Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.	**Hardware requirements**						
1.1	**Enclosure**						
1.1.1	MR	Enclosure	The weight of the DALI-box must be maximum 10kg (excluding Last-gasp components).	Yes/No			
1.1.2	MR	Enclosure	Enclosure: Plastic. There is no specific color-requirement for the enclosure itself.	Yes/No			
1.1.3	MR	Enclosure	Enclosure must have protection class ≥ IP44, excluding outside part of connectors.	Yes/No			
1.1.4	MR	Enclosure	The applied materials must comply with the Limiting Oxygen Index (LOI). This is an indicator of the combustibility of a material. The plastic materials used must not have a lower LOI than 35.	Yes/No			
1.1.5	MR	Enclosure	The minimum strength resistance is IK07 according to EN 50102.	Yes/No			
1.1.6	MR	Enclosure	The external dimensions of the DALI-box shall be less than or equal to: 300x300x180 mm (w*h*d).	Yes/No			
1.1.7	AC	Enclosure	Smaller dimensions of the DALI-box (refer 1.1.6) is desirable and will be valued.	Specify dimensions	Technical specification	20	Fixed, Linear (16,2 liter or more = 0; 6 liter or less = 20; linear score in between)
1.1.8	MR	Enclosure	The DALI-box is fitted with a hinged, transparent front. Securing front over screws is accepted.	Yes/No			
1.1.9	MR	Enclosure	The DALI-box must be easy to mount by one technician. This implies among other things: - minimum 3 mounting brackets (no mounting-holes inside box); - mounting brackets must facilitate fixation of box;	Yes/No			
1.1.10	MR	Enclosure	The DALI-box must be accompanied with the following (basic) information: - Connection-diagram of main components and slots printed on sticker or paper (paper stored inside box).	Yes/No			
1.1.11	MR	Enclosure	On the front of the cabinets the following information is made available (over sticker(s) or print(s) or plate(s)): - Manufacturer / Type box - Serial Number (identical to DALI-box serial# what is used for autentication) - QR-code (identical to DALI-box ID what is used for autentication) - Production Year - Indication of specified signal-lights or status-indicators	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.1.12	MR	Enclosure	The front of the DALI-box must be provided with a warning that says "Melden BVC voor openen". 	Yes/No			
1.1.13	MR	Enclosure	On the inside of the DALI-box the following information is made available over sticker: - ICCID-code used Simcard.	Yes/No			
1.1.14	MR	Enclosure	Opening the DALI-box must in all cases be identified over a electromechanical door contact.	Yes/No			
1.2	**Communication protocols**						
1.2.1	MR	Communication protocols	The DALI-box must support at least one of two below mentioned protocols for the exchange of data with central OT-domain: • IEC 60870-5-104 protocol implementation. This implementation must meet Enexis 104 PID (refer Annex 6). Adresses must be definable based on Asdu and CASDU. • JSON over WS implementation according to Annex 7. Implementation of both protocols is also allowed.	Yes/No. Please specify what protocol is supported.			
1.2.2	MR	Communication protocols	Evidence for the correct deployment of protocols by Tenderer must be proved through conformance test certificates after awarding. In addition, Enexis maintains the right to subject the offered system(s) to a 'conformance' test by an independent executive authority. Any negative findings are resolved without charge by Tenderer within 2 weeks. Tenderer will be (cost-) responsible for retest(s) in case of any findings.	Yes/No			
1.2.3	MR	Communication protocols	For verification of proper communication between CPU/RTU and central data collection system, Enexis preserves the right to subject the offered system(s) to an "interoperability test" after awarding. Any negative findings are resolved without charge by Tenderer within 2 weeks. Tenderer will be (cost) responsible for retest(s) in case of any findings. Remark: this Minimum Requirement is only relevant in case of use IEC60870-5-104 Protocol.	Yes/No			
1.2.4	MR	Communication protocols/SFTP	DALI-box must support up/download of measurement data, system logfiles and/or configuration files by using SFTP. Exact choice depends on 104 or JSON. Refer annex 2: Accompanying letter for details using 104 and/or JSON	Yes/No			
1.2.5	MR	Communication protocols/SSH	The DALI-box must support remote secure shell using SSH	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.3	**I/O**						
1.3.1	MR	Hardwired I/O	The DALI box must facilitate minimum 6 active Digital Inputs: • 3 active DI for reading status Short circuit indicator contacts (NO) • 1 active DI for reading status internal mechanical door contact DALI-box (NO) • 1 active DI for reading status mechanical door contact Secondary Substation (NO) • 1 spare active DI (NO)	Yes/No			
1.3.2	MR	Hardwired I/O	Digital Inputs are used to read position reports and status signals. a. Power supply for reading external potential-free contacts (NO) must be supported over max. 24 VDC. b. In case of status signals, a dead band in between must be supported to identify logical "0" and logical "1". c. Signals with a pulse duration > 100 msec. must be handled unequivocally. d. Time labels assigned to events must not deviate by more than 100 msec compared to RTU time. e. Time labels for reports and alarms must be handled in such a way that they remain uniquely identifiable within the system.	Yes/No			
1.3.3	MR	Digital I/O	The DALI-box must support monitoring of transformer load variables (refer 2.3.2) and must be expandable over extension boxes (extension-boxes out of scope tender) to monitor up to 12 outgoing LV-feeders , based on Modbus protocol.	Yes/No.			
