

# 2019 Annual Conference

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### Use of Smart Metering for distribution systems outage location

#### A proof of concept

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### BACKGROUND

The observability of the low-voltage network is still in most cases in the development phase. A major challenge for the DSO is also the location of areas affected by an outage in order to initiate effective troubleshooting. Since the smart meter communication channel (PLC-G3) is the same as for the power flow, this poster discusses the use of smart meters communication data, coupled with phase outage alarms, to check the power supply status of an area.

### OBJECTIVES AND METHOD

Due to the very limited availability of simulation methods for the G3 communication system, the simulation analysis was simplified. The main purpose is to install the tool in the field and perform tests directly in a real network. Availability of the communication link is the criteria for identifying power losses.

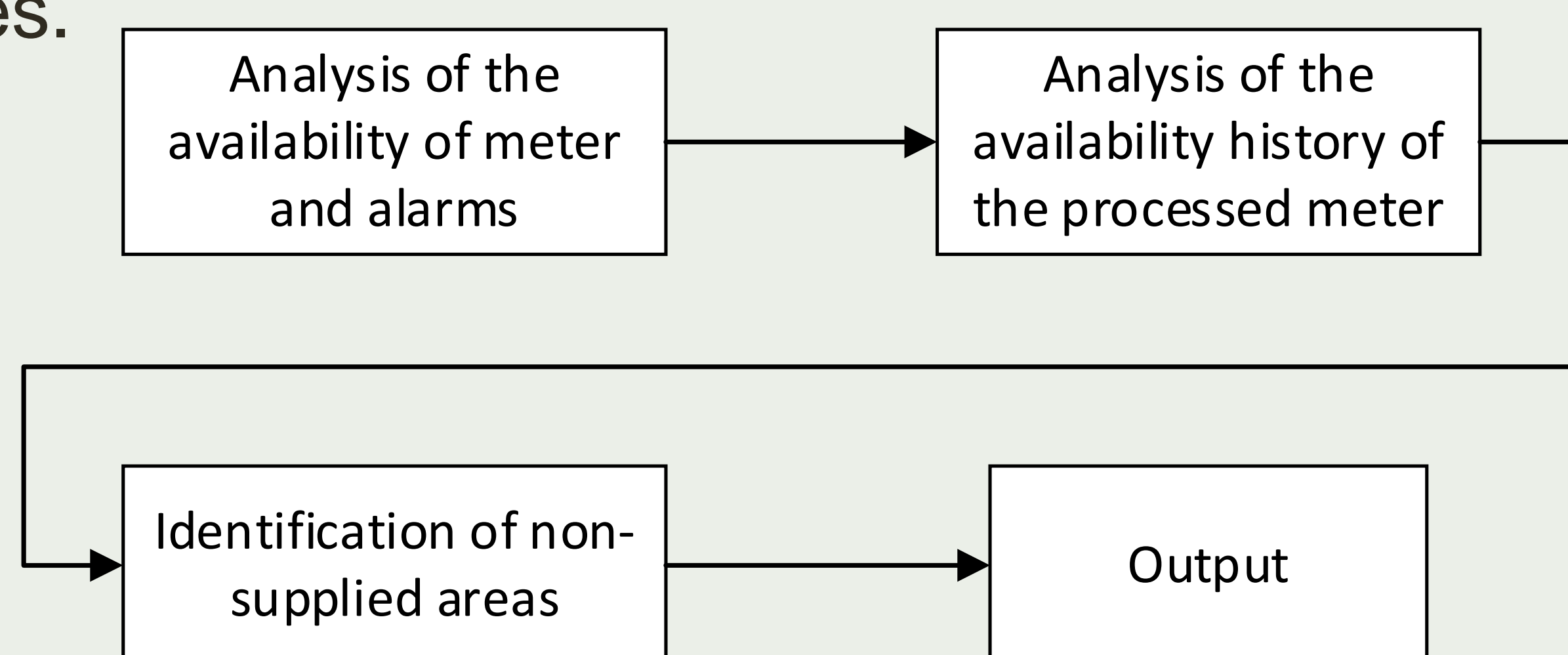


Fig. 1 Principle of the analysis system

An algorithm combining both electrical and communication topology information for analysis has been developed.

