



COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

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Agenda item #8

RESOLUTION OF THE COMMONWEALTH TRANSPORTATION BOARD

July 17, 2019

MOTION

Made By: Mr. Kasprowicz, Seconded By: Mr. Johnsen
Action: Motion Carried

HIGHWAY LIGHTING REPLACEMENT PROJECT AWARD PURSUANT TO ENERGY PERFORMANCE CONTRACTING

WHEREAS, the 2018 Virginia Energy Plan, endorsed by Governor Northam and developed pursuant to §67-201 of the *Code of Virginia*, specifically endorses Energy Performance Contracting (EPC) with Energy Services Companies (ESCOs), stating that EPC “is a budget neutral, cost-effective tool that allows state agencies and publicly-owned facilities to reduce their deferred maintenance backlogs without adding any financial burden to the taxpayer. In addition, EPC is an effective mechanism to finance capital improvements using leveraged energy savings to reduce both energy costs and consumption;” and,

WHEREAS, Governor Terence McAuliffe issued Executive Order Number 31 in October 2014, directing state agencies to “proactively pursue energy efficiency measures, especially Energy Performance Contracting (EPC), to reduce energy consumption;” and,

WHEREAS, legislative direction in the 2019 Appropriation Act (Chapter 854, Item 77G) required the Department of General Services (DGS) and the Virginia Department of Transportation (VDOT) “to maximize the use of light-emitting diodes (LEDs) instead of traditional incandescent light bulbs when any state agency installs new outdoor lighting fixtures or replaces nonfunctioning light bulbs on existing outdoor lighting fixtures as long as the LEDs lights are determined to be cost effective;” and

WHEREAS, §11-34.3 of the *Code of Virginia* authorizes state agencies to enter into energy performance-based contracts, using the services of an energy performance contractor; and,

WHEREAS, in accordance with §11-34.3, DGS, in coordination with the Department of Mines, Minerals and Energy (DMME), has established a statewide EPC program and a pre-approved list of ESCOs to serve all public bodies in Virginia that use the EPC program; and,

WHEREAS, after evaluation of proposals received from pre-approved ESCOs, VDOT selected Trane, Inc. (Trane) to provide EPC Services. In April 2015, VDOT and Trane executed a Memorandum of Understanding (MOU) for energy audit services, including, but not limited to an audit of roadway lighting technology throughout the four eastern VDOT Construction Districts; and

WHEREAS, Trane performed the scope of services required by the MOU, and based on those energy audit results VDOT has identified a candidate EPC project to replace approximately 9,627 existing roadway lighting fixtures with LED fixtures throughout Fredericksburg, Richmond, and Hampton Roads Districts, plus a portion of Northern Virginia District; and to implement a lighting controls system for all proposed LED fixtures (LED Project); and,

WHEREAS, VDOT has analyzed Trane's proposal for a contract pursuant to the EPC methodology as compared to the alternative of delivering these lighting improvements using traditional design-bid-build contracting methods, and has determined that the proposed contract under EPC best serves the interests of the Commonwealth; and

WHEREAS, as per standard EPC procedures, Trane assumes the risk should future energy consumption reductions fall short of modeled energy savings; and

WHEREAS, VDOT has ensured that the proposed LED Project has been designed to minimize lighting impacts to the environment and adjacent residents and property owners, including use of luminaires with a Correlated Color Temperature of 3000K where appropriate, while still providing proper illumination of the road in a way that best benefits road user safety and incident response; and

WHEREAS, as per standard EPC program procedures and other requirements, the proposed Trane contract has been or will be submitted for review and approval by DMME, the Virginia Department of Treasury, Office of the Attorney General and the Governor's Office; and

WHEREAS, pursuant to §33.2-209, the Commonwealth Transportation Board has the power and duty to let all contracts to be administered by the Department of Transportation for the construction, maintenance, and improvement of the highways comprising systems of state highways in excess of \$5 million.

