

### 5.3 - Veal calf buildings: a technological milestone is in the pipeline

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The design and layout of veal calf housings are currently undergoing profound changes brought about by the challenges facing French veal farmers: technical issues, with the changing patterns of calf production and feeding, especially the increasing amounts of fibrous food in the diet, health issues, with the control of environmental conditions to limit the use of antibiotics and preserve animal health and welfare, environmental issues, to consume less energy and reduce pollutant emissions, ergonomic and economic issues, ultimately to ensure the well-being and income of farmers.

To anticipate what might be the veal calf housings of the future, the “BATIVEAU” research programme commissioned by INTERBEV Veaux has been carried out since 2014. This presentation aims to disseminate the main needs expressed and the solutions devised by a group of farmers and integrators brought together at the initiative of IDELE.

For these players, the building of the future will be automated to improve the farmer's quality of life by scrapping the most laborious or repetitive tasks. Liquid and solid feeding robots will be connected to integrate all the information necessary for good feeding behaviour and facilitate remote control. The concept of precision feeding based on the dynamic adjustment of nutritional intake to the needs of calves during growth will be a key concept, the goal being to improve feed efficiency and reduce nitrogen emissions. The development of sensors to measure the animals' weight and to know the food stocks in real time will enable continuously adapting feed intake.

Similarly, new ventilation control technology will free the farmer of this duty while improving its precision. A well-controlled environment is the key prerequisite for demedicalization. Fans and air inlets will be able to be controlled more precisely using connected smart control PLCs based on newly available indicators such CO<sub>2</sub> and NH<sub>3</sub> measured by infra-red. It will also be possible to better regulate the environment by combining measurements taken in the building with external weather data and, why not, with criteria measured directly on the calves themselves (skin temperature, lying behaviour...) thanks to cameras.

The veal calf housing of the future will be eco-friendly incorporating such concepts as reducing energy consumption, alternative energy production and the use of sustainable, recyclable, low carbon footprint materials. Energy savings will include advanced equipment such as heat pumps, thermal solar panels, lighting and low consumption fans. The building will also support alternative energy production by enhancing its roof surfaces equipped with photovoltaic solar panels and biogas recovery (methanization) from slurry pits. Finally, eco-building approaches will necessarily lead us to sustainable materials, both during the construction of the building, its operation and until its deconstruction.

In conclusion, the adoption of new tools and new materials by veal calf producers will necessarily involve an acceptable cost/benefit ratio in view of the investments to be made. Part of the physical work will be replaced by monitoring tasks, in particular checking the information issuing from previously established alert settings. Situations favouring positive interactions can thus be put in place. New skills will nevertheless need to be acquired and new arrangements will need to be developed with partner organizations to facilitate access to the majority of farmers.