

# Bringing Home the Bacon:

## Reducing Greenhouse Gas Emissions from the Scottish Pig Sector



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## 1. Executive Summary

The Scottish Pig Industry Leadership Group has produced this report to provide Scottish Government with recommendations to support the sector towards achieving their targets of reaching Net Zero Greenhouse Gas (GHG) Emissions by 2045. This is one of five reports from across Scottish Agriculture that sets out key recommendations relating to sustainable pig production in Scotland.

The Global Warming Potential of Scottish pig farms is down by almost 40% over the last 20 years. This remarkable progress has been achieved as a by-product of farm and industry efforts to improve efficiency and reduce costs of production. Piguineat is one of the favourite sources of protein for Scottish consumers, combining affordable and tasty products with a low carbon footprint relative to the alternatives.

This report will focus on the key areas which will support the overall Objective of the Scottish Pig sector ***'to reduce the Greenhouse Gas Emissions from Scottish pig production whilst maintaining the output of quality, affordable Scottish Pork'***. These are:

- A. Maximising Input Efficiency
- B. Utilising Best Technology
- C. Tackling Livestock Disease
- D. Turning Wastes into a Resource
- E. Adding Value and Building Producer Confidence

As an unsupported sector historically, there has always been a drive to adopt new practices and learnings to ensure best practice and maximum production efficiency. However, recommendations have been made for public policy measures can reinforce success and sustain this positive momentum by further reducing emissions.

## 2. Background

Pig producers in Scotland have been on a challenging journey, partly because the sector has not historically benefited from direct agricultural support through the Common Agricultural Policy. They have been compelled to be more efficient, productive, and resilient in the face of many challenges and forced to make tough decisions for their farms and units based on evolving science, best practise, and consolidation in the processing plant network. This has resulted in a smaller core of professional, market-focussed farmers with sound business acumen for investing and thriving. The current challenges of Covid-19, abattoir closures and the African Swine flu prevalence globally are very real examples of business shocks which our pig farmers are currently having to contend with.

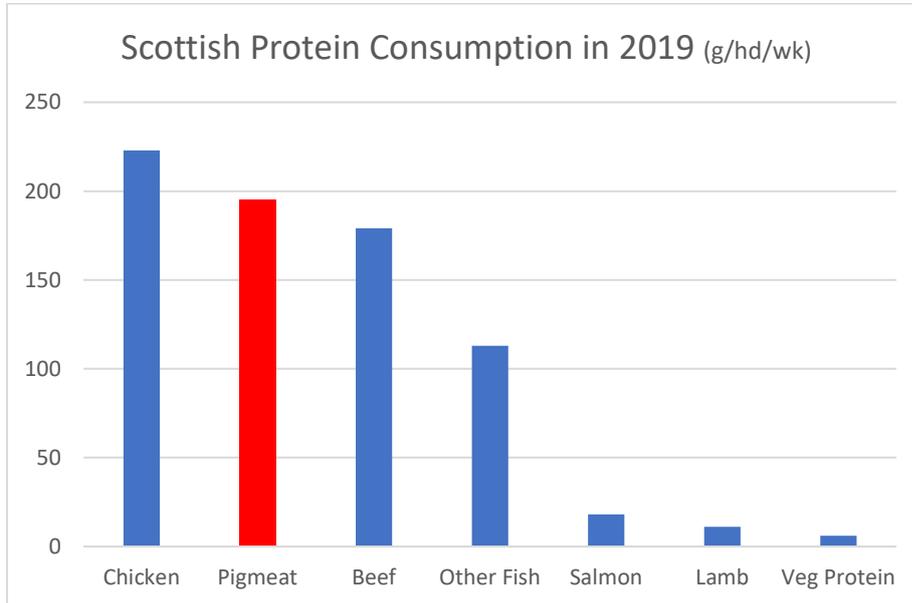
Nonetheless, the Scottish Govt has laid out urgent and ambitious targets to reduce emissions by 75% by 2030, and the collegiate and progressive Pork sector already has the rudiments of data recording and best practise knowledge sharing in place to build on the progress already made in reducing greenhouse gas emissions.

This report explains how further reductions in emissions can be achieved.

### 3. Why Pigs Matter to Scotland

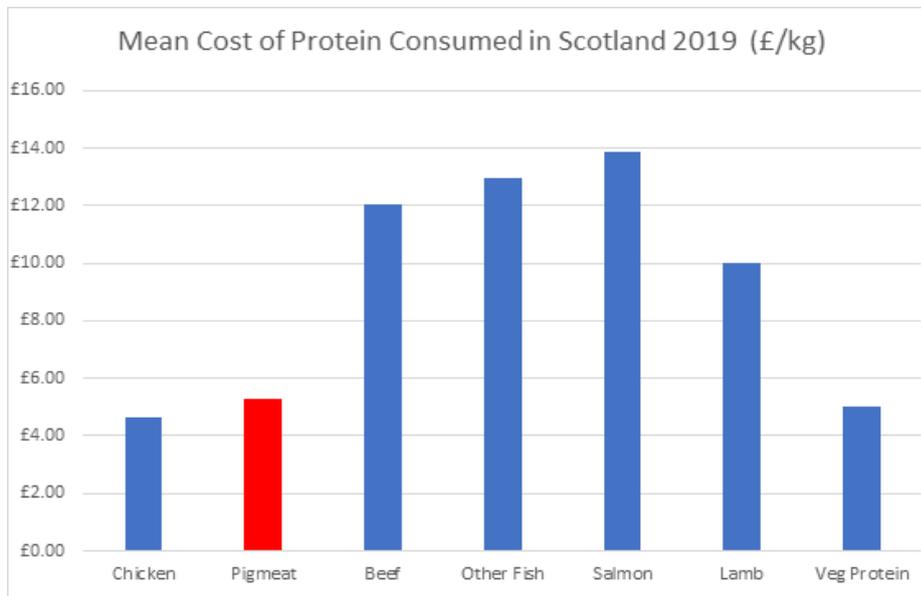
#### Consumption & Affordability

Scottish consumers eat more pigmeat than any other protein apart from chicken:



(DEFRA Household Survey, 2019)

The versatility of pigmeat means that it is consumed in a myriad of diverse ways like fresh pork, ham, sausages, pies, and bacon, to name but a few. Furthermore, it is one of the most affordable sources of protein:



(DEFRA Household Survey, 2019)