1.3.4	MR	Digital I/O	The DALI-box must support a Modbus RTU master interface, based on: - Minimum speed of 9600 Baud - Mode settings configurable by Enexis - Polling frequency of ≥ 0.1 Hz - To be polled registers of Modbus-IED's can be remotely configured by Enexis. - Connecting Modbus over USB is not acceptable.	Yes/No			
1.3.5	AC	Digital I/O	The DALI-box shall support a Smart meter P1-port input in order to read smart meter data of public street lights (Consumption counters, Power flow and Tariff-status). For specifications P1-port refer to Annex 13, DSMR v5.0.2 Final P1.	Yes/No	Technical specification	10	Fixed (Yes: 10; No: 0)
1.3.6	MR	Hardwired I/O	The DALI box must facilitate minimum 3 Digital Outputs: • 1 DO for control of (contactor) Evening/morning-lights (1); • 1 DO for control of (contactor) Night-lights (2); • 1 DO for control of Tariff (3).	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.3.7	MR	Hardwired I/O	Digital Outputs must be: a. potential-free, capable of switching 230VAC b. suitable for loads of 1 A (DO 1 and 2) class AC14 and 16A (DO 3) class AC2;	Yes/No			
1.3.8	MR	LAN-port	The DALI box must have an RJ45 interface that supports an ethernet LAN connection, with below mentioned specification: a. The LAN connection must be disabled by default (only the WAN interface is active) and it must be possible to remotely activate the LAN connection. b. The DALI box application must contain functionality for the management of both communication mechanisms (WAN and LAN). This expecially applies to properly handling the timers and watch-dogs described in the WAN requirements document (Annex 4).	Yes/No			
1.4	**Visual information**						
1.4.1	MR	System information	The following system-information must be minimum visible on the outside of the DA box (over transparent front): a. general system-failure: yes/no (basis of which field technician can determine if system is working correctly). b. IP connection and/or data transfer over modem. c. connected to mobile network. And if applicable: d. low last gasp functionality (must indicate if last gasp unit needs replacement as a result of to low voltage and/or to rapid discharge). e. local Modbus communication failure (must indicate if one ore more Modbus IED's can not be reached/read as a result of defect IED, not properly configured IED or incorrect Modbus wiring). It's not acceptable that a user needs to go through menu (screen) options to get the desired information.	Yes/No			
1.4.2	MR	Status information	The following status-information must be clearly visible on the outside of the DALI box (over transparent front): a. Status DO's (active/not active; one LED for each DO is accepted) b. Status DI's (active/not active; one LED for each DI is accepted) It's not acceptable that a user needs to go through menu (screen) options to get the desired information.	Yes/No			
1.4.3	MR	Measurement information	All specified values of measurements (refer paragraph 2.3.2) must locally be visible (based on local data). This can be achieved over a fixed display inside enclosure or a separate (mobile) external display that can be temporarily connected to the DALI-box (internal connection; not over external connector).	Yes/No. Please specify solution provided. In case separate display, specify unit in Reply format price sheet.			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.5	**Connections**						
1.5.1	MR	External connections	All below mentioned external connections must be positioned at the bottom of the DALI-box. External connections need to be supported over coded plastic connectors and external wires must be able to be connected without opening enclosure.	Yes/No			
1.5.2	MR	External connections	X1: Power supply and voltage input 230/400 VAC. Connector-type: Phoenix contact, SPC 5/5-STF-7,62 and DFK-PC 4/5-GF-7,62 series or equivalent. Refer to Accompanying letter annex 2: "External connector terminal definition".	Yes/No			
1.5.3	MR	External connections	X2: Current-sensor inputs. Connector-type: Phoenix contact, SPC 5/6-STF-7,62 and DFK-PC 4/6-GF-7,62 series or equivalent. Refer to Accompanying letter annex 2: "External connector terminal definition".	Yes/No			
1.5.5	MR	External connections	X3: Digital inputs. Connector-type: Phoenix contact, SPC 5/10-STF-7,62 and DFK-PC 4/10-GF-7,62 series or equivalent. Refer to Accompanying letter annex 2: "External connector terminal definition".	Yes/No			
1.5.4	MR	External connections	X4: Public street light and Tariff outputs. Connector-type: Phoenix contact, SPC 5/6-STF-7,62 and DFK-PC 4/6-GF-7,62 series or equivalent. Refer to Accompanying letter annex 2: "External connector terminal definition".	Yes/No			
1.5.6	MR	External connections	DALI-box must have minimum 3 cable-glands for entering external cables (e.g. external antenna cable, external Modbus-connection etc): • one cable gland M20. • two cable gland M16.	Yes/No			
1.5.7	MR	Internal connections	DALI-box must provide Modbus interface: minimal 1x 3 pole. No specific connector requirements (screw-connector accepted). Terminal assignment: Pin 1=TX+, 2=TX-, 3=Earth. This connector is meant to be available on the inside (NOT outside) of the enclosure.	Yes/No			
1.5.8	AC	Internal connections	DALI-box facilitates a Smart Meter interface (P1-port): RJ11 (6 PIN). For specifications P1-port refer to Annex 13, DSMR v5.0.2 Final P1. This connector is meant to be available on the inside (NOT outside) of the enclosure.	Yes/No	Technical specification	5	Fixed (Yes: 5; No: 0)
