BREED FOR CH4NGE
BREEDING LOW METHANE SHEEP

# Breed for CH4nge: the facts and figures

## Why methane and why the focus on ewe genetics?

- **Enteric methane contributes 50-60% of the carbon footprint (CFP) of sheep enterprises**
- **Ewes contribute approx. 66% of enteric and manure emissions, lambs approx 32%**

## What did we do?

- **19,784 measurements of individual methane, carbon dioxide and oxygen output** on **13,581 sheep of seven maternal breeds** across **40 flocks** using a PAC trailer
- **8,241 FEC** and **12,645 IgA measurements** to assess resistance to roundworms
- **Over 35,500 genotypes collected** from fully performance recorded animals including all animals measured for methane and their relatives – used to develop genomic breeding values
- **Over 87,000 records of ewe weight and body condition score collected** to improve our ability to select low methane animals that thrive in a forage based systems
- **Feed intake and feed efficiency recorded on 710 lambs fed** on grass nuts in automated feed bunkers
- **835 lambs with repeated methane measurements CT scanned and reticulo-rumen volume assessed**
- **1,146 samples of rumen fluid analysed from lambs with repeated methane measurements**

## What did we find?

- The **genetic improvement in ewe efficiency achieved over the last decade** has **reduced the methane intensity** (methane per kilogram of carcase produced) **by between 4-10% for the breeds involved in the project**
- **Selection of breeding stock based on the Breed for CH4nge index could reduce methane/kg carcase produced by 20-30% over 10 years**
- **A huge amount of variation between individual sheep in methane emissions**
  30% difference in methane output between the highest and lowest emitters within a flock
  16% of this variation in methane output is attributable to differences in genetics
- **Most efficient 25% of lambs ate over 20% less feed** (0.31kg DMI) per day but **grew at the same rate as least efficient 25% of lambs**
- **Resistance to roundworms is highly heritable** (approx. 40%) and **not genetically related to methane output**
- **A genetic relationship between lower methane (g/day) and smaller rumens**
- **Differences in the abundance of rumen micro-organisms** is **related to differences in methane production**
- **Research** carried out by **UKATC found that the majority of sheep farmers see improvements in efficiency** as a way of **reducing the impact of their flock** on the **environment**