Detail-Level Screening Report for Solar Energy Development

Executive Summary

Project:

The Solar Energy Development Project (Project) presents the Virginia Department of Transportation (VDOT) an opportunity to optimize the use of state-owned property, raise additional monies and become more environmentally responsible. Potential land lease collections, electricity savings and/or revenue sharing provisions are possible sources of value that can be captured from the Project. Ultimately, this Project meets public needs and provides public benefits by unlocking additional monies to keep facilities in a state of good repair and furthering Virginia's current energy initiatives outlined in the Virginia Energy Plan.

Report Content:

This report is part of the screening process used by the Virginia Office of Public-Private Partnerships (VAP3) to assess the suitability and desirability of delivering a project as a public-private partnership (P3). The content of the report includes a letter from the VAP3 Executive Director and the Detail-Level Screening Report.

The Detail-Level Screening Report evaluates:

- Public Need and Benefits
- Economic Development
- Market Demand for PPTA Delivery
- Stakeholder Support
- Technical Feasibility
- Systematic Interface and Compatibility
- Financial Feasibility
- Legal/Legislative Feasibility
- Project Risks
- Life Cycle Management

Recommendation:

VAP3 recommends the Project be advanced to the project development phase. During the project development phase, VAP3, in coordination with VDOT and Department of Mines, Minerals and Energy (DMME), will further refine the Project scope, structure and procurement with the goal of accelerating project delivery and maximizing the public benefits.

COMMONWEALTH of VIRGINIA

VIRGINIA OFFICE OF PUBLIC-PRIVATE PARTNERSHIPS
600 EAST MAIN STREET, SUITE 2120
RICHMOND, VIRGINIA 23219

J. Douglas Koelemay
Director

May 15, 2015

Mr. Charlie A. Kilpatrick, P.E.
Commissioner of Highways
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

RE: Detail-Level Screening Report and recommendation for the Solar Energy Development Project

Dear Commissioner Kilpatrick:

The Virginia Office of Public-Private Partnerships (VAP3) has completed a Detail-Level Screening on the suitability of procuring the Solar Energy Development Project (Project) as a Public-Private Partnership (P3).

The attached Detail-Level Screening Report evaluated the project concept against criteria used by the VAP3 to assess the suitability and desirability of delivering a project as a P3. The screening criteria include stakeholder support, technical feasibility, financial feasibility, legal/legislative feasibility and project risks.

VAP3 recommends the Project be advanced to the project development phase. During the project development phase, VAP3, in coordination with VDOT and Department of Mines, Minerals and Energy (DMME), will further refine the Project scope, structure and procurement with the goal of accelerating project delivery and maximizing the public benefits.

Should you have any questions regarding our recommendation or wish to discuss please contact me at 786-0456 or Dusty Holcombe at 786-3173.

Sincerely,

J. Douglas Koelemay

cc: The Honorable Aubrey L. Layne, Jr.
Quintin Elliott, Chief Deputy Commissioner
Garrett Moore, Chief Engineer
Jennifer Ahlin, VDOT
Kevin Gregg, VDOT
Dusty Holcombe, VAP3
Jackie Cromwell, VAP3
Alexandra Lauzon, VAP3
Hayes Framme, GOV
Al Christopher, DMME
Ken Jurman, DMME

Virginia Public-Private Partnerships

Solar Energy Development

Detail-Level Project Screening Report

This report and recommendation is part of the screening process used by the Virginia Office of Public-Private Partnerships (VAP3) to assess the suitability and desirability of delivering a project as a public-private partnership (P3). Upon completion of the detail-level screening report, the VAP3 will submit this report to the Agency Administrator for review and consideration.

PROJECT BACKGROUND

Date:	May 15, 2015
Project Name:	Solar Energy Development
Sponsoring Agency:	VDOT (can also apply to other agencies)
Project Concept Source:	Solicited

VIRGINIA P3 OFFICE RECOMMENDATION

Proceed to project development? ☒ Yes ☐ No

Executive Summary recommendations from VAP3:

The Solar Energy Development Project (Project) presents the Virginia Department of Transportation (VDOT) an opportunity to optimize the use of state-owned property, raise additional monies and become more environmentally responsible. Potential land lease collections, electricity savings and/or revenue sharing provisions are possible sources of value capture for the Project. Ultimately, this Project meets public needs and provides public benefits by unlocking additional monies to keep facilities in a state of good repair and furthering Virginia's current energy initiatives outlined in the Virginia Energy Plan. Moreover, this Project would realize public benefits by supporting a renewable energy industry in Virginia, contributing to a cleaner environment and creating economic development opportunities.

VAP3 recommends the Project be advanced to the project development phase. During the project development phase, VAP3, in coordination with VDOT and Department of Mines, Minerals and Energy (DMME), will further refine the Project scope, structure and procurement with the goal of accelerating project delivery and maximizing the public benefits.

During the project development phase, the following activities will take place:

1. develop business case and financial model to determine project costs and potential revenue;
2. create specific site screening criteria to narrow down the current list of properties;
3. conduct a risk workshop to further identify and assess project risks and potential impacts; and
4. recommend the optimal type of procurement to utilize for the Project.

Agency Concurrence: ☑ Yes ☐ No

5/27/15

Signature Date

Charlie A. Kilpatrick, Commissioner of Highways

Virginia Department of Transportation

PRELIMINARY SCHEDULE

Activity	Completion Date
High-Level Screening Report	July 2014
Request for Information (RFI)	January - March 2015
Detail-Level Screening Report	May 2015
Data collection / site feasibility analysis	Spring - Summer 2015
Business case development	Spring - Summer 2015
Enter procurement	Summer 2015

PROJECT NEED/SCOPE/APPROACH STATEMENT

Description:

This Project presents VDOT the opportunity to optimize the use of state-owned property, raise additional monies and become more environmentally responsible. Potential land lease collections, electricity savings and/or revenue sharing provisions are possible sources of value that can be captured from the Project. Ultimately, this Project meets public needs and provides public benefits by unlocking additional monies to keep facilities in a state of good repair and furthering Virginia's current energy initiatives outlined in the Virginia Energy Plan.[1] Moreover, this Project would realize public benefits by supporting a renewable energy industry in Virginia, contributing to a cleaner environment and creating economic development opportunities.

