



# Unlocking Genetic Potential: The National Genotyping Programme

**Mark Waters**

**13<sup>th</sup> May 2024**



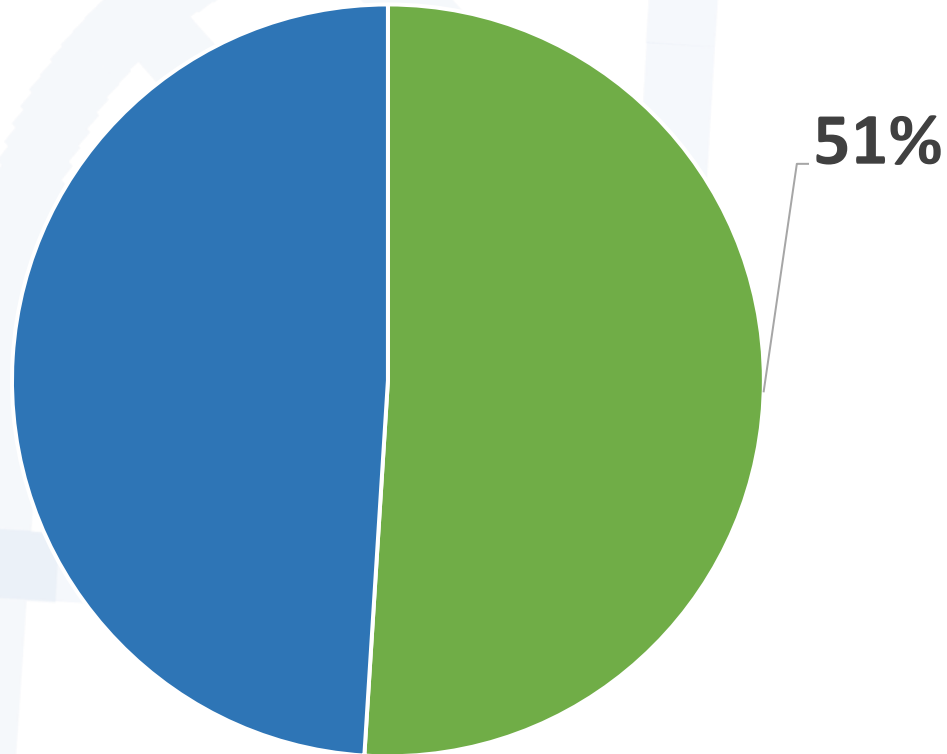
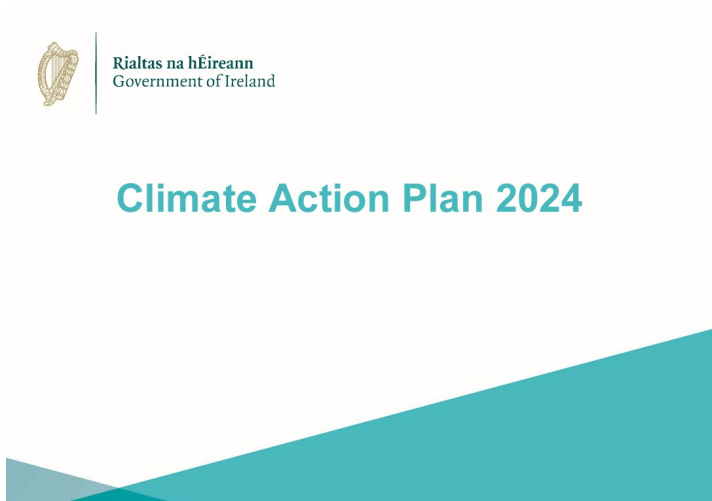
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Bia agus Mara  
Department of Agriculture,  
Food and the Marine



