



On-farm energy demand and available renewable energy potential in pig farms

Energy use in pig farms can be assessed in the range 9.7-28.8 MJ/kg¹. Feed production is the largest energy consumer, with almost 72% of the total energy consumption whereas the remaining 28% is about direct on-farm energy use. Direct energy inputs are divided between transportation, heating, ventilation, watering, waste removal, lighting and other uses (such as mix and deliver feed, manure removal, mixing in slurry tanks, and power-washing). The key demand is due to the heating systems for the farrowing and first stage weaner houses and the mechanical ventilation systems.

Therefore, pig barns show a significant potential of improvement of energy efficiency by means of a proper enhancement of the building envelope and the adoption of optimally controlled heating, cooling,



and ventilation systems. Renewable energy sources and energy efficiency measures and technologies combined with energy conservation practices provide a unique opportunity for farms to reduce energy consumption and produce their own clean energy to become partially or even totally self-sufficient. More specifically, solar energy can be utilized in confined animal buildings, like poultry and pig farms, being able to put up for both electricity and heating needs. Heat pumps' potential is focused on applications that allow their coupling with photovoltaic-thermal hybrid solar collectors or geothermal units.

RES4LIVE aims to make the most of the significant de-fossilization potential of swine farms. Heat pumps will be demonstrated for both space and water heating applications. They will be also coupled with PVTs and geothermal heat storage, and smart control systems, which will monitor indoor environment and maximize the self-consumption.

¹ Chen et al., 2015: <https://www.agrifutures.com.au/wp-content/uploads/publications/15-059.pdf>

