

**Request for Information (“RFI”) from Israel Independent System Operator
 (“NOGA”)
 Dynamic Cable Rating (DCR) System**

1. General

- 1.1. NOGA - Israel Independent System Operator Ltd. (“NOGA”) is an Israeli government-owned company operating as an independent system operator pursuant to a System Operator License, as defined in the Electricity Sector Law, 5756-1996. As an independent system operator, NOGA is responsible for the operation of the Israeli electricity system, as well as for its future planning and development.
- 1.2. Through this RFI, NOGA requests information regarding the Dynamic Cable Rating (DCR) System, based on Distributed Temperature Sensing (DTS) system, as part of a comparative pilot project for the purpose of NOGA’s review of a future Dynamic Cable Rating (DCR) System.

2. Time Schedule

- 2.1. The RFI shall be conducted on the following dates:

RFI release date	19 December 2022
Last date for submitting a Clarification Request (“Last Date for Submitting CR”)	04 January 2023
Last date for submitting a response to the RFI (“Last Date for Submitting Response”)	15 January 2023

- 2.2. NOGA may, at its sole discretion, postpone any of the deadlines listed above, but **shall not be obliged to do so at the request of any of the participants.**

3. Required Information

- 3.1. The DTS system is fiber optic based optoelectronic instrument which measure temperature along the length of an optical fiber which placed into high voltage power cables. The DTS system will be used to monitor the temperature continuously along the specified circuits.
- 3.2. The DCR system should provide real-time dynamic rating calculation and excess of real-time capacity above static ratings. The calculated parameters should be integrated into the NOGA-ISO operator’s dispatch tools. The DCR system should automatically select the best available rating methodology, based on line conditions and data availability, ensuring that ratings were constantly available.

4. The system should include following main functional parts:

4.1. Field Unit

- 4.1.1. This unit will be installed at a high voltage 161 kV substation. The Field Unit will be connected to optical fiber which placed into high voltage power cables (two circuits, 2.2 km length each) and should record, sample, analyze, calculate, and store the temperature along the length of cable. In addition, the Field Unit should

record the time of the measurements. Further analysis should be carried out at the Base Station using appropriate application software.

- 4.1.2. The Field Unit shall be capable of measuring temperature on at least six channels (single-ended measurements). The Field Unit shall be capable of obtaining the temperature data from each channel in either closed-loop or open-loop configurations with the basic accuracies specified.
- 4.1.3. The basic spatial resolution for measurement using open-ended sensing fibers shall be 0.5–1.5 m and the basic temperature resolution shall be 0.5–1.5 °C, over the required power cable route length.
- 4.1.4. The laser output of the Field Unit shall meet the Class I Laser Safety requirements.
- 4.1.5. The DTS Field Unit should be capable of working without compromising the accuracy and resolution specification in substation environments where switching transients and radio frequency (RF) interference are present. The supplied equipment should declare and assure compliance of all parameters and their testing accordance to relevant international standard requirements for: Environmental testing, Electromagnetic Compatibility (EMC) and Safety.
- 4.1.6. The operating lifetime for the DTS system shall be a minimum of 10 years continuous operation. During this period, assuming that the optical fiber has not degraded, the system accuracy and resolution shall be preserved.
- 4.1.7. The DTS field unit should be operable with the following power supply specifications: 240 V \pm 10%, 50 Hz \pm 5% single-phase power supply.
- 4.1.8. Operating Temperature: +5 ÷ +40° (At least), Humidity: Up to 85% (At least).

4.2. Base Station Analysis Software and Service Software

- 4.2.1. The Base Station software should be able to download the information from the Field Units, organize it in relevant databases, display all measures, prepare and print reports. The reports generated by the Base Station Analysis Software should be compatible to common PC software like Excel, PDF and suitable intranet/internet formats etc. The Base Station software should include permits procedure by Username and Password, intended to correctly distribute reports.
- 4.2.2. The following subset of software tools to be implemented as minimum: setup and firmware upgrade of Field Units, periodic/automatic continuous data retrieval from the Field Units to the Base Station. Supplied software shall be a Microsoft Windows-based program with menu driven capabilities as well as graphical user interface (GUI) for facilitating the measurement setup, including: zones, trace ID, and alarms. Generated data file structure format should be compatible with Microsoft Excel or Microsoft Access spreadsheet programs to allow for dynamic object linking with other Windows-based application programs. Software shall be capable of allowing remote access and control of the Field Units upgrade/configuration via Ethernet.
- 4.2.3. Line ratings should be calculated for normal operation and also for long-term emergency periods lasting up to four hours and short-term emergency periods

lasting up to 15 minutes. Ambient-adjusted line ratings predicted for a particular period of time, should be updated hourly, or even more frequently to reflect the environment condition changes (ambient temperature, wind speed and direction and so on) should determine the maximum line capacity and calculates the dynamic rating.

