- ICBF formally established in 2000 as a co-op of 30 cattle breeding orgs

- Based in Cork with 70 staff servicing ~100k farmers

- **Mission:** *To achieve the greatest possible genetic improvement in the national cattle herd – Dairy & Beef*

AgTech-It's in our DNA

THE ROLE OF ICBF

- Focus on genetic improvement as a tool for improving future profit on Irish beef & dairy farms

- Establish and maintain a central database of performance data

- Define a breeding goal & selection indexes (e.g. EBI & Euro-Star)

- Provide routine genetic evaluations for all breeds

- Operate a breeding scheme of optimal design (i.e. Gene Ireland)

- Ensure continuous improvement based on science

ICBF Database
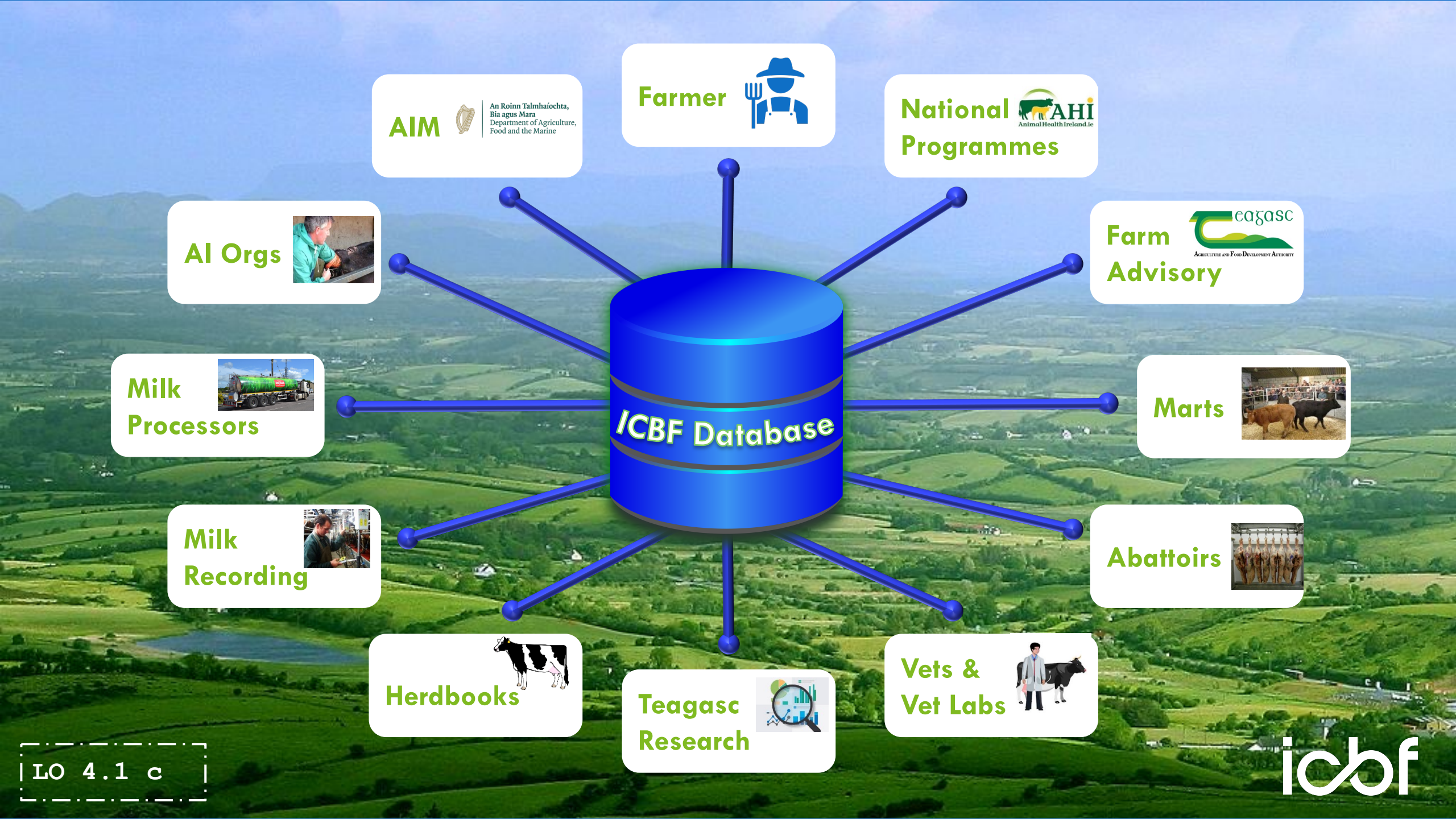
- AIM — An Roinn Talmhaíochta, Bia agus Mara, Department of Agriculture, Food and the Marine
- Farmer
- National Programmes — Animal Health Ireland.ie (AHI)
- Farm Advisory — Teagasc, Agriculture and Food Development Authority
- AI Orgs
- Marts
- Milk Processors
- Abattoirs
- Milk Recording
- Herdbooks
- Teagasc Research
- Vets & Vet Labs

