

National Sow Housing Conversion Project

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The National Sow Housing Conversion Project (NSHCP) was conceived as a descriptive project to facilitate the successful conversion of Canada's sow barns to group housing. The project involved collaboration from industry participants and academic researchers working together on a comprehensive strategy involving demonstration farms, technology transfer materials and events to support Canadian pork producers making the transition.

Research indicates that when properly implemented and managed, group housing systems provide similar levels of production to stalls. Actual transition costs range from 250 to 750 CAD per sow place, depending on the type of design, use of existing infrastructure and producer input for labour. The majority of early adopters of group housing have implemented non-competitive feeding systems, such as electronic sow feeding, which have long term benefits in terms of ease of management and individual control of feed intake over competitive feeding systems such as floor feeding.

INTRODUCTION

In response to consumer concerns regarding the welfare of sows housed in stalls, large numbers of North American food retailers and supermarket chains have announced plans to develop 'stall-free' pork supply chains. The 2014 Canadian Code of Practice for the Care and Handling of Pigs also includes a number of requirements that limit the use of gestation stalls. Consequently, the pork industry is under pressure to implement group gestation housing for Canada's approximately 1.3 million sows. There are major concerns within the industry around the conversion process and implementation of group housing for sows. The process requires a large capital investment, and selecting the 'right' system requires knowledge that is not readily available. Within the Canadian industry there is limited knowledge and experience on the management of sows in group systems. This project set out to fill that gap by providing pork producers with scientific and practical information on barn conversion options and the management of sows in groups.

MATERIALS AND METHODS

Primary barn sites

Six barn sites were identified across Canada to document the conversion to group housing. The conversion process on these farms was documented through questionnaires, interviews, farm visits, photos, and videos taken before, during, and after the transition. As well, producers were asked to provide production data and economic data. Videos and the project website give visitors a 'virtual tour' of each facility. Producers at the primary site barns were aided by a barn evaluation by an experienced engineer and ongoing support from the NSHCP working group.



Secondary barn sites

In addition to the primary site barns, six other barns that had already implemented group housing were identified across Canada. Less intensive data was collected from these sites, including questionnaires, interviews, photos, videos, and barn visits. These additional sites are used to show producers a wider variety of feeding systems design choices, and to highlight the necessity of developing a plan that will work with their individual barn design, budget, and management style.

Communications

Communicating the results to other producers interested in converting to group housing was one of the main goals of the NSHCP. Research on group housing was compiled and summarized in multiple articles. Results have been presented through workshops and producer meetings, in an annual newsletter, and the development of the project website: www.groupsowhousing.com, which contains full documentation of the barn conversions, as well as general information on group housing options and contacts across the country for those seeking information and advice. A working group consisting of provincial pork organization representatives from across the country conducted yearly meetings throughout the project to exchange information about activities in each region and management of the project.

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RESULTS AND DISCUSSION

Design and husbandry

The project used descriptive methods to document barn renovations and producers who had already implemented group housing. A range of locations, feeding systems and farm sizes was sought so as to provide a range of examples to inform other producers considering the conversion (Table 1).

Improved knowledge by studying farm sites

Five problem areas identified while conducting this project were:

1. Producers implementing ESF systems lacked information on the importance of having a dedicated training area for training sows to use ESF feeders. This resulted in difficulties during the changeover period, as many sows did not learn the system quickly. Both producers and their animals experienced stress during the transition and only later did they install a dedicated area for training animals.
2. Electrical interference problems which caused sorting equipment to fail.
3. Staffing issues when implementing competitive feeding. All pigs should be observed at the time of feeding in these systems to identify sows that are lame or in poor health. Unlike with stall housing where sows can be checked throughout the day. This influences staff scheduling and daily feeding times.
4. Lack of suitable ear tags for sows. More information is needed on RFID ear tags to support producers using this technology. Some sows (housing systems and genotypes) are more prone to ear tag loss, so more information on this aspect of management would be helpful.
5. Enrichments for sows. The Code of Practice requires that all pigs be provided with 'multiple forms of enrichment'. This can be of particular benefit for sows as it can potentially reduce aggression and decrease stereotypic behaviour. Producers require more information on what enrichments are suitable for sows and how to provide them.

Sow production in groups

In this study, in general, producers reported no significant changes in production once group housing was established and initial management problems were addressed. One producer noted a reduction in stillborn piglets, but this was not verified. One participating farm provided detailed production data before and after conversion (Table 2), indicating comparable conception rates and litter sizes before and after the conversion.

Renovation costs

Assessing the existing barn structure is key in the decision making process. Depending on the soundness of the structure there may be additional investment required and this must be factored into cost estimates for construction and planning process. When pricing a significant renovation the cost will be approximately 50-75% of the cost of new. Most new structures, whether for farrowing, dry sows or finishing, cost around thirty two dollars a square foot structure (Ontario prices). Therefore, major renovations cost between fifteen and twenty four dollars a square foot. If estimated costs exceed these parameters, serious consideration should be given to building new. Most renovations include pit work, slats and interior walls. Exterior walls, ceiling, trusses and steel are generally not included or required.