1.5.9	MR	Internal connections	The DALI-box must provide an RJ45 interface that supports an ethernet LAN connection. This connector is meant to be available on the inside (NOT outside) of the enclosure.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.5.10	MR	Internal connections	The DALI-box must provide 24 VDC terminals to power external IED's (refer 1.6.4). This terimals are meant to be available on the inside (NOT outside) of the enclosure.	Yes/No			
1.6	**(Emergency) Power supply**						
1.6.1	MR	Power supply	The DALI-box must be suitable for a supply voltage of 230/400 VAC -10% to +10%.	Yes/No			
1.6.2	MR	Power supply	The 230/400 VAC supply must be internally additionally protected (glass fuse not accepted) in case protection provided by Enexis at power connection point over fuse 2A type GG is not sufficient.	Yes/No			
1.6.3	MR	Power supply	The DC voltage must be short-circuit and overload protected by an automatic fuse.	Yes/No			
1.6.4	MR	Power supply	The DC voltage must be sufficient to power the DALI-system and 3 external IED's. Power consumption IED's in total: 24VDC / 5W.	Yes/No.			
1.6.5	MR	Emergency power supply	The DALI-box must be prepared to add a last gasp emergency power supply (inside cabinet) afterwards. Remark: the last gasp functionality is not part of the standard DALI-box and will be ordered seperately.	Yes/No			
1.6.6	MR	Emergency power supply	The seperately to be offered last gasp functionality must be able to successfully transmit or process short circuit indicator position changes to the central system in case of power-failure. Last gasp functionality for 30 seconds after power-failure during lifetime is sufficient. Last gasp functionality must be designed for system power consumption and an additional 5W external power consumption (powering short circuit indicators during 30 seconds).	Yes/No			
1.6.7	MR	Emergency power supply	The seperately to be offered Last gasp functionality must have an design life of at least 12 years (based on 20 Degrees Celsius operating conditions). Last gasp functionality is maintenance free.	Yes/No			
1.6.8	MR	Emergency power supply	The seperately to be offered Last gasp power source (e.g. battery or powercap) must be connected with plugs in order to facilitate easy placement and replacement.	Yes/No			
1.6.9	MR	Emergency power supply	Temperature compensated loading of offered Last gasp power source must be facilitated, in case batteries are used for emercency power supply.	Yes/No			
1.6.10	AC	Emergency power supply	Enexis preferres few Last gasp power source replacements. Longer design life as stated in 1.6.7 are preferred and will be extra awarded.	Specify Last gasp power source solution and design life.	Technical specification	15	Fixed, Linear (15 = designlife 20 years or more; 0 = designlife 12 years or less; linear score in between)

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
1.6.11	AC	Emergency power supply	Replacement/spare Last gasp power source units shall be stored in non-energized conditions for at least 2 months, without structural degrading of its capacity. Higher shelf times will be extra awarded.	Specify Shelf time for Last gasp power source units (based on recommendation of supplier).	Technical specification	5	Fixed, Linear (5 = shelftime 24 months or more; 0 = shelftime 2 months or less; linear score in between)
1.6.12	MR	Emergency power supply	A general alarm (to trigger replacement) must be generated if Last gasp power source capacity decreases and is not able to perform as specified.	Yes/No			
2.	**System behaviour**						
2.1	**Power-up behaviour**						
2.1.1	MR	Power-up behaviour	When starting up from a voltage-less state, the box must respond as if it were an initial start-up. The system must not end up in an undefined state. Invalid events/alarms and/or measurement-values during start-up must be suppressed. Digital Outputs must restore specified position (if public lights must be activated after start-up, this activation must be recovered).	Yes/No			
2.1.2	MR	System monitoring	The system must automatically generate a message via IEC 60870-5-104 or JSON if RTU, I/O-modules and/or IED's, or parts thereof, are lost. The individual alarms must be able to be transferred into a collective message in a simple manner. The desired functionality must be configured and/or parameterized through configuration/application-software. See Annex 2: Accompanying letter for details using 104 and/or JSON.	Yes/No			
2.1.3	MR	Watchdog	A configurable watchdog mechanism shall be supported by the DALI box ensuring correct functionality and co-existence with other implemented mechanisms/features. In case of any issues on device or network side which would result in loss of service and ability to communicate with central server, watchdog mechanism will ensure DALI box reset aiming to regain service.	Yes/No			
2.2	**System-functionality**						
2.2.1	**Load management and related purposes**						
2.2.1.1	MR	Timestamp	All measurements by RTU must be provided with a time stamp.	Yes/No			
2.2.1.2	MR	Accuracy	Accuracy of measurement data-chain must be ≤ 1% (excluding sensor).	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.2.1.3	MR	Current-ratio	Only non-scaled values must be transmitted to central OT-system. Current-ratio of current transformers must be remotely configurable for RTU.	Yes/No			