LO 4.1 c

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Yearly Data Figures

102k
Herds

7.7 Million
Farm Movements

2.2 Million
Slaughter Records

2.4 Million
BVD Records

2.4 Million
Animal Births

4.8 Million
Milk Recording Records

6.5 Million
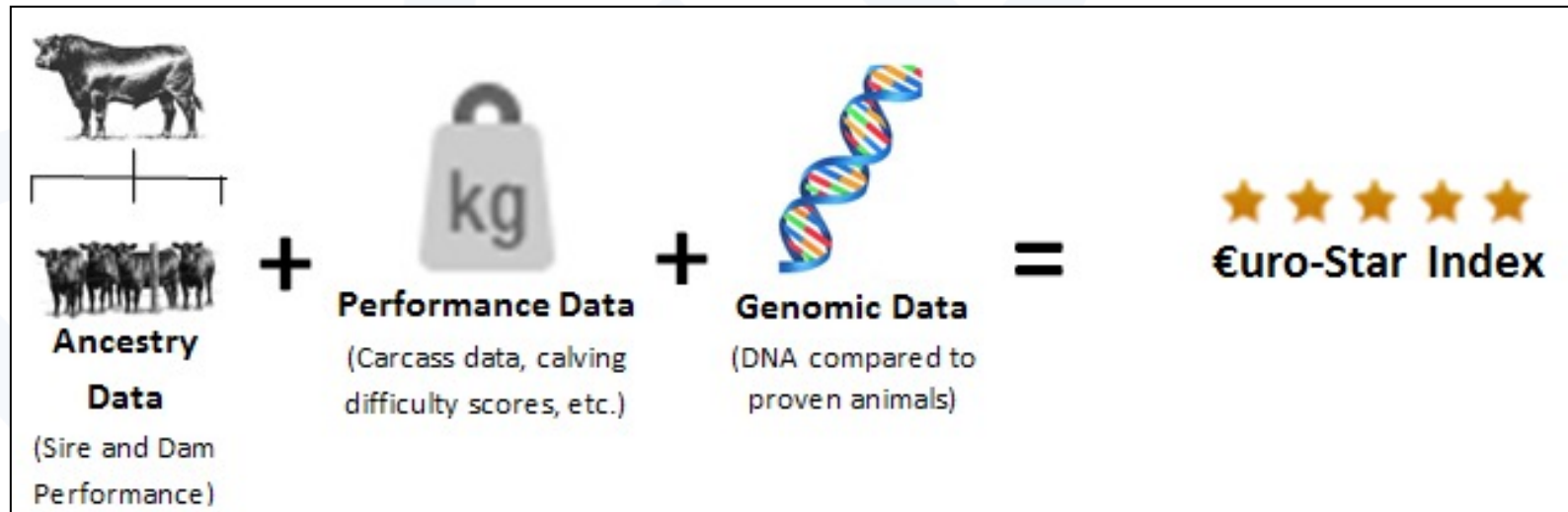Live Animals

850k
AI Records

1
Oracle Exadata Platform

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Breeding Indexes
What are they?

- A tool for selection of more profitable animals

- Estimation of an animal's genetic potential

- Based on data collected on an animal + relatives

- More data = higher reliability

Ancestry Data (Sire and Dam Performance) + Performance Data (Carcass data, calving difficulty scores, etc.) + Genomic Data (DNA compared to proven animals) = €uro-Star Index

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Breeding Indexes
Where does it start for an animal?

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Breeding Indexes
Where does it start for an animal?

