



LCA and ENVIRONMENTAL PRODUCT DECLARATION of an IMMUNOLOGICAL PRODUCT (**IMPROVAC VACCINE**) for BOAR TAIN T CONTROL in MALE PIGS

Paulo Moraes¹, Jim Allison¹, Joseph A. Robinson¹, Gian Luca Baldo², Fabrizio Boeri², Paola Borla²





¹Pfizer Animal Health, NJ, USA

²Life Cycle Engineering (LCE), Torino, Italy

LC05B - Life Cycle Management approaches for
different industrial sectors
SETAC, Milan, 17th May 2011



INDEX

-  **Goal and scope of the project**
-  Method and System
-  Results
-  Final remarks



GOAL AND SCOPE

The meaning of a Life Cycle Assessment (LCA) study of **IMPROVAC** can be recognized in:

- need to produce reliable data about the environmental burden of an average farm that uses and that doesn't use the immunological product



primarily for understanding any possible environmental benefit of using it



for benchmarking against existing practices (i.e. Physical castration)



for eventual disseminating activities, including green marketing tools such as **Environmental Product Declaration/Climate Declaration** (EPD - ISO 14020 Type III environmental claims).



WHAT IS IMPROVAC?

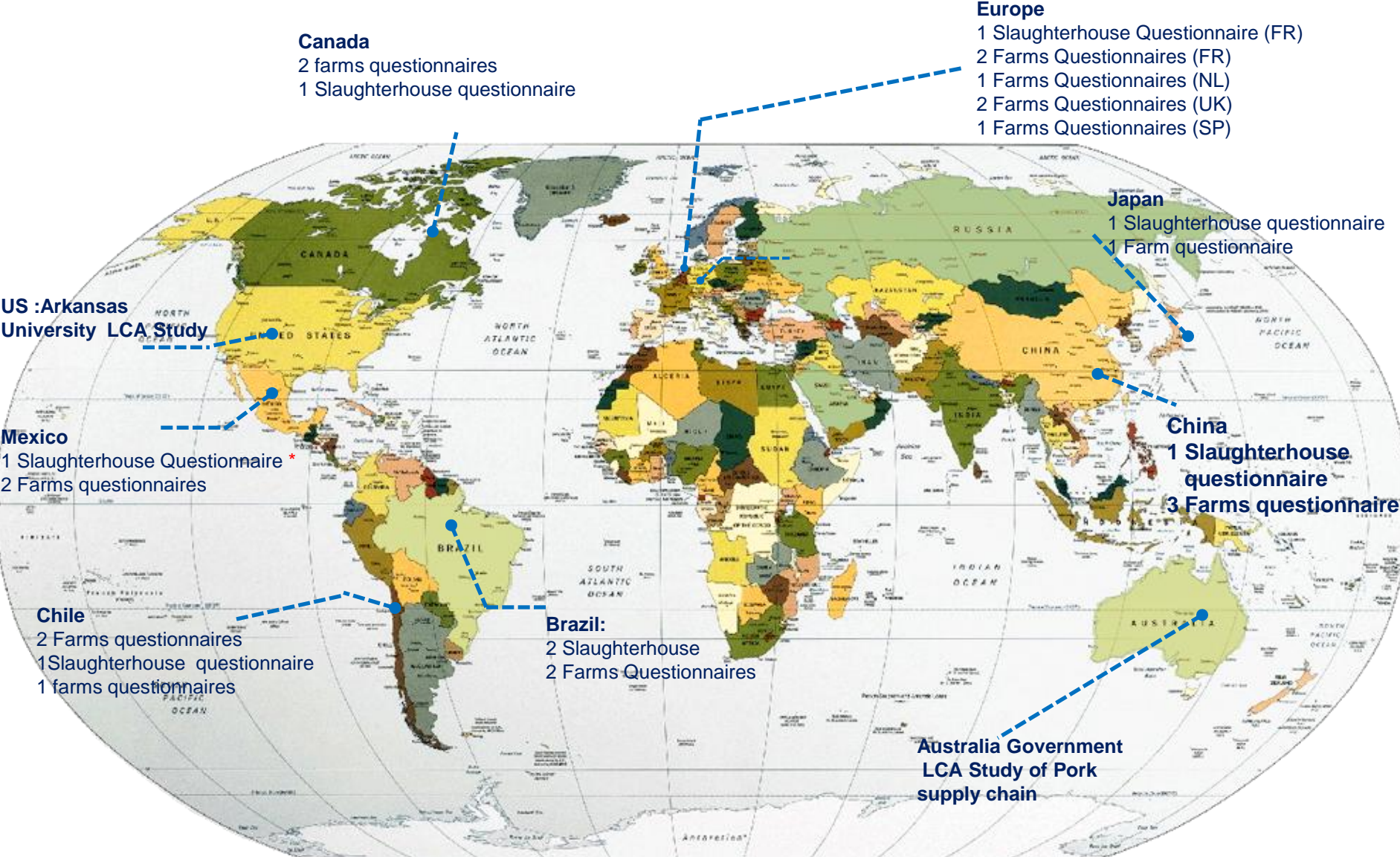
“IMPROVAC is a safe and reliable immunological product (vaccine) that uses the pig's own immune system to prevent unpleasant odor and taste in pork - an alternative to physical castration”