4.3. Calibrator

The system should include some means of calibration of the instrument connected to optical fiber to ensure the reliability of the measured temperature at the commissioning stage as well as at periodic intervals. A full calibration procedure document for calibrator should be provided. The calibration will be performed annually. The DTS calibrator will contain two sets of fibers that are placed in a carefully controlled temperature environment with input terminals to accept standard optical connectors, defined by the DTS system requirements. The calibrator should provide two user-settable reference temperatures such as, for example, 70 and 30 °C, including the possibility to undertake the DTS calibration by applying the thermal environment at the remote cable ends. The control software should have capability to recalibrate the DTS unit automatically when connected to the calibration unit. The system should be supplied with valid calibration certificate from an authorized and accredited laboratory, technical documentation stating DTS system power supply requirements, accuracy in temperature measurements, spatial resolution, maximum allowable fiber attenuation at operating frequencies, and measuring intervals, for various fiber ranges, and user manual.

4.4. Mandatory Requirements

- 4.4.1. Ampacities will be updated automatically with minimum rate of 4 times per hour,
- 4.4.2. Calculated dynamic rating will be based on real-time measurement of line parameters,
- 4.4.3. Possibility to integrate DCR system into the NOGA-ISO operator's dispatch tools.

4.5. Communication

Any standard communication systems, including M2M - CDMA or GSM IP networks, local radio or fiber optic. The web interface should provide full access to all device features, such as real-time monitoring, remote control and full device configuration.

4.6. Accuracy

The global error margin on real-time rating acceptable for operators should be around +/- 10%.

4.7. Security and Encryption

Security required to comply with all cyber requirements of "Noga-ISO" and I.E.C. companies.

4.8. Reference To Existing Installations

References of existing customers/utility installations should be given.

5. Required Information

- 5.1. The participants may direct questions or seek additional information ("Clarification Request").

- 5.2. Any Clarification Request should be submitted in writing to the e-mail address mentioned in Section 6.2.
- 5.3. A Clarification Request should be submitted by no later than the Last Date for Submitting CR as specified in Section 2.1.
- 5.4. NOGA may address a Clarification Request but is not obligated to do so. At NOGA's discretion, any response to a Clarification Request may be issued in writing to all participants, provided, however, that the identity of the participant submitting the Clarification Request will not be disclosed.

6. NOGA's POC; Submission Place

- 6.1. NOGA has appointed the following person as its POC for the purpose of this RFI: Itay Heidemann ("NOGA's POC").
- 6.2. All communications relating to this RFI should be addresses to NOGA's POC through the following e-mail address: Itay.Heidemann@noga-iso.co.il
- 6.3. All documents submitted pursuant to this RFI, should be submitted to the e-mail address mentioned in Section 6.2.

7. General Prerogative

- 7.1. At any time prior to the Last Date for Submitting Response, NOGA may refine, change, amend, add to, eliminate from or modify this RFI, for any reason, whether on its own initiative, or in response to a Clarification Request received pursuant to Section 5.
- 7.2. NOGA may communicate and hold meetings with any or all participants during any stage, including after the Last Date for Submitting Response, at NOGA's sole discretion.

8. General Terms

- 8.1. The purpose of this RFI is only to gather information from entities interested in participating in a future tender or competition process for a consultation project in the field of submarine electrical energy, should one take place.
- 8.2. This RFI does not constitute a tender or an invitation to make proposals, but an early request for information in accordance with the provisions of Section 14A of the Mandatory Tenders Regulations 5753-1993 ("Regulations"). Therefore, the participants are hereby informed that according to the provisions of the Regulations:
 - 8.2.1. NOGA's tenders committee shall keep a record of any information received through the responses and any discussions that have taken place with participants.
 - 8.2.2. Responding to this RFI is not a prerequisite for participating in a future tender or competition process, should one be held, and will not confer any advantage on participants. The participants are not obligated to participate in any future tender or to engage with NOGA in any other way.
 - 8.2.3. Any information received through a response to this RFI, on the basis of which a tender or other competition process was held in accordance with the Regulations, shall be subject mutatis mutandis to the right to review and access to information under Section 21(e) of the Regulations.
- 8.3. NOGA shall have full discretion in determining the terms of any future tender or other engagement process under the Israeli law and regulations, if and to the extent published in the future, including without limitation the terms of the contract, pricing and any other matter relating to the engagement.

- 8.4. Without derogating from the generality of the aforesaid, it is hereby clarified that any detail described or indicated in this RFI may be changed at the sole discretion of NOGA and is not meant to bind NOGA in any way.
- 8.5. The participants shall bear all costs associated with preparing and submitting a response and shall not be entitled to any consideration and/or any reimbursement and/or compensation and/or indemnity for any expenses and/or damages incurred in connection with this RFI and/or with submitting a response.
- 8.6. This RFI shall be governed by and construed in accordance with the laws and regulations of the State of Israel. The applicable courts in Haifa shall have the exclusive jurisdiction with respect to all matters and all disputes arising in connection with this RFI.