2.2.1.4	AC	Connection-test	DALI-box is able to automatically verify correct connections of analog inputs (Voltage and Current-sensors). E.g. functionality supported by digital meter.	Yes/No	Technical specification	10	Fixed (Yes: 10; No: 0)
2.2.2	**Public Street Light control**						
2.2.2.1	MR	Control	DALI-box must support a local astronomical clock.	Yes/No			
2.2.2.2	MR	Control	DALI-box must support a locally stored Public Street Light program. Available memory storage must be sufficient to store 9 programs. Each program can cover a time period of 1 year. Only 1 program is active. Programs are stored using the local timezone.	Yes/No			
2.2.2.3	MR	Control	Locally stored Public Street Light program must be centrally configurable/managable using JSON as descibed in Annex 7 or using a uploadable configuration file. Refer Annex 2: Accompanying letter for details using 104 and/or JSON.	Yes/No			
2.2.2.4	MR	Control	Public Street light program must support: • Fixed time basis for activation and de-activation for Evening/morning as well as Night-lights seperately. • Configurable offset basis (in regard to astronomic time or local time) for activation and deactivation. • Distinction between working days, weekend-days, holidays (fixed and variable), seperate days and summer/winter-days. • Minimal 16 entries to specify public street light behaviour. • Evening/morning lights to be operated identical as Night-lights in case this option is activated. For example of control-functionality refer to to Annex 2.	Yes/No			
2.2.2.5	MR	Control	Direct remote control of Public Street Lights (Evening/morning and Night) must be possible using JSON (refer Annex 7) and/or 104. Remote control must overrule locally stored Public light program. See Annex 2: Accompanying letter for details using 104 and/or JSON.	Yes/No			
2.2.2.6	AC	PLC	DALI box supports basic PLC functionality to compare measurements and I/O-status (e.g. to detect deviations in max. load or power consumption of Public Street Lights, when activated; Public Street Light load or powerconsumption available over P1 port input; refer 1.3.6).	Yes/No	Technical specification	10	Fixed (Yes: 10; No: 0)
2.2.3	**Tariff control**						
2.2.3.1	MR	Control	DALI-box must support a locally stored Tariff program. Tariff program is using the local timezone.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.2.3.2	MR	Control	Locally stored Tariff program must be centrally configurable/managable using JSON as descibed in Annex 7 or in case of 104 protocol by using a uploadable configuration file. See Annex 2: Accompanying letter for details using 104 and/or JSON.	Yes/No			
2.2.3.3	MR	Control	Tariff program must support: • Fixed time basis for activation and de-activation Tariff Output • Distinction between working days, weekend-days and holidays (fixed and variable) and seperate days. • Minimal 16 entries to specify Tariff switch behaviour.	Yes/No			
2.2.3.4	MR	Control	Direct remote control of Tariff must be possible. Remote control must overrule locally stored Tariff program.	Yes/No			
2.2.3.5	MR	Control	Only in case of support of P1 Smart Meter port (ref. 1.3.5): DALI-box should be able to transfer (copy) the Tariff status on the P1-port directly to its Tariff Output (DO 3). Commanding DO 3 based on locally stored Tariff program or Tarfiff status Smart Meter input (P1-port) should be remotely configurable.	Yes/No			
2.3	**Data processing**						
2.3.1	**General**						
2.3.1.1	MR	Events and alarms	Events (including status of all DI's) and alarms must be transmitted, processed and implemented immediately using JSON as described in Annex 7 and/or 104. See annex 2: Accompanying letter for details using 104 and/or JSON.	Yes/No			
2.3.1.2	MR	Data availability	Data must not be compromised in case of power failure. Stored data must stay available after power failure.	Yes/No			
2.3.2	**Load management and related purposes**						

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.3.2.1	MR	Data processing	Below stated measurement-data (only transformer load) must be processed and transmitted by default on daily basis (meant for load management-purposes): Daily maximum (00:00-24:00 hours) of: • Voltage, 3 phase • Current, 3 phase • Total active power, S 3 phase • Total reactive power, S 3 phase • Total energy (counter), delivery and re-delivery (at 24:00 hours) • Only in case of support P1-port Smart Meter Public street Lights (refer 1.3.6): energy counters (at 24:00 hours). Daily minimum (00:00-24:00 hours): • Voltage, 3 phase • Total active power, S 3 phase • Total reactive power, S 3 phase Remote configuration options to select/deselect above mentioned variables must be available.