



## Good practices sheet Energy savings in sawmills

### CAPACITOR BANK<sup>1</sup>

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<sup>1</sup> Technical source: Schneider “energy compensation”: [http://www.schneider-electric.fr/sites/france/fr/solutions-ts/energy\\_efficiency/compensation-energie.page](http://www.schneider-electric.fr/sites/france/fr/solutions-ts/energy_efficiency/compensation-energie.page)

### INVESTMENT LEVEL (FROM 1 TO 3):

- ▼ HUMAN INVESTMENT : 🖐️
- ▼ RETURN ON INVESTMENT : ⌚ TO ⌚⌚⌚
- ▼ COSTS : €€ TO €€€

## BACKGROUND AND ISSUES

The motors need active and reactive power to function. When a certain consumption limit is exceeded, reactive power results in financial penalties as it disrupts the energy suppliers' network. It also causes losses due to the Joules effect, voltage drops at the end of the line, a fall in active power, etc. The users of industrial networks know from experience that a poor  $\cos \phi$  can be much more expensive (if below 0.9).

At a European level, the calculation shows that by raising the power factor to 0.95 ( $\cos \phi$ ), the reactive energy compensation would mean a potential energy saving of 48 TWh per year.

## PRESENTATION OF THE PLAN AND ITS IMPLEMENTATION

The power supply to the motors is fitted with a bank of capacitors that totally or partially eliminates the reactive power by correcting the installation's power factor at the motor's terminals. The capacitor bank should be complemented by harmonic filters as required.

In general terms, these implementation measures can be divided into the following stages: analysis of invoices, taking action, analysis of the network structure, determination of the requirements, sizing the bank and putting it into operation and finally, measuring the impact.



Capacitor bank for a canter line

Comment:

This system is financially viable in France in the following 2 cases:

- Yellow tariff (36 to 250 kVA): invoicing by kWh consumed and in kVA for subscription
- Tariff above 250 kVA: invoicing for the reactive power measured (November to March<sup>2</sup>)

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## POTENTIAL GAIN

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- In France, energy savings as a result of the technology:

For GREEN TARIFF subscribers (more than 250 kVA): cancellation of invoicing for reactive energy

For YELLOW TARIFF subscribers (from 36 to 250 kVA): 15% reduction in the contract power (kVA)

For all: reduction in active energy loss in the region of 3%.

- Average return on investment: 12 to 18 months<sup>3</sup>

Cases observed during visits to sawmills in France

Sawmill no. 16: no costs related to reactive energy over a one-year period following the installation of a capacitor bank appropriate for the electrical equipment

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<sup>2</sup> Gimélec believes that extending the invoice period from 5 months to 12 months in line with other EU countries should encourage the widespread adoption of these measures

<sup>3</sup> Source: Gimélec: [http://www.schneider-electric.fr/documents/solutions-ts/efficacite-energetique/14-brochure\\_cer\\_bat.pdf](http://www.schneider-electric.fr/documents/solutions-ts/efficacite-energetique/14-brochure_cer_bat.pdf)

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Sawmills no. 2, no. 6, no. 10 and no. 13: sawmills fitted with capacitor banks, savings not calculated

- Other improvements; this system provides a convergence of interest throughout the value chain:
  - Optimisation of the power factor at the point of the network in question (it is possible, for example, to provide the installation with a reserve of power without changing subscription);
  - Reduced disruption to the installation (heating, equipment breakdowns, defect in the process, etc.);
  - Increased working life of the equipment;
  - Reduced size of cables, processors and Joules losses.
- Points to note:

On networks polluted by harmonics, the addition of a capacitor bank amplifies the level of harmonics. It is therefore imperative to resolve the dual problem of energy compensation and harmonic disruption for the installers (in the long term this could lead to the destruction of the capacitors and generate resonance on the network or even be the cause of equipment malfunctioning).

- Reproducibility:

This system can be used in any sawmill or enterprise whose power supply generates reactive energy.

- In addition:

The manufacturers offer software enabling users to decide, in a few clicks, on the capacitor bank that is best suited for installation in accordance with the electrical data, together with on-site measures to determine the most appropriate installation.

*Reactive energy contributes to increased power consumption, higher electricity bills and greater CO<sub>2</sub> emissions into the atmosphere.*

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