

LIGHTING POLICIES & ENERGY SAVINGS PERFORMANCE CONTRACT (EPC)

July 2019 CTB Workshop

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Summary of Recent VDOT Activities

- **2015: Competitively procure Energy Services Contractor (ESCO)**
- **September 2017: Previous CTB Presentation**
 - **VDOT defers action on Energy Performance Contract pending investigation into potential effects of LED lighting on human health**
- **Sept. 2017 – May 2019: Develop updated lighting policies based on numerous discussions and research with key stakeholders:**
 - **Industry experts (Dr. Ron Gibbons of Virginia Tech Transportation Institute, Illumination Engineering Society, LED manufacturers)**
 - **Health policy experts (Dr. Mario Matta of AMA, Dr. George Brainard of Thomas Jefferson University Hospital, Int'l Dark Skies Assn)**
- **July 2019: Request CTB authorization of proposed LED lighting Energy Savings Performance Contract (EPC)**

Benefits and Drawbacks of Roadway Lighting

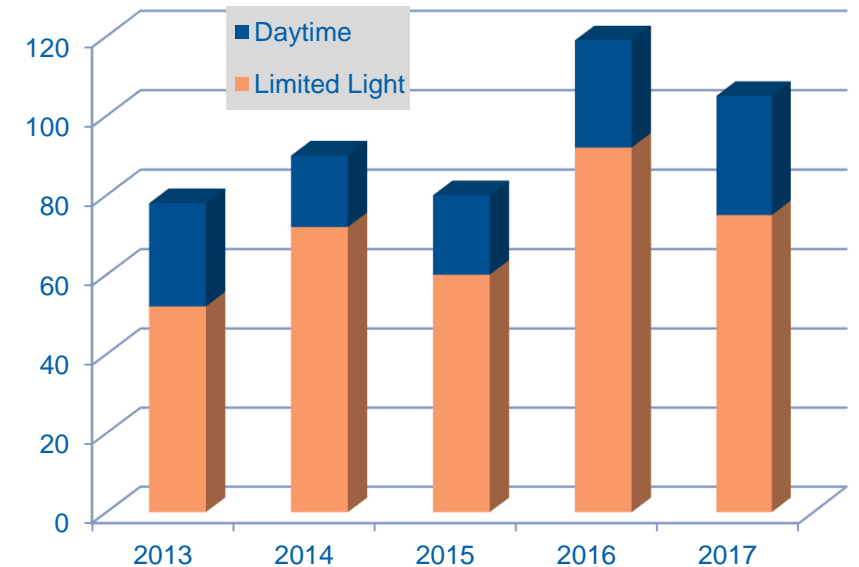
■ Benefits

- Safety benefits when smartly placed
- Reduces pedestrian crash risk
- Facilitates incident response
- Personal security in parking lots

■ Drawbacks

- Energy consumption
- Maintenance & Operations costs
- Impacts to adjacent residents
- Contributes to skyglow
- Risk of light poles being struck

Virginia Pedestrian Fatal Crashes



Current State of VDOT's Lighting

- **± 50,000 conventional + high mast fixtures**
- **Majority of lights are still High Pressure Sodium (HPS)**
 - **HPS luminaires have 5-year life span; LED luminaires are expected to last 15+ years**
- **± \$4 million per year on energy bills alone**

Location Type **	Inventory
Conventional	20,100 poles
High-mast	700 poles
Sign lighting	2500~3000 structures
Tunnels	6 tunnels (24/7 lighting)
Park & Rides	69 VDOT-owned P&Rs with lighting (20,900 spaces)
Rest areas	41 rest areas
Weigh stations	21 weigh stations

***excludes other miscellaneous lighting types such as underpasses, combination traffic signal/light poles, and aerial/marine navigation lights. Street lights and post-top lights are typically maintained by others.*