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.3.2.2	MR	Data processing	Below stated measurement-data (for transformer load as wel as optional outgoing feeders) must be processed and transmitted immediately (meant for operational purposes): • Voltage, 3 phase, actual value • Current, 3 phase, actual value • Total active power, S 3 phase, actual value • Total reactive power, S 3 phase, actual value • Active power, 3 phase, actual value • Reactive power, 3 phase, actual value • THDi, 3 phase, actual value. • Only in case of support P1-port Smart Meter Public street Lights (refer 1.3.6): Total active power, S 3 Phase, actual value. Remote configuration options to select/deselect above mentioned variables must be available. Refresh of measurement-data must be based on offset value (threshold), with minimum and maximal constraints. Offset value: if an actual measurement value exceeds the previous measurement-value transmitted by more than the offset-value, an updated measurement-value must be transmitted. Enexis must be able to configure the offset value for each measurement as a percentage (default 5%, excluding voltage) and as a fixed value (voltage: 1 volt). Minimal and maximal constraints must be remotely configurable (e.g.: maximum number of transmissions: once every 1 second; minimum number of transmissions: once every 60 minutes). Remote rebooting of the system, in order to process an updated offset-value, is accepted.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.3.2.3	MR	Data processing	Below stated measurement-data (for transformer load as wel as optional outgoing feeders) must be proccessed on a, remotely configurable, fixed time basis (e.g. every 15 minutes or never) and must be stored locally on FIFO-basis. Local stored measurement-data must be retrievable over data files (for grid analysis purposes): • Voltage, 3 phase, average value • Current, 3 phase, average value • Active power, 3 phase, average value • Reactive power, 3 phase, average value • Total Harmonic Distortion in current (THDi), 3 phase, average value • Only in case of support P1-port Smart Meter Public street Lights (refer 1.3.6): Active power, 3 phase, average value. Local registration interval must be configurable remotely (default 5 minutes). The memory must be sufficient (and remain available) to store above mentioned measurement-data with timestamp on 1 minute basis for transformer load and on 5 minute basis for max. 12 optional outgoing feeders during at least one month.	Yes/No			
2.3.2.4	MR	Data processing	All measurement-data must be transmitted to central OT-domain in non-scaled format.	Yes/No			
2.3.3	**Public Light control**						
2.3.3.1	MR	Data processing	Status of DO's (Evening/morning and Night relays) must be transmitted to central OT domain upon change or on request from the central OT domain using JSON as described in Annex 7 and/or 104. See annex 2: accompanying letter for details using 104 and/or JSON.	Yes/No			
2.3.4	**Tariff control**						
2.3.4.1	MR	Data processing	Status of DO (Tariff relay) must be transmitted to central OT domain upon change or on request from the central OT domain using JSON as described in Annex 7 and/or 104. See annex 2: accompanuing letter for details using 104 and/or JSON.	Yes/No			
2.4	**Logging/Management and Monitoring**						
2.4.1	MR	Dataprocessing/ local syslog	Interruptions to the normal operation or relevant events (e.g. from modem/router, RTU, RTC) such as (local) communication failure, resetting IEC 60870-5-104 application, datastorage issues due to memory limitations etc. must be logged in a local syslog or syslogs including time label, to enable subsequent fault analysis. Logging must be available locally at least 7x24 hours.	Yes/No			
2.4.2	AC	Dataprocessing/ SNMP	Monitoring of relevant system-events and measurements on the health of the system, its componenents and the communication is possible using SNMPv3. Tenderer provides a relevant MIB for this purpose.	Yes/No	Technical specification	10	Fixed (Yes: 10; No: 0)

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
2.5	**Timekeeping**						
2.5.1	MR	Timekeeping	The system must be provided with an NTP client in order to obtain the correct time of two (configurable) NTP servers. NTP version 6 is to be supported. The RTU must provide timestamps to events in UTC time.	Yes/No			
2.5.2	MR	Timekeeping	The system must provide a Real Time Clock (RTC). During power-outage the clock must keep functioning for at least 7x24 hours. The use of seperate replacable batteries for power back-up of the RTC is not allowed. When the system boots, the RTC time is initially used (until syncing with NTP is possible). The RTC is periodically synchronised by the NTP-time. When correct time during start-up is not guaranteed a default time/date must be loaded and this must be logged in the syslog.	Yes/No			
2.5.3	MR	Timekeeping	NTP is used for clock synchronization. Enexis will synchronize all box clocks via the (mobile) network using an NTP server (to be defined by Enexis if this is the controlling station, server or another system). The NTP time value is UTC. All events, logs and 104/JSON time tags are in UTC (2.2.1.1). For public lighting (2.2.2) and tariff switching (2.2.3) the local timezone is used as reference. The box must convert the UTC to local time with day light saving for this purpose.	Yes/No			
3.	**Operating conditions**						
3.1	**Environment**						
3.1.1	MR	Environment	The cabinet including the installed components must be suitable for following ambient conditions: • temperature: -20 to +55 degrees Celsius • humidity: 10-95% non-condensing.	Yes/No			
3.1.2	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Electrostatic discharge: IEC 61000-4-2 class 3, 8kV/Air and 6kV/Contact	Yes/No			
3.1.3	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • EMC: IEC 61000-4-3 class 3, 10V/m	Yes/No			
3.1.4	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Fast Transient Burst (5nS/50nS): IEC 61000-4-4, 2kV	Yes/No			