VDOT administers a variety of state-owned properties and real estate parcels across Virginia. For example, VDOT administers right-of-way (ROW) properties, including adjacent land to interstates and sound barrier walls, and state-owned properties not considered ROW, including, but not limited to: central headquarters, district offices and facilities, regional offices and facilities, operations and maintenance facilities, and Park and Ride sites.

Solar energy systems can be placed on a variety of sites and thus the technical feasibility is driven in the most part by the characteristics of the site. VDOT sites could include: rooftop solar systems; ground mounted solar systems on vacant land or underutilized space; solar canopies over park and ride lots; solar sound barrier walls; and/or a combination of some or all. In project development, the technical feasibility of potential sites will be further studied and screening criteria established to narrow down a list of the most feasible sites.

The screening criteria will also help further refine the scope of the Project, which could progress in a several ways:

1. smaller, distributed sites packaged together into one award for total energy capacity;
2. a large, singular site; and/or
3. a combination of both types of sites.

A variety of business models are possible for this Project and the most feasible ones are highly dependent on VDOT's project priorities and desired appetite for risk. Three business models have been identified to potentially meet the priorities and risk appetite of VDOT. All three business models include a rental amount for access to land (or space) to design, build, finance, operate and maintain (DBFOM) the solar energy system (or the Project). The difference between each of these models is where the solar power produced by the Project goes. In Model 1, the solar power goes into the electricity grid. In Model 2, the solar power is consumed onsite by the land owner. In Model 3, the solar power goes into the grid and is consumed by an offsite facility owner. The solar power in each model is sold at an agreed upon rate. The flow of assets in the three business models described above is illustrated in Figure 5.

In the three business models, the rent usually takes the form of a land lease agreement (LLA) between the land owner and the solar energy system owner. Selling the solar power at an agreed upon rate usually takes the form of a power purchase agreement (PPA) between the solar energy system owner and other entity consuming the solar power, which depends on the model and could include the site owner, electricity provider and/or the offsite facility owner. All three models could be carried out by contracting with an electricity provider and two models could be carried out by contracting with a private developer.

In addition to these three business models, VAP3 would also like to explore the possibility of revenue sharing on profits and potential sharing of the value of the renewable energy certificates (RECs) generated by the Project. Depending on the business model chosen for the Project, the Virginia Public Procurement Act (VPPA)[2] or Public-Private Educational Facilities and Infrastructure Act (PPEA)[3] could be used to procure the Project. In project development, the business models will be furthered analyzed from a financial and risk perspective to determine which model and type of procurement provides the most value to Virginia and fits into VDOT's priorities.

An important project development activity will be to convene a risk workshop involving experienced professionals and important stakeholders to further identify and assess Project risks threatening success of this Project and their associated potential impacts on the cost and schedule for the Project. Currently, the largest risk to the Project is the utilization of the federal Business Energy Investment Tax Credits (ITCs)[4] as these credits expire December 31, 2016, no other state incentives currently exist, and VDOT currently has no funding allocated as public subsidy. Thus, accelerated project development is essential to make this Project financially feasible. The general recommendation from experienced professionals is to complete procurement and issue a notice to award by December 2015 to ensure the Project can be commissioned in time to meet the expiration deadline.[5]

SCREENING CRITERIA-DESIRABILITY

Public Need and Benefits

☒ Yes ☐ No ☐ TBD

This Project presents the opportunity for VDOT to optimize the use of state-owned property, raise additional monies and become more environmentally responsible. Potential land lease collections, electricity savings and/or revenue sharing provisions are possible sources of value that can be captured from the Project. Ultimately, this Project meets public needs and provides public benefits by unlocking additional monies to keep facilities in a state of good repair and furthering Virginia's current energy initiatives outlined in the Virginia Energy Plan.

Moreover, this Project would realize public benefits by supporting a renewable energy industry in Virginia and contributing to a cleaner environment. This Project promotes energy security by helping to diversify the means of energy generation and reducing the amount of conventional grid energy, which offers protection from future energy rate increases.

Economic Development

☒ Yes ☐ No ☐ TBD

This Project has the potential to generate economic development across Virginia by enhancing the economic growth, competiveness and viability of the Virginia's renewable energy and associated industries. The Project would enhance Virginia's economy by generating construction jobs, professional service needs, and growth in the companies directly operating in the renewable energy and associated market(s).

The extent to which jobs and businesses are created or grown is directly related to the size of the Project. According to an RFI Respondent, 1 megawatt (MW) of solar energy installed can employ the equivalent of approximately 15 workers for one year and create approximately $2.5 million in business revenue.[6] Using the National Renewable Energy Laboratory's Jobs and Economic Development Impact Model[7] and a 20MW generic project, the model estimates the following economic impacts:

1. during the construction period, $19M in local spending, 230 direct & induced jobs at an average of $20+/hr, $770,000 in sales tax for the state (based on a state rate of 5% with no known exemptions for utility scale projects); and
2. after construction, over $425,000 in annual sales & property tax for the state.