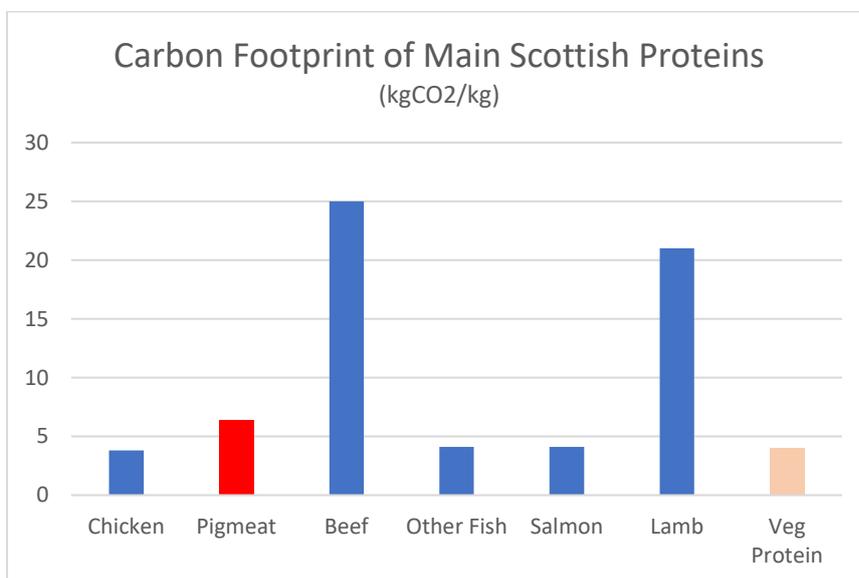
The Covid-19 pandemic has demonstrated the appetite for red meat remains, and pork has seen the greatest bounce in retail demand, throughout the lockdown, up 15% year-on-year (Kantar) because of the following market drivers:

- More family meal occasions at home (more sausages/bacon at breakfast/snacks)
- Cooking at home using premium cuts of pork
- Affordability
- Improved cooking skills and a reduction in food waste
- Buying locally with butchers' sales increased

As an accessible, affordable, and healthy source of protein, the advancement of the pork sector with the right environmental credentials will allow producers to be at the forefront of delivering the Scottish Food Policy. This can be achieved through local food chains, public sector procurement, awareness of consumer trends and, most significantly, by providing those facing food poverty with affordable protein.

### Dietary Carbon

The Carbon Footprint of pig meat compared to other proteins is shown below.



(University of Lancaster for BBC; SRUC)

The pigmeat figure is the average carbon footprint from 6 Scottish pig farms that used the SRUC AgRECalc tool in 2019 and the Land Use Land Use Change Factor (LULUCF) has been included, even though some of the protein will have been from sustainable sources. All other figures are from the University of Lancaster study. Note that there is no large-scale Scottish source of vegetable protein.

### Production Systems

Scotland currently has around 46,000 breeding sows, producing about 1.2m pigs each year. One third are reared and slaughtered in Scotland, whilst the remainder move to England at various ages either as breeding stock or for slaughter. 25,000 sows are in outdoor breeding systems and 21,000 indoors. Nearly all pigs bred from outdoor sows are also kept in sheds from weaning onwards due to the Scottish weather. There are about 100 businesses producing pigs on a commercial scale at 250 different locations, all family businesses apart from one large company.

In 2020, 31,105t of carcass meat were produced in Scotland, which is 19% more than the volume of lamb produced. The total contribution of the pig sector and all associated activities to the Scottish economy is estimated to be £298m.

“Provenance & Profit: A Strategy for Scotland’s Pig Industry” was launched in 2018 as part of Ambition 2030, the overall strategy for Scotland’s food and drink sector. Positive progress has been made on a number of the objectives, although both Covid-19 and the UK’s departure from the EU are currently presenting serious challenges. The overall objective is to double the economic contribution of the pig sector to £500m by 2030. Crucially this can be achieved by increasing the proportion of further processing that takes place in Scotland and by increasing brand value, rather than by having higher production on farm.

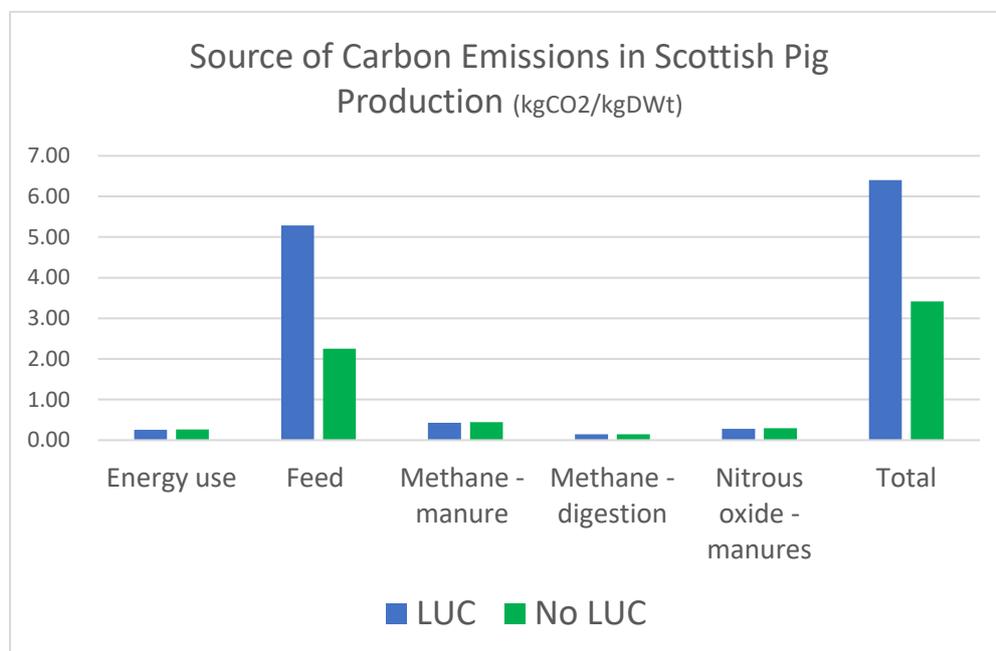
This level of output at abattoir level means that the self-sufficiency of Scotland for pigmeat is estimated by Quality Meat Scotland to be only 33%.

### Current Government Support

The pig sector currently receives no financial support from Pillar 1. Pig farmers are eligible for certain Pillar 2 schemes, such as the Agricultural Transformation Fund, but have also excluded from several, such as New Entrant Schemes. Pig processors have made use of the Food Processing, Marketing and Collaboration Scheme and industry groups have used the Knowledge Transfer and Innovation Fund. In total, this has all added up to less than £1m per annum over recent years.

