



by Javier Amantegui, Iberdrola Distribution, Spain

I believe that the only solution to the problems is a black-box approach.

Challenges and Opportunities



utilities face by using modern protection and control systems

Before considering the application of relays, we should answer a basic question:

What is the main requirement for protection from the utilities' point of view? In my opinion, there is no doubt that reliability is the main requirement.

When there is a fault in the grid, everybody expects relays to trip quickly and with selectivity no matter the kind of fault or the initial cost of protection.

According to a survey carried out in eight utilities by the CIGRE Task Force 34.06 (2002), reliability indexes were between 92% and 97.5%. The three utilities with the best indexes, above 97%, had carried out an extensive refurbishment program of their protection system. Although this may seem obvious, it must be emphasized that refurbishment is the easiest way to achieve protection reliability improvement.

There are two main drivers for refurbishment:

Measurement Equipment

The measurement equipment used is as follows:

■ Increasing protection requirements are coming from the grid. For example, in the case of Spain there has been an

increase in load of 32% in the last seven years. This increase has resulted in a reduction of critical clearing times and new requirements for protection.

■ Protection assets are becoming older. According to aforementioned CIGRE Task Force, 40 to 50% of the protection relays of some utilities were electromechanical and more than 30 years old.

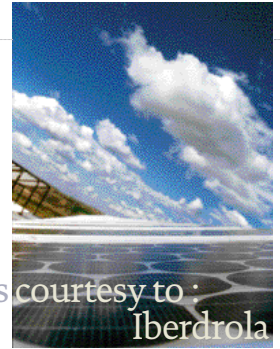
Taking these two facts into account, we must think of protection as a strategic asset that should be able to cope with more and more demanding requirements from the grid now and in the future. In order to achieve this, state of the art protection systems will need to be installed in the grid.

But let's go even further -- improvements in reliability that can be obtained from new digital relays. According to Iberdrola's experience with causes of protection failure in new substations, only around 15% of the failures are internal to the relays. However, 40% of the failures are outside the relays, mainly due to wiring, and 45% of the failures are caused by setting errors. The good news is that 85% of these failures could be eliminated by the utility.

Consider the three main ways to achieve reliability improvement:

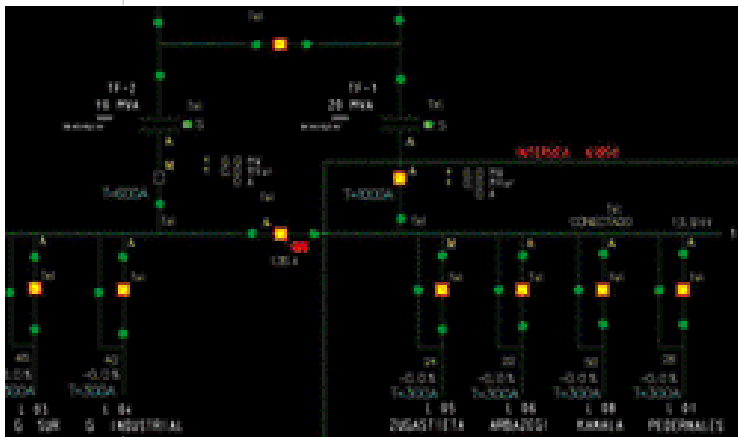
■ Standardization: in order to reduce engineering and construction errors.

■ Commissioning testing: in order to identify and correct these errors.



pictures courtesy to : Iberdrola

1 Human Machine Interface



2 IED Panels - 1/2