Additionally, successful delivery of this Project would help VDOT be a leader in expanding a competitive renewable energy industry in Virginia and thus contribute to building a new Virginia economy that is diverse, cutting-edge, and attractive to the world.[8]

Market Demand for P3 Delivery

☒ Yes ☐ No ☐ TBD

The VAP3, in coordination with the Virginia Department of Mines, Minerals and Energy (DMME), issued an RFI on January 15, 2015 to solicit responses to questions related to the potential Project. The responses were due back to the parties by March 13, 2015.

The RFI asked for information from individuals, firms, teams or organizations that have experience with solar energy development projects. This RFI received 21 written responses from: 18 developers/installers; 1 Virginia utility; 1 educational research center; and 1 public comment. Most respondents indicated they would be interested in continuing evaluation of the Project in Virginia and participating in the procurement for such a Project.

The RFI and responses can be found at: http://www.p3virginia.org/projects/solar-energy-development/

Stakeholder Support

☒ Yes ☐ No ☐ TBD

A new Virginia Energy Plan was released by DMME on October 1, 2014. In part, the Virginia Energy Plan centered on growing Virginia's energy economy with a particular focus on renewable energy, especially solar energy. As a recommendation, the Virginia Energy Plan called for the establishment of the Virginia Solar Energy Development Authority (Authority) and for the installation of 15 MW of solar power on state and local assets by June 30, 2017.[9]

In the 2015 Virginia General Assembly Session, House Bill 2267 (§ 67-1501)[10] was passed, which formally establishes the Authority. "*The Authority is established for the purposes of facilitating, coordinating, and supporting the development, either by the Authority or by other qualified entities, of the solar energy industry and solar energy projects by developing programs that increase the availability of financing for solar energy projects, facilitate the increase of solar energy generation systems on public and private sector facilities in the Commonwealth, promote the growth of the Virginia solar industry, and provide a hub for collaboration between entities, both public and private, to partner on solar energy projects.*" The establishment of this Authority through legislation shows the commitment from Virginia's legislators and the McAuliffe administration for increasing solar energy in Virginia.

The Authority is also tasked with "*assisting investor-owned utilities in the planned deployment of at least 400 megawatts of solar energy projects in the Commonwealth by 2020," (§ 67-1505).* This task shows the strong commitment of Virginia's investor-owned utilities, which provide a majority of Virginia's energy, to largely increasing the generation of solar energy across Virginia.

Furthermore, the Virginia State Corporation Commission's (SCC's) support for solar energy development is evident through the establishment of Chapter 382 of the Virginia Acts of Assembly,[11] which creates a renewable energy pilot program[12] to allow for PPAs with private developers. The driving motivation behind the establishment of this program was Dominion issuing cease and desist letters to a solar energy project using a PPA with a private developer (Secure Futures) on the campus of Washington and Lee University (W&L). Dominion argued the project was deemed to violate the Code of Virginia § 56-577 (A)(5)(a)[13] because the project was located in Dominion's exclusive territory and did not supply W&L 100% of its energy demand.[14] Illustrated by this example, the SCC has taken actions to decrease the barriers for obtaining PPAs with private developers in Virginia.

Stakeholder support will further be evaluated in project development and special attention and specific outreach will need to be paid to localities and other local stakeholders that may be affected by the Project.

SCREENING CRITERIA FOR FEASIBILITY

Technical Feasibility

☒ Yes ☐ No ☐ TBD

The Project could progress in a several ways:

1. smaller, distributed sites packaged together into one award for total energy capacity;
2. a large, singular site; and/or
3. a combination of both types of sites.

Solar energy systems can be placed on a variety of sites and thus the technical feasibility is driven in the most part by the characteristics of the site. VDOT sites could include rooftop solar systems (see Figure 1 for example), ground mounted solar systems on vacant land or underutilized space (see Figure 2 for example), solar canopies over park and ride lots (see Figure 3 for example), solar sound barrier walls (see Figure 4 for example), and/or a combination of some or all.

For example, several state DOTs, including Oregon and Massachusetts, are pursuing solar energy projects via P3 delivery methods. The first project to be completed in the U.S. by a DOT on ROW was developed in 2008 by Oregon DOT (ODOT) and is called "Oregon's Solar Highway Demonstration Project."[15] This project is a ground-mounted solar array system located in the ROW, consisting of 594 photovoltaic panels and producing 104 kilowatt hours (kWh) of electricity. This system supplies approximately one-third of the needed energy to illuminate the interchange at Interstate 5 and Interstate 205. The Massachusetts DOT (MassDOT) is currently working to implement a state-wide Solar Photovoltaic (PV) Energy Program[16] to build ground mounted solar energy systems on multiple sites

located within the highway ROW. The scope of MassDOT's project includes ten parcels of ROW located at eight different locations with a total capacity of approximately 5.5 MW. For this project, MassDOT executed the Master License Agreement/PPA (MLA/PPA) in November 2014 and is currently in construction.

Most respondents to the RFI for this Project focused on ground mounted (similar to the ODOT and MassDOT projects described above) and rooftop solar energy systems as the least technically challenging and most economically feasible sites because of the strong track record and low cost of installation for these types of sites. The key characteristics described by RFI respondents for ground mounted and rooftop solar energy systems are captured in the Table 1.