1. On-farm production benefits: healthier production without the setbacks of physical castration (poor growth and feed conversion)
2. Meat processing benefits: more meat per animal
3. Social benefits: animal welfare and sustainability









DATA COLLECTION, a global project





INDEX

-  Goal and scope of the project
-  **Method and System**
-  Results
-  Final Remarks



LCA APPROACH, functional unit

FUNCTIONAL UNIT DEFINITION

**IMPROVAC
PRODUCTION:**

**UPSTREAM &
CORE**

2 doses immunological product use per male pig

**USE PHASE (FARM)
LEVEL**

2 doses immunological product use per male pig

DOWNSTREAM

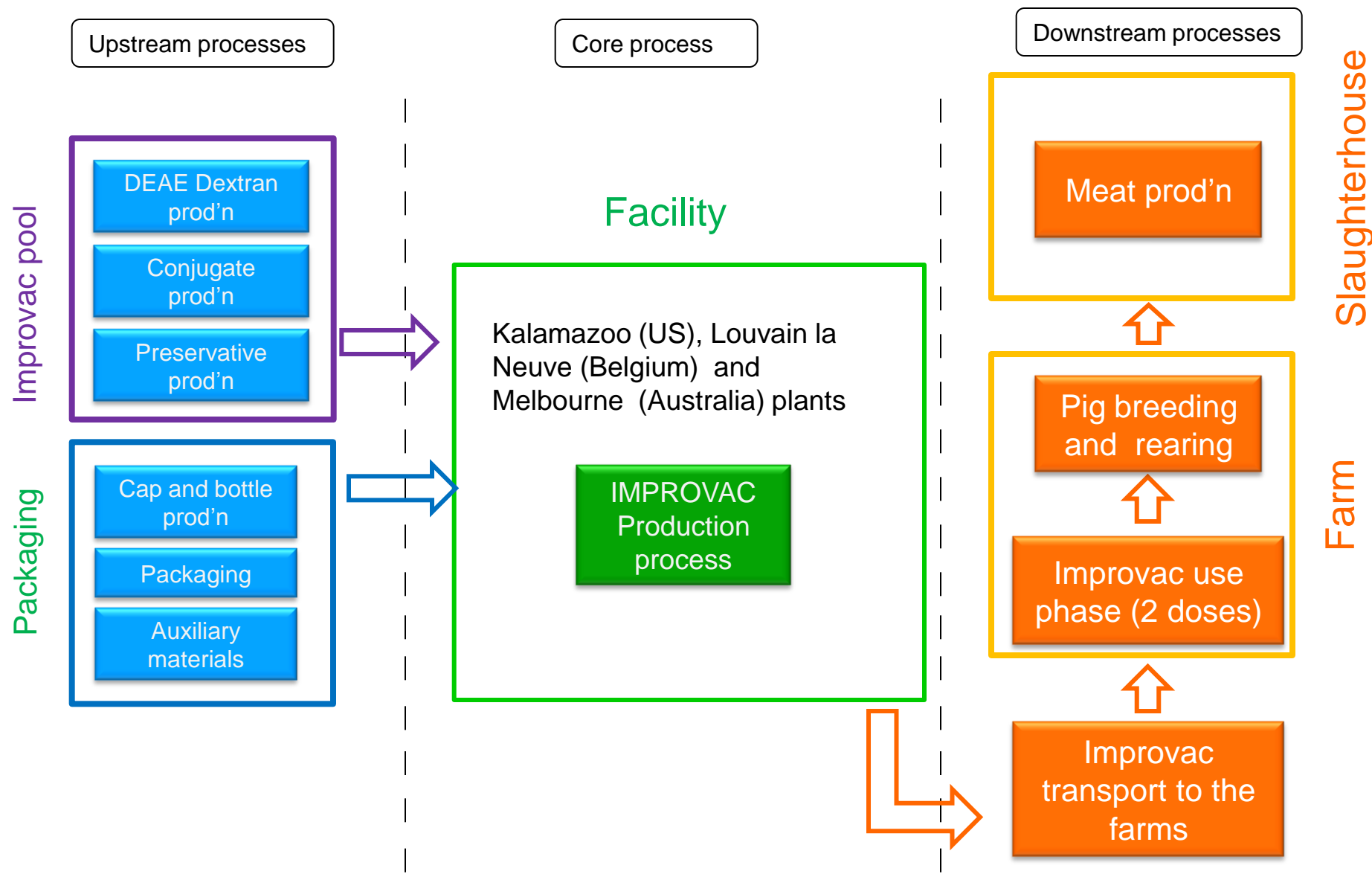
**END OF LIFE
(SLAUGHTERHOUSE)**