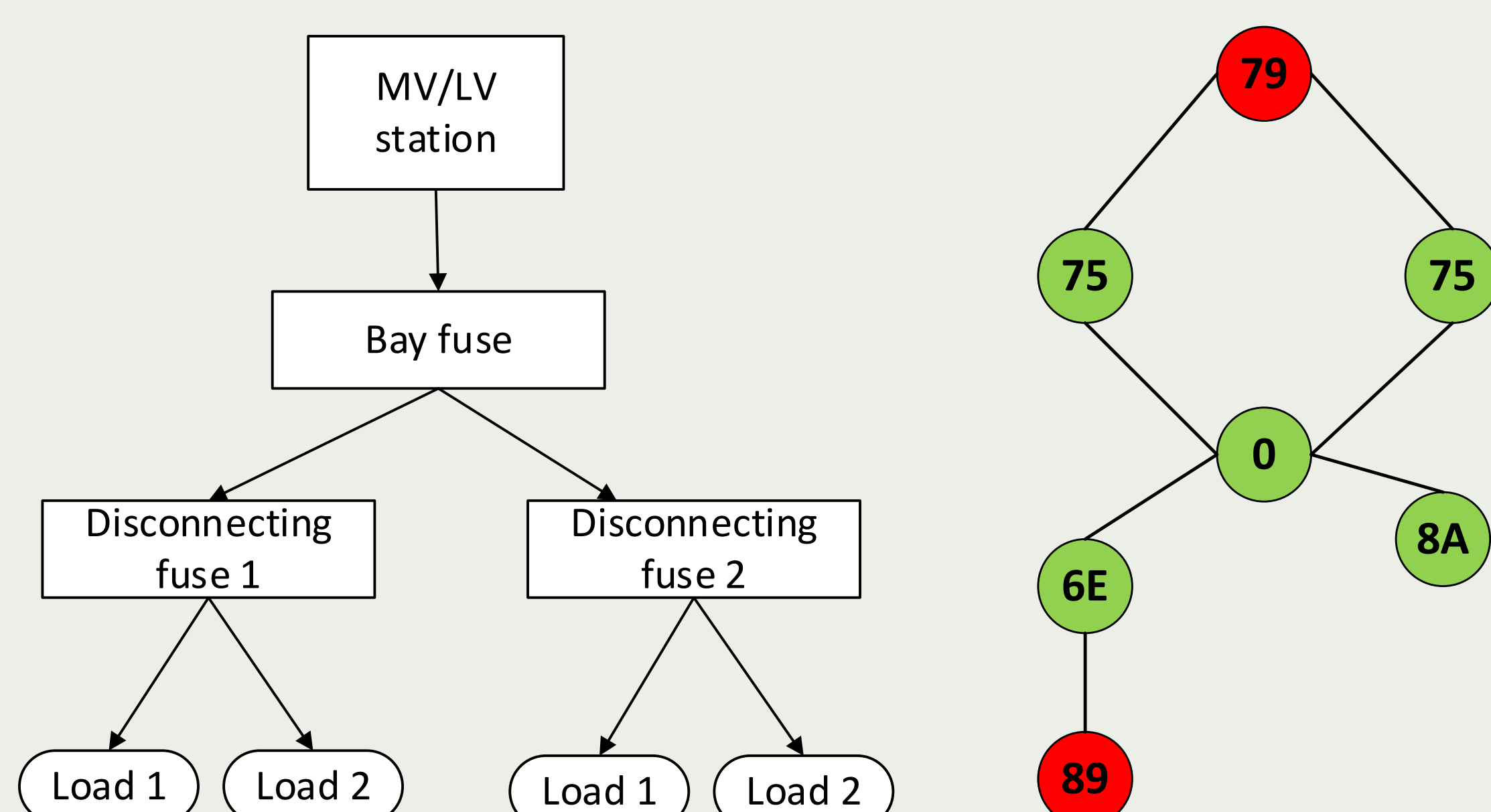


Fig. 2 Network electrical topology and G3 communication topology

### RESULTS

A test infrastructure has been set up in the Rolle Hospital network. Four smart meter were used as targets to test the program. An example of case study is presented here.