Sire + **Dam** ÷ **2**

= **Parent Average**

Breeding Indexes
As the animal gets older

Performance Data

Genomic Data

Breeding Indexes
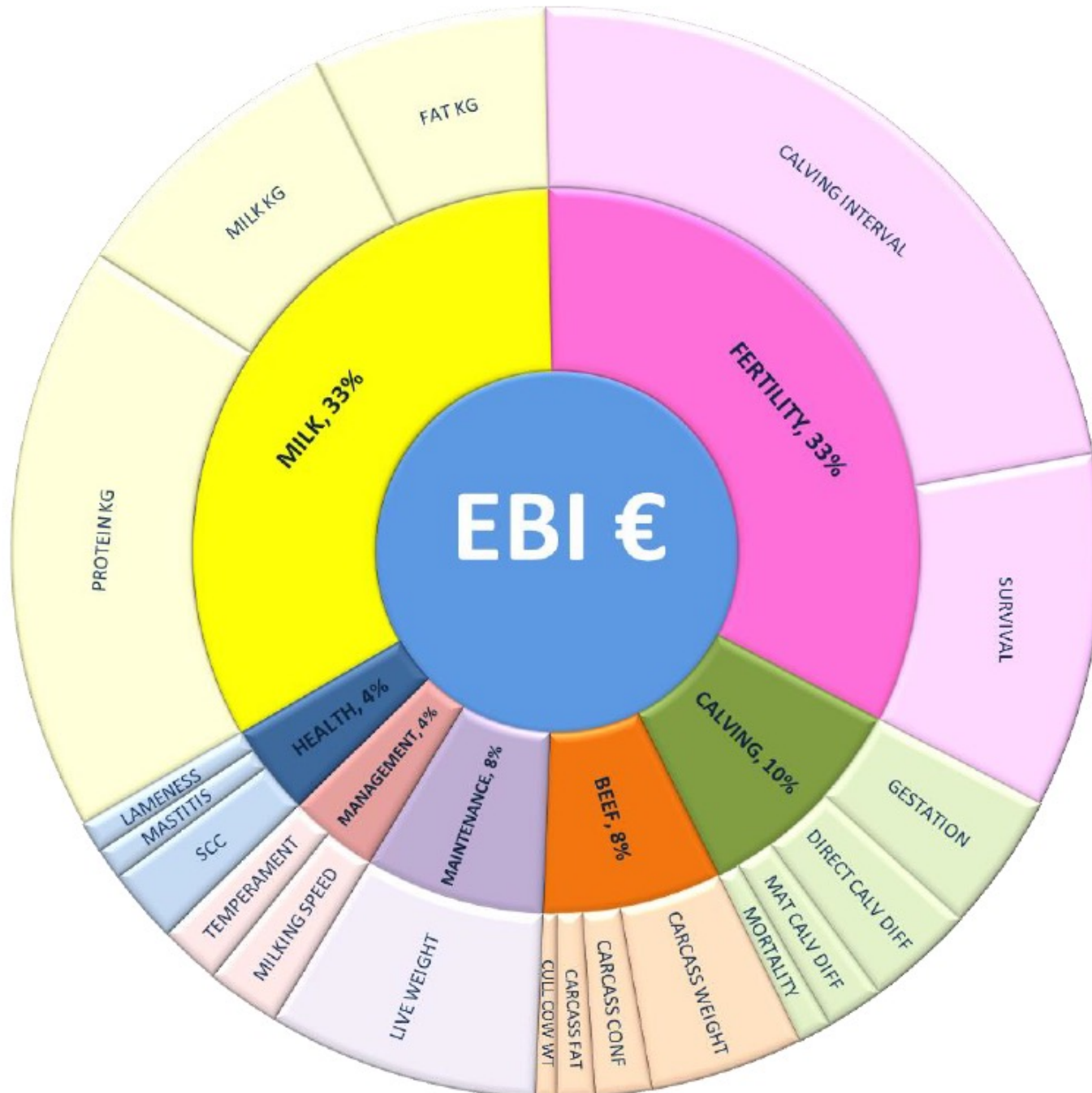## Genomics – Improved selection of breeding animals

Which ones will I keep?!?!