**It is the pig ready for slaughter (alive-weight) and the unit
mass of final product (meat)**

DOWNSTREAM

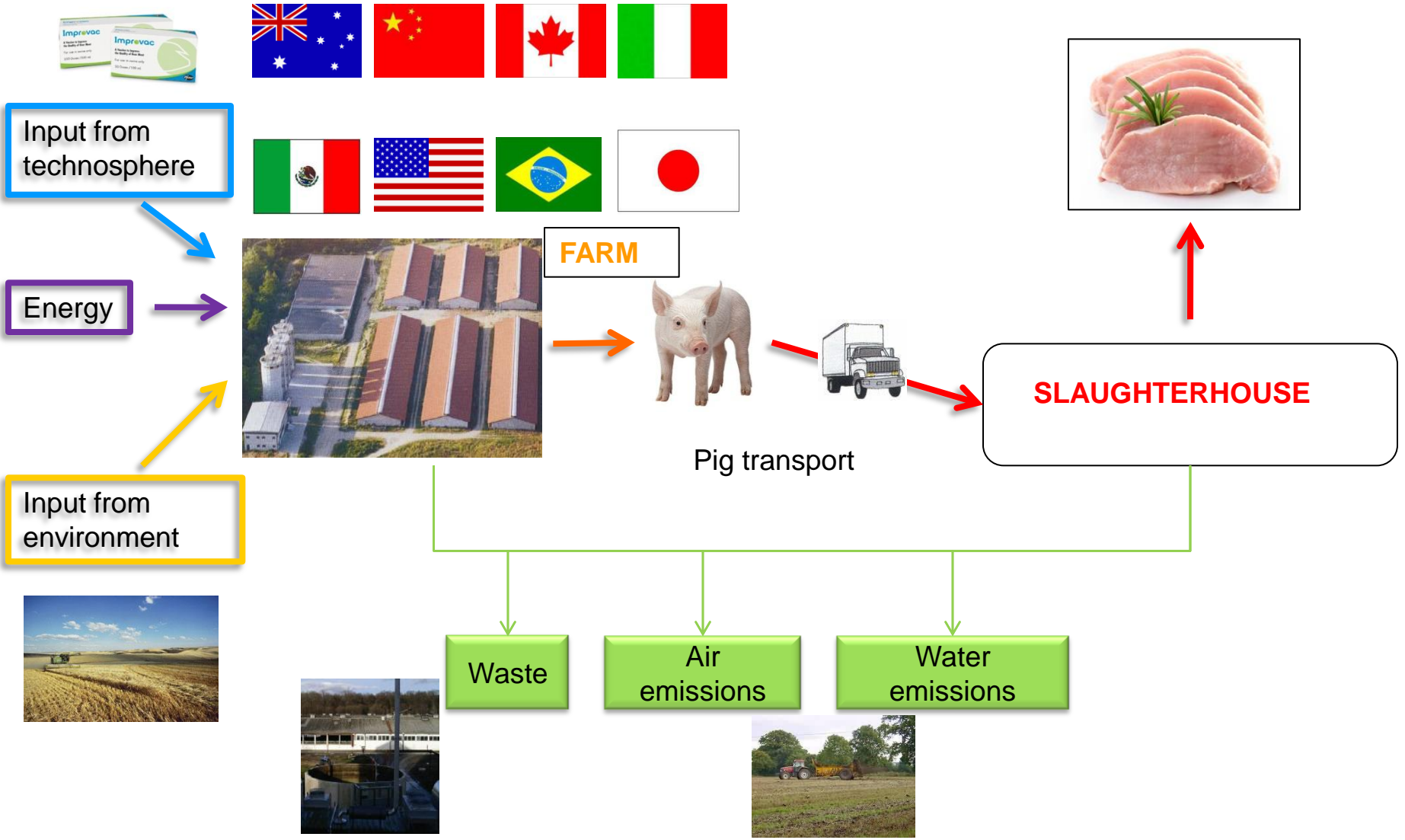


SYSTEM BOUNDARIES









SYSTEM: DOWNSTREAM PROCESS





INDEX

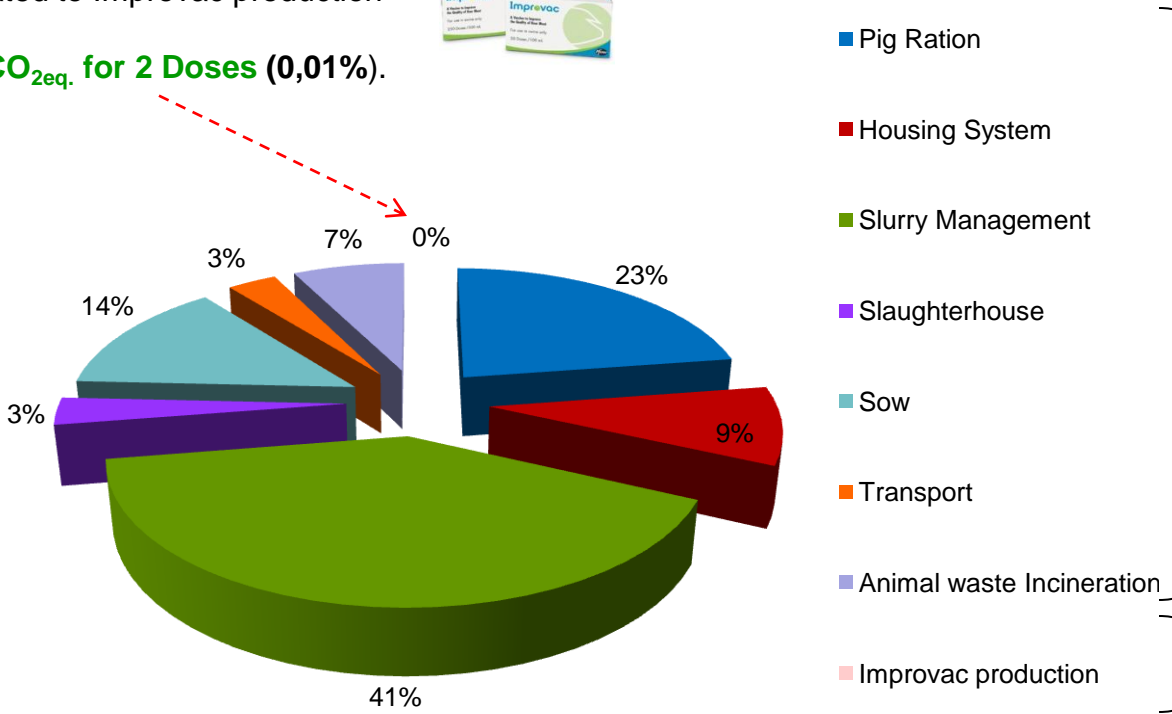
-  Goal and scope of the project
-  Method and System
-  **Results**
-  Final Remarks