Table 1: Key Site Characteristics

	Large, Singular Installation	Smaller, Distributed Installations	
	Ground Mounted	Ground Mounted	Rooftop
Electricity generation:	Approximately 4-16 MW	Approximately 400-500 KW	
Size:	At least 25-100 acres	At least 2-3 acres	At least 40,000 - 75,000 square foot flat roof
Surface:	Minimum grading required Land slope no greater than 8-10% South facing land	Minimum grading required Land slope no greater than 8-10% South facing land	Roof less than 5 years old South facing roof
Site elements:	Minimum shading and obstructions	Minimum shading and obstructions	
Electricity offtake infrastructure:	Proximity to interconnection infrastructure with capacity to offtake the electricity and minimum upgrades required	Proximity to interconnection infrastructure or a facility with enough capacity to offtake the electricity	

The RFI respondents also described value in packaging together smaller, distributed installations into one contract for a total capacity. This would allow for efficiencies to be gained, which could drive down the overall cost of the Project. This concept is similar to the MassDOT project, which packaged together ten different small, distributed installations, and to the Pennsylvania P3 Rapid Bridge Replacement Project.[17] The Pennsylvania P3 Rapid Bridge Replacement Project is an example of a P3 project that bundled together the replacement of 558 deficient bridges into one award and used a detailed screening methodology to narrow down to the chosen 558 bridges. Bundling these bridges together created economies of scale and resulted in project savings and efficiencies.

State environmental permits are handled through the Department of Environmental Quality (DEQ) and contribute to the overall technical feasibility of a site. In 2009, the General Assembly of Virginia approved legislation (§ 10.1-1197.6),[18] which called for DEQ to develop permit by rule (PBR) regulations[19] for the construction and operation of small renewable energy projects. A solar energy project with a rated capacity not exceeding 100 MW is considered a small renewable energy project (§ 10.1-1197.5).[20] The solar PBR guidance[21] describes a subset of projects considered "de minimis" projects because they generally have little impact on natural resources. De minimus projects are considered solar energy projects with a rated capacity not exceeding 5 MW and require significantly less work and submissions to DEQ than projects that do not meet the de minimus criteria. Thus, the requirements for state environmental permits depend on the site and generation capacity.

VDOT, as a state agency, is required to cooperate with a locality where a capital project involving new construction costing at least $500,000 is located. During the planning phase of such a capital project, VDOT shall give a notice to the locality for "*the locality to evaluate the project for consistency with local ordinances other than building codes and to provide the locality with an opportunity to submit comments to the agency during the planning phase of a project*" (§ 15.2-2202).[22]

In project development, the technical feasibility of potential sites will be further studied and screening criteria established to narrow down a list of the most feasible sites. These screening criteria will include, but not be limited to, site characteristics, such as the ones in the table above and environmental requirement considerations.

Systematic Interface and Compatibility

☐ Yes ☐ No ☒ TBD

In 2012, Virginia consumed approximately 2,356 trillion Btu's, which was the 13th largest amount of energy consumed ranked by state, and Virginians purchased 107,794,985 megawatt hour (MWh) of electricity.[23] This Project is a part of Virginia's larger system of energy consumption, generation and distribution, and thus systematic interface and compatibility is an important consideration.

Retail sale of electricity in Virginia is provided by regulated and public utilities, which serve exclusive territories and have an obligation to serve customers who request service in their territories. Electric utilities include three investor owned electric utilities:

1. Dominion Virginia Power (Dominion) serves approximately 2.4 million customers;
2. Appalachian Power Company (APCo) serves approximately 500,000 customers in Southern and Southwest Virginia; and
3. Old Dominion Power (a subsidiary of Kentucky Utilities), serves customers in Wise and Dickinson Counties.

As of 2012, Virginia's investor owned utilities provided approximately 84% of the retail electricity in Virginia, of which Dominion Virginia Power provided approximately 67%.[24] In addition to investor-owned

electric utilities, customers are also served by 13 electric cooperatives and 16 municipal electric providers. The electric cooperatives together serve well over a million customers, and are the second largest provider of electricity in Virginia.

This Project will need to consider the interconnection impacts on the larger energy grid system. Infrastructure upgrades could potentially be required if the total capacity with the additional energy from the project cannot be handled by current energy infrastructure at certain potential sites. These upgrades would add to the overall project cost and make certain sites economically unviable. Thus, coordination with the electricity providers will be key to success for this Project and important during the screening process to identify the most viable site(s).

Interconnection considerations would be less of a consideration if the Project was structured in a way to consume all of the electricity generation onsite and not place any into the lager energy grid system.

Financial Feasibility

☐ Yes ☐ No ☒ TBD

Most RFI respondents identified the expiration of the ITCs in December 2016 as a critical to the financial viability of the Project and explained that the inability to take advantage of the Business Energy ITC equal to 30% of expenditures could potentially make the Project economically unviable. This federal ITC is critical because Virginia does not have state incentives for solar energy projects. General consensus from the RFI respondents is the decrease in the capital cost of solar energy installations coupled with the federal ITC make this Project economically viable with no public subsidy needed from VDOT. Thus, the private sector would use private financing to fill the gap between the total Project cost and ITC reimbursement. The general recommendation from the respondents was to complete procurement and issue a notice to award by December 2015 to ensure the Project can be commissioned in time to meet the expiration deadline.

A variety of business models are possible for this Project and the most feasible ones are highly dependent on VDOT's project priorities and desired appetite for risk. Three business models have been identified to potentially meet the priorities and risk appetite of VDOT. All three business models include a rental amount for access to land (or space) to DBFOM the solar energy system (or the Project). The difference between each of these models is where the solar power produced by the Project goes. In Model 1, the solar power goes into the electricity grid. In Model 2, the solar power is consumed onsite by the land owner. In Model 3, the solar power goes into the grid and is consumed by an offsite facility owner. The solar power in each model is sold at an agreed upon rate. The flow of assets in the three business models described above is illustrated in Figure 5.

In the three business models, the rent usually takes the form of a LLA between the land owner and the solar energy system owner. Selling the solar power at an agreed upon rate usually takes the form of a PPA between the solar energy system owner and other entity consuming the solar power, which

depends on the model and could include the site owner, electricity provider and/or the offsite facility owner. All three models could be carried out by contracting with an electricity provider and two models could be carried out by contracting with a private developer.