- Higher reliabilities on young animals → less risk
- Confirm parentage & prevent inbreeding.
- Identify genetic defects

Trait Emphasis make-up in the EBI
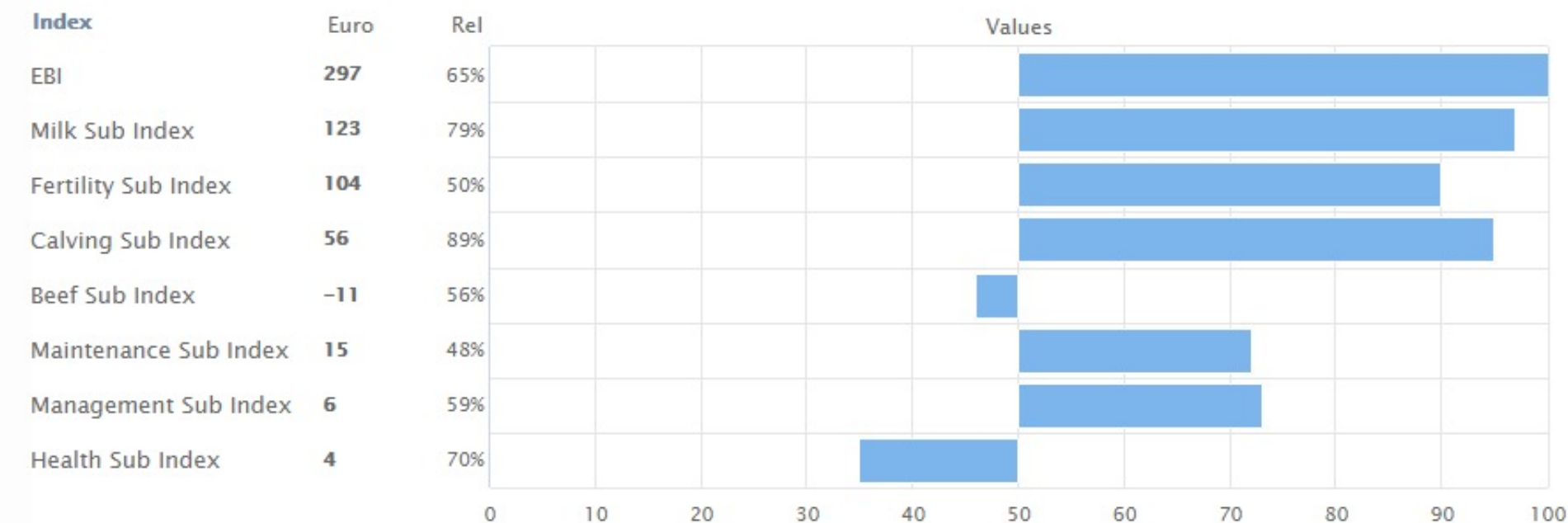
EBI
Economic Breeding Index

- Used by dairy farmers to select most profitable breeding animals (males & females)

- 19 traits with different levels of emphasis depending on importance of trait – protein kg is mush more important than cull cow weight

- Trait emphasis based on an economic farm systems model developed by Teagasc. Model looks at the economic value of each trait.

- ICBF collects data and evaluates animals. Evaluation results are then combined with Teagasc economic values to give the EBI.

- EBI designed to maximise profitability in the Irish dairy system – spring calving, grass based with milk payment based on kg of solids (fat + protein).

Animal Details

AI Code: FR4728	**Breed:** HO (81.25%), FR (15.63%), UN (3.13%)	**Pedigree Status:** PED
Animal Name: (IG) KILFEACLE PIVOTAL	**Owner:** NATIONAL CATTLE BREEDING CNTR	**Sire:** (IG) LONGVIEW RELIABLE / LWR Sire Verified (SNP)
Sex: MALE	**Date of Birth:** 23-JAN-2018	**Dam:** KILFEACLE OLIVE 1589 / IE341324521589 Dam Verified (SNP)
National ID: 372219765491921	**Date of Evaluation:** Mar 2021 (VALID UNTIL 23-MAY-21)	**MGS:** (IG) LAURAGH EVERT / LHZ
International ID: HOLIRLM219765491921		

Genotype available for animal; genomics accounts for 27% of the animal's overall index

EBI Summary | Milk | Fertility | Calving | Beef | Maintenance | Health | Conformation | TB And Liver Fluke | Pedigree | Previous Evaluation