## 4. What is the Environmental Impact of Pig Production in Scotland?

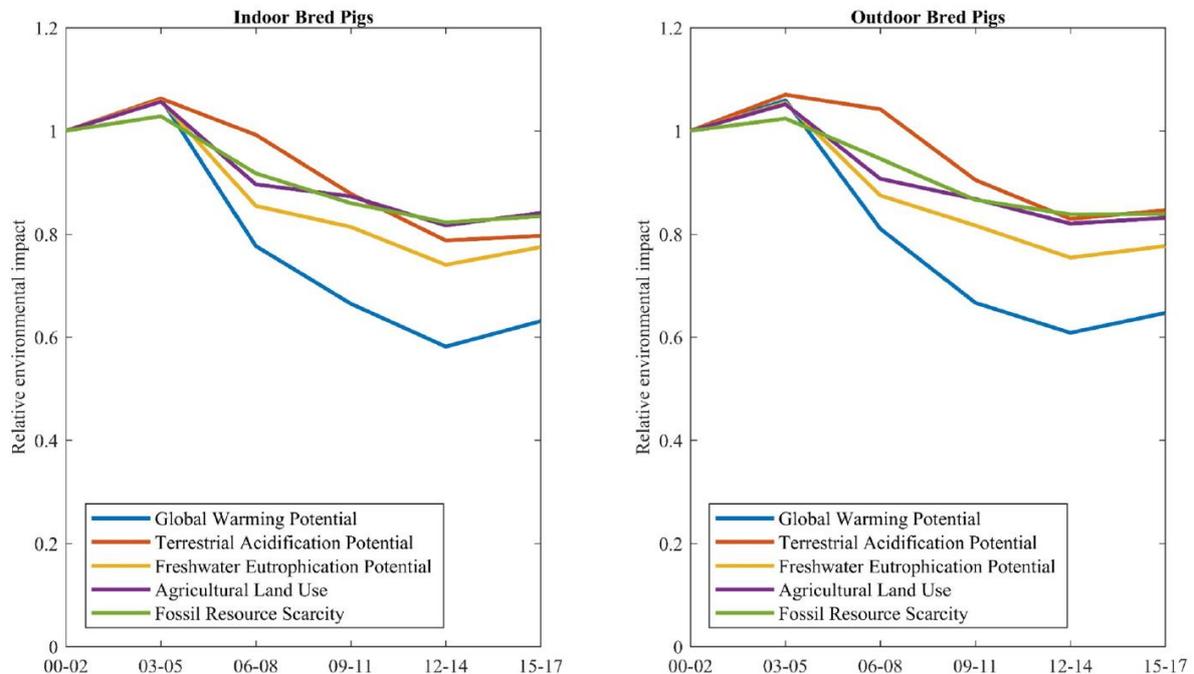
In common with all farming operations, pig production in Scotland has an impact upon the environment as it converts a range of inputs into nutritious protein. The following chart is based on carbon footprinting carried out on Scottish pig units last year and highlights the main factors that generate carbon emissions on pig units:



(SRUC)

These figures are based upon the average total from six units that used the AgRECalc carbon footprinting tool in 2019.

Emissions associated with feed production are clearly the major contributor, particularly taking account for the Land Use Change (LUC) that accounts for deforestation linked to soya production. Digestive methane emissions are negligible, but emissions of both methane and nitrous oxide from manures are more notable. What is more remarkable is that the UK pig industry has reduced its Global Warming Potential by 37% in the indoor sector and 35% outdoors:



(M. Ottosen *et al*, 2021)

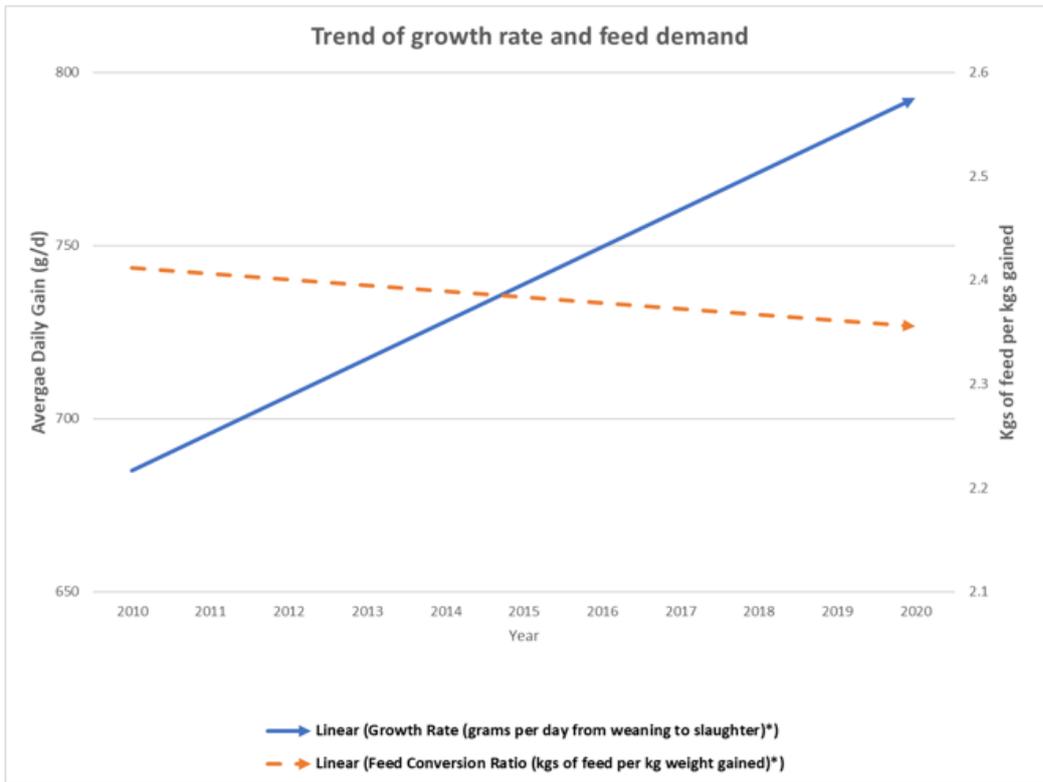
This is a major achievement for an industry in which on farm improvements to pig health, welfare, productivity and financial sustainability have lowered their carbon footprint. This has happened almost as a side-effect rather than being an explicit objective and without significant support from government. What makes this more remarkable, is that UK output of pigmeat was the same in 2020 as it was in 2000. **The reductions are purely down to improvements in production efficiency rather than by simply reducing the number of pigs.**

These reductions were attributed by the authors to three main factors:

1. Changes in animal performance, which enabled a decreased energy concentration in feed
2. Inclusion of alternative, home grown ingredients where possible
3. Increased slaughter weight without a corresponding increase in inputs