AgTech - it's in our DNA

# Why Genotype the National Herd?

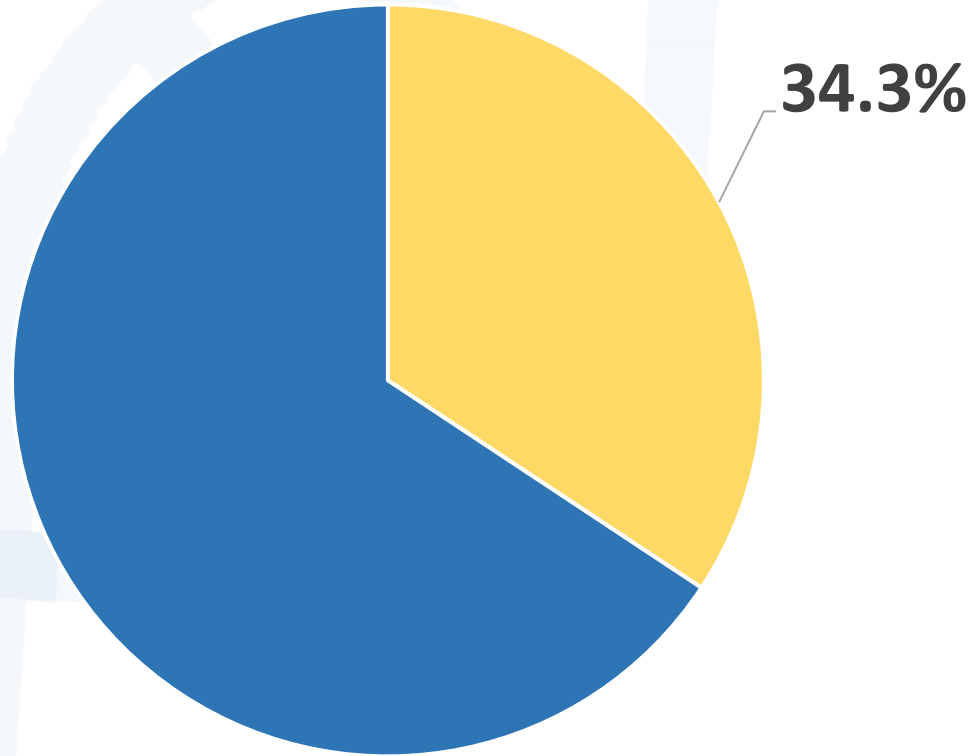
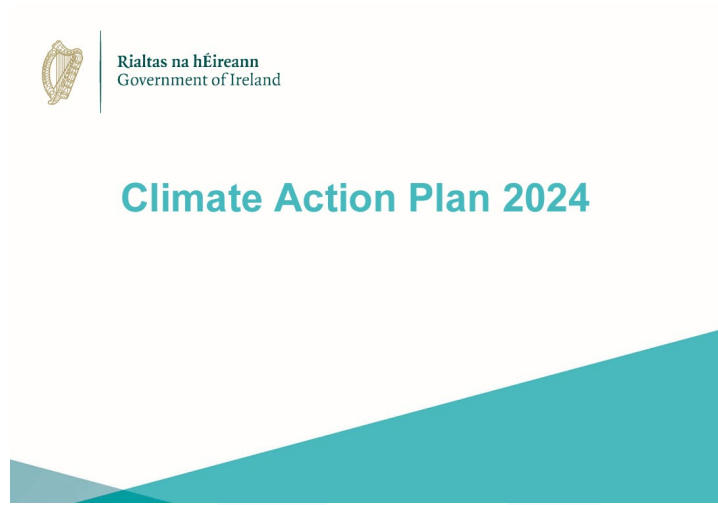
## Ireland's Total GHG Emissions



