

**Vendor Quotes**

**Bipartisan Infrastructure Law (BIL) Grid Resilience and Innovation Partnerships (GRIP)  
Funding Opportunity Announcement (FOA) Number: DE-FOA-0002740  
Assistance Listing Number: 81.254**

**Confidentiality Statement:** *This document may contain trade secrets, confidential, proprietary, or privileged information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the government. The government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source.*



## Utilidata Proposal - IIJA Smart Grid Chip Deployment

### Distributed AI Platform at Duquesne Light Company

#### Term

This proposal shall be effective upon contract execution through December 31, 2028 and may be extended through mutual agreement in writing by both parties.

#### DLC Project Schedule (as of 3/8/2023)

	Quarters																			
	2024				2025				2026				2027				2028			
Tasks	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Pre Work for deployment																				
2. Physical/Comms Testing																				
3. Hardware field deployment																				
4. App development, field testing and refinements																				
5. Milestone Reports																				
6. Final report																				

Confidential (March 2023)

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### **Pricing**

Hardware: \$500/SGC

Software: \$10/SGC/year

	2H 2024	2025	2026	2027	2028	Total
SGCs Deployed	10,000	10,000	15,000	15,000	0	50,000
Hardware	\$5,000,000	\$5,000,000	\$7,500,000	\$7,500,000	\$0	\$25,000,000
Software	\$100,000	\$200,000	\$350,000	\$500,000	\$500,000	\$1,650,000
Total	\$5,100,000	\$5,200,000	\$7,850,000	\$8,000,000	\$500,000	\$26,650,000

### **Payment schedule**

- 10% down payment upon contract signing, \$2,665,000.00 USD
- 2024 only, following down payment
  - hardware balance to be invoiced at an adjusted unit price of \$243.50 USD
- 2025, hardware invoiced upon receipt of goods, payment terms Net 30
- Software - Billed November 1st annually, payment terms Net 30

### **Hardware warranty**

3 year warranty on meter adapter hardware, starts from the date of shipment

- Product returns will be managed through the project management return material authorization process.
- Hardware will be replaced in kind.
- Issues will be tracked and managed via a root cause analysis process.

### **Terms and Conditions**

To be mutually agreed to by both parties in alignment with terms established per DLC-Utilidata Master Purchase Agreement in 2023.

*Confidential - March 2023*



## LineVision - Overhead Line Monitoring

Proposal: DLCLVGRIP





LineVision Inc.  
529 Main Street, Suite 307  
Boston, MA 02129 USA

February 13, 2023

Duquesne Light Company  
411 Seventh Ave  
Pittsburgh, PA 15219

LineVision Proposal Number: DLCLVGRIP

Dr. Elizabeth Cook,

I am pleased to present Duquesne Light Company with the following proposal for LineVision's non-contact overhead line monitoring system for:

Year 1

- [REDACTED]
- [REDACTED]
- [REDACTED]

Year 2

- [REDACTED]
- [REDACTED]

Year 3

- [REDACTED]

This is the project that DLC and LineVision intend to present to the DOE for a GRIP grant.

## Scope of Work

LineVision will provide the monitoring equipment, technical direction at installation, calibration, data communications, Data Portal access with the information described below, and hardware warranty for the duration of the LineAware Annual Service Contract, which commences on the Installation Date or 30 days after delivery of the equipment, whichever is sooner.

### LineAware:

Access will be made available to the online Data Portal within thirty (30) days of the Installation Date. The deliverables listed below will be made available via the Data Portal:

1. For all conductor phases (A, B, & C), conductor sag (feet or meters)
  2. For all conductor phases (A, B, & C), conductor horizontal blowout (feet or meters)
  3. Local ambient weather conditions including ambient temperature (Deg F or Deg C), % global horizontal irradiance, and % chance of precipitation.
  4. Risk of ice accumulation on conductors\*
  5. Detection of ice on conductors\*
- \*Requires real-time line loading data to be provided by the customer

### LineRate:

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To provide accurate values for Dynamic Line Ratings, LineRate utilizes a machine learning process to train the data and requires a range of different operating conditions to be observed by the system which may require up to ninety (90) days to appear in the Data Portal. Once trained, this data will be backfilled to the original Installation Date.

1. Realtime Dynamic Line Rating
2. Forecasted Dynamic Line Rating, hourly, up to 240 hours (10 days) out
3. Customizable short-term and long-term emergency ratings
4. Average conductor temperature for the monitored stringing section (Deg F or Deg C)

#### LineHealth:

After 6 months, or sooner as data collection permits, LineVision will produce a LineHealth report based on accumulated data. When made available by the customer, historic line loading data can be processed through our LineHealth module and incorporated into the LineHealth report for deeper insight. An update to the LineHealth report will be released every 6 months, based on LineAware readings that impact asset health.