Index	Euro	Rel	Values
EBI	297	65%	
Milk Sub Index	123	79%	
Fertility Sub Index	104	50%	
Calving Sub Index	56	89%	
Beef Sub Index	–11	56%	
Maintenance Sub Index	15	48%	
Management Sub Index	6	59%	
Health Sub Index	4	70%	

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Euro-Star Index

Euro-Star Terminal Index

Trait	Economic Weight (€ Unit)	Trait Emphasis
Calving Difficulty	-4.65	18%
Gestation	-2.25	4%
Mortality	-5.34	3%
Docility	17.03	2%
Feed Intake	-0.1	16%
Carcass Weight	3.14	41%
Carcass Conformation	14.77	11%
Carcass Fat	-7.86	5%

Euro-Star Replacement Index

Trait	Trait Emphasis	Trait Type
Maternal Calving Difficulty	6%	
Age 1st Calving	6%	
Calving Interval	9%	
Survival	8%	**Cow Traits 71%**
Milk	18%	
Cow Liveweight	14%	
Cow Docility	4%	
Cull Cow Weight	7%	
Calving Difficulty	7%	
Gestation	2%	
Mortality	1%	
Docility	1%	**Calf Traits 29%**
Feed Intake	4%	
Carcass Weight	10%	
Carcass Conformation	3%	
Carcass Fat	1%	

- Used by suckler beef farmers to select most profitable breeding animals (males & females)

- 2 indexes:
  - *Terminal Index (9 traits)* – to select animals for slaughter
  - *Replacement Index (17 traits)* – to select females suitable as future suckler cow.

- Trait emphasis based on an economic farm systems model developed by Teagasc. Model looks at the economic value of each trait.

- ICBF collects data and evaluates animals. Evaluation results are then combined with Teagasc economic values to give the Euro-Star Index.

- Star rating system ranks animals – 1-star = bottom 20%, 5-star = top 20%

DBI
Dairy Beef Index

Pie chart — Dairy Beef Index trait breakdown:
- Polledness, 3%
- Carcass conformation, 6%
- Carcass fat, 1%
- Carcass weight, 17%
- Docility, 1%
- Feed intake, 5%
- Calf mortality, 1%
- Carcass bonus, 3%
- Gestation length, 10%
- Calving difficulty (heifer/cows), 53%
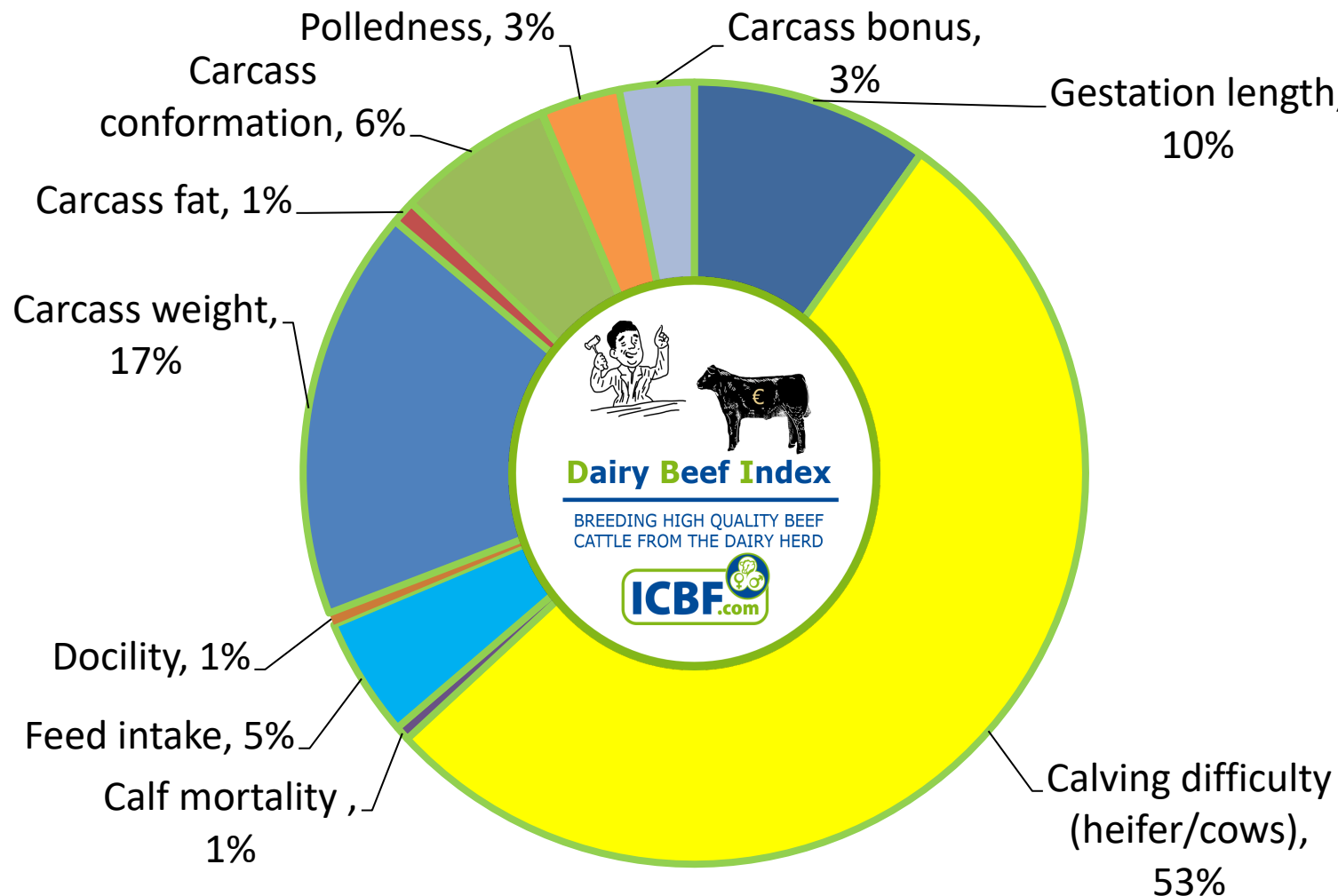
- Used by dairy farmers to select beef bulls for use on dairy cows.