■ Targeted Emissions Reduction

# Why Genotype the National Herd?

## Ireland's Total GHG Emissions

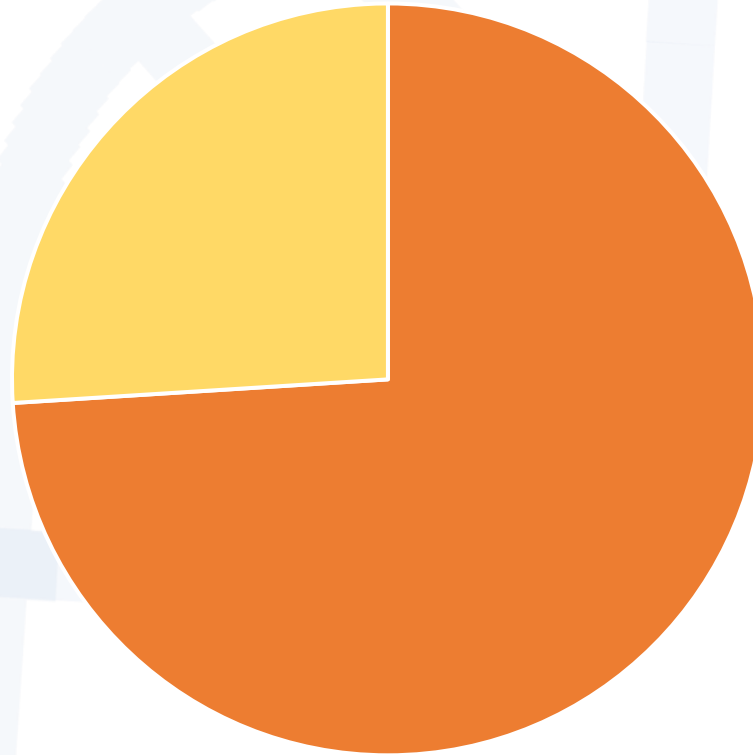


■ Agricultural Emissions



# Why Genotype the National Herd?

## Ireland's Agricultural GHG Emissions



74%

■ Livestock Emissions



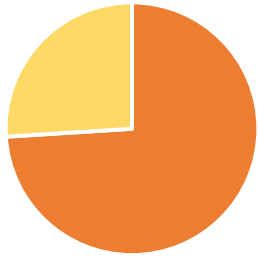
Rialtas na hÉireann  
Government of Ireland

Climate Action Plan 2024



# Why Genotype the National Herd?

Ireland's Agricultural GHG  
Emissions **74%**



■ Livestock Emissions



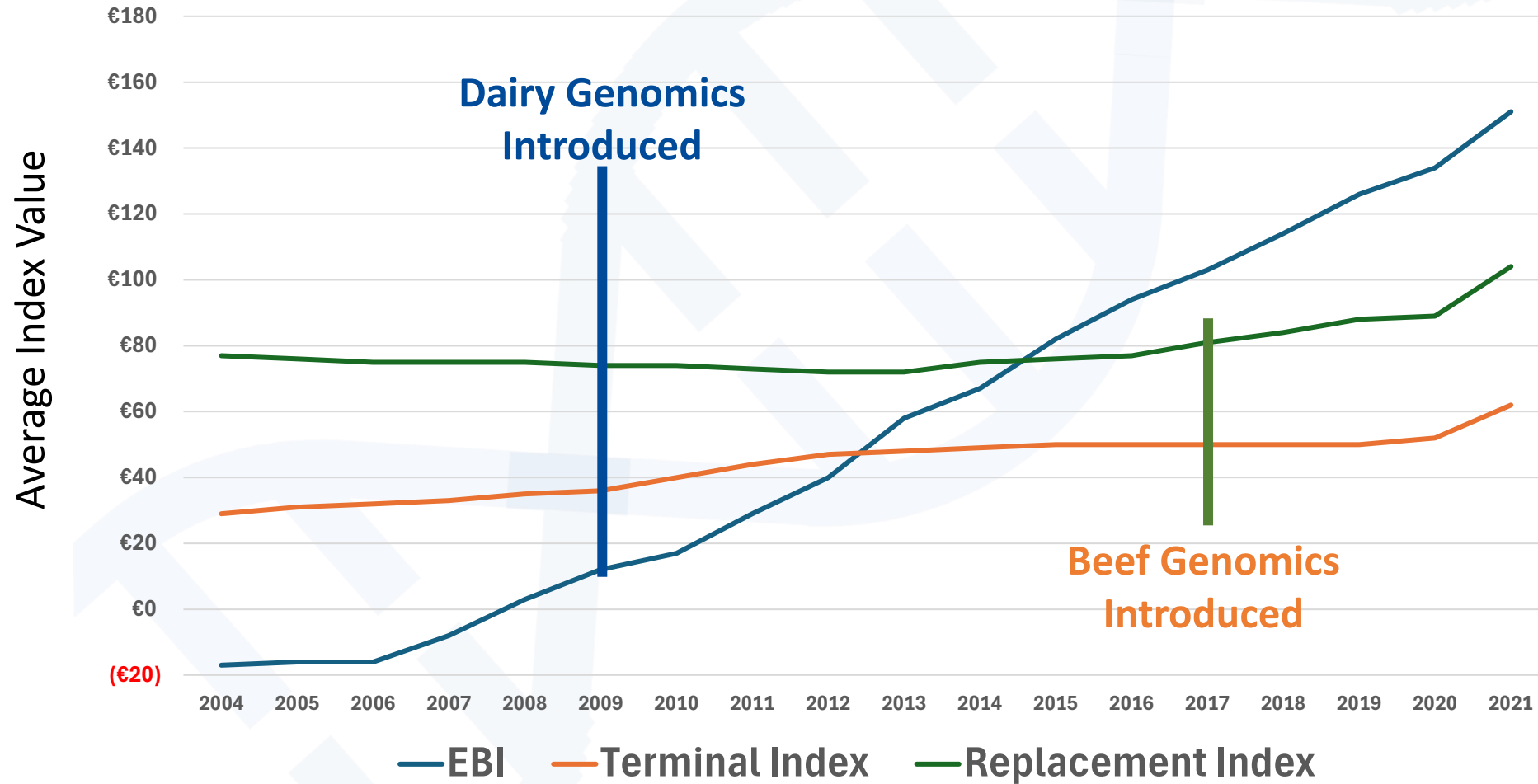
**Marginal Abatement  
Cost Curve 2023**  
Executive Summary