Contracting with an electricity provider simplifies the number of contracts and contracting entities because the electricity provider is the owner of the solar energy system. Thus, a PPA between the solar energy system owner and the electricity provider is unneeded. Figure 6 demonstrates what contracts are needed between the site owner, electricity provider and, for Model 3, the offsite facility owner. In Model 1, the site owner enters into a LLA with the electricity provider and does not enter into a PPA with the electricity provider. Therefore, the site continues to consume power form the grid through the state electricity contract. In Model 2, the site owner enters into an LLA and PPA with the electricity provider. By entering into the PPA, the site owner consumes the solar power onsite, supplements any additional power needs through the state electricity contract and potentially sells any excess solar power not consumed onsite to the electricity provider. From the site owner perspective, Model 3 is the same as Model 1. The difference with Model 3 is that an offsite facility owner enters into a PPA to consume the solar power that is produced by the solar energy system. This means that a state agency besides VDOT could agree to buy the solar power produced on a VDOT site from the electricity provider. The PPAs with the electricity provider could potentially take the form of an amendment to the state electricity contract.

On the other hand, contracting with a private develop is more complex and involves a large number of contracts and contracting entities because the private developer is the owner of the solar energy system. Thus, a PPA between the solar energy system owner and the electricity provider is needed. Figure 7 demonstrates what contracts are needed between the site owner, solar energy system owner, and electricity provider. In Model 1, the site owner enters into a LLA with the solar energy system owner and the solar energy owner enters into a PPA with the electricity provider to place the solar power into the grid. In Model 2, the site owner enters into an LLA and PPA with the solar energy system owner. By entering into the PPA, the site owner consumes the electricity onsite and supplements any additional electricity needs through net metering with the electricity provider. Model 3 is not possible when contracting with a private developer.

Contracting with an electricity provider versus a private developer has the advantage of a simplified structure; however, the agreements would be negotiated with a single contracting entity. A negotiated procurement opens the Project to the risk of not capturing as much value as could be captured through a competitive procurement process; however, measures in the negotiations could mitigate this risk. For instance, VDOT could require the electricity provider to competitively bid the capital improvements and tie this bid price to the LLA or PPA. Contracting with a private developer would allow for a competitive procurement process, which potentially could allow VDOT to capture more value from this Project. Depending on the business model chosen for the Project, the VPPA or PPEA could be used to procure the Project.

In addition to these three business models, VAP3 would also like to explore the possibility of revenue sharing on profits and potential sharing of the value of the RECs generated by the Project.

In project development, the business models will be furthered analyzed from a financial and risk perspective to determine which model provides the most value to Virginia and fits into VDOT's priorities.

Legal/Legislative Feasibility

☐ Yes ☐ No ☒ TBD

This Project could be accommodated under the General Powers of Commissioner.[25] These powers could be used as long as the value that can be captured from the Project was programmed to *"constructing, improving, maintaining, and preserving the efficient operation of the roads embraced in the systems of state highways and to further the interests of the Commonwealth in the areas of public transportation."*

The legal feasibility of the business models described above is highly dependent upon what type of agreement is allowed under the state electricity contracts with Dominion and APCo, which govern the state's purchase of electricity in each electricity provider's exclusive service territory. Virginia does not have state electricity contracts with the 13 electric cooperatives and 16 municipal electric providers and thus a Project in any associated service territories would need to be handled on a case-by-case basis. Amendments or memorandum of agreements may need to be added to the state electricity contracts depending on the business model that advances to procurement. This issue will be further studied in project development and inform which business models are feasible.

The business model involving a PPA between VDOT and a private developer is the most challenging model from a legal perspective due to the presence of a PPA with a private developer and associated need for net metering. For example, Dominion issued cease and desist letters to a solar energy project using Model 2 with a private developer (Secure Futures) on the campus of W&L. Dominion argued the project was deemed to violate the Code of Virginia § 56-577 (A)(5)(a)[26] because the project was located in Dominion's exclusive territory and did not supply W&L 100% of its energy demand.[27] Illustrated by this example, barriers exist to obtaining PPAs with private developers in Virginia; however, the SCC's renewable energy pilot program (Chapter 382 of the Virginia Acts of Assembly[28]) decreases these barriers by allowing for PPAs with private developers. This program is limited to the total amount of energy that can be covered under the program, which is 50 MW, and on individual projects for the amount electricity installation, which for tax exempt entities is between 1 kilowatt (kW) and 1 MW. Currently, the program includes eight solar energy projects[29] throughout Virginia, which combined total approximately 1.9 MW. Therefore, the program has approximately 48 MW of available capacity for solar energy projects involving PPAs with private developers. Further analysis of the state electricity contracts during project development will determine whether a PPA for this Project may be able to fall under the SCC pilot program or amendments or memorandum of agreements to the state electricity contracts are needed.

In the 2015 Virginia General Assembly Session, House Bill 1950 (§ 56-594)[30] was passed, which increases the maximum generating capacity of an electrical generating facility owned or operated by an electric

utility's nonresidential customer that may be eligible for participation in the utility's net metering program from 500 kW to 1 MW. Net metering can impact the Project economics because the law requires the net metered project to bear all reasonable costs of equipment required for the interconnection to the supplier's electric distribution system, including costs, if any, to install additional controls, perform or pay for additional tests, and purchase additional liability insurance.[31] While the law specifies the electricity provider can charge stand-by fees to residential and agricultural consumers in addition to the charges for transmission and distribution already included in the retail rate of electricity, the law does not specify the electricity provider can charge the same fees to other consumers, including VDOT. If a PPA with a private developer is allowed, then this Project could utilize net metering.