1. Loss of strength from historical annealing analysis
2. Conductor end-of-life projection
3. Phase by phase observed sag distributions
4. Observed sag/temperature relationship curves
5. Conductor elongation analysis
6. Projected safe maximum operating temperature
7. Rated breaking strength evaluation & aeolian vibration risk
8. Average conductor temperature for the monitored stringing section

#### Alerts:

User-configurable alerts for various events can be set. Examples for various modules include, but are not limited to:

- LineAware: Line sag near/exceeding its sag limit
- LineRate: DLR near/exceeding static line rating
- LineHealth: Line temperature near/exceeding designed Maximum Operating Temperature

## Customer Responsibilities

Customer will be responsible for supplying the necessary tools, equipment, and onsite crew to perform the physical installations of equipment on the transmission towers (full details are described in the LineVision V3 Installation Guide).

Customer will provide the necessary engineering information as outlined in Appendix A and the LineVision V3 Installation Guide by completing the Line Specification Worksheet (provided separately).

For LineHealth, Customer shall provide as much historical loading information as possible in order to make the best use of the historical conductor damage model. The loading information should be provided in a .CSV or equivalent format clearly indicating the units of power (Amps, MW, etc) with timestamps ideally with the loading value reported hourly.

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Customer will also share available field data on conductor corrosion measurements to provide supplemental information to refine LineVision's LineHealth models and further characterize the failure mode of the conductor as steel corrosion vs annealed aluminum.

## Pricing & Term

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
# New V3s	18	9	8	-	-	-	-	-	-	-
Installed Lines	331 304 324	318 314	62 162	-	-	-	-	-	-	-
Hardware	\$800,910	\$400,455	\$355,960	-	-	-	-	-	-	-
Shipping Estimate	\$4,482	\$2,241	\$1,992	-	-	-	-	-	-	-
LineVision System Hardware with 10 year license for LineRate, LineHealth and LineAware	\$279,587	\$424,169	\$554,814	\$554,814	\$554,814	\$554,814	\$554,814	\$554,814	\$554,814	\$554,814
<b>Total Price</b>	<b>\$1,084,979</b>	<b>\$826,865</b>	<b>\$912,766</b>	<b>\$554,814</b>	<b>\$554,814</b>	<b>\$554,814</b>	<b>\$554,814</b>	<b>\$554,814</b>	<b>\$554,814</b>	<b>\$554,814</b>

**Total: \$6,708,309**

Pricing is inclusive of the technical direction for installation, calibration, data communications, Data Portal access, and hardware warranty for the duration of the Annual Service Contract which commences on the Installation Date or 30 days after delivery of the equipment, whichever is sooner.

All pricing is in US Dollars and exclusive of all applicable sales taxes and duties.

### Invoice Milestone Schedule:

- 75% upon contract execution or receipt of Purchase Order
- 25% upon receipt of hardware, or 90 days after receipt of Purchase Order whichever occurs first.

**Term:** This contract is effective for 10 years from the Signature Date.

### Auto-Renewal:

Each term shall automatically renew for subsequent periods of the same length as the initial term with the same services, unless either party gives the other written notice of termination at least sixty (60) days prior to the expiration of the then-current term. Except as set forth in a separate agreement, LineVision may increase pricing for renewing services to be equal to the current year's list pricing.

## Sensors & Data Collection

The LineVision V3 system incorporates multiple sensors that allow for monitoring of overhead line physical and electrical operating conditions:

- LiDAR Optical Sensor:** a Class 1 eye-safe Light Detection and Ranging (LiDAR) sensor performs a periodic measurement of conductor positions in three dimensions, allowing for the accurate determination of conductor position in space.



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- **Additional Onboard Sensors:** Internal temperature sensors and power quality monitoring charge controller.
- **Ambient Weather Data:** For each installation site, a latitude, longitude, and height-specific interpolated weather model is created. Data is collected from various numerical models from weather service agencies around the planet and observations from reliable weather stations. This information is taken into the system, bias corrections are performed, and now-casts and forecasts are created for each location and time.

## Power Supply

The LineVision V3 system operates on a standalone/self-powered 12V DC power supply that can be outfitted in several configurations, depending on customer and site requirement needs.