## Breeding = Win Win!

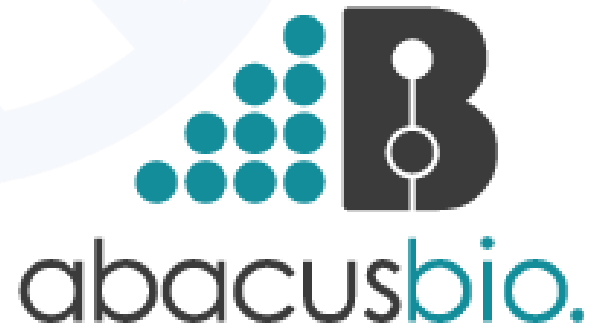
# The Effect of Genomics on Genetic Gain

Average EBI and Beef Euro-Star Indexes Over Time



# Rewards of Genotyping

400%!



# Where Are We Starting From?





# Level of Genotyping Up to 2023

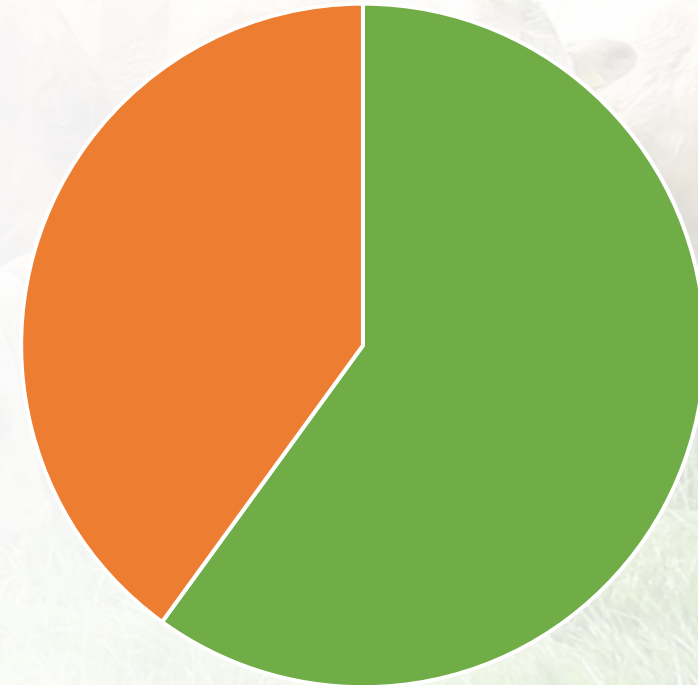
Percentage of National Suckler Herd Genotyped

2023

60%

>3 Million Genotypes  
Total

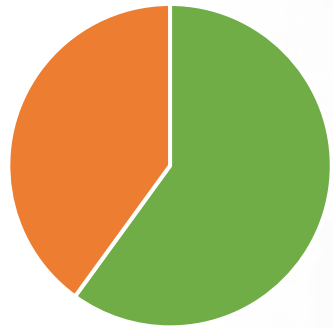
350-400K New  
Genotypes/Year  
from Government Schemes  
(BDGP and SCEP)



