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Energy company and SKOV are testing fans

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Based on the test results, we will still recommend MultiStep as the best investment, says Paul R. Jeppesen of SKOV

Kurt Mortensen, energy consultant of the Danish energy company EnergiMidt, now has new arguments when he is advising pig producers on potential energy savings.

A study of the energy consumption of fans has just been completed. It showed that the energy consumption of fans varies a lot but that comes as no surprise to Kurt Mortensen.

- The study confirmed the figures which I can otherwise compute by means of the two ventilation calculation programs that I use. But it is a good feeling to have tangible figures to rely on. In future, I can tell the farmer confidently that if he invests in this particular equipment and if he has set the control correctly, this is the energy consumption he can expect, says Kurt Mortensen.





Five sections

Bjarne Volsgaard of Volsgaard Svineavl, situated in Ørnhøj between Holstebro and Skjern in Denmark, provided the pig house setting for the fan test which was carried out jointly by EnergiMidt and SKOV.

The test involved five sections with finishing pigs.

All sections had similar layouts and five different fan combinations with two outlets per section.

- As standard, we used MultiStep with traditional fans with which we compared the others. The results showed that energy consumption is reduced when using either frequency-controlled fans or the extremely energy-efficient EC fans that are regulated through a direct current principle. The frequency fans reduced electricity consumption by 15 and the EC fans by 30 per cent respectively. In return, the acquisition prices of both the frequency and EC fans are higher, says Paul R. Jeppesen of SKOV.

- Rather than using only frequency or EC fans, it is possible to use MultiStep with frequency-controlled stepless operation from 0-100 per cent after which a traditional triac fan connects. We also did that in the test which resulted in slightly less energy savings, i.e. approx. five percentage points compared to the starting point, says Paul R. Jeppesen.

- I am surprised that MultiStep principle resulted in less savings compared to two parallel frequency or EC fans, says Kurt Mortensen,

Paul R. Jeppesen adds that the test results were based on two outlets per section with one stepless and one ON/OFF fan. Previous test results have demonstrated that energy savings increase with the number of ON/OFF fans used.

- If additional savings are required, an EC fan should be chosen as a MultiStep stepless fan rather than a frequency-controlled fan, recommends Paul R. Jeppesen.

Payback period

The payback period for a fan investment depends both on the electricity tariff and on the temperature strategy chosen.

- The test clearly showed that choosing MultiStep with two traditional triac fans ensures the shortest possible payback period. However, choosing a solution with only frequency-controlled fans will ensure payback of the additional investment in about 14 years. An EC solution will be paid back in approx. 12 years. It is possible also to combine frequency and triac fans with MultiStep; in this case the investment will be paid back

in approx. 10 years. An EC and triac solution combined with MultiStep will be paid back in approx. 8 years as compared with a MultiStep combined with two traditional triac fans, says Paul R. Jeppesen, adding:

- The electricity saving also depends on the temperature strategy: the lower the temperature, the higher the energy consumption because the fans are running at max. speed. In this case, frequency fans are not of interest since, besides from being expensive to acquire, they are also the fans that use most power when running at high output levels.



The three persons behind the fan test: From the left Paul R. Jeppesen, SKOV, Bjarne Volsgaard, who owns the test house and Kurt Mortensen, EnergiMidt. Photo: Ole Mortensen, Tilsted.com

Test results

The tables below show the test results on which the above conclusions are based. Table 1 shows the number of test days and the production results. It appears that the production results are quite similar in the various sections.



Table 1: Production and results

System type	Number of test days First test	Number of pigs	Weight in – kg (lbs)	Weight out – kg (lbs)
1 x Triac stepless 1 x ON/OFF (MultiStep)	411	735	33.4 (74)	107.9 (238)
1 x EC stepless 1 x ON/OFF (MultiStep)	417	739	32.1 (71)	108.6 (239)
1 x Frequency stepless 1 x ON/OFF (MultiStep)	369	733	31.8 (70)	105.5 (233)
2 x EC stepless parallel	433	722	30.9 (68)	108.3 (239)
2 x Frequency stepless parallel	403	728	31.7 (70)	106.8 (235)

MultiStep with traditional fans is used in table 2 as the basis of comparison. The table indicates how many years it will take for the additional investment to be paid back through electricity savings.

Table 2: Additional investment, payback.

System type	Number kW/year	Annual electricity saving (%)	*Additional investment/section Index	Additional investment, payback Year
1 x Triac stepless 1 x ON/OFF (MultiStep)	3854	-	100	-
1 x EC stepless 1 x ON/OFF (MultiStep)	2947	25	200	+ 8
1 x Frequency stepless 1 x ON/OFF (MultiStep)	3466	10	150	+ 10
2 x EC stepless parallel	2610	30	300	+ 12
2 x Frequency stepless parallel	3324	15	200	+ 14

MultiStep with traditional fans is used as the basis of comparison. An electricity tariff of 0.625 DKK/kW was used. The additional investments are computed based on SKOV's list prices of the various fans, excluding electrical installations.