- **Batteries:** Sealed lead acid (SLA) or lithium iron phosphate (LiFe) batteries are used to provide continuous DC power to the LineVision system.
- **Solar photovoltaic array:** Including a battery charge controller and power quality monitor, this array provides energy to recharge the batteries. A typical installation would specify a 100 Watt-capacity polycrystalline silicon photovoltaic panel.
- **Optional Mains Power:** The LineVision V3 System can be powered locally via available 120/240 Vac mains power.

## Installation

For standard on-structure installations, the client's line crew or authorized representative must perform the physical installation of the V3 System on the structure, with the support and on-site technical direction of trained LineVision field technicians and/or approved and trained local agent partners of LineVision. LineVision works closely with the asset owner to ensure that the installation process adheres to all applicable local safety regulations and policies. For additional information please refer to the LineVision V3 Installation Guide.

- **No Outage or Live Line Work Required:** The system is able to be installed when transmission lines are energized as no equipment is placed on or near the conductors but rather on the tower structures.
- **No Conductor Limitations:** The system can monitor and provide information for any conductor size, type, and bundle configuration without limitations.

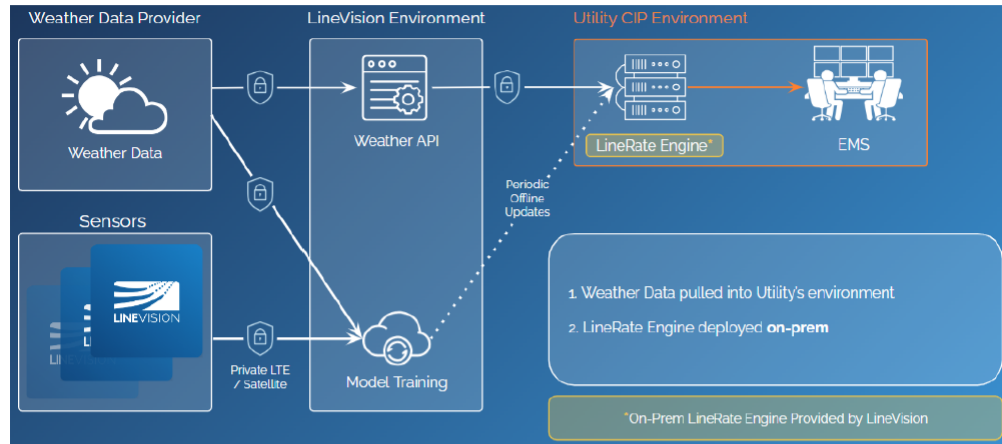
## Integration Into System Operations

LineVision data backhaul is designed as a secured cloud-based service for seamless integration into utility operations including EMS, SCADA, and Historian applications. Onboard cellular and/or satellite modems transmit raw sensor data via secure VPN to the LineVision cloud platform where additional advanced analytics are performed. Globally compatible modems and SIM cards are provided and managed by LineVision. The logical flow diagram below outlines the system architecture.





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**System data is made available to end users via multiple simultaneous methods.**

#### 1. Secure Data Portal

System data is made available on a web interface secured via HTTPS utilizing Secure Socket Layer (SSL) Version 1.2 or later and uses NIST-approved algorithms and key lengths.

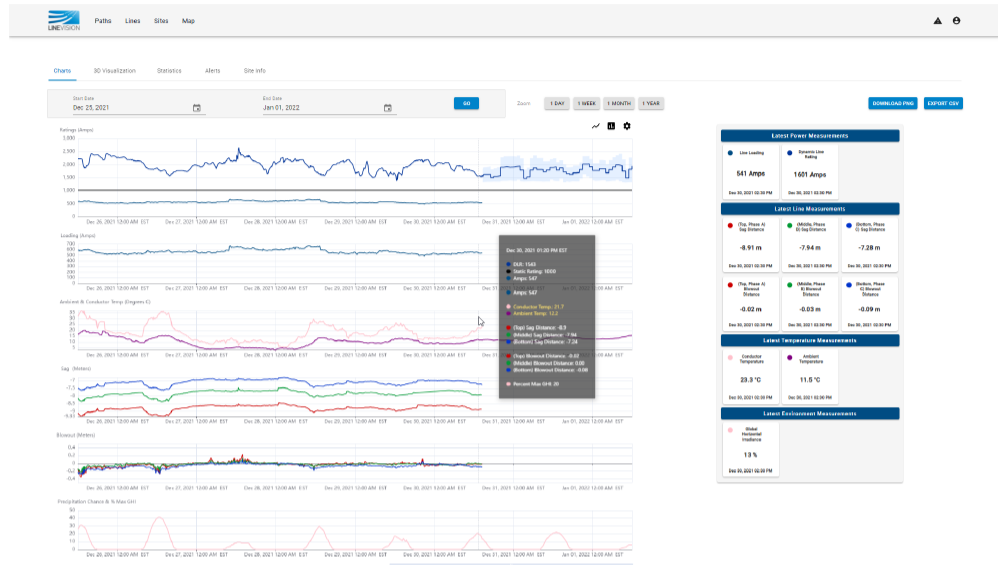
The Data Portal contains a powerful set of features designed for the best user experience. It includes:

- Dashboard View of All Monitored Sites
- Map View
- Statistical Analysis Tools
- Data Export via CSV
- Map Export via KML
- Customizable Data Ranges
- Toggleable on/off Data Sets
- Customizable Alerts

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LineVision V3 Data Portal

## 2. API

LineVision data is provided by way of a RESTful API which allows customers to automate and integrate LineVision Data. Hyper-localized, near-real-time Weather data is consumed through your cloud or other enterprise environment and then transmitted securely by you into your CIP environment in order to adhere to NERC CIP standards.

## 3. On-Prem Line Rating Engine

In addition to our cloud integration, LineVision has been working in collaboration with DLC to build an on-premise installation of our line rating engine software in the corporate environment or the NERC CIP environment. This approach uses minimal outside inputs and allows for a secure, NERC CIP-compliant line ratings calculation engine. Sensor data are used to train the Dynamic Line Rating model, which is packaged and delivered as part of the LineRating Engine. This model is continually trained, packaged, and delivered periodically as part of a regular patch cycle. The additional lines covered in the scope of this proposal will be incorporated into the same integration, with the only increase in scope relating to some configuration work and the additional lines being included in the DLR engine as part of a periodic update.

## Information Security Management

LineVision is committed to the highest level of data integrity for our clients and is undertaking certification of adherence to ISO 27001:2022 standards. LineVision's ISO 27001-compliant Information Security Management System ("ISMS") is established and maintained to protect the confidentiality, integrity, and availability of information assets under LineVision's control.

LineVision's ISMS sets forth requirements and standards related to:

- Access control
- Asset management

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- Business Continuity and Disaster Recovery
- Cryptography
- Data Management
- Human Resource security
- Incident Response
- Information Security
- Operations Security
- Physical security
- Risk management
- Secure Software Development
- Third-Party Management
- Privacy

### Additional Notices

This quote remains valid and open for acceptance unless withdrawn by LineVision for a period of 60 days from receipt. LineVision reserves the right to withdraw this quote, in its sole discretion, by providing written or electronic notice.

Client may use the software only for internal business purposes and may not copy, distribute or grant access to any of the data to any third party without written consent of Seller.

I welcome your comments and look forward to continuing to work with you.

Sincerely,

Alex Houghtaling  
Vice President, LineVision, Inc.  
E: [ahoughtaling@linevisioninc.com](mailto:ahoughtaling@linevisioninc.com)  
P: 617-990-2482



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## Appendix A - Data Required for Model Training & Calibration

### Before Installation

The following information is required for all monitored circuits prior to hardware installation.

All projects:

- Circuit Number & Name
- Circuit Voltage
- Conductor Type, Size, and Bundling
- Conductor Properties (if different from Southwire Overhead Conductor Manual)
- Conductor Emissivity and Absorptivity Coefficients
- Structure Drawings for Each Installation Location

Projects including LineRate:

- Conductor Normal Maximum Operating Temperature
- Normal Static Line Ratings
- Normal Line Rating Assumptions
- PLS-CADD Reports
  - Stringing Chart Summary
  - Structure Attachment Coordinates
  - Structure Longitude and Latitude
  - Or if a PLS-CADD model is not available, csv tables for the full line containing:
    - tower numbers
    - tower latitude/longitude + coordinate system
    - centerline elevation (Z) at towers
    - start and end tower number of each stringing section
    - span lengths
    - wire attachment point elevation (Z) for all phases
    - midspan sag at the emergency MOT for all phases

Projects including LineHealth:

- Historical Line Loading Information
- Maximum Sag Table up to MOT

### After installation

Line loading data must be provided by the customer via an automated integration or periodic .csv file transfers for the duration of the contract.



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# BRIDGEWATER Proposal

## Grid Visibility Project

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for



3/2/2023



## Scope of Services

Bridgewater Consulting Group, Inc. (BCG) will provide consulting services under this Statement of Work (SOW) in support of Duquesne Light Company's (DLC) Grid Visibility Project. BCG will provide DLC with project management and technical services for the duration of the Grid Visibility Project.