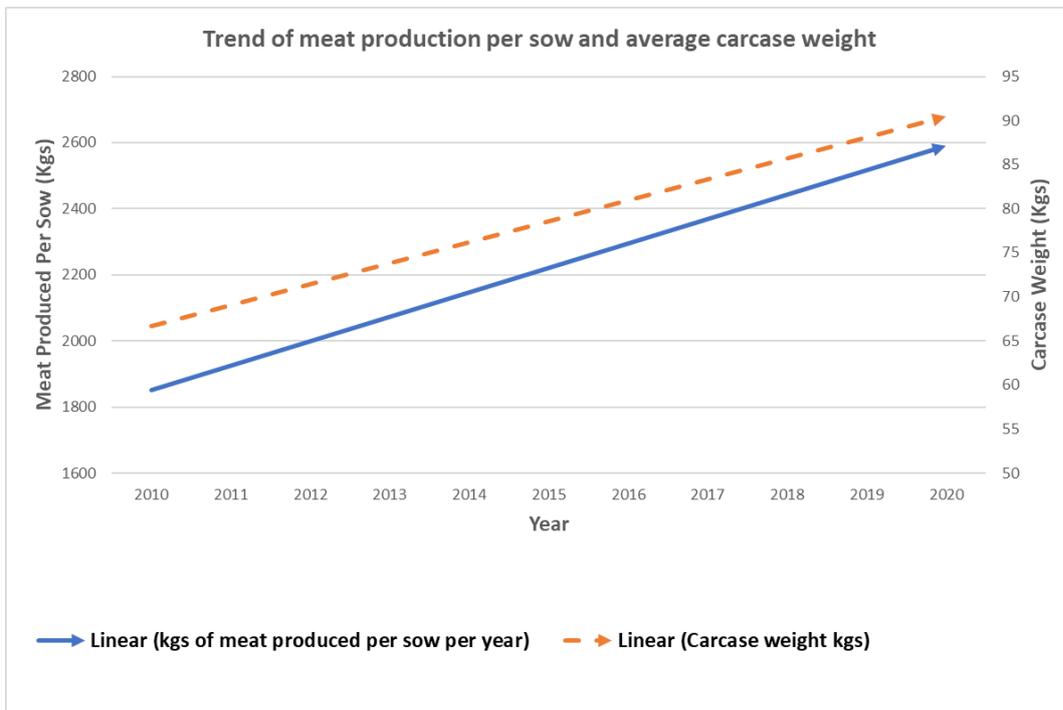
The inclusion of imported soyabean meal is the most significant feed contributor. It is imported, mainly from South America and so has a high Global Warming Potential associated with its production and transport. However, over the last two decades, pig producers have made a conscious effort to drive improvements in feed utilisation performance and growth rates.

The chart below highlights the progress which Scottish producers have made - increasing growth rate through genetics and careful management whilst reducing the amount of feed required to achieve that growth:



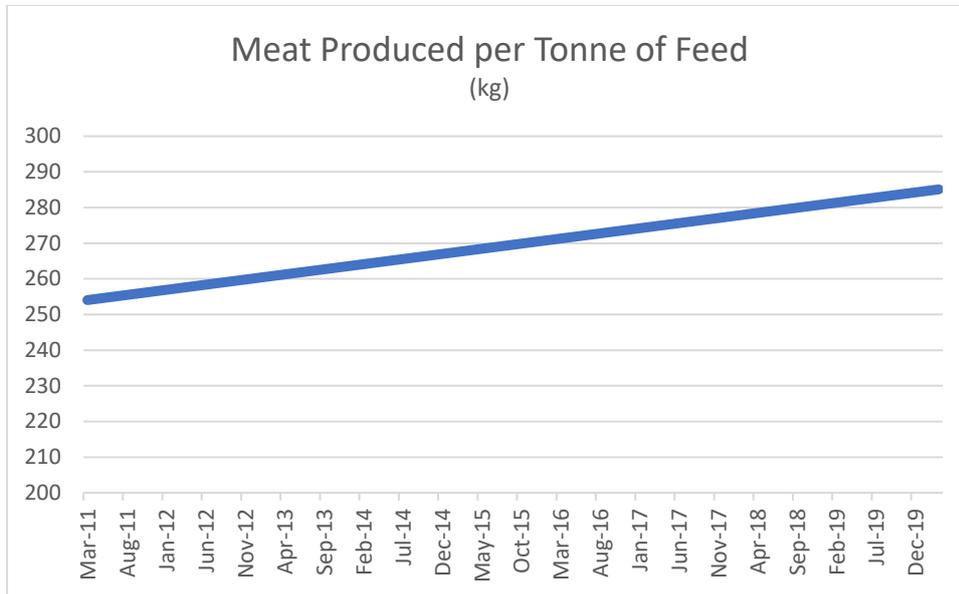
The next chart highlights the steady increase in the weight of each pig that has been achieved and so the corresponding increase in the total amount of meat produced for every sow on breeding farms:

(Aberdeen Pig Benchmarking Group)



(Aberdeen Pig Benchmarking Group)

Combining these improvements gives an indication of how the reductions in CO2 per unit of output have been achieved: These significant improvements over the last decade mean that the pork is being produced with a far lower CO2 output per kg of meat. The reason for this is shown in the following chart:



(Aberdeen Pig Benchmarking Group)

With feed being responsible for 5.28kg of CO2/kg per kg of pig meat last year, we have assumed that it was responsible for 5.92kg of CO2 in 2011, so this activity alone reduced the GHG emissions from the sector by more than 1% every year.

### Biodiversity

The benefits of using outdoor pigs as a break crop from continual arable production has long been understood, with improvements in soil fertility clearly evident after the pigs have moved on. More recently, Scottish outdoor producers have undertaken biodiversity audits annually to understand how they can enhance their local environment, for example, by sowing pollinator margins or creating habitats in areas of the field less suited to production.



(©Karro Food Group)

Biodiversity challenges are less relevant to indoor production because it tends to involve only buildings, with other land on the farm considered to be part of the arable or extensive livestock system and so biodiversity measures are linked to those enterprises instead. This is the significant

drawback of considering the environmental impact of individual enterprises on mixed farms – this report is only one part of the wider integrated picture of Scottish farming and so there is considerable appeal in the Integrated Farm Management approach advocated by the Arable Climate Change Group.

There is, however, a need for continued focus to minimise the airborne and water-borne pollutants that affect the wider environment on all types of units. *M. Otteson et al* (2021) also modelled reductions in the region of 20% over the last 20 years for Terrestrial Acidification Potential and Freshwater Eutrophication Potential, both of which reflect reductions in the impact upon the environment for wildlife.

## 5. The Objective

**To reduce the Greenhouse Gas Emissions from Scottish pig production whilst maintaining the output of quality, affordable Scottish Pork.**

## 6. The Solutions

### A. Maximising Input Efficiency

Feed is the biggest input in pig production accounting for two thirds of all costs. Using it as efficiently as possible will have the biggest effect on GHG emissions.

1. **Protein** levels in feed have been reduced by up to one third and this has resulted in a corresponding reduction in ammonia (NH<sub>3</sub>) and nitrous oxide (N<sub>2</sub>O) emissions. Currently there is no reward for reducing protein in diets. The NVZ and IPPC regulations don't take account of the resulting lower Nitrogen in muck and slurry. Feed recording needs to be improved to calculate on-farm efficiency levels.

<p><b>Recommendation1:</b> Encouragement to complete simple on-farm feed and slurry recording to allow baseline GHG emission levels for the sector to be established.</p>
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2. **Cereals** make up around 80% of the total ingredients in pig feed by volume. Most of Scotland's pig farmers mix their own feed on farm. 48% of the cereals are grown on farm with another 27% purchased from neighbouring farmers. This keeps the carbon footprint very low, as less transport is involved. Slurry and muck from the pigs are used to grow the crops thus reducing the need for inorganic fertiliser.