LCA APPROACH: total CO₂eq. Results

GWP main contribution

GWP related to Improvac production
0,04 kgCO₂eq. for 2 Doses (0,01%).



DOWNSTREAM PROCESS

UPSTREAM AND CORE PROCESSES

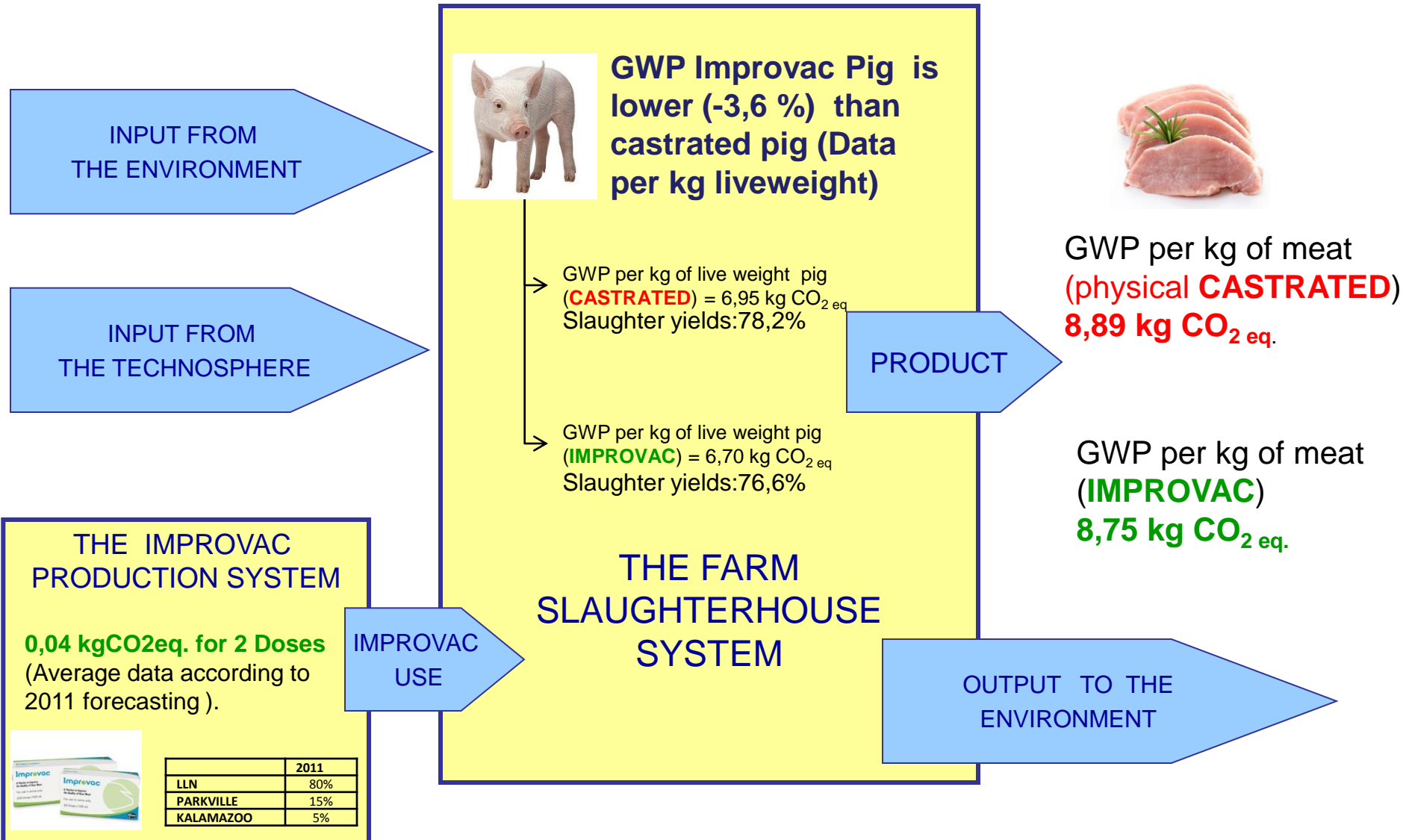
- *Transport phase includes:
- Improvac transport from facilities to farm (2 doses per pig)
 - transport of Improvac crew,
 - pig feed transport from suppliers to farm
 - pig transport to slaughterhouse.



