FUTURISTIC "WINDSTREEK" HOUSE IS FULLY ENERGY NEUTRAL

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Robert Nijkamp is an innovator. The broiler grower from The Netherlands designed a very special, fully naturally ventilated and energy neutral "Windstreek" house. He permanently collects and connects big data in order to as effectively as possible manage his flock in this unique house.

"We have been raising broiler birds on our farm for about 60 years", says Robert. *"In two regular houses (with daylight in the houses and a extrernal wintergarden), we keep 45.000 broilers."*

All are slow growing Hubbard birds, raised under the **"one star better life"** label, which is a qualification of the Dutch organization for protecting animals. **This involves that our birds are taken to slaughter at 56 days of age, when they have reached an average liveweight of 2.5 kgs.**

In the year 2010 we started thinking of another house. However, since we were convinced that innovation was essential, **this new house had to be of a different design and "futureproof".**

Hence, we got in touch with the Wageningen University in our country (WUR). This resulted in high involvement of the university in this special project. Moreover we contacted suppliers and also in close cooperation with a number of them, the Windstreek design was born."

The very unique house measures 23 x 90 meters. It offers space to 25.000 birds, also of the slow growing Hubbard breed.

WIND DIRECTION

The most eye catching aspect of this house is of course its shape. Some people even think it's a soccer stadium. Windstreek is the Dutch word for **"wind direction"**. That refers to the principle of its construction and ventilation system.

- On the one lateral side, the house is only 3 meters high, while at the other side it measures about 12 meters high.
- It is **completely naturally ventilated without any fans.** The entire ventilation system is based on natural principles, being relative humidity and temperature.
- On the low side, fresh air comes in through inlets. **The incoming air is warming up, thanks to the body temperature of the birds.**
- As a result, **this warm air moves upwards and leaves the house through outlets at the high end on the opposite side *(Photo 1).***
- This airflow is **fully natural**, also thanks to the slope shape of the roof.

On many places inside the house, sensors measure temperature and relative humidity. The **air inlets and outlets are controlled permanently,** based on these figures, mainly on relative humidity.

Photo 1. *Warm air leaves the Windstreek house through outlets at the upper end of the building*

For this purpose, smart software has specifically been designed. A vast surface of **solar panels** is placed at the roofs of the other buildings on the farm. All electricity needed and mainly for heating the brooders, is obtained from these panels. As a result, **the electricity supply is fully energy neutral.**

When day old chicks arrive for a new round, temperature inside is too low. *"For this reason we place them underneath an infrared brooding line, which runs over the full length of the house"*, says Robert. ***"This feels as if they can hide under the wings of mother hen. Also this is very energy saving, since only the space underneath the brooding line is heated, rather than the full house. This saves up to 75% of the energy input."*** ***(Photo 2).***

Photo 2. *Once the infra-red brooding line is lifted, the young birds have full access to the litter area*

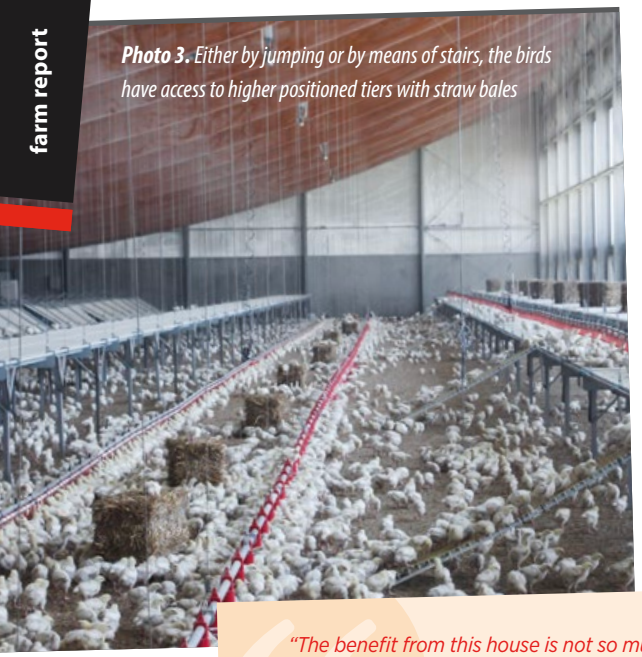

Photo 3. *Either by jumping or by means of stairs, the birds have access to higher positioned tiers with straw bales*

STRAW BALES

Once the chicks are growing bigger, they get access to the full surface of the house. **There's a litter area, but Nijkamp also created higher positioned tiers.**

- These are **easily accessible for the birds**, either by means of stairs, or by jumping ***(Photo 3)***.
- On these tiers (slatted floors), **the birds find straw bales, allowing them to scratch.**

"Broiler birds like to sit in a higher position", says Robert. *"These bales create extra movement space for them."*

"The benefit from this house is not so much a gain in FCR and less mortality", Robert continues, referring to the economics of the Windstreek house. *"These figures are similar to our other houses. FCR is equal or even slightly higher. The greatest benefit is that this house is fully energy neutral. We have no energy expenses and as a result it is very sustainable. Other benefits are lower emissions from ammonia, odor and particulate matter. The result is a very pleasant climate inside. That is truly a positive aspect, both for the benefit of the birds and for ourselves".*

BIG DATA

"However, we don't stop at this stage", Robert continues. *"**The basis for properly managing the flock, is having ample data available, to quickly respond to the circumstances. Real time information is useful. All kinds of data can quite easily be measured through sensor technology.** But that doesn't necessarily add so much to the data we have available already"*, says Robert.

"It doesn't really make sense to measure feed consumption, for example. The birds will empty the feeders anyway. But that doesn't say too much. Measuring water consumption is more useful instead. The more the birds move, the more water they drink. **Where does that signal come from?** It seems obvious that the incidence of light causes more movement of the birds. In that case, no measures are needed**. We try to understand the biorhythms of the birds.**

Also, **we can derive data from the veterinarian and other sources.** This may explain what the flock behaviour can be after vaccination. **Do they again drink more water?**

We connect the available data from different computers and platforms to each other.

And **based on these big data analyses, we aim to predict the health condition of the flock."** That's why Robert founded farmersnet.org.

Through this, **farmers can join and help each other to develop new big data analysis with themselves in the lead.**

***Photo 4.** Robert Nijkamp: "In order to achieve the best possible conditions for our flock in the Windstreek house, we need to collect and connect big data"*

*"In the end, that's what it is all about. **We aim to achieve the best possible conditions for our flock in the Windstreek house**"*, Robert concludes. **"Keeping mother hen in mind and create natural circumstances. Thereby managing the flock on the basis of solid real time data."** ***(Photo 4).***

During the upcoming VIV Europe tradeshow in Utrecht, The Netherlands, from May 31 - June 2, Robert Nijkamp will be on display with farmersnet.org.

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