**Recommendation 2:** On-farm auditing tools to recognise 'home grown' and/or 'locally sourced' cereals which supports a lower carbon footprint per farm.

3. **Soya** use is controversial due to deforestation in Brazil. There is a moratorium amongst soya buying companies not to buy soya from recently deforested land but this can be evaded by grazing cattle on the land before they grow soya on it. Clearly this is a major multinational political issue and unilateral moves in Scotland are likely to simply offshore the problem. More sustainable supplies are available from the USA and some from Argentina. Soya is ideally suited to pig diets and is highly digestible, whereas peas, beans, and lupins have lower protein and are less palatable. Historically, swill feeding or meat and bone meal was used but this has been banned due to the significant disease risks associated with it. There has been more success using rapeseed meal to substitute for soya (even though the amino acid profile is not as well suited for pigs) and oilseed rape is also easier to grow in the Scottish climate. Bacterial protein grown on a substrate and insect derived protein could be used in the future. Synthetic amino acids are already being used effectively to reduce soya inclusion rates. All of these alternatives are currently more expensive, which is barrier to uptake when competing against imported pigmeat that would still use soya. Removing soya altogether could be detrimental to Climate Change objectives because less efficient diets would increase feed use with a consequent rise in GHG emissions. A targeted reduction is far more realistic and new research should be geared towards this.

**Recommendation 3:** Research and Development commissioned into alternative protein supplements and the effect they have on reducing GHG emissions. Consideration should be given to the wider effects of using alternative protein sources.

4. **Training** opportunities specific to pig farms are in short supply. With labour being the second biggest cost on pig farms, support is required to provide CPD for farm managers and staff to enhance their skills and knowledge. This challenge can be partly addressed through Modern Apprenticeship Schemes. Currently the cooperative Ringlink Scotland and land-based training provider Lantra facilitate opportunities for young people to be introduced to and experience working on farm. AHDB Pork in England also have extensive training programmes for modern pig producers.

**Recommendation 4:** Funding to deliver specific on/off-farm training and develop pig-specific training material would boost interest amongst trainees and employers.

5. **Knowledge Transfer and Exchange** is necessary to share expertise and improve the overall efficiency of the Scottish pig sector. The Pig Monitor Farm has been an effective mechanism for sharing knowledge amongst farmers, staff, vets, government bodies and the ancillary industry, acting as the central hub for KE in the Scottish industry. A new 5-year project would

allow this to continue. The Knowledge Transfer and Innovation Fund has also been successfully used for projects that have advanced pig health and product quality.

**Recommendation 5:** Knowledge Transfer and Exchange should be continued with a new Pig Monitor Farm programme and continuation of the KTIF scheme.

6. **Energy** is used for feed processing, heating, lighting, cleaning, and ventilation. Several pig farms have invested in renewable energy over the years to help off-set the energy which they are using. Renewable energy has the potential to greatly reduce the carbon footprint of pig units provided the national inventory does not record it somewhere other than in the agriculture category. There is scope for better measurement of energy use so that waste is reduced, and savings made.
- **Anaerobic Digestors** use muck and slurry to create energy but usually also utilise other feedstocks for example silage from grass, rye, or maize.
  - **Biomass Boilers** run on wood chips or pellets to replace heat from fossil fuels or electricity.
  - **Solar Panels** either on shed rooves or on land to provide electricity.
  - **Wind Turbines** of various sizes to provide some or all the electricity requirements of the farm unit.

Any new grant scheme should ensure dividend is targeted at both large and small units which may have other diversified food production on site.

**Recommendation 6:** Support to invest in renewable energy initiatives for example anaerobic digestors, biomass boilers, solar panels, and wind turbines to offset the energy requirement on pig farms.

## B. Utilising Best Technology

Pig farms have used highly efficient genetics to remain competitive and there have been dramatic improvements in the output from breeding herds over the last 10 years. On-going investment in buildings, ventilation and feeding systems will all help to reduce GHG emissions.

7. **New Building** investment since 2011 has been minimal due to the abolition of the Agricultural Buildings Allowance. Support to invest in new pig housing facilities could incorporate improved welfare, novel energy saving measures and a better atmosphere to improve pig health and welfare and grow pigs more efficiently. Variable returns and an uncertain market have reduced investment in buildings and the removal of capital allowances on buildings has been a disincentive. Furthermore, local planners have frequently blocked projects that improve premises to reduce GHG emissions.
8. **Ventilation** in many sheds needs either an overhaul or replacement. Good ventilation is essential for maintaining good health, welfare, and performance in a pig herd. Modern fans use far less energy than older systems and even the simple installation of baffles can have

dramatic results. Recent studies have shown that investment and training are required to improve the environment for pigs and people.

- 9. Insulation** of sheds will improve the atmosphere and reduce wasted energy. Pig buildings could be assessed and given a thermal insulation rating. Investment in insulation could then be targeted at problem buildings. Newer outdoor pigs arks have greatly improved insulation giving demonstrable benefits for sow condition and piglet comfort.

**Recommendation 7:** Capital grant funding and/or annual investment allowances as well as supportive planning legislation will encourage investment into building facilities which improves both herd and environmental efficiency.

- 10. Legal Requirements** around pig buildings are periodically reviewed. In 1999, there was a unilateral ban on sow stalls in the UK that resulted in 40% of the UK pig herd going out of business. This was predominantly because food labelling laws did not allow the difference to be clearly communicated to UK consumers and so cheap EU imports from housing systems banned in the UK flooded the market. It is imperative that the lessons from that need to be learnt for any future changes to housing systems. The industry is not resistant to change and indeed market sentiment often moves more quickly than legislation, however, any change needs a long lead time, grant support to assist with investment and labelling rules that protect from unfair competition.

**Recommendation 8:** Any proposed changes to legislation need to consider their impact upon progress to reduce GHG emissions and if changes are required, sufficient lead time be given to enable the required investments to be made along with relevant grant support.

- 11. Data Recording** on most Scottish pig farms is excellent for the breeding herd and so improvements are easy to measure. Feeding herd information however is not currently readily available because it is time-consuming to weigh pigs and recording feed use accurately is difficult to achieve in individual pens. QMS fund the provision of a recording system so use of the feeding herd modules needs to be encouraged through training or advice.
- 12. Data Integration** should be encouraged between the suppliers of computer control systems for feeding, ventilation, and energy so that they can communicate with each other. Currently, the computers are specific to these individual operations but enabling them to communicate would create readily available information to monitor input use.
- 13. Electronic Identification Systems & Automatic Weighing** should be developed and installed to enable the performance of the growing pig to be easily measured. This relies on being able to quickly identify and trace individual pigs. Pigs must meet a tight market specification, so labour-saving weigh systems would enable processor requirements to be targeted efficiently.