■ Genotyped

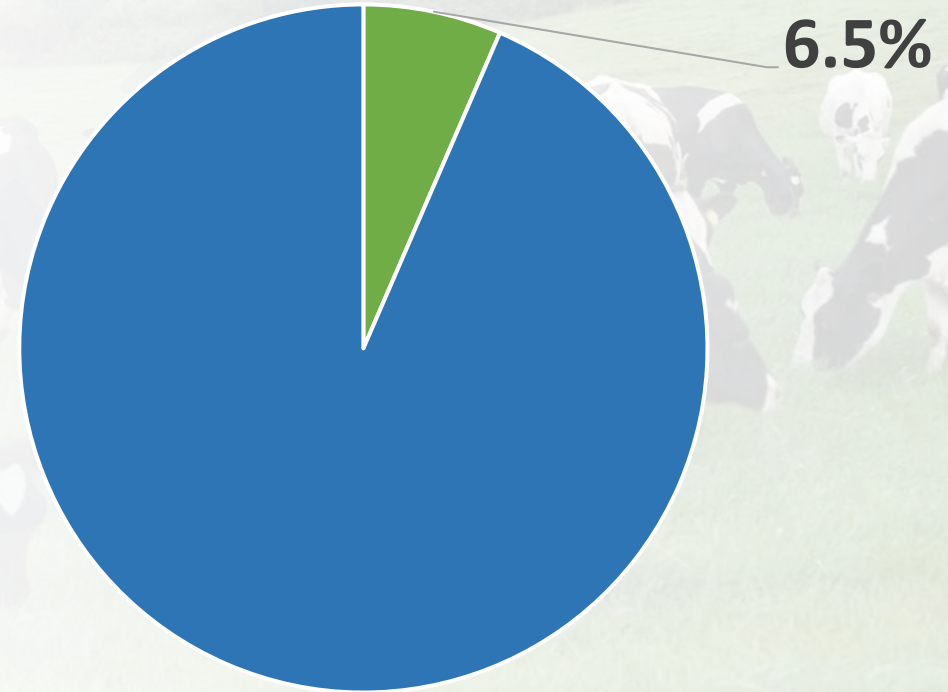
# Level of Genotyping Up to 2023

Percentage of National Suckler Herd  
Genotyped 2023 **60%**



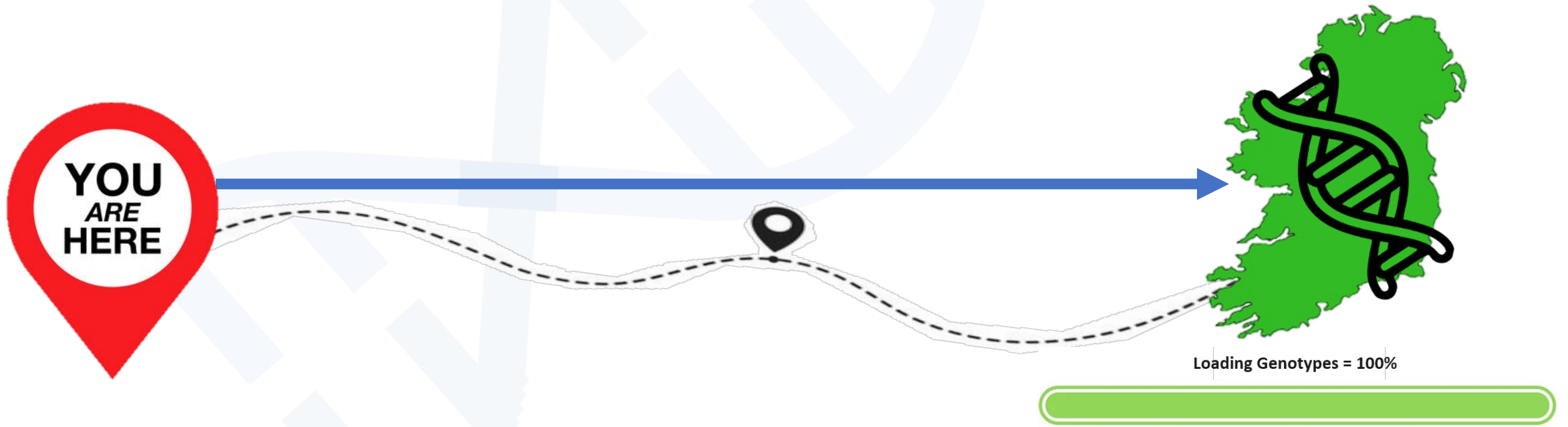
■ Genotyped

Percentage of National Dairy Herd  
Genotyped 2023



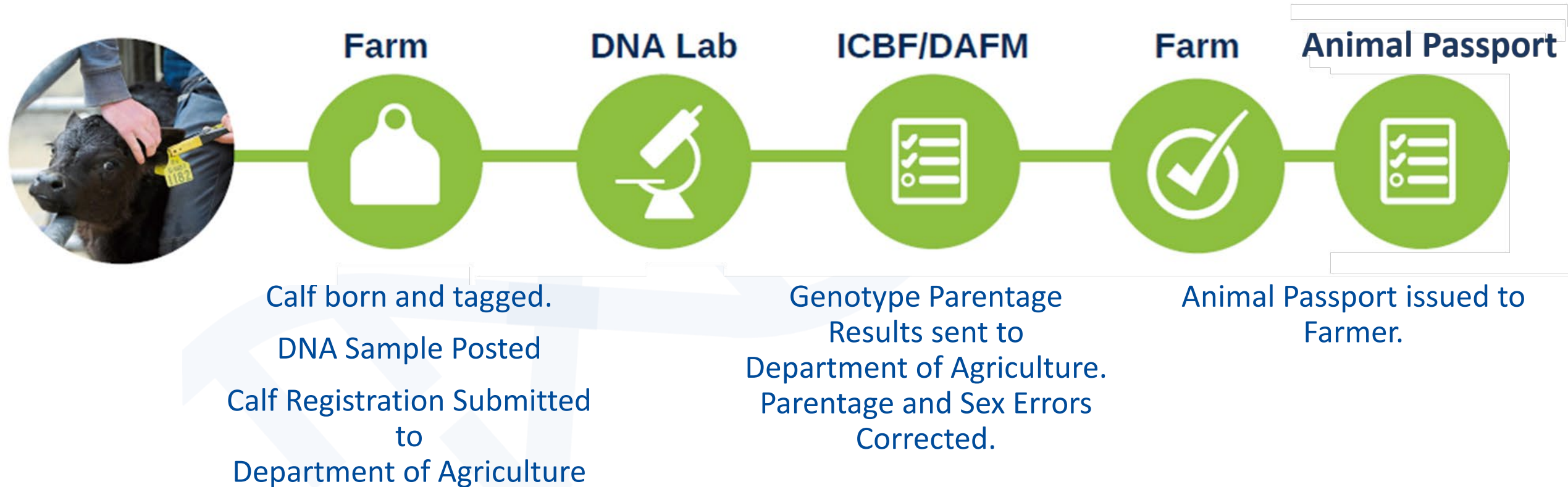
■ Genotyped

