) ("New York Model"),
• Environmental Planning & Design, LLC, *Zoning and Permitting Solar in Your Municipality* (Dec. 2012) – prepared for Citizens for Pennsylvania's Future (PennFuture), City of Pittsburgh, Allegheny County, Southwestern Pennsylvania Commission, CONNECT (Congress of Neighboring Communities), and SUNWPA (Solar Unified Network of Western Pennsylvania
• North Central Texas Council of Governments and State Energy Conservation Office, *Model Ordinance Guidelines for Municipalities*(July 2016).
• University of North Carolina School of Government, Adam Lovelady, *Planning and Zoning for Solar in North Carolina*(2014).
• Utah Clean Energy, *Solar Friendly Zoning Toolbox*
• Virginia Department of Environmental Quality and Local Government Outreach Group, *Model Ordinance for Larger-Scale Solar Energy Products in Virginia and Model Ordinance for Smaller-Scale Solar Energy Projects in Virginia (By Right Permitting)*(Dec. 2012).

Studies and Reports

Farm Service Agency – USDA

- Conservation Reserve Program

NREL (National Renewable Energy Laboratory – US Dept. of Energy)

- Beneath Solar Panels, the Seeds of Opportunity Sprout

o Describes research into low-impact development of solar farm installations which preserve the topsoil. Native vegetation reduces water use and promotes pollinator populations. Food crops can be grown underneath solar panels, which provide shade and reduce water use.

- Overview of Opportunities for Co-Location of Solar Energy Technologies and Vegetation

o Details research findings identifying the benefits of re-vegetation and low-impact site preparation for the local ecosystem and neighboring agricultural productions.

- Best Practices at the End of the Photovoltaic System Performance Period

o Details issues of decommissioning and disposal of solar panels and solar energy systems

EERE (Office of Energy Efficiency & Renewable Energy – US Dept. of Energy)

- Farmer's Guide to Going Solar

o FAQ-format page with links to research studies

A Study of the Hazardous Glare Potential to Aviators Form Utility-Scale Flat-Plate Photovoltaic Systems

- Study showing photovoltaic panels typically less reflective than windows and white concrete

ENF Solar

- Solar Trade Platform and Directory of Solar Companies

CONCLUSION

This report provides a summary of the public meeting held and public comments received pursuant to SR 182 of 2021 and attempts to provide valuable information from other states, model ordinances, studies and reports on solar energy developments. Development of the program required by Act 301 of 2021 is still ongoing and due to the requirements of that process and of Louisiana's Administrative Procedures Act, this report was unable to provide specific legislative recommendations within the timeframe outlined in SR 182. Through the Act 301 process DNR plans to develop a statewide program and also to publish guidelines to provide guidance to parish and local governments, solar energy developers, landowners, and to the general public.

This report attempts to point to existing resources covering many of the issues raised in the June 29th public meeting and in the written comments submitted. It is hoped that this report can provide some guidance to the Legislature, Parish governments, and interested parties in the interim. As LDNR has been putting together resources and collaborating with other state agencies and universities and organizations, it is important to note that the overall discretion of how to manage solar development remains at the local level. As each of our sixty-four parishes have unique laws, drainage, siting and a host of other interest, it is imperative that each parish and local authority recognize that this document is to be used as guidance and not be interpreted as a final regulatory action for implementing solar development in local areas. We wish to thank all those who participated in the June 29th meeting and look forward to additional research into and consideration of the issues raised.