Consulting Services will include:

- Project management and technical advisory services related to DLC's Grid Visibility Project tasks and deliverables outlined in the accepted Grid Visibility Project's application to the Department of Energy. Some examples of these tasks and deliverables include:
  - Deployment of dynamic line rating (DLR) sensors
  - Deployment of smart grid chips (SGC)
  - Project management plan
  - Cybersecurity plan
  - Development of use cases
  - System architecture and design
  - Community engagement
  - Documents and presentations for regular Department of Energy updates
  - Final project report

The BCG Team will provide the DLC Sponsor and stakeholders with a regular status report. This status report will reflect point in time performance on scope, schedule, risks and/or issues.

## Period of Performance

The Services shall commence on the date of the Purchase Order issuance and shall continue through December 31, 2028.

## Data Files and Security

DLC is responsible for the actual content of any data file, selection, and implementation of controls on its access, use, backup, recovery, integrity, and security of the stored data.

## Facilities

At this point, BCG does not anticipate the need for resources to be on site. All activities will be carried out remotely. DLC will be responsible for providing all appropriate access to systems and applications required to conduct the activities remotely. This may include but not limited to any VPN software and respective credentials, login credentials to any systems and DLC email and calendaring applications.

If and when project resources will be required to be on-site, DLC will provide Bridgewater and its personnel with suitable office space, accommodations, and facilities that Bridgewater may reasonably require to perform the Services, in particular, supplies, furniture, telephone/fax communications, high speed internet connectivity, VPN software and/or systems access to perform required duties and other facilities for Bridgewater personnel while working on the Project.



Additionally, the Bridgewater Project Team will be provided all necessary clearance and security badges to appropriate areas in accordance with the Consulting Services Master Agreement (CSMA). DLC will be responsible for ensuring that it has appropriate backup, security, and virus-checking procedures in place for any laptop computer, DLC provides.

### Software and/or Equipment to be provided by DLC

- DLC network account
- Client-required software access
- Access to appropriate document repositories
- Applications and tools required for remote collaboration and meetings

### Escalation Process

Timely resolution of technical issues is critical to maintaining project control and DLC satisfaction. The purpose of the escalation process is to ensure issues are identified and resolved quickly. The escalation process provides a mechanism to alert the Project Manager or Consultant and other management personnel of issues not being resolved. Either Consultants or DLC may escalate a project issue as follows:

DLC will escalate issues in the following order if they remain unresolved at the previous level:

Company	Name	Level
DLC	Jessica Valentine	1
DLC	Elizabeth Cook	2
Company	Name	Level
Bridgewater	William Thai <a href="mailto:will.thai@bridgewcg.com">will.thai@bridgewcg.com</a>	1
Bridgewater	Nu Pho <a href="mailto:nu.pho@bridgewcg.com">nu.pho@bridgewcg.com</a>	2

### Contract Fee

BCG will perform the in-scope Services outlined herein on a Time & Materials (T&M) basis. BCG shall submit invoices monthly. BCG will bill DLC in US Dollars.

Fees will be billed at the rates outlined in the Resource Classification and Rates section of this SOW.

### Resource Classification and Rates

Staffing requirements for this engagement will be revisited on an as-needed basis in agreement with BCG. The following are the roles and rates required for this engagement:

Role	Hourly Rate
Technical Advisor	\$225.00
Project Manager	\$155.00

Total Budget from January 1, 2024 through December 31, 2028 is \$750,000, not to exceed \$150,000 per year.



### Project Change Control Procedure

Process for Changes to the Services or Deliverables shall be per the terms of the Master Agreement, and may be supported by the following if a change to the proposal is required:

- A Project Change Request (PCR) may be the vehicle for communicating requested change. The PCR must describe the change, the rationale for the change, and the impact the change will have on the project.
- The designated Project Manager of the requesting party (BCG or DLC) will review the proposed change and determine whether to submit the request to the other party.
- Both Project Managers will review the proposed change and approve for further impact assessment or reject it. BCG and DLC will mutually agree, per the terms of the Master Agreement, on any charges for such assessment, if any. The assessment will determine the impact the PCR will have on the Proposal fee, schedule, and other terms.
- Upon completion of the impact assessment, both parties will review the impact of the proposed change and, if mutually agreed, invoke the Change Control processes aligned with the Master Agreement.
- A written PCR must be signed by both parties as supporting documentation.