**14. Feeding Systems** that reduce waste would result in cost savings and reduced emissions. Any saving is significant because feed is the biggest input. Automated systems should also improve welfare and save labour. SRUC modelling identifies precision feeding as a practice that gives a positive return on investment as well as environmental benefits.

**15. Modern LED Lighting** gives significant savings in energy and improves pig performance.

**Recommendation 9:** Financial support to invest and install equipment to improve production, energy and environmental efficiency.

### C. Tackling Livestock Disease

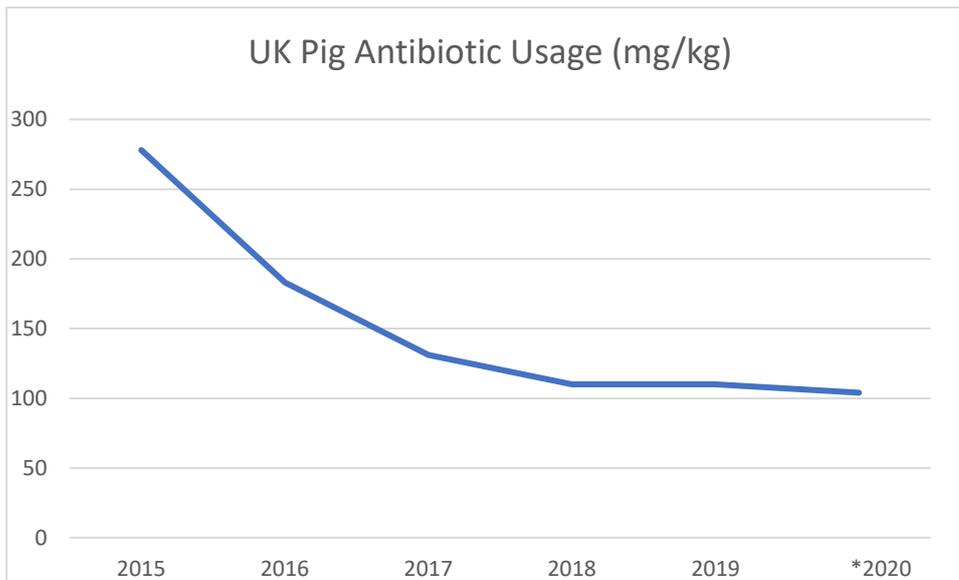
The health of the Scottish Pig Herd has improved significantly due to individual herds undergoing a total or partial depopulation and collaborative approaches to area disease reduction. This and the targeted use of vaccines mean that there is an increase in pig performance and a reduction in antibiotic usage. Healthy pigs utilise inputs more efficiently and so have a lower carbon footprint, quite aside from the ethical priority of ensuring that livestock are reared in the most humane manner possible.

**16. Wholesome Pigs (Scotland)** has led collaborative initiatives to improve health amongst Scottish pig farmers for 20 years, with remarkable levels of success. Data is collected and shared from abattoirs, farms and vets allowing coordinated interventions that are far more effective than individual farmers doing their own thing. The critical enabling step took place in 2015 when all producers agreed to share pig health information with each other, removing the main barrier to coordination on local and regional levels.

**17. Quarterly Vet Visits** by vets specialising in pigs helps to reduce the presence of disease on pig farms and ensures that good animal welfare is maintained.

**18. Early Warning System** – the Scottish Pig Disease Control Centre (SPDCC) is an industry-led initiative that has the simple objective of minimising the welfare and economic impacts of serious disease outbreaks, such as Swine Dysentery and Porcine Epidemic Diarrhoea. It needs more resources so it can achieve this objective effectively.

**19. The Electronic Medicine Book (eMB)** shows the progress that has been made by farmers and their vets to reduce antibiotic usage. These figures are for the UK for reasons of confidentiality. Figures are generally lower for Scotland except for 2019 when there was an outbreak of Swine Dysentery (the impact of which was reduced by the SPDCC):



(AHDB; \*2020 figure only includes first six months)

20. **Investment** in buildings, ventilation and insulation can create a better atmosphere and reduce levels of disease within a pig herd, not least because it is impossible to disinfect wood which was commonly used in older pig buildings. Local planning regulations need to reduce the obstacles pig producers have to improving premises to reduce GHG emissions.
21. **Water** quality and delivery is vital for pig health. Pig farms have greatly reduced in-feed medication and systems to acidify water can help to alleviate health problems. In-water medication system enable more precise and rapid delivery, reducing waste.
22. **Site Biosecurity** to prevent the entry of disease should be a top priority on pig farms. Fencing, disinfection, wheel washing and CCTV can all help.
23. **Depopulation/Repopulation** – a partial or total depopulation is necessary where there is a high disease burden on a herd and antibiotic usage is too high. These both require significant financial investment. PRRS (Porcine Reproductive and Respiratory Syndrome) is a pig disease which can have a serious economic impact on pig farms due to its immune-suppressive effect and partial or total depopulation are the most effective approaches to its control.

**Recommendation 10:** Financial incentives to reduce, control, prevent and eradicate diseases within the Scottish pig herd.

24. **Biotechnology Research** has a great deal of potential in pigs, for example, at the Roslin Institute where gene editing has developed pigs that are resistant to PRRS. There are consultations on-going currently about whether gene editing should be permitted, and questions also remain about customer acceptance of such practices. Nonetheless, the Scottish Research Institutes are global leaders in this field and should be supported to continue the

under-pinning research into technologies that will enhance the ability of industry to produce more with less emissions.

**Recommendation 11:** Research and development into biotechnology solutions to breed disease resistance pigs and reduce environmental impact.

#### **D. Turning Wastes Into A Resource**

Slurry and muck are the major by-products of pig farming. These are already used to grow grass and crops in mixed farming systems, all of it used either on the production farm or an immediate neighbour. Better utilisation and accounting of slurry and muck in soil nutrition would result in reduced usage of inorganic fertiliser. Slurry and muck can also be good sources of renewable energy, but large amounts of capital expenditure are required to unlock this resource.

