WESTERN POWER DISTRIBUTION

OPEN LV

OPENING UP THE SMART GRID

OpenLV Measurement Points

ea technology

RIIO NIC NETWORK INNOVATION COMPETITION

Report Title:	OpenLV Measurement Points
Report Status:	For Publication
Project Ref:	2689-PUBLC-S001-V01.00.01
Date:	18.10.2017

Document Control

	Name	Date
Prepared by:	Richard Ash	29.09.2017
Reviewed by:	Tim Butler	18.10.2017
Recommended by:	Richard Potter	18.10.2017
Approved:	Dan Hollingworth	18.10.2017

Revision History

Date	Issue	Status
18.10.2017	1.0	For Publication

DISCLAIMER

Neither WPD, nor any person acting on its behalf, makes any warranty, express or implied, with respect to the use of any information, method or process disclosed in this document or that such use may not infringe the rights of any third party or assumes any liabilities with respect to the use of, or for damage resulting in any way from the use of, any information, apparatus, method or process disclosed in the document.

Telephone +44 (0) 1332 827446. E-mail wpdinnovation@westernpower.co.uk

Contents

1. Electrical Measurements

This document lists the measurements which are made by the OpenLV hardware and published on the LV-CAP Data Marketplace so that Applications running in the substation can make use of them.

Electrical measurement values will be published every 60 seconds.

1.1 LV Busbar

- RMS Voltage phase to neutral for each phase
  - Minimum, Maximum and Mean values

1.2 Transformer Secondary

- RMS current in each phase
  - Minimum, Maximum and Mean values
- Current phase angle (power factor) for each phase
  - Mean value
- Real (Active) and Reactive power flow in each phase (including direction)
  - Mean values
- Real (Active) and Reactive energy in each phase
  - Energy flow values for each 60 second measurement period

1.3 Outgoing Feeder

One outgoing feeder will be monitored. Additional feeders maybe monitored subject to funding for the additional measurement hardware costs.

- RMS current in each phase
  - Minimum, Maximum and Mean values.
- Power factor for each phase
  - Mean value
- Real (Active) and Reactive power flow each phase (including direction)
  - Mean values
- Real (Active) and Reactive energy in each phase
  - Energy flow values for each 60 second measurement period

2. Temperature Measurements

Temperature measurement values will be published every 10 seconds.

2.1 General

- Outdoor ambient air temperature
- Indoor ambient air temperature (indoor substations). In multiple room substations this will be in the transformer chamber.

2.2 Transformer

- Transformer top oil temperature (or as close an approximation as can be managed)

3. Additional Measurement Inputs

3.1 Additional feeder current monitoring

- Monitoring of additional outgoing feeders can be added. The measurements made on additional outgoing feeders are the same as those listed above.
- The system can be expanded up to a total of 4 outgoing feeders plus the substation total, or 5 outgoing feeders using a calculated total *if all outgoing feeders are then being monitored*.
- The additional sensors required (three per feeder) would need to be purchased.
- No additional software development is required.

3.2 Feeder Neutral current monitoring

- Monitoring of the measured neutral current in outgoing feeders can be added. The neutral current measurements are the same as those listed above.
- Neutral current can be measured on up to 5 feeders, subject to the load current already being measured.
- The additional sensors required (one per feeder) would need to be purchased.
- No additional software development is required.

3.3 Additional temperature monitoring

- Monitoring of additional temperatures can be added. The measurement parameters would be the same as the core temperature measurements above.
- The platform has 5 further thermocouple temperature measurement channels available.
- The thermocouple probe itself and suitable cable to the OpenLV enclosure would have to be purchased.
- No additional software development is required.

3.4 Additional analogue inputs

- A suitable interface for 0-5V, 0-10V 4-20mA etc. analogue inputs has been identified.
- It has 8 analogue input channels.
- This will not be fitted to the OpenLV systems as standard but could be added at an equipment cost of around £150.
- The software support would be shared with the rest of the system and so not add additional costs.