# How Do We Get to Fully Genotyped?

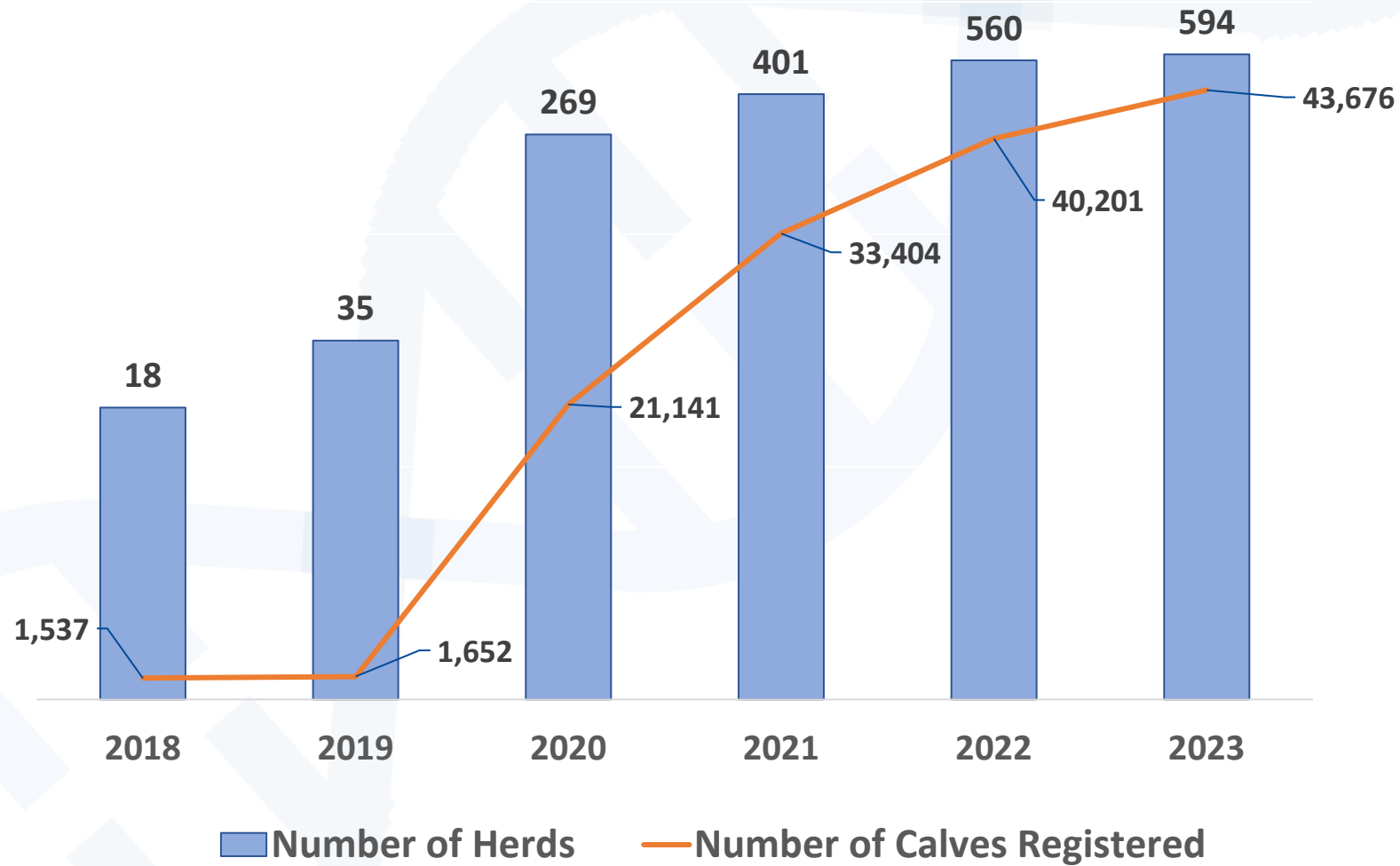


# DNA Calf Registration System

## *Typical DNA Registration Timeline*

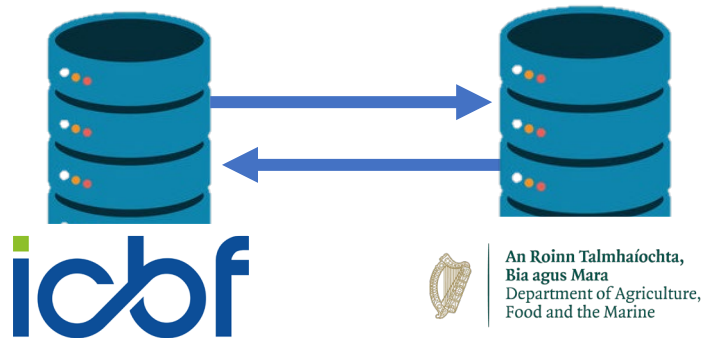


# DNA Calf Registration Pilots





# DNA Calf Registration Pilots



Data Integration  
and Transfer



Reduced  
Turnaround Times



“Double Tissue”  
Calf Tags