3.1.5	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Surge protection (1,2/50µS): IEC 61000-4-5 class 3, 2kV CM and 1kV DM	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
3.1.6	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Conducted Radio Frequency: IEC 61000-4-6 class 3, 10V	Yes/No			
3.1.7	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Magnetic fields 50Hz: IEC 61000-4-8, level 3, 10A/m permanent and 100A/m 1-3 sec.	Yes/No			
3.1.8	MR	Environment	The following immunity requirements apply to the assembly of components (or its inputs and outputs where relevant): • Damped oscillating waves (1MHz burst): IEC 61000-4-18, 1kV DM/2,5kV CM	Yes/No			
3.1.9	MR	Environment	The assembly of components shall comply with acceptance criteria class 2 of chapter 7.5 of IEC 61850-3 and table 23 of IEC 60255-26.	Yes/No			
3.2	**Lifetime, failure rate and proven technology**						
3.2.1	MR	Lifetime	Technical lifetime must be minimum 10 years, with cumulatively failure-rate of max. 15%, based on the following environmental conditions: • temperature: -20°C (1% time), +20°C (98% time), +55°C (1% time) • humidity: 40% (5% time), 65% (85% time), 95% (10% time).	Specify lifetime			
3.2.2	AC	Annual failure rate	Specify cumulatively and annual failure-rate over 10 Years of service, based on conditions as specified in 3.2.1.	Specify cumulatively and annual failure rate/year over 10 years of service. In case of no specifications, a cumulatively failure rate of 15% over 10 years of service will be used as default.	TCO		Refer Price-sheet
3.2.3	AC	Annual failure rate over lifetime period	Tenderer can prove its failure-rate of assembly or major parts, e.g. over MTBF-calculations, failure-analysis or similar. Please provide evidence.	Provide evidence by means of: 1) theoretical analysis based on FMEA and risk analysis by means of reliability statistics (= MTBF calculation) 2) Failure rate expectation over lifetime by means of accelarated life cycle testing on test samples	Technical specification	15	Fixed (0=No evidence; 5=MTBF calculation RTU+Modem; 10=MTBF calculation assembly; 15=Failure analysis assembly by testing)

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
3.2.4	AC	Proven Technology	Switching functionality over pre-defined switchingprograms based on astronomic criteria (e.g. for Public Street Lights), is proven technology for the product(-line) offered. Proven technology means that the offered product(-line) is in use by one or more customers for at least 6 months. The contracting authority would like to receive evidence of the technology being a proven technology as stated above.	Yes/No; please provide evidence.	User-friendliness	15	Fixed (0=No; 15=Yes)
3.3	**Maintenance**						
3.3.1	AC	Maintenance	Enexis intends not to perform any preventive inspection and maintenance activities (only reactive maintenance based on alarms). If correct operation of the system incorporates maintenance (e.g. changing batteries and/or electrolytic capacitors during by Enexis stated minimum lifetime), this must be specified by the Tenderer.	Specify maintenance requirements if applicable	User-friendliness	10	Fixed (Maintenance required=0, No maintenance required=10)
4.	**Software/tools/systems**						
4.1	**General Software requirements**						
4.1.1	MR	General software requirement	The software used must be fully compliant with following TCP/IP RFCs: • TCP/IP: RFC 1122 (https://tools.ietf.org/html/rfc1122). • IPv6: RFC 6540 (https://tools.ietf.org/html/rfc6540).	Yes/No			
4.1.2	MR	General software requirement	Software must be IPv6 compatible as well as IPv4 compatible. It must be possible to switch over from IPv4 to IPv6 remotely in the future.	Yes/No			
4.2	**Configuration and commissioning tools**						
4.2.1	MR	Configuration management	Tenderer is responsible for delivery of pre-configured (basic settings to facilitate comissioning process) DALI-boxes including installed SIM-cards (provided by Enexis), which are not yet assigned to a specific location or secondary substation. Substation-specific configuration settings will be added during commissioning-process.	Yes/No			
4.2.2	MR	Configuration management	Tenderer must provide a commissioning tool to remotely commission and configure DALI-boxes when first connected. Commissioning-tool must facilitate data-import functionality (CSV, XML or JSON format to be defined by supplier and handed over to Enexis) for substation-specific configuration settings. An alternative solution is that tenderer develops an import function in the commissioning tool for the file mentioned above. Hardware (server) to run this management-tool must be included in the offer. Refer Annex 2: accompanying letter.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
4.2.3	MR	Configuration management	Tenderer must provide a management tool to remotely manage DALI-boxes (firmware updates, patches and/or configuration changes). Management-tool must facilitate data-import functionality. Hardware (server) to run this management-tool must be included in the offer. Refer Annex 2: accompanying letter.	Yes/No			