- 25. Reducing Inorganic Fertiliser** – slurry and muck have been used effectively in mixed farming systems to reduce the requirement for inorganic fertiliser. QMS commissioned a study that calculated an average saving of 1,021 kg CO<sub>2</sub>/ha saving in GHG emissions by substituting the inorganic fertiliser with slurry with average nutrient content of Scottish pig units. This could be done more effectively through better training.
- 26. On-Farm Slurry Analysis** of slurry and muck is not widespread. This needs to be encouraged so that inorganic fertiliser can be better targeted. NVZ regulations should be modified to take account of slurry and muck analyses.
- 27. Slurry Storage** needs to be increased to utilise slurry effectively and protect against future changes in legislation. Existing slurry storage is also in need of replacement and covers on stores reduce ammonia emissions, maintaining the level of nitrogen in the slurry so that it can be utilised by crops. Note that SRUC modelling shows that there is no financial return on investment from covering slurry stores so grant incentives would be required.
- 28. Slurry Distribution & Application Systems** reduce the reliance on tractors and tankers using fossil fuels to transport slurry. They also enable application and incorporation at times more suited to the crop when ground conditions with tankers may be challenging. Slurry Injection reduces emissions and increases the level of nutrients that are available to the crop.
- 29. Slurry Cooling** – Heat can be removed from slurry and pumped to sheds on the farm that require heating. This would be difficult and very expensive to retrofit. It should be encouraged in any new building that can utilise it.
- 30. Slurry Acidification** – Acidification of slurry reduces the levels of ammonia in pig sheds by keeping it in the slurry as ammonium. GHG emissions are reduced and the environment in the pig shed is improved. The slurry also has a greater nutrient value. This again is expensive to retrofit but should be encouraged in any new building.

**31. Hydrogen Electrolysis** –This process removes methane from slurry and converts it into hydrogen which could in the future be used to fuel machinery. This merits more exploration to understand the potential and limitations.

**32. Air Scrubbers and Biofilters** could be fitted on new buildings to reduce emissions. Settling ponds and swales can be constructed to reduce the risk of contamination by surface water running through farms.

**Recommendation 12:** Grant support should be provided through the Agricultural Transformation Programme to encourage uptake of the above measures.

### **E. Adding Value and Building Producer Confidence**

Pig producers in Scotland operate in a market environment and most of the capital required to deliver the on-going investment needed will come from the private sector. As such, confidence that there will be longer-term market opportunities is essential to enable a return on investment to be calculated.

**33. Clear and positive leadership** from Government could counter local and national perceptions and encourage a thriving Scottish pig sector with a sound environmental footprint. Ireland and New Zealand are examples where supportive government has created a thriving agricultural industry. The Good Food Nation Bill is an opportunity to outline how the multiple objectives of affordable, nutritious food can be combined with the progress towards net zero GHG emissions whilst maintaining a thriving rural economy.

**Recommendation 13:** Confidence provided by positive leadership from Scottish Government.

**34. Cooperative marketing** is already widespread in the pig industry, enabling family farms to thrive within an increasingly concentrated processing and retailer environment. Formal Producer Organisation status would enable investments to be made through vertically integrated supply chains, strengthening resilience in these supply chains by engaging the end user - consumers. Initiatives such as the QMS Butchers club and Scotland Food & Drink Buy Local directory are important so that people know where Scottish Pork can be found. Scottish Pork should be more visible and valued in the list of sustainable Scottish products than is currently the case.

**Recommendation 14:** Producer Organisations should be extended to the pig sector and investment schemes adapted to allow vertical investments by supply chain partners.

**35. Processing Infrastructure** for slaughter and adding value is limited in Scotland, leaving the supply chain very exposed if anything happens to Quality Pork Ltd at Brechin. Grant support to encourage processing investment should be continued and a Scottish food resilience map be developed to identify where strategic investments could help to build resilience. The

current challenges of Covid closures have heightened awareness of the importance of food supply fragility.

**Recommendation 15:** Grant support should continue to the processing sector through a successor to the Food Processing, Marketing & Co-operation Scheme.

**36. Scottish Pork** reared, processed, and consumed here has a lower carbon footprint than that of many of the imports. The survival and expansion of our home-based industry is the best way to negate Climate Change by reducing emission offshoring. Quality Meat Scotland have a key role in marketing this brand to secure the loyalty of Scottish consumers. If gold standard GHG credentials can be demonstrated by the pork sector, there may also be premium export opportunities to sell Scottish Pork into markets that value these credentials. There may also be potential to participate in the wider branding opportunities proposed by other reports such as the Suckler Beef Climate Scheme or Scotland Food & Drink.

**37. New Entrants** require confidence and support to get established. There have been several farms that have recently set up finishing pig units but very few new entrants to pig breeding in the last 20 years due to the higher capital cost. This needs to be addressed to future proof the Scottish pig herd and reduce the age profile of pig farmers. New Entrants need encouragement and support.

**Recommendation 16:** New Entrants need encouragement and support through both mentoring and financial assistance.

**38. Research Funding** is nearly all spent on animal welfare at present and most of it will have very little effect on GHG emissions. There is scope for the research organisations in Scotland to focus on the issues in this paper that will reduce emissions. The Centre for Knowledge Exchange proposed in the Draft Strategy for Environment, Natural Resources and Agriculture Research is a logical next evolution of the SEFARI Gateway concept that has helped to improve the two-way communication between the pig industry and the research community over recent years. The Knowledge Transfer and Innovation Fund has also proved effective.

**Recommendation 17:** Research and Development funding is required to make advancements in reducing GHG emissions and improving Knowledge Exchange.

**39. Planning** rules make it difficult for pig farmers to invest in new infrastructure. The planning costs are the same as other industrial buildings, but the return on investment is significantly lower, which acts as a barrier to new and existing farmers investing in pig buildings. There has also been historic resistance from some local authorities to granting planning approval for any pig farm projects, something that may be changed by guidance from Scottish Government.

**Recommendation 18:** Local planning regulations need to address the obstacles pig producers have to improving premises to reduce GHG emissions.

## 7. How Should We Measure Progress?

- 40. Carbon Emissions Baseline** levels must be established to determine where each farm and the sector sits currently. Platforms like SAOS' CarbonPositive are needed to identify a baseline for carbon sequestration, renewable energy production and the environmental stewardship of natural assets including water and biodiversity for every farm in Scotland. Currently, it is unclear how the national inventory captures improvements in efficiency and feed ingredient sourcing that have already had a sizeable impact on the actual GHG emissions of the sector. In particular, the concepts outlined in the Interim Report from the Farming for 1.5°C Inquiry where the three different GHG's are split out have merit for pigs because Nitrous Oxide and Carbon Dioxide emissions are far more significant than Methane. Future progress can then be effectively measured and reported.

**Recommendation 19:** Financial support to accelerate carbon emission baselining levels and inventory work.

- 41. Carbon Audits** performed annually would help to focus pig farming businesses on making improvements. The carbon auditing tools currently available require investment to improve the accuracy and ease of use for application on pig units without the use of consultants. There is scope for some input information to be supplied centrally rather than expecting farmers to find out, most notably by feed companies relating to the source of their raw materials.

**Recommendation 20:** Financial support to complete annual carbon audits using improved measurement tools.

- 42. Sensors and regulatory reforms** could be trialled to measure emissions outside and gas levels inside pig buildings and a review considered to find a more user-friendly alternative to the Integrated Pollution Prevention and Control Regulations (IPPC) to ensure that the sector is minimising damaging impacts on the environment. The performance of IPPC permitted pig farms in Scotland has generally been good, but the IPPC regulations were designed by the EU to regulate industrial sites with point-source pollution and has always proved challenging for both industry and regulators to apply to farms with diffuse pollution risks. Attention should be given to whether a more effective regulatory approach can be developed now that the UK is out with the EU.