NOW, THEREFORE, BE IT RESOLVED that the Commonwealth Transportation Board hereby concurs with VDOT's recommendation and hereby agrees to award the contract for this project to Trane, subject to the following:

- (1) Receipt of required approvals by the Department of Mines, Minerals and Energy, Virginia Department of the Treasury, Office of the Attorney General and the Governor's Office;
- (2) Agreement on all technical terms and conditions between the parties to the contract; and
- (3) Financing of the project by the Virginia Department of the Treasury via the Virginia Energy Leasing Program.

BE IT FURTHER RESOLVED by the Commonwealth Transportation Board that the Commissioner of Highways, or his designee, is granted the authority to execute a contract for the LED Project, with substantively the same terms and conditions as presented to the Commonwealth Transportation Board with such technical/non-substantive additions or modifications deemed necessary by the Commissioner, and to take all steps and execute all other documents necessary to effectuate the award of this contract to Trane, Inc. once the above-referenced conditions have been met.

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CTB Decision Brief

Highway Lighting Replacement Project Award Pursuant to Energy Performance Contracting

Issue: The Commissioner of Highways seeks Commonwealth Transportation Board (CTB) approval to enter into a proposed contract pursuant to the Energy Performance Contracting methodology (EPC) with Trane, Inc. (“Trane”) for Highway Lighting Replacement services.

Facts: VDOT has been directed by the Governor and General Assembly to evaluate and implement Light-Emitting Diode (LED) lighting improvements and consider EPC with Energy Services Companies/Contractors (ESCOs) to reduce energy consumption pursuant to:

2018 Virginia Energy Plan (issued October 2018 pursuant to §67-201 of the Code of Virginia): EPC is a budget neutral, cost-effective tool that allows state agencies and publicly-owned facilities to reduce their deferred maintenance backlogs without adding any financial burden to the taxpayer. In addition, EPC is an effective mechanism to finance capital improvements using leveraged energy savings to reduce both energy costs and consumption.

Governor’s Executive Order 31 (issued October 2014): All state agencies should proactively pursue energy efficiency measures, especially EPC, to reduce energy consumption. EPC is a budget neutral, cost-effective tool that permits state agencies and publicly-owned facilities to reduce their deferred maintenance backlogs without adding any financial burden to the taxpayer.

2019 Appropriation Act, Chapter 854, Item 77(G):

The Director of the Department of General Services shall work with the Commissioner of the Department of Transportation and other agencies to maximize the use of light-emitting diodes (LEDs) instead of traditional incandescent light bulbs when any state agency installs new outdoor lighting fixtures or replaces nonfunctioning light bulbs on existing outdoor lighting fixtures as long as the LED lights are determined to be cost effective.

Under the auspices of § 11-34.3 of the *Code of Virginia*, the Department of General Services (DGS), in coordination with the Department of Mines, Minerals and Energy (DMME) has established the statewide EPC program, and has also established a pre-approved list of ESCOs to serve all public bodies in Virginia that use the EPC program.

In October 2014, VDOT issued a request for pre-approved ESCOs to perform a “back-of-envelope proposal” to audit VDOT’s energy usage. VDOT selected Trane following competitive evaluation of the proposals received, in consideration of both their cost proposal and technical expertise. In April 2015, VDOT and Trane executed a Memorandum of Understanding (MOU) for energy audit services of VDOT central office facilities, VDOT Materials Lab, rest areas/welcome centers, VDOT’s four major tunnels, and roadway lighting throughout the four eastern VDOT Construction Districts.

In August 2017, VDOT and Trane preliminarily agreed to proceed with development of a proposal for highway lighting replacement (LED Project or Project). VDOT and Trane had agreed to a scope of work and a financed Project cost of \$15,925,000 (\$1,550 per fixture exclusive of MOU, owner-contingency costs, and VDOT’s internal administration and construction engineering/inspection costs), after VDOT negotiated with Trane to reduce their initial proposal of \$1,850 per fixture.