Under net metering regulations, the Project would be limited to a maximum amount of 1MW per site(s) and subject to all interconnection costs. The Project would have the option of entering into a PPA with the electricity provider to purchase the excess generation for one or more net metering periods. The PPA should be consistent with 20VAC5-315 Regulations Governing Net Energy Metering.[32] This regulation specifies the rate for which the customer's electricity provider shall be obligated by the PPA to purchase the excess power generation and the payment for a customer's renewable energy certificates RECs for the requested net metering periods. The regulation specifies rates for investor-owned electric distribution companies, member-owned electric cooperatives and competitive suppliers.

The business model of a LLA with an electricity provider could potentially require amendments or memorandum of agreements to the state electricity contracts or fit into the Solar Partnership Program[33] established by Dominion. For this program, Dominion will construct and operate up to 30 MW of Dominion-owned solar facilities on leased rooftops or on the grounds of commercial businesses and public properties throughout its Virginia service territory. The Solar Partnership Program is limited to the total amount of energy that can be covered under the program, which is 30 MW, and on individual projects for the amount of electricity installed, which is up to 2 MW. The Solar Partnership Program includes projects such as a 150 kW installation at Old Dominion University, a 2.4 MW installation at Philip Morris USA, a 600 kW installation at Capital One and a 100 kW installation at Virginia Union University. The Program has currently not met the maximum 30 MW limit, so this Project could potentially be included without a need for additional SCC authorization. Further analysis of the state electricity contracts during project development will determine whether amendments or memorandum of agreements to the state electricity contracts are needed or if the Solar Partnerships Program could be utilized.

Additional federal requirements exist for site(s) located on ROW land adjacent to a federal interstate and potentially site(s) not located on ROW land adjacent to a federal interstate but originally acquired by the state with federal transportation funds. If located on a ROW site, then this Project could fall under 23 CFR 645 Subpart B[34] or 23 CFR Part 710.[35] The definition of "utility" in 23 CFR 645.207 is broad enough to include solar and wind generated energy facilities. Solar panels and wind turbines constitute a "facility or system" for producing, transmitting, and distributing electricity and/or heat. To the extent that any such facilities serve "the public", they can be accommodated under the DOT's approved Utility Accommodation Policy Manual or Plan.[36]

The use of real property acquired as a part of a transportation project in which federal funds participated for public or private highway and non-highway purposes is granted to the state DOTs in 23 CFR Part 710 on Real Property Management. This grant is contingent upon ensuring the continued safety and integrity of the federally funded facility and adhering to the federal requirements for design, safety, security, operation and maintenance. The right to use this area by public or private parties for interim non-highway uses may be granted in airspace leases. Moreover, the state DOT may receive fair market income from real property leases and use it for Title 23 (transportation) eligible projects (23 CFR 710.403 (e)). While specific site(s) for the Project have not been determined, the rights to real property are important because many state transportation projects in Virginia include some form of federal funding. In project development, coordination with the FHWA will help determine whether the Project fall under 23 CFR 645 Subpart B or 23 CFR Part 710 and which federal requirements need to be followed.

Project Risks

☒ Yes ☐ No ☐ TBD

The P3 method could transfer key Project risks to the private sector. Depending on the final scope and business model of the Project, the transferable risks could include risks associated with development, design, permitting, construction, regulatory issues/changes and schedule, as well as long term risks associated with financing, lifecycle costs, operations, maintenance and decommissioning.

The RFI respondents all highlighted the utilization of the federal ITCs as the largest risk to the Project since these credits expire December 31, 2016, no other state incentives currently exist, and VDOT currently has no funding allocated for the Project. Accelerated project development is essential to complete procurement and issue a notice to award by December 2015 to ensure the Project can be commissioned in time to meet the expiration deadline, which was the general timeline recommendation from the RFI respondents. Accelerated project development introduces the risk of a condensed and streamlined project timeline with multiple project activities happening at the same time, which are dependent upon each other.

Other Project risks include:

- additional federal requirements needed with ROW;
- coordination with the electricity providers in Virginia;
- ease of site control;
- the fundamental economics as the price of power in Virginia is relatively low compared to other states;
- technically feasible sites with optimal site characteristics;
- size and economic limitations of the PPA pilot program and net metering;
- Virginia has a voluntary renewable portfolio system;
- electricity providers are not obligated to purchase the renewable electricity, unless the system is net metered;

- the market for RECs is not as lucrative as states with mandatory renewable portfolio systems;
- interconnection to the grid and proximity to a substation and distribution lines that can handle additional electricity load;
- the anticipated crush of demand for solar panels and labor nationwide to meet the federal ITC deadline in 2016 and associated spike in prices for equipment;
- cost of capital financing;
- local land use and construction permitting process;
- under developed solar industry in Virginia with a lack of experience; and
- coordination and outreach or engagement with local stakeholder and the general public.

An important project development activity will be to convene a risk workshop involving experienced professionals and important stakeholders to further identify the risks threatening success of this Project.

Life Cycle Management

☒ Yes ☐ No ☐ TBD

Advancing the proposed Project via a P3 delivery method could drive life cycle management considerations in the overall project execution. VDOT could realize life cycle efficiencies by integrating project activities, such as design, construction, financing, operations, maintenance and decommissioning, into one long-term contract. Life cycle efficiencies can also be gained through economy of scales gained in the single contracting of multiple sites across Virginia or single large site.

Moreover, VDOT could pave the future for the development of a life cycle model for additional VDOT projects and projects with other state agencies, such as the Department of Aviation, Department of Motor Vehicles and Department of Conservation and Recreation.