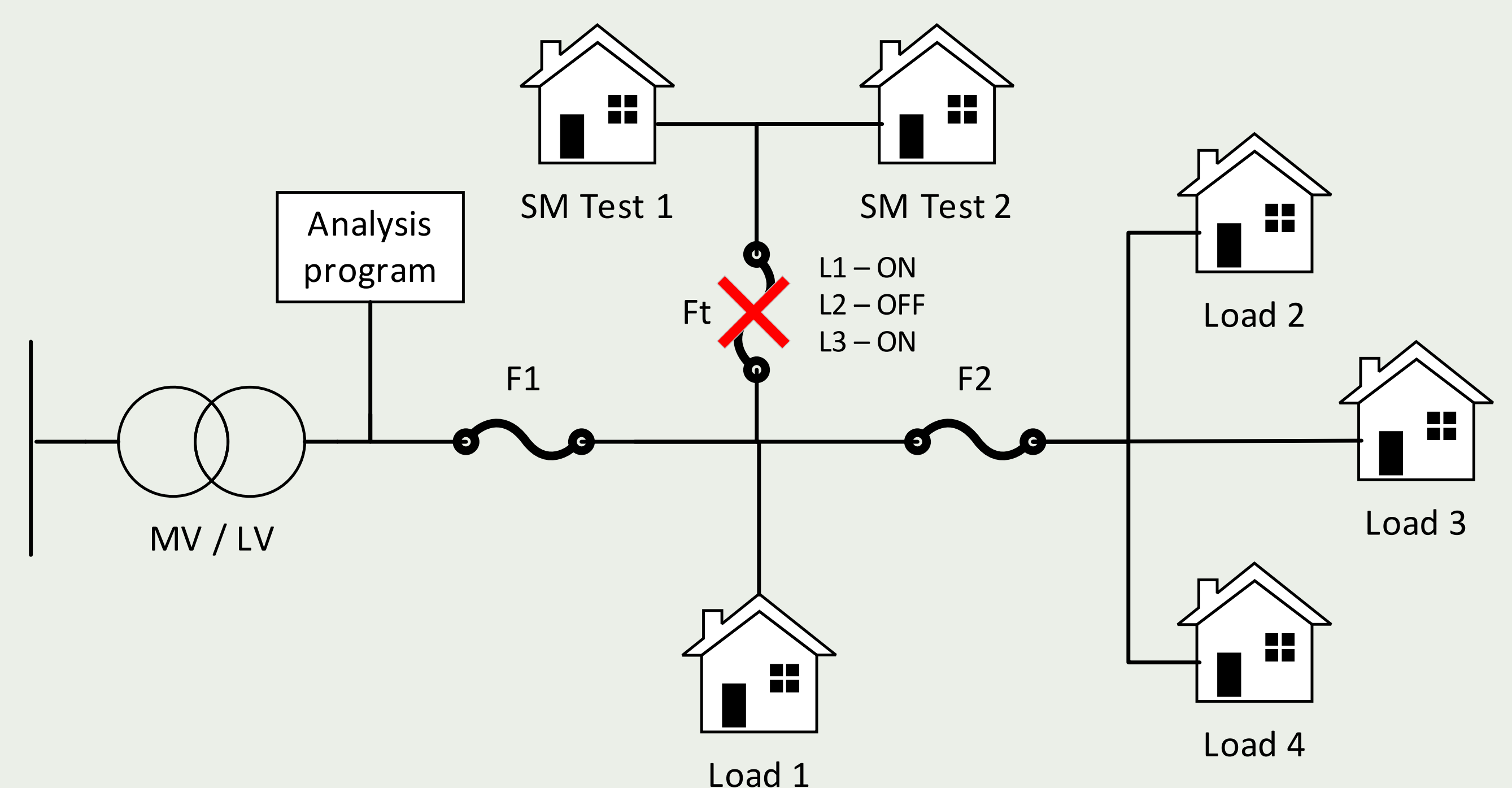


Fig. 3 Example of case study

The used test smart meters are communicating on two different phases (L1 and L2). The lost of L2 on fuse Ft is simulated. The analysis program give the following results.

Type of information	Affected phase	Affected customer	Possible problem
Alarm	L2	1	Ft or customer
Lost of communication	L2 or all	1	Ft or customer

Using only one system (alarm or communication) to retrieve network information is not reliable, since a network fault cannot be distinguished from a customer one. Combining both results bring the right answer.

### CONCLUSION AND PERSPECTIVES

The ability to identify power losses using the communication data and alarms provided by smart meters has been demonstrated. An on-demand version of the program will be implemented in the DSO's control center in order to evaluate the operation with real failure cases; at the same time, tests with a more substantial infrastructure are planned.