VDOT Strategies for Smarter Lighting

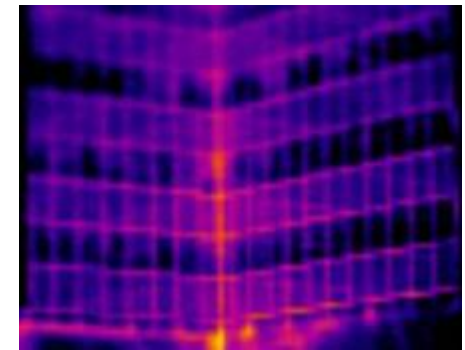
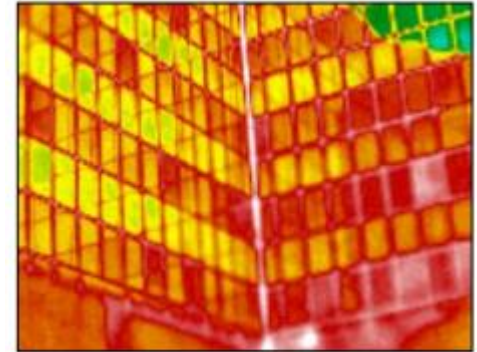
- **All new lighting will be Light-Emitting Diodes (LEDs)**
- **Only use road lighting where justified – “nodes, not roads”**
 - Discourages addition of new continuous freeway lighting
 - Promote use of lighting at traffic signals and pedestrian crossings
 - Use sign lighting (illumination of overhead signs) only where needed
- **Minimize adverse impacts of lighting**
 - Correlated Color Temperature (CCT) policy that best balances road safety vs. potential public health impacts
 - Design lighting to minimize skyglow and light trespass
- **Pursue Energy Savings Performance Contract (EPC) for road lighting**

Energy Savings Performance Contracting (EPC)

- **A state contract program managed by the Department of Mines, Minerals & Energy and the Department of General Services.**
 - **Allows agencies and public bodies to use a streamlined procurement process by selecting from a list of pre-qualified contractors**
- **Virginia Treasury Board operates and administers the Energy Lease Program**
 - **State agencies obtain consistent and competitive credit terms for financing energy efficiency improvements**
 - **Treasury Board procures a line of credit from financing companies under the terms of a Master Lease Agreement under which individual agencies can finance the energy efficiency projects over 12 and 15-year terms.**

Benefits of Energy Savings Performance Contracting

- **Well-established procedures with extensive Virginia track record**
 - **Collective state agency savings of \$18.5 million in 2017**
- **Budget-neutral: implements capital improvements without impacting capital budget**
- **Cost savings guaranteed by the competitively procured Energy Services Contractor (ESCO)**
- **Reduced long-term costs (energy and O&M)**
- **Encouraged by Virginia's leadership**
 - **2018 Virginia Energy Plan & Exec. Order #31 (2014)**



Before and after thermographic imaging of DMV HQ's windows in winter

Keys to a Successful EPC

- **ESCO services were competitively procured as per § 11-34.3**
 - VDOT competitively selected Trane in April 2015 from a list of multiple prequalified ESCOs, using established DGS procedures
- **Cash-flow positive from year one**
 - Required by Code of Virginia § 11-34.3
- **Reliable devices/controls that reduce O&M costs**
- **Owner and ESCO have equal ability to transparently Measure & Verify (M&V) future energy usage**
 - **Lighting Controls Systems (LCS) facilitates easy, transparent M&V**



Scope of Proposed Road Lighting EPC

current
powered by GE

AcuityBrands

- **9,627 conventional + high-mast LEDs**
- **Proven brands with strong track record**
 - **Fixtures: mixture of Current By GE and Acuity fixtures**
 - **Lighting Controls System (LCS): Current By GE's LightGrid system**
 - **Fixtures = 15 year warranty**
- **Locations:**
 - **Fred/Rich/HR Districts, plus portion of NOVA District**
 - **Freeway and interchange lighting**
 - **Park & Rides, rest areas, weigh stations**
- **Does not include repairing/replacing poles, conduits, etc.**