- Calving difficulty and gestation have very high emphasis – most important factors for dairy farmers when selecting beef sires.

- Carcass traits also important – significant decline in carcass merit of calves from dairy herd over the past decade.

- DBI looks to improve quality of calves (carcass traits) without compromising on calving (calving difficulty and gestation).

Animal Details

AI Code: SA4604	**Breed:** SA (100%)	**Pedigree Status:** PNP
Animal Name: KNOTTOWN ROY	**Owner:** NATIONAL CATTLE BREEDING CNTR	**Sire:** BEGUIN / SA4059 ^{Sire Verified (SNP)}
Sex: MALE	**Date of Birth:** 15-AUG-2016	**Dam:** KNOTTOWN KATE / IE371214631058 ^{Dam Verified (SNP)}
National ID: IE371214651745	**Date of Evaluation:** Mar 2021 (VALID UNTIL 23-MAY-21)	**MGS:** BURON (FR 07) / FR1526337733
International ID: SALIRLM371214651745		

> Genotype available for animal, genotype included in evaluation

Replacement/Terminal ⬤ Dairy Beef

€uro-star Index	Replacement Graphics	Terminal Graphics	Calving	Linear Type	TB And Liver Fluke	Pedigree	Evaluation History	Index Comparison

| Star Rating (within Salers breed)	Economic Indexes	Purpose	€uro value	Index reliability	Star Rating (across all beef breeds)