# National Genotyping Programme (NGP)



**icbf**



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Department of Agriculture,  
Food and the Marine

## National Genotyping Programme

# National Genotyping Programme (NGP)



Launched June 2023

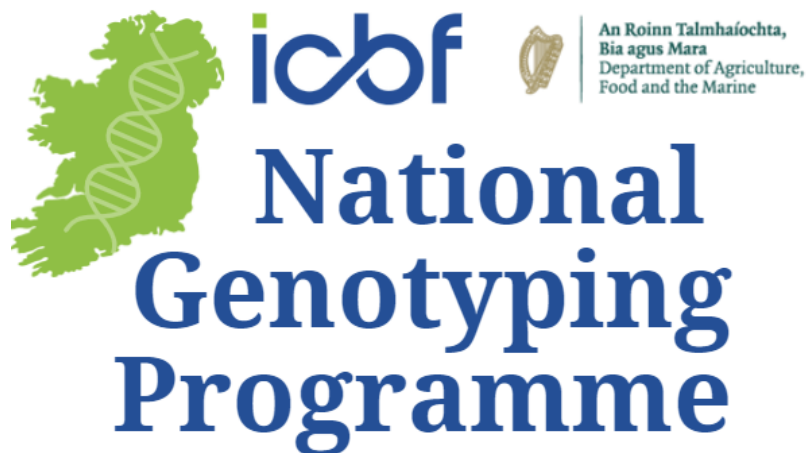


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# NGP Phase 1 - 2023



Apply today!



