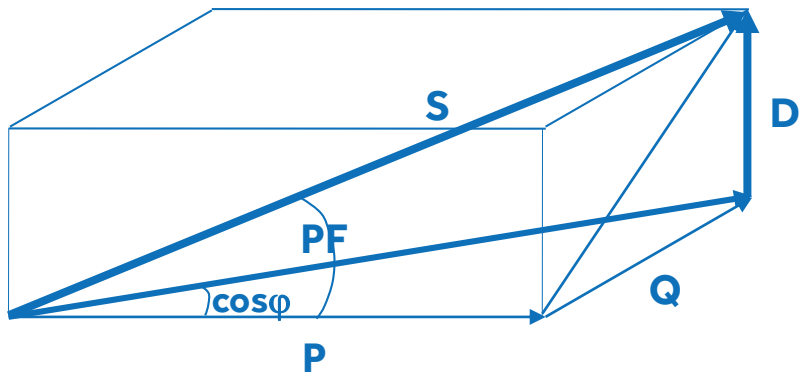
Complete Solution for Energy Efficiency – Copy (application example)

The case we wish to present concerns a complete **energy efficiency** intervention, carried out at a well-known company in Milan that manufactures plastic products suitable for containing cosmetics.

For the reactive energy compensation of the plant we have provided a special power factor correction system. To this we then added the active filtering solutions, in order to minimize not only the reactive component, but also to break down the deforming one.

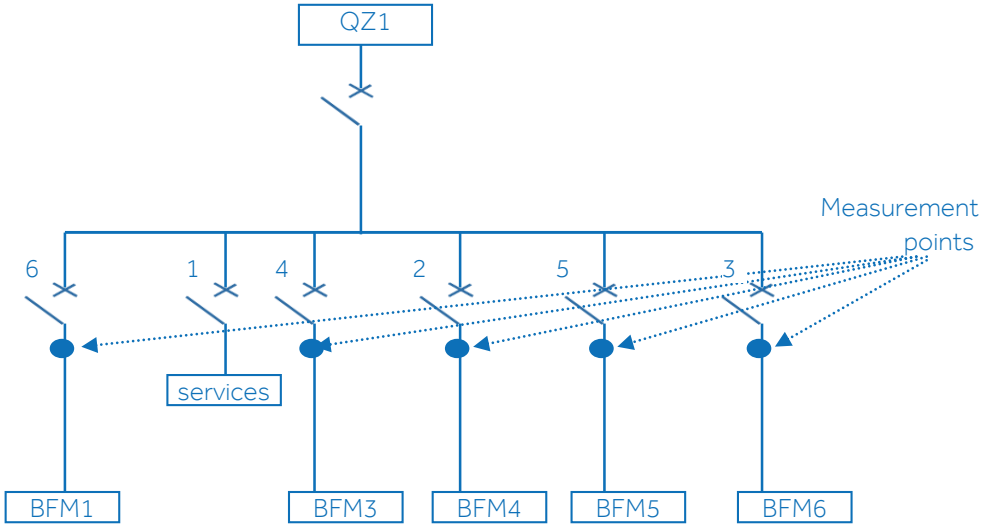
As is known for production activities, the only power really necessary for the operation of the machinery is the active power P, the other powers (reactive Q and distorting D) are **dispersed energies that cause useless consumption and accelerated degradation of the electrical system**.



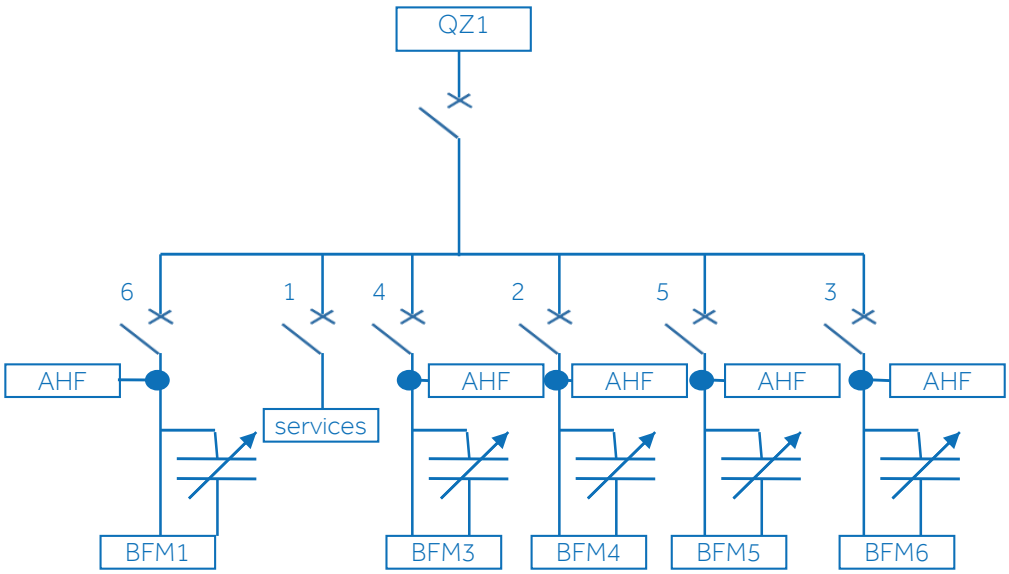
In the case of distorting power, sometimes machinery malfunctions are also generated, such as the blocking of correct PLC operation or even breakage of electronic devices (eg controlled diodes, IGBTs, electronic boards...). The distorting power is essentially due to the harmonic currents generated by electronic systems, particularly heavy is harmonic pollution due to the third harmonic (generated by single-phase electronic systems such as LED lighting and computers).

Production units with integrated electrical systems with photovoltaic panels directly connected to the general distribution panel that feeds all the utilities are increasingly encountered: in this case, the combined effect of reactive and distorting energy can prove to be particularly insidious and this problem must be adequately addressed by expert personnel.

In the facility we are talking about, being it a huge and very complex production plant, we have provided **distributed power factor correction systems, equipped with blocking reactors**, designed to compensate for any departure from the general switchboard that each feeds a production line. In order to identify the powers and the type of capacitor banks, we carried out a measurement campaign on each electrical input.



Following the measurements, we have identified the sizes of the filters necessary to:
1) Compensate all harmonic currents and obtain a **THDI <5%**
2) Obtain a "fine" compensation of the power factor so that upstream, at the level of the main switch of the distribution panel, there is **cosϕ = 1**



With this hybrid solution we have achieved two notable advantages:
1) Automatic power factor correction systems allowed us to obtained a cosϕ = 0.97 on each line, with a rather limited economic investment and with robust and reliable equipment, capable of withstanding sudden changes in voltage and current. The benefit of a local power factor correction is enormous since the amperage upstream of each input is enormously reduced, preserving the automatic switches of the power center, extending the life span of all plastic insulators (in particular of electrical cables) and **minimizing losses due to Joule effect**.
2) AHF active filters, canceled the distorting power, while obtaining an average THDI of 3%, and used the residual power of the active filters thus reaching a **unitary power factor**.