IMPROVAC PIG
 GWP per kg of live weight =
 = **6,70 kg CO₂ eq.**



RESULTS: CARBON FOOTPRINT CO₂ eq.



INPUT FROM THE ENVIRONMENT

INPUT FROM THE TECHNOSPHERE

THE IMPROVAC PRODUCTION SYSTEM

0,04 kgCO₂eq. for 2 Doses
(Average data according to 2011 forecasting).



	2011
LLN	80%
PARKVILLE	15%
KALAMAZOO	5%

IMPROVAC USE

THE FARM SLAUGHTERHOUSE SYSTEM



GWP Improvac Pig is lower (-3,6 %) than castrated pig (Data per kg liveweight)

GWP per kg of live weight pig
(CASTRATED) = 6,95 kg CO₂ eq
Slaughter yields:78,2%

GWP per kg of live weight pig
(IMPROVAC) = 6,70 kg CO₂ eq
Slaughter yields:76,6%

PRODUCT



GWP per kg of meat
(physical CASTRATED)
8,89 kg CO₂ eq.

GWP per kg of meat
(IMPROVAC)
8,75 kg CO₂ eq.

OUTPUT TO THE ENVIRONMENT

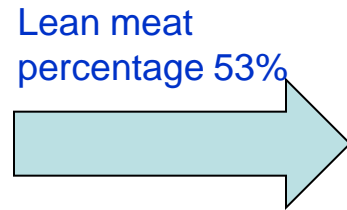


Pig carcass

Lean meat

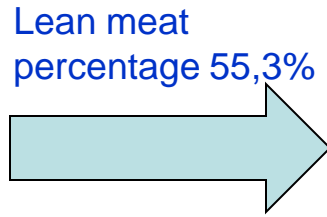


Average CO₂ eq. per kg of pig carcass (**CASTRATED**) = 8,89 kg
(Average math based on 8 LCA models for castrated pigs in the several Regions).



Average CO₂ eq. per kg of pig lean meat **CASTRATED** = 16,77 kg

Average CO₂ eq. per kg of pig carcass (**IMPROVAC**) = 8,75 kg
(Based on Castrated models with feed intake and slurry reduction of -6% - source Pfizer TRIALS).