4.2.4	AC	Configuration management	Tenderer provides a userfriendly, preferably automated, authentication process of DALI-boxes. Result is an operational communication-interface between central OT-domain and DALI-box (ready to transfer substation-specific configuration data). Manual configuration activities performed locally over web interface or configuration-tools are not accepted. Refer to Enexis commissioning process in Annex 2: Accompanying letter.	Please specify in detail each action needed to achieve an accepted, operational communication path between central OT-system and DALI-box.	User-friendliness	30	Fixed (30=outstanding functionality: no manual interventions during commissioning are needed; each manual intervention -5 points, minimum = 0 points).
4.2.5	AC	Configuration management	Tenderer provides a userfriendly, preferably automated, configuration process, taking into account substation specific configuration parameters (e.g. security-credentials, transformer ratio current sensors; which MV-bays are remotely monitored over short circuit indicators). Manual configuration activities performed locally over web interface or configuration-tools are not accepted. Refer to Enexis commissioning process in Annex 2: Accompanying letter.	Please specify in detail each action needed to achieve an fully functional DALI-box, based on Enexis commissioning process.	User-friendliness	30	Fixed (20=outstanding functionality: no manual interventions during commissioning are needed; each manual intervention -5 points, minimum = 0 points).
4.2.6	MR	Memory storage	Apart from having sufficient memory to store readings as specified elsewhere in this specification, the memory space must be sufficient to store at least two firmware and configuration versions. It must be possible to store one actual and one backup/new version, in order to remotely update de DALI-box	Yes/No			
4.2.7	MR	Impactfull commands	Impactful commands (switch-command, software changes, reset, etc.) must be protected for accidental change.	Yes/No			
5.	**Documentation, training, service and support**						
5.1	**Documentation**						

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
5.1.1	MR	Instruction manual	Selected participant must provide two product manuals in Dutch: • an expert-manual for system engineers of the (remote) OT-management department. At least must be covered: specification of software/hardware configuration, remote configuration-tools, local web-interface, expert troubleshoot options (focus software) and remote management of DALI-boxes. • a quick start guide for field staff responsible for mounting and commissioning DALI-boxes. At least must be covered: system-overview of main components and slots, connection-diagrams, commissioning-procedures, basic troubleshoot options (focus hardware), Last gasp replacement procedures (if applicable) and explanation of local status-visualisation.	Yes/No			
5.2	**Schemes**						
5.2.1	MR	Schemes	All drawings must be provided digitally in a vector (DXF) format after awarding.	Yes/No			
5.3	**Training**						
5.3.1	AC	Training	Tenderer should facilitate an adequate system-engineer training (engineers OT-department) in Dutch or English (at minimum level B2 of the European framework of references, refer Annex 11, sub-annex 2). System-engineers must be able to set up and manage software templates, facilitate central commissioning, manage remote updates (firmware, configuration-files and settings), handle and interpret log files, carry out detailed fault diagnosis independently and manage centrally stored data. (Premise: two training courses in the Netherlands/total max. 10 system-engineers).	Specify training-duration, with a minimum of 2 days or more if found necessary based on complexity of solution (offer can be included in Reply format Price sheet).	User-friendliness	5	Fixed, linear (5 or more training days needed=0; 2 training days = 5; linear score in between)
5.3.2	AC	Training	Tenderer should facilitate an adequate field staff training in Dutch (at minimum level B2 of the European framework of references, refer Annex 11 sub-annex 2). Core users must be able to understand the functionality of the used products/components in basic for Enexis Use-cases, commission systems and be able to perform a basic fault diagnosis (without tooling) independently. They should be able to train commissioning engineers independently. (Premise: 2 training-courses in the Netherlands /total approx. 16 core-users in total). In order to meet the Enexis practice, the Enexis specific parameters/configuration settings need to be included in these courses.	Specify training-duration, with a minimum 0f 0,5 days or more if found necessary based on complexity of solution (offer can be included in Reply format Price sheet).	User-friendliness	5	Fixed, linear (2 or more days needed = 0; 0,5 days = 5; linear score in between)
5.4	**Support and development**						

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
5.4.1	MR	Support/SLA	Tenderer shall provide initial expert-support in Dutch or English (minimum level B2 according to the European framework of references), during normal working hours CE(S)T to facilitate correct initial installation of central software tools and correct functioning of the DALI-boxes.	Yes/No			
5.4.2	MR	Support/SLA	Tenderer shall provide software-engineering expertise during contract-period to implement additional requested functionality by Enexis. Support in Dutch or English (minimum level B2 according to the European framework of references) during normal working hours CE(S)T.	Yes/No; Specify development-expertise in €/hour all included in reply format Price sheet.			