June 2019 Pro Forma Financial Analysis

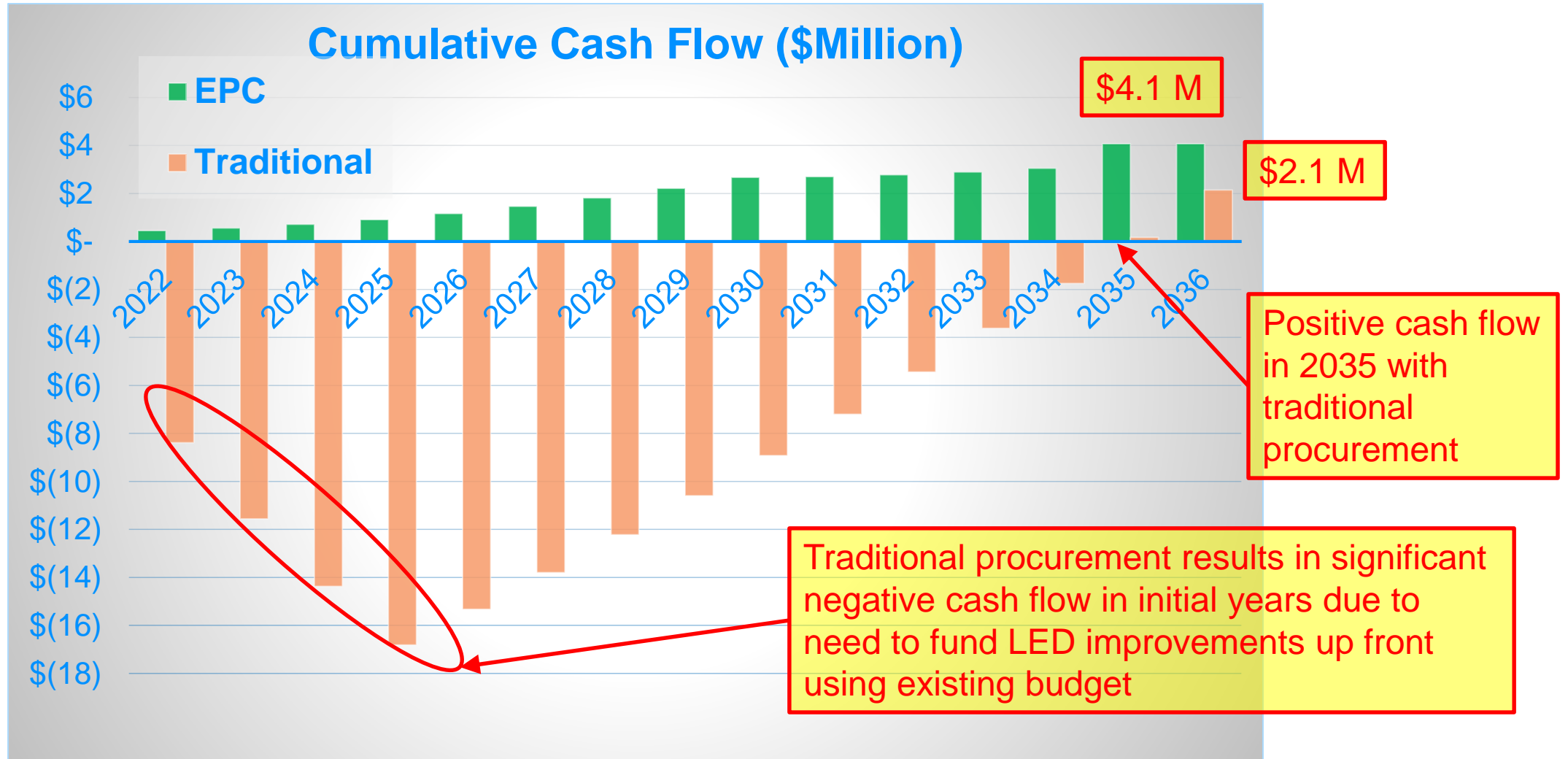
Project Costs (2020-2036)	Cost
CONSTRUCTION COSTS **	\$17.40M
Operation Costs (2018-2034):	
-- M&V and Controls	\$1.46M
-- Interest Payment	\$4.50M
TOTAL PROJECT COSTS (over 15 years)	\$23.36M

NET PROJECT SAVINGS
 = \$27.43M - \$23.36M = **\$4.1M**

Project Savings (2020-2036)	Savings
Total Energy Savings:	
-- LED savings	\$15.86M
-- LCS savings	\$2.46M
O&M Savings	\$9.11M
TOTAL PROJECT SAVINGS (over 15 years)	\$27.43M

***Includes \$500K owner contingency and Trane's \$514k previously-incurred energy audit costs*

EPC vs. Traditional Procurement (Cumulative Cash Flow)



EPC Benefits

- **Does not impact VDOT's capital budget**
- **More cumulative net savings than traditional procurement**
- **Positive cash flow begins in 2020, not 2035**
- **Turnkey solution**
- **Consistent with Exec. Order #31 & 2018 VA Energy Plan**
- **Reduced glare/skyglow/trespass impacts**
- **Reduces VDOT's carbon footprint**

Risk Mitigation

- **Conservative O&M and energy savings assumptions**
- **Negotiating cost-saving measures with Trane**
- **Review of similar EPC implemented by peer state DOT**
- **Careful vetting of selected fixture and LCS brands**
- **Long-term contract with Current by GE for LightGrid system**
- **Office of Attorney General (OAG) and Dept. of Mines, Minerals, & Energy (DMME) reviewing and assisting VDOT to vet this nontraditional contract**
 - **Department of Treasury and Governor's Office approval required before EPC can proceed**