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FIGURES

Figure 1: Rooftop Solar System Example – Canon Virginia inc.'s Industrial Resource Technologies Facility in Gloucester, Virginia

Source: Cannon

Figure 2: Ground Mount Solar System Example - Oregan Department of Transportation Solar Energy Demonstration Project in Portland

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Figure 3: Solar Canopy over Parking Lot Example – Rutgers University

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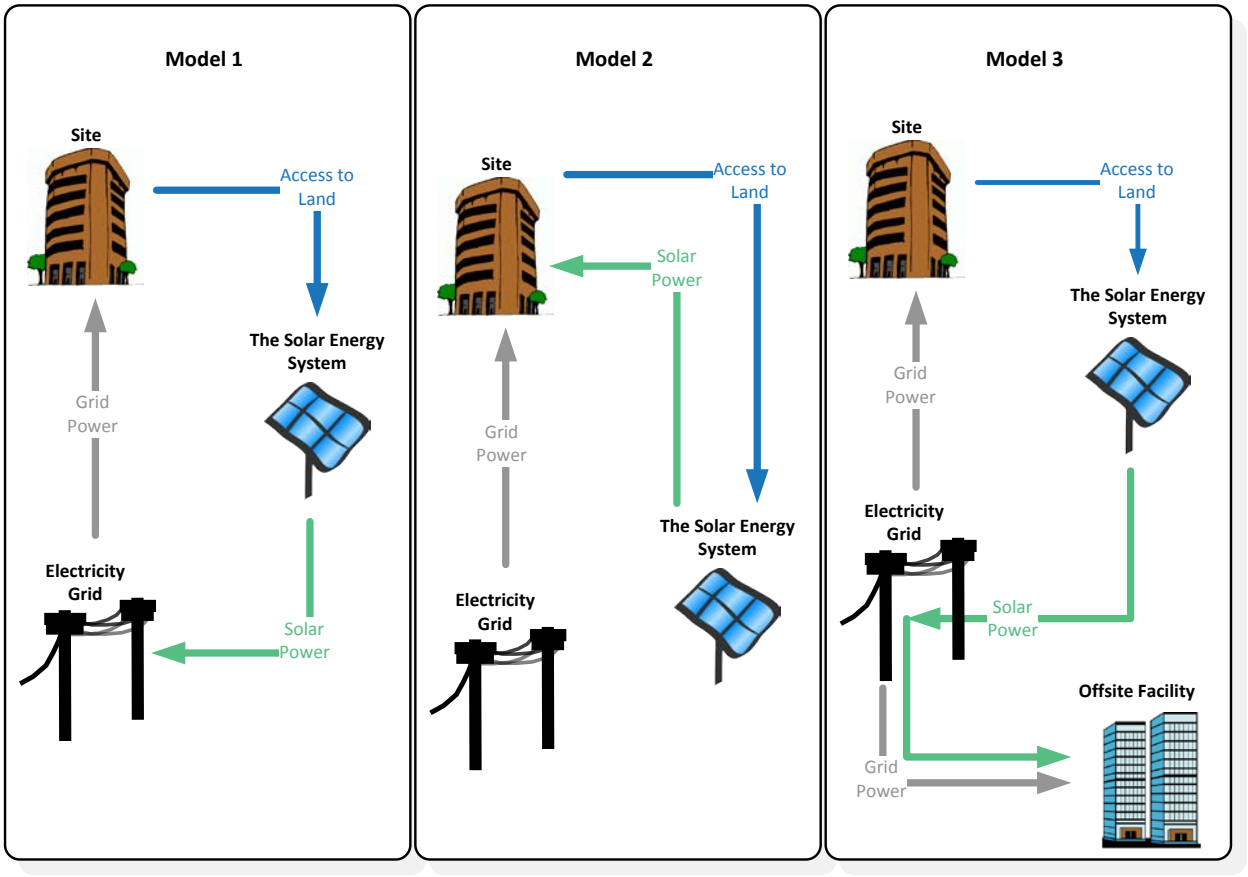
Figure 4: Solar Sound Barrier Wall Example – Located in Europe

