TAVRIDA ELECTRIC

Excellence in Engineering

Rezip

**Advanced Fault Detection,
Isolation and Restoration Algorithm**

FDIR for a Smarter Grid

Electric utilities are faced with a constant dilemma: SAIDI and SAIFI improve with a number of reclosers, but the greater number of reclosers leads to protection coordination problems. Various vendors offer a range of solutions to tackle this issue, but quite often it leads to other disadvantages and customer frustration:

• Overcomplicated system settings and set-up
• Very expensive telecommunication equipment and system
• Lower overall reliability due to communications dependability
• Not scalable or additional services from the vendor required

The Rezip algorithm is Tavrida Electric's original solution for overhead distribution networks automation using Rec15/25 automatic circuit reclosers. It reduces the duration and scale of power outages, providing the distribution grid with self-healing capability in a simple straightforward way, and without the need to invest in communication infrastructure.
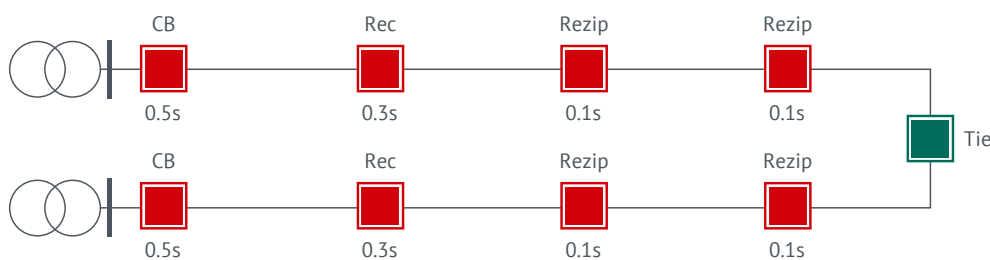
Rezip application areas:

1. Very long feeders

Power supply of distant areas (>50 km) with high fault rates requires to increase the number of sections
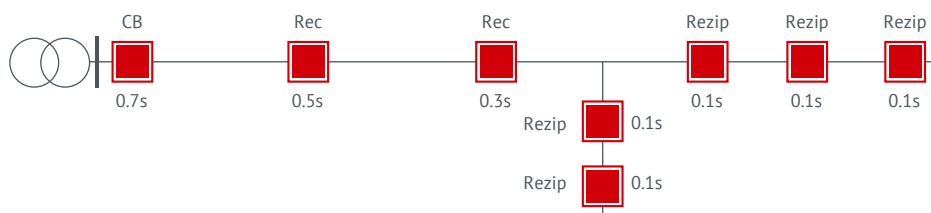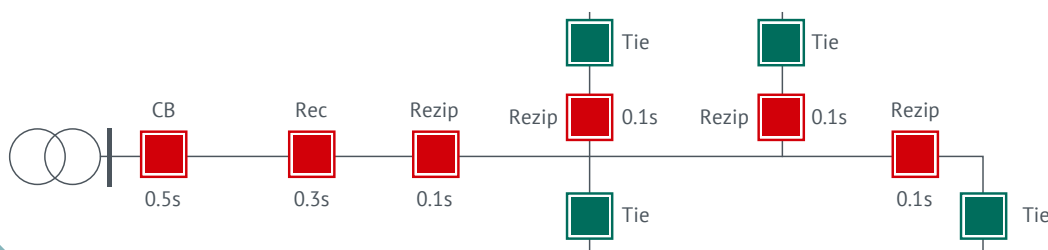

2. Loop schemes

Some feeders existing nearby can be connected into a ring to further increase reliability and Rezip is able to deal with protection coordination problems
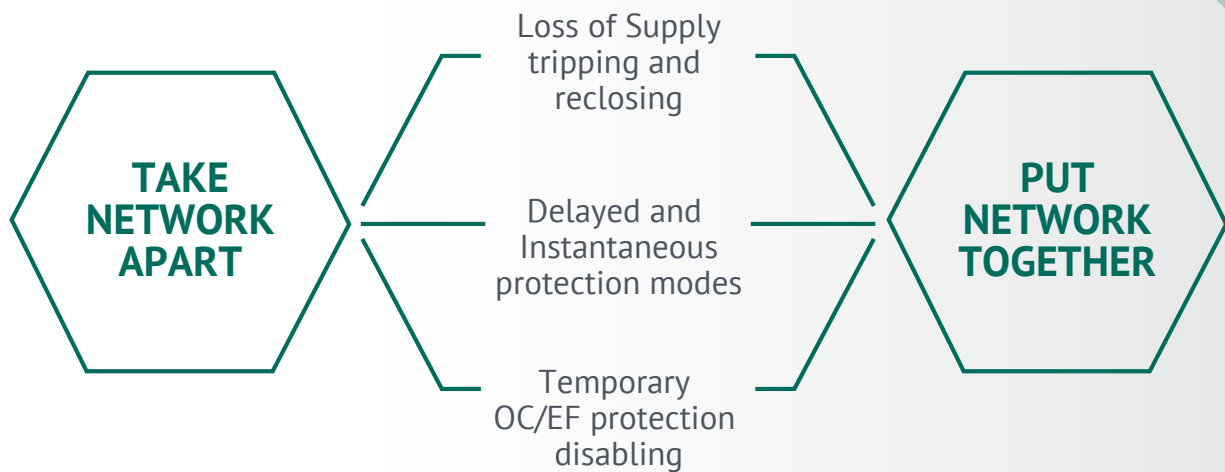