Average CO₂ eq. per kg of pig lean meat **IMPROVAC** = 15,82 kg

Pig live weight considered for all categories: 115 kg

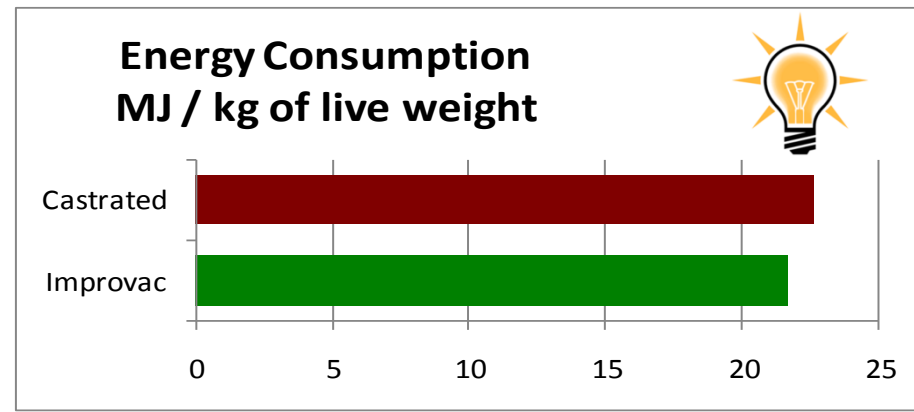
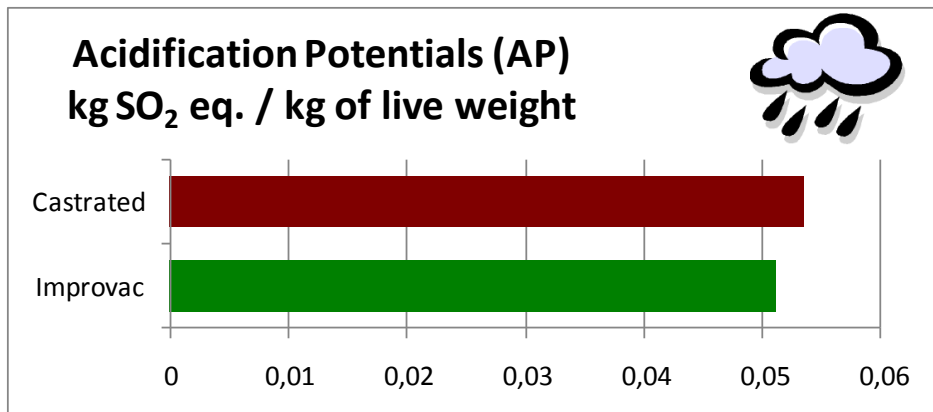
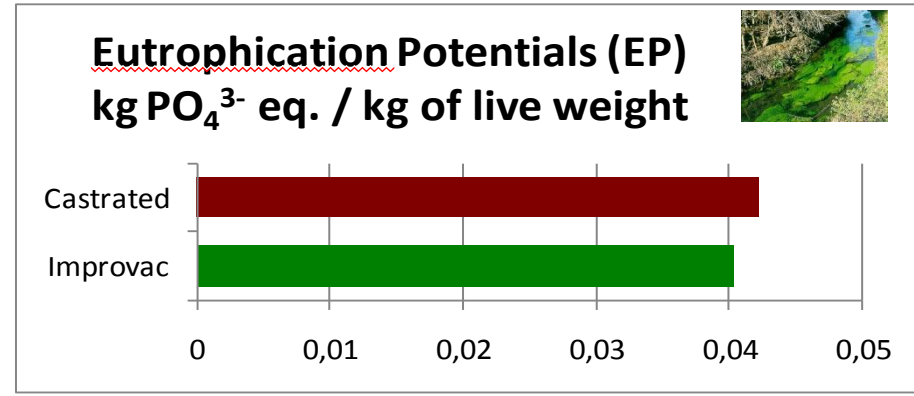
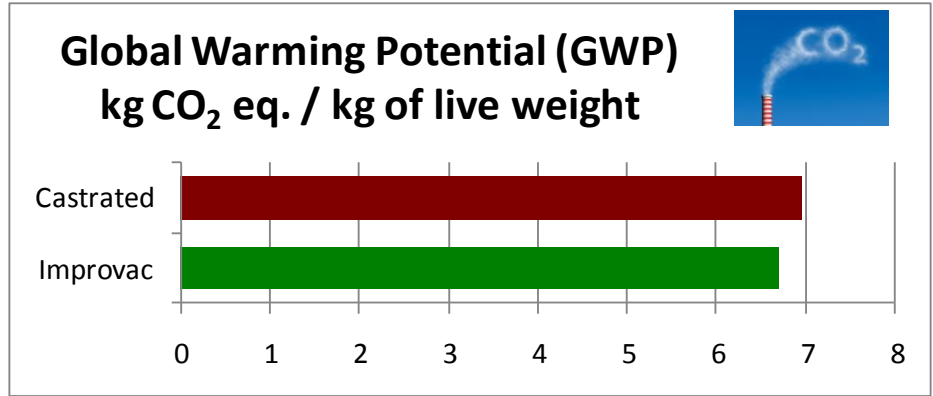
Reference Document for slaughter yields

