Reduce your electricity bill.
Increase available power.
Optimise your electrical installation.

Solutions that optimise your investments and operating costs while improving energy quality.
Save on energy with Power Factor Correction solutions.

Save energy and reduce your electricity bill:
- Reduce your electricity bill by eliminating reactive energy penalties.
- Decrease energy losses and use higher available active power to lower your subscribed demand.

Choose a long-lasting solution with quick payoff:
- The solutions pay for themselves in 1 to 3 years through savings on your electricity bill.
- They have an average service life of 15 years, corresponding to the best performance available for this type of solution.

Benefit from high energy availability:
- Solutions combining harmonic filters and power factor correction eliminate electrical malfunctions that reduce energy availability.
- Fewer breakdowns of electrical equipment mean higher continuity of service.

Increase the service life of your equipment:
- Thanks to limited temperature rise and overvoltages, your equipment lasts longer.

Protect the environment:
- Energy savings produced by power factor correction help protect the environment by reducing CO2 emissions related to power generation.

Protect life and property:
- All solutions comply with the most demanding local and international standards.

**Example:**

**Before installing a capacitor bank**

Apparent power required
\[ S = \frac{P}{\cos \varphi} = \frac{500}{0.75} = 665 \text{ kVA} \]

The transformer is overloaded

**After installing a capacitor bank**

- Target: \( \cos \varphi_2 = 0.92 \)
- Required reactive energy
- \( Q = P (\tan \varphi_1 - \tan \varphi_2) = 230 \text{ kvar} \)
- New apparent power required
- \( S = \frac{500}{0.92} = 543 \text{ kVA} \)

**Gain:** 122 kVA

**Benefits produced by installing a capacitor bank**

The transformer rating is 630 kVA, while the apparent power required without capacitors is higher (665 kVA). The transformer is overloaded. Installation of a capacitor bank reduces the apparent power required to 543 kVA, representing a gain of 122 kVA and eliminating problems related to transformer overloads.

In addition, less reactive energy is carried over the transmission lines.
Choose your solution. Power Factor Correction can be used on all sites and on all electrical networks.

Power Factor Correction solutions for slightly and moderately polluted networks:

■ **Varset Classic & Varset Comfort**
  - Capacitor banks for slightly polluted (Classic) or polluted (Comfort) networks.
  - Energy savings and power factor correction.

■ **Varset Harmony**
  - For polluted networks.
  - Energy savings and power factor correction.
  - Reduces network pollution.

Filter solutions for heavy polluted networks:

Reduced harmonics and voltage drops.

■ **Varset Filtrer**
  - Passive filters (H5, H7, H11).

■ **Sinewave**
  - Active filters up to 480 A (H2 to H25).
  - Response time 40 ms.

■ **AccuSine**
  - Active filters up to 2100 A (H2 to H50).
  - Response time < 8ms.

Power Factor Correction:
Impact of capacitor banks

Harmonics management

Penalty threshold
Everything you need to know about reactive energy:

All electrical networks carry two types of energy: active energy and reactive energy.

- In industrial processes, only active energy is converted into mechanical, thermal or luminous energy.
- Reactive energy is used only to supply the magnetic circuits of machines, motors and transformers.
- The supply of reactive energy by the electrical network has a number of negative aspects:
  - Higher electricity bill.
  - Installation overloads and energy losses.

Capacitor banks supply reactive energy locally to reduce the amount supplied by the network.

Calculation of the Power Factor ($\cos \varphi$)

The tangent of the angle $\varphi$ ($\tan \varphi$) provides an indication of reactive energy consumption.

\[
\tan \varphi = \frac{Q}{P}
\]

A good $\tan \varphi$ is close to 0.

The cosine of the angle $\varphi$ ($\cos \varphi$) provides an indication of the electrical efficiency of an installation.

\[
\cos \varphi = \frac{P}{S}
\]

A good $\cos \varphi$ is close to 1.

Power Factor Correction principle

Without capacitors

Power generation \quad \rightarrow \quad Active energy \quad \rightarrow \quad Transmission network \quad \rightarrow \quad Motor

Active energy \quad \leftarrow \quad Reactive energy

Supply and billing of reactive energy by the energy provider

With capacitors

Power generation \quad \rightarrow \quad Active energy \quad \rightarrow \quad Transmission network

No billing of reactive energy

The capacitor bank supplies reactive energy
Did you know?

■ Why should I have capacitor banks in my electrical network?

> Capacitor banks are necessary to supply the reactive energy consumed by motors and transformers. Most energy providers bill reactive energy in addition to active energy. Reactive energy penalties are aimed at inciting users to reduce their consumption of reactive energy by installing capacitor banks.

■ What is the service life of a capacitor bank and when must it be replaced?

> Schneider Electric capacitor banks have a very long service life, providing an average of 15 years of energy savings. We recommend carrying out a few on-site tests on capacitor banks that are more than 10 years old in order to check their operation.

■ Did you know that your capacitor bank will pay for itself in just a few electricity bills?

> Power Factor Correction solutions offer very fast return on investment. The savings produced pay for your capacitor bank in less than 1 to 3 years.

■ How to find out more about power factor correction solutions?

> Ask for technical documentation and the complete catalogues.
Your contractor has the solution to fit your needs, bringing you energy savings and improving the quality of your installation.

The 7 commitments of your contractor:

1 > Assume total responsibility
   for the supply of your installation from design to commissioning, while respecting the shortest deadlines.

2 > Optimise costs
   with solutions that reduce your energy consumption.

3 > Increase energy quality
   with solutions that reduce harmonic disturbances and their effects on the electrical network.

4 > Conduct studies
   based on on-site measurements (power factor and harmonics) to accurately determine your power factor correction needs.

5 > Follow up and maintenance
   with preventive tests and maintenance management to ensure continuous operation of your installation.

6 > Ensure the safety of life and property,
   using only products that comply with the most demanding standards.

7 > Contribute to the ecological efficiency of customers
   by helping them reduce their electricity bill and protect the environment by reducing their energy consumption.

Schneider Electric stands firmly behind your contractor’s commitments with:

■ A front-ranking position in the field of electrical distribution and automation.
■ High quality products and innovative solutions.
■ Long-term support.
■ Assistance to its partners backed by highly effective resources.
■ Product availability through a network of distributors and partners in more than 100 countries.

Schneider Electric has more than 200 000 Power Factor Correction references worldwide and offers Power Factor Correction solutions for small and large sites.

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