**Recommendation 21:** Trial sensors to measure emissions outside and gas levels inside pig buildings and review regulatory approaches to monitoring.

## 6. Conclusion

Scottish pig farmers have demonstrated they can and will adapt their business and behaviours to deliver both economical and sustainable outcomes. In pursuit of further reductions in greenhouse emissions (GHG), our pig farmers need to make strategic investments. This report has identified the most cost-effective environmental mitigation strategies and proposes economic and policy support to help make those changes happen. These include investment in new infrastructure; further advances in technology and energy; further enhancement of pig health & welfare; and supporting producer confidence through cooperation and market development. Improvements are needed in the national inventory to enable current and future performance to be more accurately reported.

The Rural Economy and Connectivity Committee requested greater clarity on the interaction between the Climate Change Plan targets for agriculture and the Ambition 2030 target of doubling the food and drink sector. This report has outlined how these three policy ambitions can be aligned with respect to pigmeat production, trade and consumption.

Scottish pig farmers take pride in being *open* in the sharing of data, being *consistent* in tackling different challenges in disease and husbandry, and now need to be *brave* in facing new challenges which will be essential in further reducing emissions.

**With supportive policy, we are certain that pork production will play an active part in leading our food supply chain to achieve net zero emissions in Scottish agriculture.**

## Appendix 1: Summary of Suggested Policy Measures

Pig producers do not want a basic payment so discretionary policy measures proposed that are intended to focus producers, the wider supply chain and supporting organisations on those actions that will further reduce carbon emissions. The costs are very rough estimates spread across 3-years.

Scottish Government Support Measures	Areas requiring support	Rec' Link	Support Required (financial/policy etc)
<b>Sustainable Agriculture Capital Grant Scheme (SACGS)</b>	<ul style="list-style-type: none"> <li>- <u>Start Up Grants</u> for New Entrants</li> <li>- <u>Inclusion</u> of pig handling and management equipment within SACGS.</li> </ul>	16 9	£2m
<b>Agricultural Transformation Programme</b>	<ul style="list-style-type: none"> <li>- <u>Financial incentives</u> to encourage better management and disposal of slurry &amp; muck on farm e.g. slurry stores &amp; covers, anaerobic digesters. Upgrades to buildings improving insulation, ventilation, health or welfare.</li> </ul>	12	£20m
<b>Co-operation and Collaboration across the supply chain</b>	<ul style="list-style-type: none"> <li>- <u>Capital Investment</u> into Scottish processing infrastructure required to safeguard the pig supply chain. (FPMC).</li> <li>- <u>Extend funding</u> from current PO scheme to pig sector</li> </ul>	15 14	£10m
<b>Knowledge Transfer</b>	<ul style="list-style-type: none"> <li>- <u>3-year grant</u> to deliver a monitor farm programme.</li> <li>- <u>Financial support</u> to deliver an apprenticeship scheme</li> <li>- <u>Subsidised</u> sector specific training opp's</li> </ul>	5 4 4	£2m
<b>Integrated Farm Management Programme</b>	<ul style="list-style-type: none"> <li>- <u>Funding</u> to develop farm carbon auditing tools to deliver more accurate results for pig producers.</li> <li>- <u>Financial assistance</u> to complete annual carbon audits.</li> <li>- <u>Acceleration</u> of the SAOS CarbonPositive tool to establish individual farm carbon baseline and inventory.</li> </ul>	2 20 19	£500,000
<b>Research and Development</b>	<ul style="list-style-type: none"> <li>- <u>Financial support</u> to research the effectiveness of alternative protein sources, and their effects on GHG emissions.</li> <li>- <u>Financial support</u> to develop solutions to reduce, control prevent and eradicate disease.</li> <li>- <u>Financial support</u> to R&amp;D biotechnology solutions to breed disease resistance pigs.</li> <li>- <u>Funding</u> to understand and make advancements on reducing GHG emissions on pig farms effectively.</li> <li>- <u>Funding</u> to trial indoor and outdoor sensor technology</li> </ul>	3 10 11 17 21	£3m (?)
<b>Renewable Energy Incentives</b>	<ul style="list-style-type: none"> <li>- <u>Enhanced incentives</u> to support on-farm renewable initiatives such as anaerobic digestion, heat pumps, solar, etc.</li> </ul>	6	£5m

<b>Supportive Planning</b>	- <i>Supportive</i> planning legislation which encourages on farm investment and few bureaucratic burdens.	<b>18</b>	<b>£0</b>
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### Conditionality

Mandatory requirements to qualify for access to funding have been outlined for the Suckler Beef Climate Scheme. The elements that could be equally applied to pig producers are:

- Statutory Management Requirements (SMRs) and Good Agricultural and Environmental Conditions (GAECs)
- Carbon audit
- Health, Welfare & Biosecurity Plan
- Manure analysis
- Nutrient management plan
- Marketing plan or membership of marketing cooperative
- Membership of a farm assurance scheme
- Continual Professional Development for unit managers
- Biodiversity enhancements (outdoor units only)

The arable or grassland enterprise of the farm will pick up the biodiversity and soil management elements rather than linking it to the pig sheds.

Applications for capital grants should require an estimate of the savings in GHG emissions that the investment will yield and this can be used as scoring criteria in competitive schemes. Furthermore, supply chain investments need to demonstrate how they fit within the pig industry strategy laid out in “Provenance & Profit” so that the limited funds available are applied to greatest effect. It would be helpful if the capital investment schemes could be launched soon to tie in with the temporary new deduction rules on capital investment announced by the UK Government in the recent Budget.

## **Appendix 2: Participants & Acknowledgements**

### **Scottish Pig Industry Leadership Group**

- Marion MacCormick, Independent Chair
- Roderic Bruce, Quality Pork Ltd Chair & Producer
- Gregor Christie, Scotlean Board Member & Producer
- John Davidson, Scotland Food & Drink
- William De Klein, Karro Food Group, Producer & Processor
- Wayne Godfrey, Browns Food Group, Processor
- Andy McGowan, Scottish Pig Producers
- Sarah Millar, Quality Meat Scotland
- Clare Powell Tuck, Pilgrims Pride, Producer & Processor
- Grace Webster, GW Pig Consultants, Veterinarian
- Barry Robertson, Robertsons Fine Foods, Processor
- Philip Sleigh, QMS Board Member & Producer
- Patrick Stephen, Scottish Pig Producers Board Member & Producer
- Professor Jos Houdijk, SRUC
- Jamie Wyllie, NFUS Pigs Working Group Chair & Producer

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- Karro Food Group
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- Pilgrim's UK
- Quality Meat Scotland
- SAOS
- Scotland Food & Drink
- Scotlean Pigs Ltd
- Scottish Pig Producers Ltd
- SRUC

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