5.4.3	MR	Support/SLA	Tenderer shall provide expert-support/assistance on distance in case of incidents or issues during contract-period in Dutch or English (minimum level B2 according to the European framework of references), during normal working hours CE(S)T. Below mentioned incident-levels are applicable: - Minor incident/issue: a hardware abnormality (≤ 4 DALI-boxes) or a disrupted support function is applicable, but business-critical parts of the application function properly and are not affected. Business-critical functions of the application are Public Streetlight Control, Tariff control and retrieving measurement data as well as short circuit indicator signals. - Major incident/issue: a hardware abnormality (5 ≥ x ≤ 14 DALI-boxes), a security-related issue or a (support) function indirectly affecting business-critical parts of the application is applicable. - Critical incident/issue: an incident/issue not classified as minor or major with business-critical impact. Below mentioned service-levels have to be met: - Minor incident/issue: will be under investigation within 5 working days and 90% of incidents/issues will be solved within 20 working days. - Major incident/issue: will be under investigation within 1 working day and 90% of incidents/issues will be solved within 10 working days. - Critical incident/issue: will be under investigation within 4 hours and 90% of incidents/issues will be solved by workaround within 8 hours. Final solution within 5 working days. In case of Major and Critical incidents a root cause analysis has been closed within two weeks after the incident.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
5.4.4	MR	Support/SLA	Tenderer will provide on-site support (during normal working hours CE(S)T) within 4 hours in case of critical incidents (e.g. critical Public Street Light issues) during contract-period in Dutch or English (minimum level B2 according to the European framework of references). Time based on Enexis offices located in Weert or Zwolle.	Yes/No			
5.4.5	MR	Support/SLA	Tenderer shall provide support for client software (current version = N, N-1 and N-2) in combination with an operating system for at least 8 years after the delivery of the unit. This support includes: • Incident-management support (refer 5.4.2). • Provide software updates / improvements if applicable. • Pro-active reporting about relevant Cyber Security vulnerabilities. • Pro-active provision of security patches for vulnerabilities. • Software-engineering activities requested by Enexis based on fixed hourly rates. Preliminary activities for software update service incorporate: • Ongoing monitoring of announcements by third party software, like OS (via web portals) concerning the availability of new patch levels and releases. • Assessment of changes (bug fixes, security patches) in order to decide whether immediate integration and installation in the client's operational system is necessary. Measures for prompt delivery when a potential system risk is perceived to exist, with estimation of whether a system risk is present to be done by vendor: • Test the compatibility of the third party software updates to be delivered with the reference system and the client's project-specific system. • Eliminate any incompatibilities between the new third party software release and the application software system by modification of the application software. • Compilation and delivery of the system changes (patches) with documentation and test instruction.	Yes/No			

Ref.	Requirement type AC=Awarding Criterium MR=Minimum req.	Requirement	Requirement description	Reply-format	Valuation category (if AC)	Max. score	Assessment method
5.4.6	MR	Support/SLA	Tenderer shall provide support for hardware for at least 8 years after the delivery of the unit. This support includes: • Perform hardware-repair of DALI-boxes out of warranty period (based on mutually agreed fixed prices up front). • Report performed hardware-repairs. • Logistical handling of DALI-boxes send for repair. • Maintaining knowledge of the Enexis DALI-box • Maintaining tracability of used components. • Notifying of EOL of used components minimum 1 year before actual EOL-date. • Yearly evaluation meeting	Yes/No			
5.4.7	MR	Development	Any software modification shall be justified by the Tenderer, documented and tested (incl. regression). Software changes must be submitted in advance by the Tenderer (using release notes) and implemented by means of releasemanagement. Software-releases should be backwards compatible. Enexis reserves the right to not accept software-modifications if need can not be demonstrated and/or correct operation can not be guaranteed.	Yes/No			
5.4.8	MR	Development	Any hardware modification shall be motivated by the Tenderer, documented and tested. Hardware changes must be submitted in advance by the Tenderer (using release notes). Enexis reserves the right to not accept hardware-modifications if need can not be demonstrated and/or correct operation can not be guaranteed.	Yes/No			