

192 The importance of advancing our understanding and application of energy systems. J. F. Patience*^{1,2}, G. L. Allee³, F. Ji⁴, R. B. Hinson³, D. Y. Kil⁴, H. H. Stein⁴, L. L. Stewart⁴, J. E. Pettigrew⁴, and A. D. Beaulieu¹, ¹*Prairie Swine Centre, Saskatoon, SK Canada*, ²*Iowa State University, Ames*, ³*University of Missouri, Columbia*, ⁴*University of Illinois, Urbana*.

Energy is a unique component of the pig's diet, in that it really is not a nutrient like amino acids, vitamins or minerals. Energy is supplied by 3 distinct and unique components of the diet: lipid, protein and carbohydrate. Thus, energy is a complex subject; one of the most challenging aspects is the development of a system that adequately quantifies the content of energy in a diet. Energy systems fill two roles. They serve as the basis for trading of ingredients by characterizing their available energy content. They also provide a platform for diet formulation, supporting the formulation of diets that will meet the pig's needs for maintenance and productive function(s) at the lowest possible cost. The adoption of any specific energy system assumes compatibility with both functions. In North America, DE and ME systems have prevailed; in Europe, the net energy system has been adopted more widely. It is generally accepted that the NE system has advantages over DE and ME in terms of defining the relative energy content of ingredients and thus their economic value. There is much less agreement on which system has the greatest capability for diet formulation, achieving desired or predictable animal productivity outcomes most effectively. There is a clear need for additional research on this latter topic, as it is central to the advancement of our understanding of all of the available energy systems. Most critically, energy is becoming increasingly costly to the global pork industry, and the relative contributions of starch, protein and lipid to this energy supply is changing. As the North American pig industry continues to move towards increased use of by-product ingredients, questions surrounding energy and diet formulation are certain to increase. Remaining competitive in the global food marketplace will depend on our ability to answer these questions.

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