In September 2017, VDOT paused further pursuit of the EPC based on concerns raised by the CTB regarding the potential public health impacts of LEDs. In response, VDOT engaged the help of national lighting experts to help develop a strategy that best balances the need to properly illuminate

the road and help drivers see dark objects on the road at night (such as deer, pedestrians, or debris), with the need to minimize impacts to skyglow, light trespass, and any potential health impacts to property owners/residents near VDOT owned lights. VDOT issued, in May 2019, two Instructional & Informational Memoranda (IIM) IIM-TE-390, Road Lighting, and IIM-TE-380.1, Sign Lighting which document and provide information concerning implementation of this strategy.

In April 2019, VDOT resumed negotiations with Trane to develop a draft contract under the EPC methodology that takes into account the new road lighting strategy. Contractual requirements/provisions that have been incorporated to minimize the impacts of this proposed EPC on skyglow, light trespass, and public health include:

- Fixtures with 3000K Correlated Color Temperature (CCT) will be used at all locations where that is required by VDOT's new strategy.
- All fixtures installed pursuant to this contract will be zero cut-off fixtures that minimize skyglow.
- Most of the LED replacements will have less backlight and glare as compared to the existing high-pressure sodium (HPS) fixtures.
- Many of VDOT's existing fixtures are tilted upwards, resulting in significant backlight/uplight/glare. In most cases VDOT will be able to replace those with LEDs that are level with the road surface.
- Implementation of a Lighting Controls System (LCS) that will allow VDOT to more smartly manage the illumination levels at individual fixtures.
- Although not addressed by the EPC per se, the LCS will give VDOT future capability to evaluate potential for time-of-night dimming in Park & Rides or on limited access highways.

VDOT has reviewed and concurred with Trane's methodologies for estimating current energy usage, modeled future energy usage, and modeled cash flows during the construction period and 15-year bond amortization period. This LED Project, as set forth in the draft contract, is expected to result in positive net cash flow for VDOT throughout the contract term (until 2036), with a cumulative net benefit of \$4.1 million during that period.

The proposed LED Project consists of and the draft contract provides for replacement of 9,627 conventional and high mast roadway lighting fixtures with LED fixtures throughout Fredericksburg, Richmond, and Hampton Roads Districts, plus a portion of the Northern Virginia District.

These fixtures are primarily located on interstate/limited access highways, ramps, VDOT-owned Park and Rides, rest areas/welcome centers, and weigh stations. The LED fixtures will be a mixture of Current By GE or Acuity Brands, both of which are manufactured in the United States. The revised 2019 Project cost is estimated to be approximately \$17,399,000 (approximately \$1,700 per fixture exclusive of MOU, owner-contingency, and VDOT's internal administration and construction engineering/inspection costs). The revised total financed Project cost is estimated to be approximately \$1.5 million (9.3%) higher than the September 2017 cost. VDOT has reviewed the reasons for this cost increase and is satisfied that this increase is justified, based on the following factors:

- General industry-wide increases in cost of construction
- A significant proportion of Virginia's contracting resources are already committed to existing and upcoming megaprojects (I-66, HRBT Expansion, Fred Ex, etc.)
- Contract has expanded into NOVA Construction District, which is typically a higher-cost District for construction
- Increased inventory management complexity due to addition of 3000K fixtures into the Project

LED fixtures offer substantial benefits over traditional highway fixture technologies, including:

- Energy savings – LED fixtures consume 50% or less of the energy consumed by traditional High Pressure Sodium (HPS) fixtures, thus reducing VDOT's energy expenditures and carbon footprint;
- Operations & Maintenance – VDOT's current fixtures typically must be replaced every five years or sooner. VDOT negotiated with Trane to receive a 15-year manufacturer's warranty for the fixtures, five years more than the Industry standard of 10 years. VDOT anticipates that the life span will exceed 15 years, as VDOT's specifications require both the optical elements and the driver to be rated for 100,000 hours, which equates to almost 23 years based on an average annual burn rate of 12 hours per day;
- Work zones – VDOT will need to close shoulders and travel lanes much less frequently for future re-lamping operations, reducing risk of work zone-related incidents; and
- Safety – LED fixtures emit a crisper, whiter light with significantly improved Color Rendering Index (CRI), allowing drivers to better distinguish dark objects at night.