★★★★★	Replacement (per daughter lactation)	To breed future cows for the suckler herd	€243	62% (High)	★★★★★
★★★★★	Terminal	To breed beef animals from the suckler herd that are destined for slaughter	€112	83% (V High)	★★★★☆
★★★★★	Dairy Beef	To breed beef animals from the dairy herd that are destined for slaughter	€125	80% (V High)	★★★★★
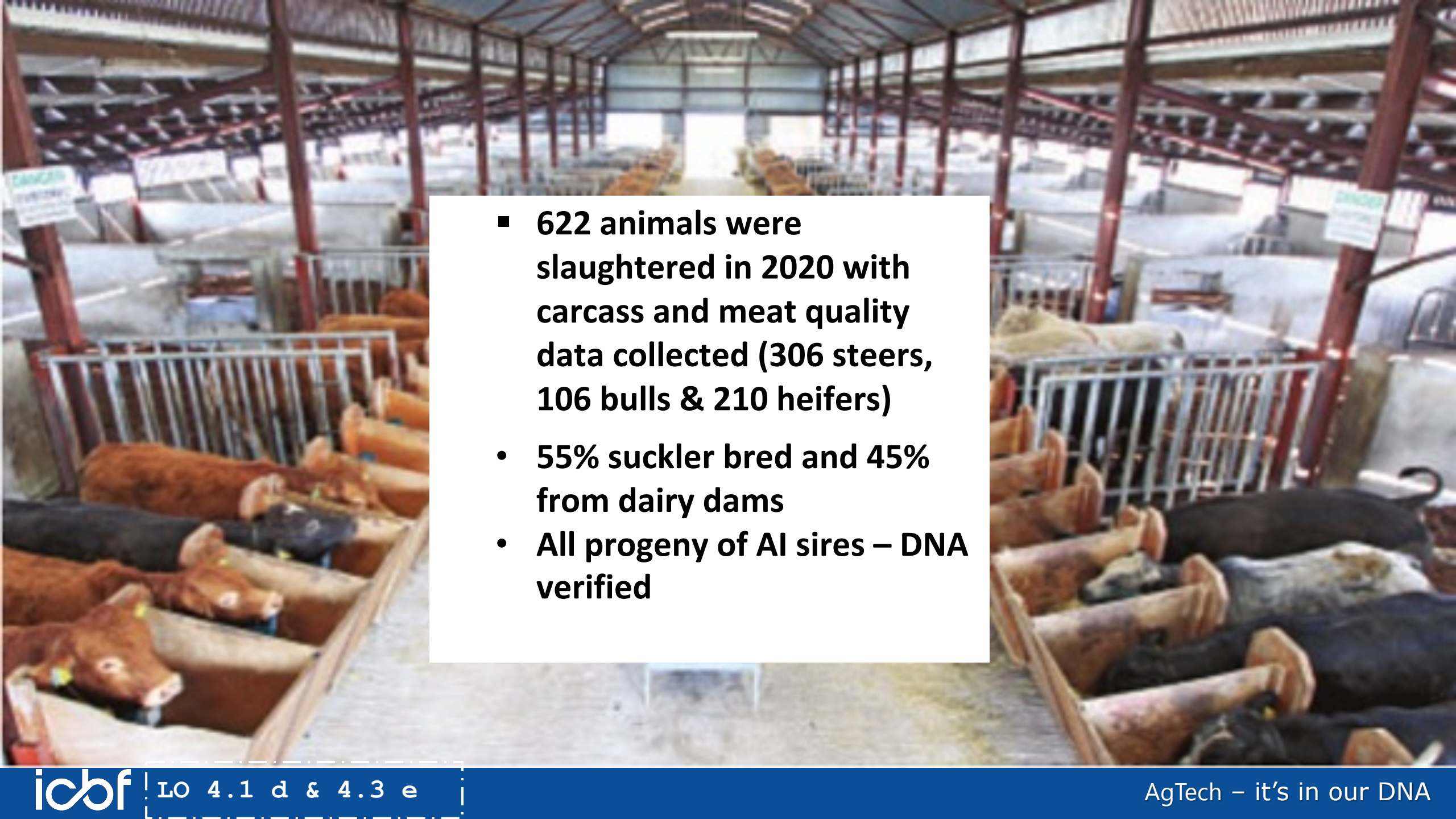
- **622 animals were slaughtered in 2020 with carcass and meat quality data collected (306 steers, 106 bulls & 210 heifers)**

- **55% suckler bred and 45% from dairy dams**
- **All progeny of AI sires – DNA verified**

Insentec – collecting feed data

AgTech – it's in our DNA

Measurements obtained in abattoir

- <u>Meat quality</u>
- Carcass wt, fat and conformation
- Primal yields
  - British spec
  - 19 different cuts
- pH
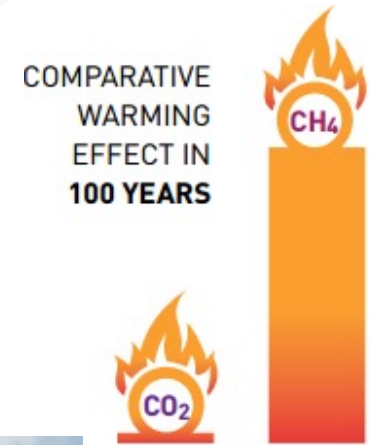 - Hourly and ultimate

Measurements obtained in abattoir

- <u>Meat eating quality</u>
- Colour of loin
- Visual marbling of the loin
- Composition analysis
  - Intramuscular fat %, protein % & moisture %
- Cook loss and shear force
- Sensory analysis

The Methane challenge!