While initial cost estimates varied greatly, ranging from under \$500/sow to over \$1,000/sow place, actual results indicate costs are generally below \$500 per sow. Detailed renovation costs for one participating farm can be seen in Table 3.. The total cost of the renovation was \$1,091,582.74 for a 3,000 sow herd (\$364/sow).



Feeding systems

Many early adopters have implemented non-competitive feeding systems including a variety of ESF and free-access ESF systems. Most non-competitive systems use radio frequency identification (RFID) ear tags to control and monitor individual feeding in sows. These systems are more expensive to install and require greater technical knowledge, but have long term benefits in terms of reducing aggression, managing feed distribution, limiting feed waste and automated data capture to facilitate sow monitoring and record keeping. The number of sows which can be accommodated and choice of feeding system is another key consideration, as some group feeding systems require more space per sow than conventional stalls. This is one reason for the popularity of large group ESF systems; they make very efficient use of floor space, resulting in similar sow numbers per square foot when converting from stalls to groups.

Competitive feeding systems, such as floor feeding or shoulder stalls, allow all animals to access feed at once. These systems are generally less expensive to install, but have higher long term costs. Management is more labour-intensive because the sows are in smaller groups and they require more frequent observation and intervention. Production levels are also generally lower and feed costs higher due to greater feed usage, with dominant sows consuming more feed than subordinates.

Sow management

Controlling aggression and managing feed intake and are two of the most challenging areas related to group gestation. However, there are many tips and techniques to address these problems. Some techniques include the use of pre-mixing pens, segregating low and high parity sows, feeding sows prior to mixing, providing enrichments at mixing, and pen designs including solid panels allowing sows to avoid bullying. Previous socialization during gilt development is also beneficial, such as providing multiple mixing events before gestation. Keeping sows in large groups also reduces social aggression as pigs adopt a more passive social response. Individual and genetic differences in aggressive behaviour have been observed, however more research is needed to identify selection criteria.

Table 1. Project Farm Sites (including 6 primary sites and 6 secondary sites)

Province	Designation*	Herd size (sow number)	Feeding system	Grouping
New Brunswick	Secondary	1200	Schauer, CanArm	Static, 16 pens of 60 sows
Quebec	Primary	600	Gestal	Static, two feeders per pen of 40 sows
Quebec	Secondary	850	Schauer	Static, two feeders per pen of 150 sows.
Ontario	Primary	220	Nedap	Dynamic, two feeders for 120 sows, one feeder for 50 gilts
Ontario	Primary	1800	CanArm	Dynamic
Ontario	Primary	100	Gestal, Organic	Static, two feeders per pen of 30 sows
Ontario	Secondary	1400	Trough	Static, pens of 18 sows
Ontario	Secondary	650	Weda	Dynamic, one pen with 5 feeders
Manitoba	Primary	3000	Gestal	Static, two feeders per pen of 40 sows
Saskatchewan	Secondary	600	Nedap	Dynamic, 5 feeders per pen, gilts and sows housed separately
Alberta	Secondary	275	Nedap	Dynamic, four feeders in one pen
Alberta	Primary	4100	Shoulder stall	Static, pens of 15-16 sows or 10 gilts

*Barn designation. Primary: The barn conversion was documented. Secondary: Barn was already converted. Barn layout and management of sows was documented.

Table 2. Herd production data before and after barn renovations for group housing.

Production variables	Stalls	Groups
Number of Serves	2008	1768
Return Serves (%)	6.9	7.0
Conception Rate (%)	91.8	93.0
Farrowing	1785	1476
Total Born/Litter	14.9	15.3
Live Born/Litter	13.6	14.0
Mummified/Litter	0.4	0.5
Born Dead/Litter	1.0	0.8
Total Weanings	1767	1355
Pigs Weaned/Litter	11.6	11.5
Total sows	2989	2586
Total gilts	330	456
Removal Rate (%/yr)	45.8	38.5
Suckling Days/Litter	21.2	24.0
Litter/Sow/Year	2.51	2.33
Pigs Weaned/Sow/Year	27.4	24.1

Note: Lower performance numbers after renovation were due mostly to smaller herd inventory, which was being rebuilt.

CONCLUSION

The NSHCP was designed to help Canada's swine production sector respond to the emerging issue of group sow housing. By compiling the best information available on group housing and working with early adopting producers, the extension work to spread the knowledge was done in an efficient manner.

At present, 20-25% of the Canadian sow herd is managed in groups, and this is expected to increase to over 90% by July 2024. Therefore, the information resources gathered will be even more valuable going forward to 2024. Proper planning is essential to identify the appropriate feeding system and pen layout for sows in groups. The appropriate system for each producer will vary depending on herd size, management style, technical expertise, existing structures and budget.

Table 3. Construction costs for HyLife Rosco barn renovations. The 3,000 sow farrow-to-wean facility was converted to group pens with Gestal G3 feeders.

Description	Cost
Labour	\$ 289,353
Feed equipment	\$ 447,130
Concrete	\$ 51,127
Penning	\$ 169,098
Misc	\$ 134,872
TOTAL	\$ 1,091,582

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