In addition, a key component of the LED Project addressed by the draft contract is the implementation of Current By GE's LightGrid LCS. Advantages of the LCS include:

- Utility-grade metering -- LCS provides accurate readings of energy usage, allowing VDOT and Trane to independently verify that actual "after" energy usage matches Trane's models;
- Energy savings -- Approximately 15% additional energy savings beyond those achieved by LED conversion alone. LCS also minimizes risk of "dayburning" (when a traditional light sensor fails, resulting in daytime lighting);
- Notifications -- Automatic notifications of power or light failure, reducing labor costs. Currently VDOT must periodically perform visual assessments to identify outages;
- Remote operation -- Gives VDOT the ability to remotely turn on, off, or dim individual lights, based on operational and safety assessment;
- Dimming – although not addressed pursuant to this contract, LCS gives VDOT the capability to implement strategies to dim certain lights based on time of day, for example potential late-night dimming of all park & ride lights; and
- Incident Response and Operations – LCS may give VDOT future capability to dynamically change light levels/patterns in response to real-time traffic conditions or ongoing incidents.

Under EPC, contract costs are paid for using funding from the Virginia Energy Leasing Program (VELP) managed by the Department of the Treasury. The VELP enables agencies to obtain consistent and competitive credit terms for financing energy efficiency improvements, providing up-front payment, which is paid back through savings in future energy expenditures. Once approved and finalized, VDOT would be responsible for the lease payments regardless of actual energy savings resulting from the LED Project; however, under the contract, VDOT will have recourse with Trane if savings are insufficient. At an anticipated 2.80% interest rate, VDOT's lease payments will be approximately \$1.6 million annually for 15 years. The LED Project is forecast to result in a cumulative positive net cash flow of approximately \$4.1 million by 2036.

VDOT has compared the proposed negotiated draft Trane contract against an alternative scenario in which VDOT delivers these lighting improvements using in-house resources and traditional design-bid-build contractors. Based on this comparison, VDOT has determined that the proposed EPC Project best suits the needs of the Commonwealth, resulting in quicker delivery of lighting improvements,

sooner realization of energy savings, and minimized impacts to VDOT's maintenance budget due to the VELP financing.

Should the CTB/VDOT elect not to award/enter into a contract with Trane under EPC, pursuant to the Memorandum of Understanding, VDOT would need to repay \$513,800 to Trane for the cost of their Phase 1 energy audit.

VDOT recommends that the CTB award and authorize the Commissioner to execute a contract with Trane for this Project under EPC, for the following reasons:

- The proposed contract allows VDOT to cost-effectively implement energy savings improvements without any financial burden to taxpayers;
- VDOT has carefully reviewed the terms and financing of the draft contract to ensure that the LED Project represents the best value for Virginia's taxpayers as compared to traditional procurement methods;
- The proposed LED fixtures will reduce the impacts of VDOT's lighting system on skyglow and light trespass as compared to the existing high pressure sodium fixtures;
- The proposed contract will result in fixtures with increased longevity, reducing VDOT's long-term Operations & Maintenance costs, as well as reducing the frequency of which VDOT workers and drivers are exposed to increased risk of work zone crash during relamping operations; and
- The proposed LCS will give VDOT significant flexibility to more smartly manage its lighting in future years.

VDOT recommends award of/authorization for the Commissioner to execute a contract under EPC with Trane for this Project, subject to the following:

- (1) Appropriate EPC/contract reviews/approvals by DMME, Virginia Department of the Treasury, Department of Planning and Budget, Office of the Attorney General, and the Governor's Office ;
- (2) Agreement on all technical terms and conditions; and
- (3) Financing of the Project by the Virginia Energy Leasing Program.

Recommendations: VDOT recommends that the CTB authorize the Commissioner to execute a contract under EPC with Trane, with substantively the same terms and conditions as described herein, with such non-substantive/technical additions or modifications as the Commissioner deems necessary, subject to the conditions set forth above.

Action Required by CTB: The CTB will be presented with a resolution for a formal vote.

Result if Approved: The Commissioner of Highways will be authorized to enter into a contract under EPC with Trane as presented above.

Public Comments/Reactions: None.