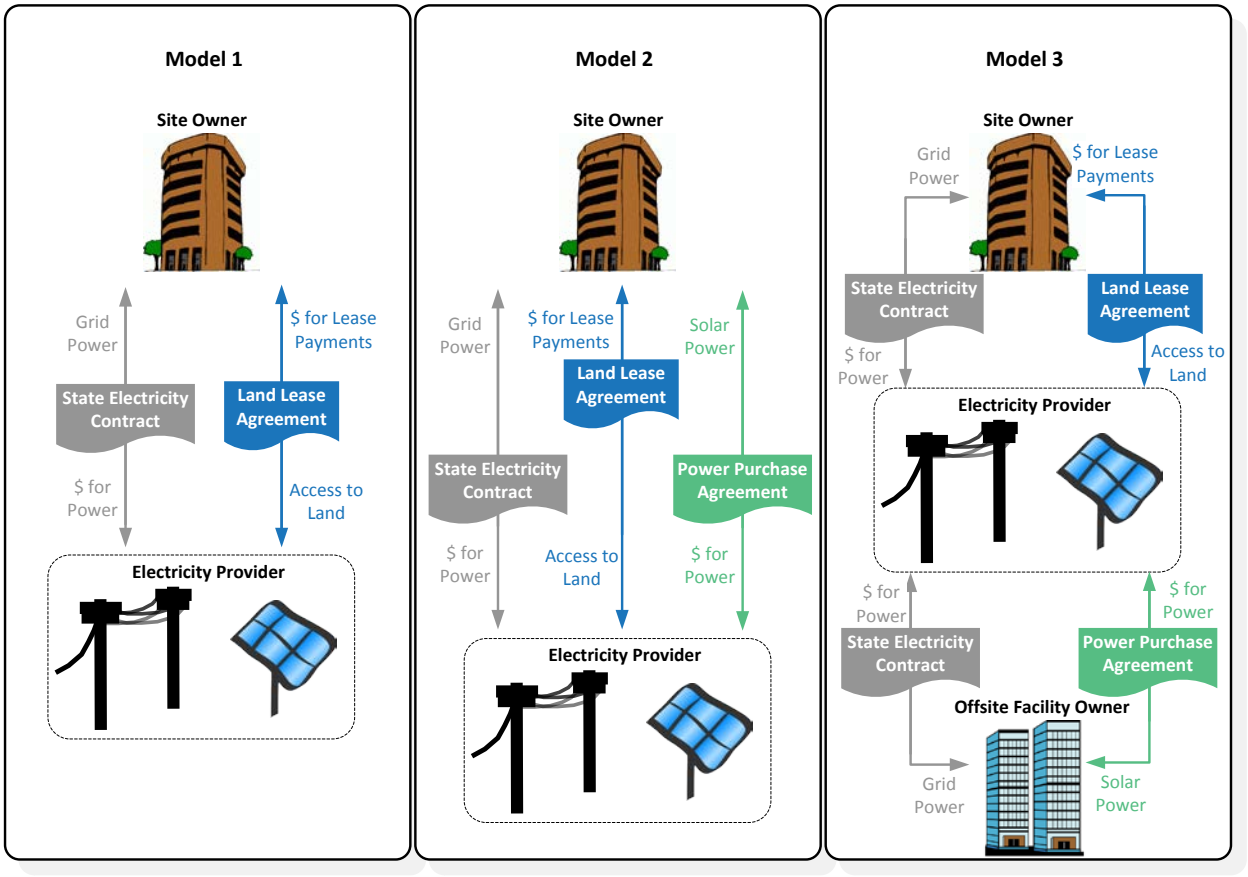
Source: www.photovoltaik.eu

Figure 5: Flow of Assets in the Three Business Models



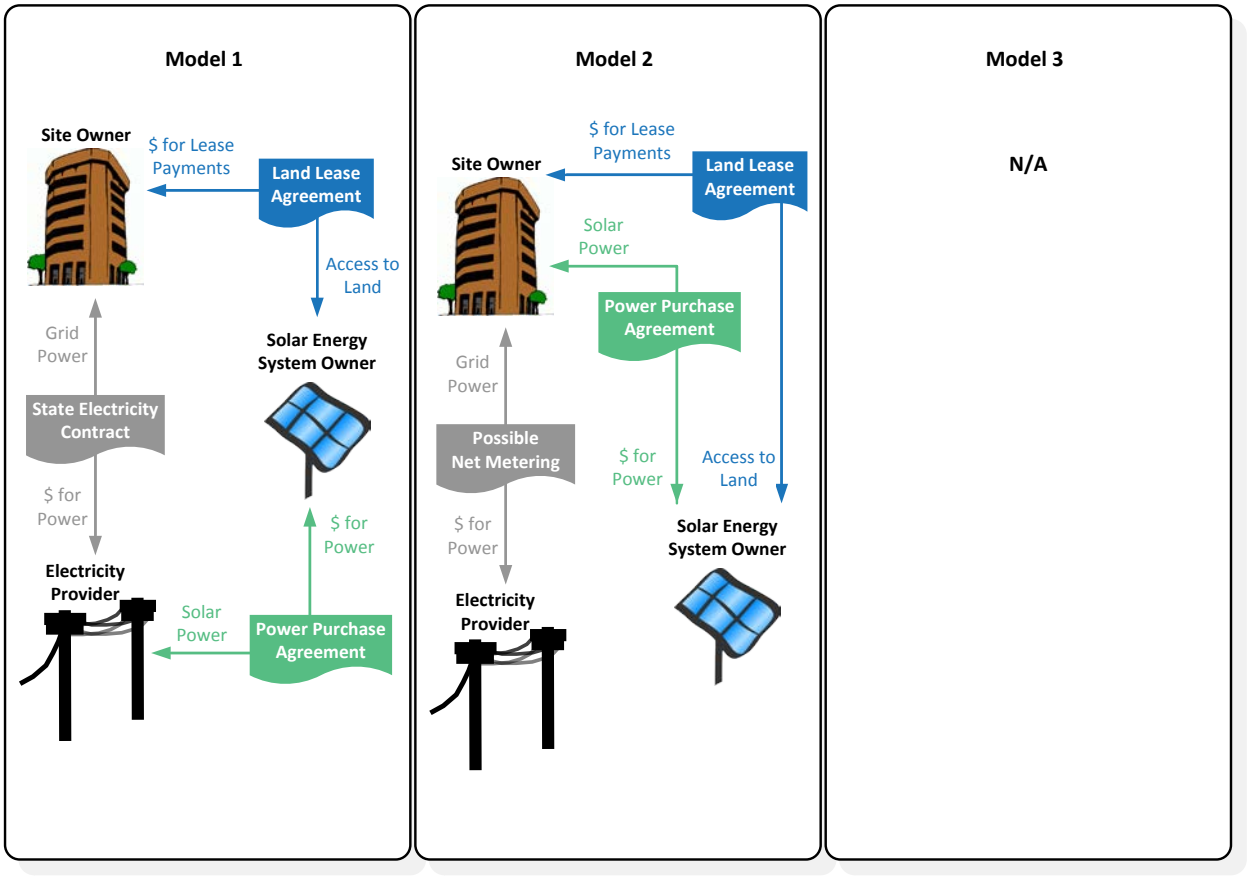
Source: VAP3

Figure 6: Agreements in Three Business Models **WITH ELECTRICITY PROVIDER**



Source: VAP3

Figure 7: Agreements in Three Business Models **WITH PRIVATE DEVELOPER**



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