3. Meshed networks

Highly meshed grid topology forces the utilities to use manual control and suffer from permanent economical losses, while Rezip can resolve this in a cost-efficient way

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Rezip Algorithm Philosophy

TAKE NETWORK APART

- Loss of Supply tripping and reclosing
- Delayed and Instantaneous protection modes
- Temporary OC/EF protection disabling

PUT NETWORK TOGETHER

TAKES ONLY FEW SECONDS MAX!

1. The algorithm is initiated by an upstream recloser tripping

2. Once the loss of supply is detected, all Rezip reclosers will trip during upstream recloser dead-time

3. When the recloser closes, it restores supply to the closest Rezip recloser(s)

4. It activates the ARLS timer and after a pre-set time the Rezip reclosers will close restoring the power supply to downstream Rezip recloser(s)

5. Immediately after the closing Rezip recloser(s) are operating in instantaneous protection mode and if any of them detects the fault, it will trip before the upstream protection device will

6. By the time next Rezip recloser is closed by the ARLS, the upstream Rezip OC/EF protection is disabled

Key features:

• No time grading between Rezip reclosers is required

• Any number of Rezip reclosers can be connected in series

• Algorithm correct operation and reliability do not depend on communications

• Easily scalable approach for hassle-free grid modernization

• Cost-effective and future-proof solution

• Up to 80% SAIFI improvement

Reliable Hardware & Intelligent Software

Rec15/25 Automatic Circuit Recloser:

- State of the art Outdoor Switching Module
- Sophisticated control and protection for Smart Grids
- x6 combined current and voltage sensors built-in
- Maintenance free
- Lightest weight
- Plug & Play design
- 55,000 installations worldwide

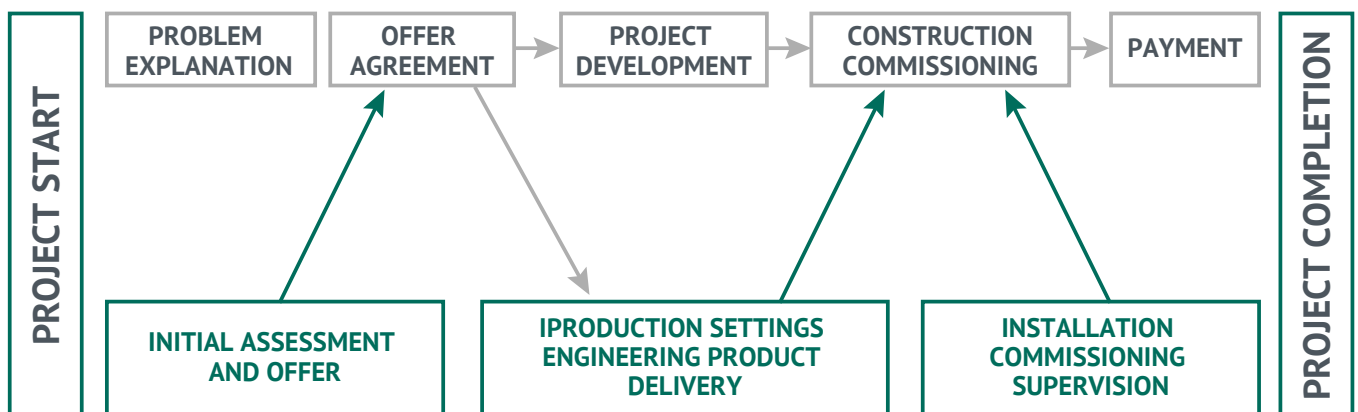| Parameter	Rec15	Rec25
Rated voltage (Ur)	15.5 kV	27 kV
Rated continuous current (Ir)	630 A	630 A
Rated short-circuit breaking current (Isc)	16 kA	12.5 kA
Rated frequency (fr)	50/60 Hz	
Operating cycles, rated current (CO-cycles)	30 000	
Electrical endurance, breaking current (O-CO cycles)	50	
Closing time, not more than	77 ms	
Opening time, not more than	43 ms	
Rated operating sequence	O-0.1s-CO-2s-CO-2s-CO	
Outdoor Switching Module weight	68 kg	72 kg
Service life	30 years	

TELARM® software:

- Network editor and faults simulation
- Automated reliability indices calculation
- Logs and settings for remote management
- Standalone elementary SCADA
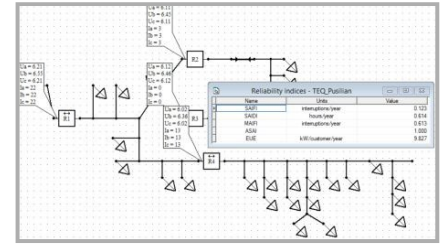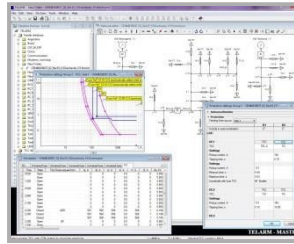
Project Implementation Approach

To ensure that Rezip reclosers operate efficiently in the distribution network, Tavrida Electric experts analyse the system, identify the most feasible locations for installation and forecast the expected network performance improvement. To further simplify network automation, Tavrida Electric protection engineers calculate, upload and test protection settings prior to site delivery. As a result, the customer receives a complete Plug & Play FDIR solution, minimizing required engineers' man hours and total capital investment.

PROJECT START

| PROBLEM EXPLANATION | OFFER AGREEMENT | PROJECT DEVELOPMENT | CONSTRUCTION COMMISSIONING | PAYMENT |

INITIAL ASSESSMENT AND OFFER

IPRODUCTION SETTINGS ENGINEERING PRODUCT DELIVERY

INSTALLATION COMMISSIONING SUPERVISION

PROJECT COMPLETION

- Root cause identification of customer problems
- Ensure investment and human resources efficiency
- Allows the customer to focus on other important tasks or projects
- Easy to install, commission and maintain with support from highly qualified engineers
- Well proven solution deployment experience with projects located globally

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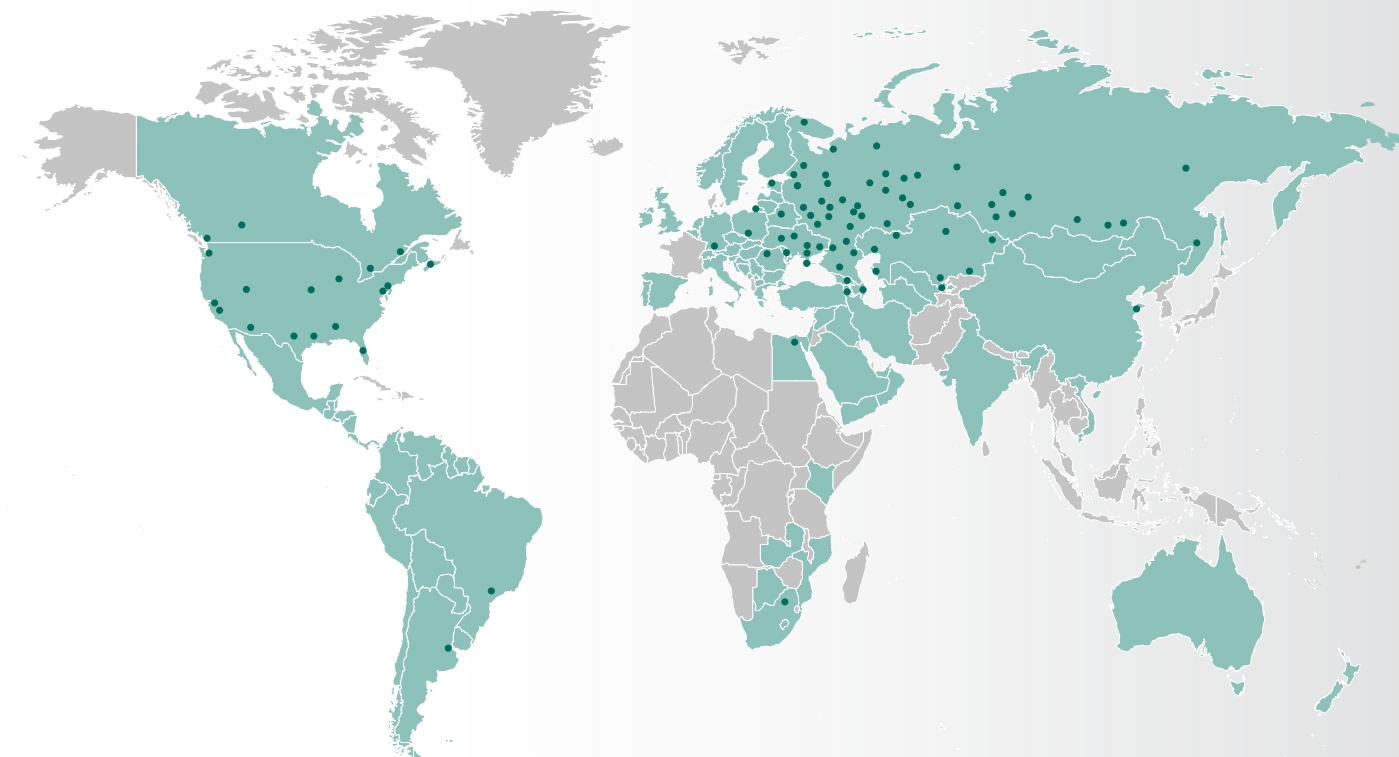
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