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7. (13.) SAVJETOVANJE HRVATSKOG OGRANKA MEĐUNARODNE ELEKTRODISTRIBUCIJSKE KONFERENCIJE

SO5 - 02 GRID AUTOMATION PLANNING OF CROATIAN DISTRIBUTUION NETWORK OF ELEKTROISTRA PULA

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CONTEXT and OBJECTIVES

- Using Elektroistra Pula in the north-west region of Croatia as a blueprint for implementation of smart grid concept with an emphasis on distribution automation.
- Currently high values and spread of interruption frequency (SAIFI) and poor unavailability (SAIDI).
- Study aims at integration of network automation functions in order to improve reliability of electricity distribution by decreasing unavailability of supply.

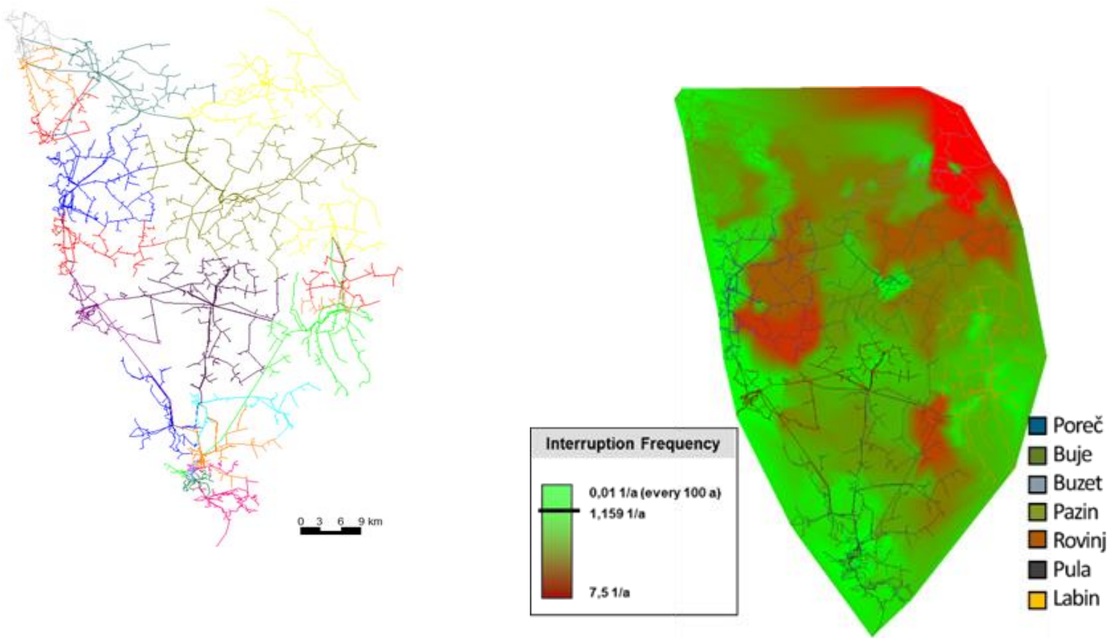

Figure 1 – Distribution network of Elektroistra Pula (left) and calculated current SAIFI values (right)

APPROACH

- Current network evaluation
- Extension planning due to load increase and integration of distributed generation until 2032
- Definition of target unavailability for SAIDI to halve the present value
  (SAIDI = 102 min/a)
- Derivation of methodology for grid automation planning based on a synthetic network approach for integration of network automation functions
- Determination of localization and amount of automation infrastructure in network region

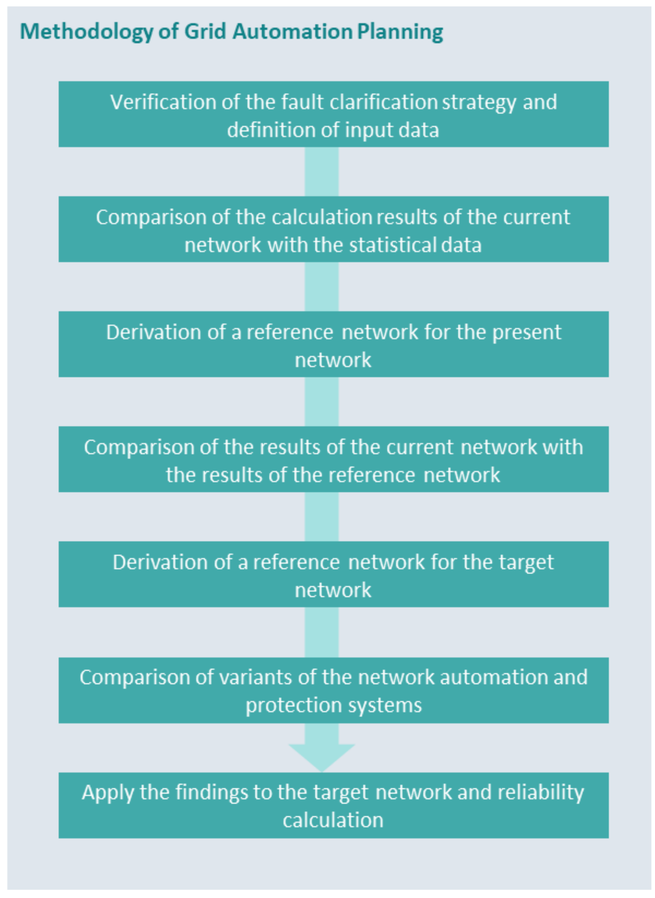

Figure 2 – Methodology for the grid automation planning

Derivation of different automation variants:

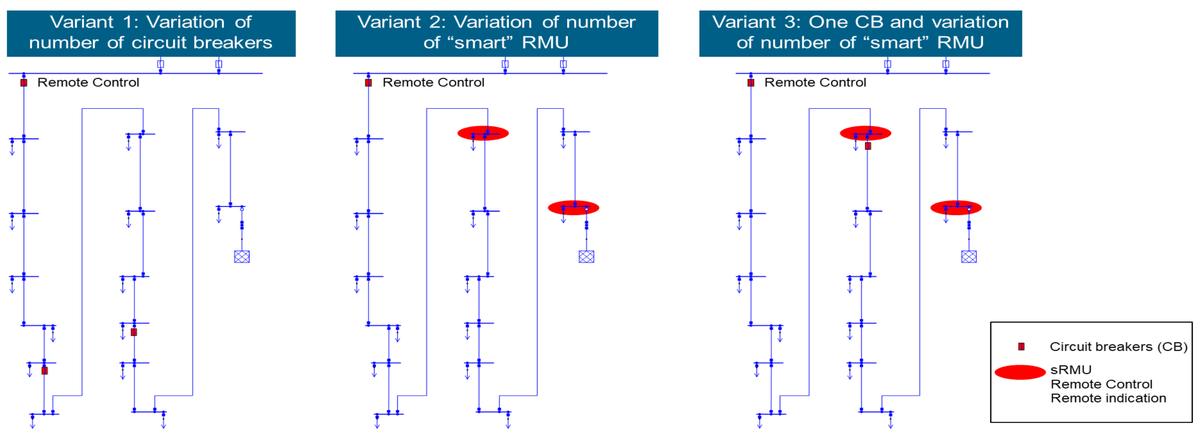

Figure 3 – Automation variants for reference network.

Optimum amount and position of the considered variables (circuit breaker and smart ring main unit) are determined considering the time grading of protection systems and nodes with highest information gain or safety disconnection in order to comply with the target SAIDI value.

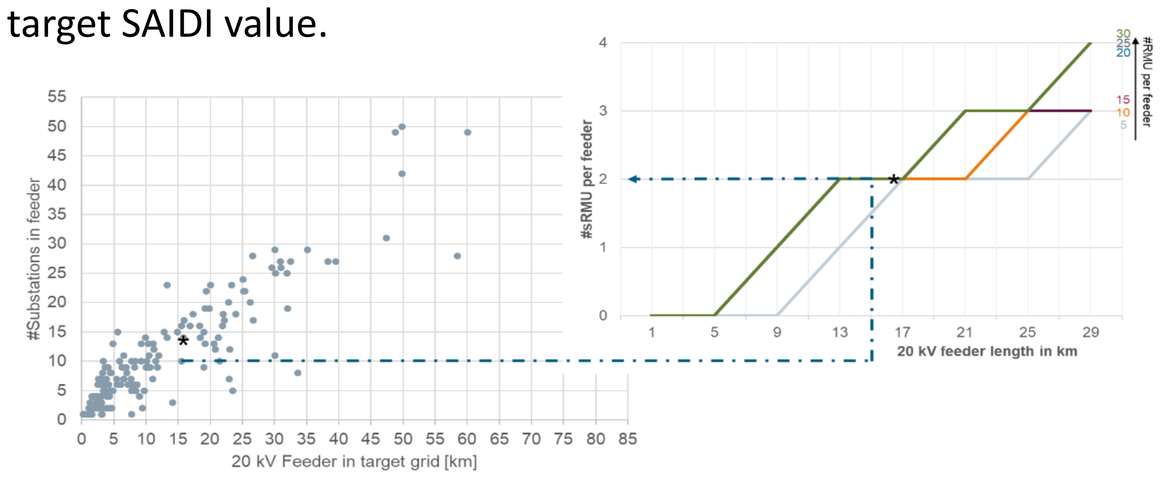

Figure 4 – Necessary measures to achieve the target SAIDI for the variant 2.

RESULTS

- Comparison of the variants showed that integration of a defined number of smart RMU (variant 2) represents the optimal techno-economical solution.
- With this variant the targeted SAIDI of 51 min/a can be achieved.

Figure 5 – Interruption Duration Index by zones for the automation variant 2.

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