- Methane accounts for the majority of GHG from agriculture ~ 60%.

- Methane – potent Greenhouse Gas – 28 times more potent than carbon dioxide.

- Sources:
  - Enteric fermentation (feed digestion) - 56.2%
  - Stored slurries & manures - 9.6%

- Reducing methane will be key to meeting
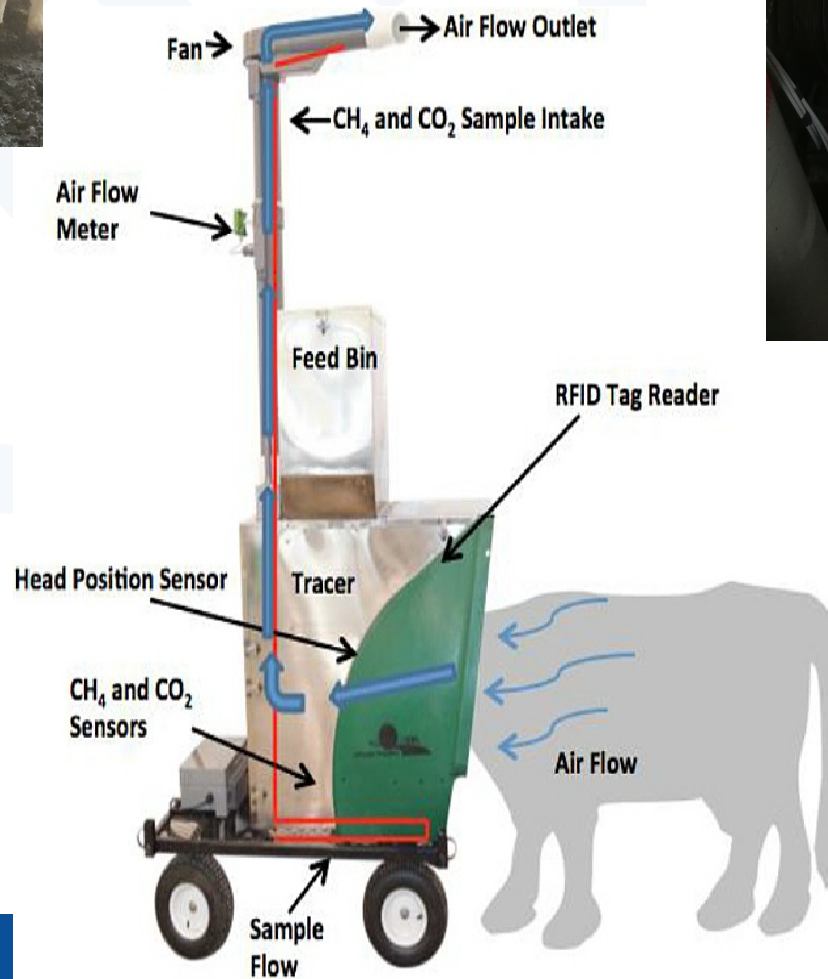
- our EU targets on climate change.

COMPARATIVE WARMING EFFECT IN 100 YEARS

Measuring methane emissions

Gate to allow single animal access

Calibrating machine

Feed drop

Fan → → Air Flow Outlet

← CH_4 and CO_2 Sample Intake

Air Flow Meter

Feed Bin

RFID Tag Reader

Head Position Sensor

Tracer

CH_4 and CO_2 Sensors

Air Flow

Sample Flow

#WeBreedInnovation

Thank you for listening

Our Farmer & Government Representation

Our AI & Milk Recording Organisations

Our Herdbooks
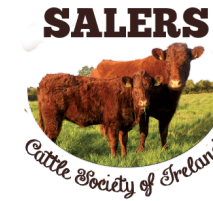
Acknowledging Our Members