Implications of using Improvac® for Boar Taint, Growth, Carcass Quality and Meat Quality of Finishing Male Pigs. University of Illinois at Urbana-Champaign and Pfizer Animal Health - March, 2009.







OTHER RESULTS

IMPROVAC VS CASTRATED relationship





INDEX

-  Goal and scope of the project
-  Method and System
-  Results
-  **Final Remarks**



FINAL REMARKS

The benefits of the Improvac™ technology can be identified in a reduced consumption of feed and a reduced production of slurry.

The LCA study showed **a clear environmental benefit** in terms of all the main impact indicators of the Improvac™ system vs. the baseline scenario (physical castration).

The conservatively estimated reduction in carbon footprint is near to 4% on a live weight basis, which corresponds to a reduction of about 6% on a one kg of lean meat basis. For a typical fattening pig reared to a weight of 115 kg the reduction in global warming potential is equivalent to approximately 28 kg of CO₂ eq.



THE EPD IS AVAILABLE AT WWW.ENVIRONDEC.COM

Improvac

EPD[®]
www.environdec.com

ENVIRONMENTAL PRODUCT DECLARATION for IMPROVAC^{®1}

CPC Code 35270, Vaccines for human or veterinary medicine, whether or not put up as medicaments.
Version 3 of
Pre-certification N° SP-00261
Valid until:

¹ The product is also known as VIVAM[®], INNOSURE[®] and IMPROVEST[®]

Pfizer Animal Health

Improvac

The Product

Improvac is an immunological product that can be used in pig management as an alternative to physical castration for the control of boar taint, an offensive off odor and taste caused by compounds such as *androstenone* and *skatole*² that can accumulate in the fat of entire male pigs³ following the onset of puberty. Improvac's mode of action is similar to a vaccine, and in many countries it is classified as a vaccine. In others, it is classified as an immunological product, depending on the country's regulatory criteria.

The safety and effectiveness of Improvac, including safety for human health, have been assessed by regulatory authorities, including the European Medicines Agency. The product has been approved for use and granted a zero-day withdrawal, which means that no interval is required from a safety perspective between the time the animal receives Improvac and when it may be slaughtered and enter the human food supply⁴.

² Androstenone is a "male reproductive pheromone" chemically related to testosterone. It is produced by the testes of pigs after puberty and accumulates in fat. Skatole is produced in the gut of all pigs but should disappear from the body is normally eliminated by the liver. This process is slower in pigs under the influence of male hormones, meaning that entire male pigs have a tendency to accumulate skatole.

³ An "entire male" (or castrate) pig is also called "boar".

⁴ More details about IMPROVAC are available on web site of European Medicines Agency (EMA): [http://www.ema.europa.eu/ema/index.jsp?refresh=true/medicines/veterinary/medicines/000130/vec_000130.pdf&url=medicines/000130/vec_000130.pdf](http://www.ema.europa.eu/ema/index.jsp?refresh=true/medicines/veterinary/medicines/000130/vec_000130.pdf&url=medicines/veterinary/medicines/000130/vec_000130.pdf&url=medicines/000130/vec_000130.pdf)

3



The end

Thank you very much for your attention.