# NGP Phase 1 - 2023



RTE

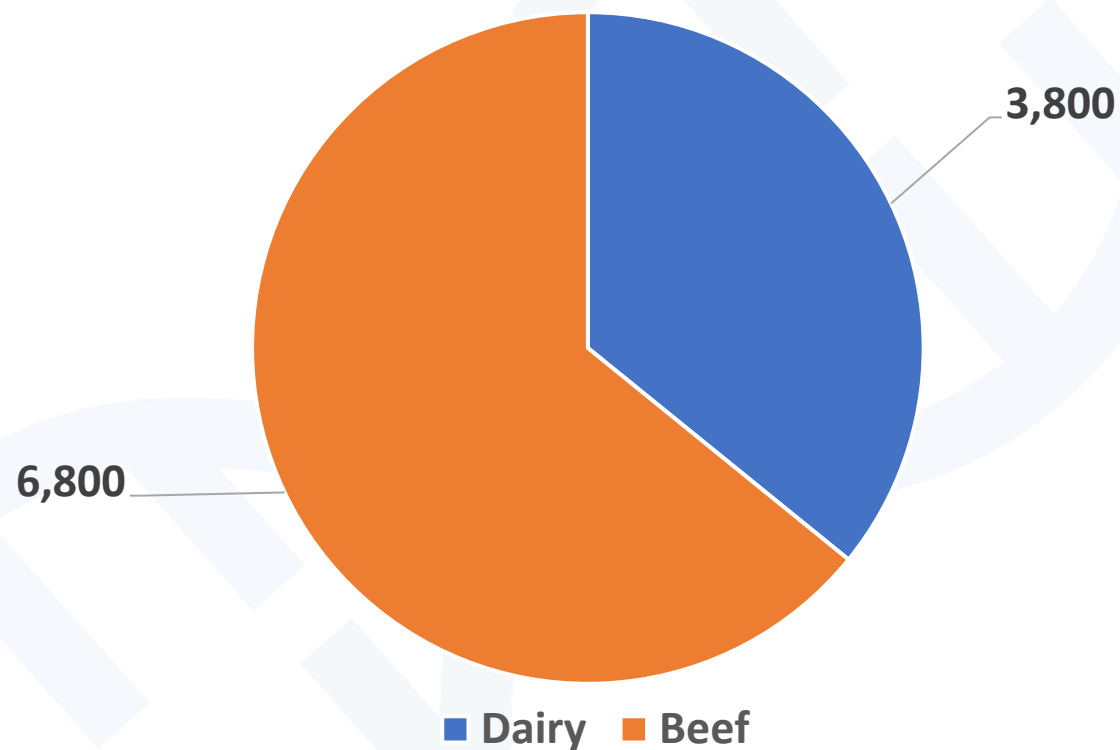


Microsoft Teams



# NGP Phase 1 - 2023

Total Herds in NGP



10,600 Herds Total





# NGP Phase 1 – 2023

NGP Phase 1 Genotypes Reported by Week

780,000  
Samples Total!

Fully Funded by  
Department of Agriculture



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Department of Agriculture,  
Food and the Marine

Week 40 Week 41 Week 42 Week 43 Week 44 Week 45 Week 46 Week 47 Week 48 Week 49 Week 50 Week 51 Week 52

# Level of Genotyping After NGP Phase 1

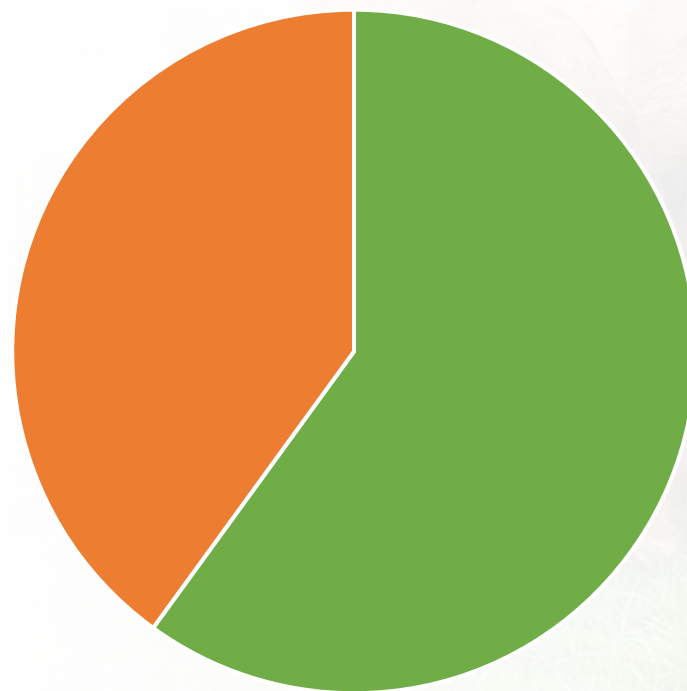
620K Genomic Evals  
Published at once – Jan  
2024

>4 Million  
Genotypes  
Total

Dairy Genomic Evaluation Report								
Jumbo/DOB	16-Jul-2023				Breed	HO (100%)		
Tag/Sex	37221444041389 M				Sire	372222281262260 (€49) <small>Sire Verified (SNP)</small>		
Name					Dam	372214444061119 (-€2) <small>Dam Verified (SNP)</small>		
Date of Evaluation	11-Aug-2023 (Evaluation valid until 26-Sep-2023)				MGS	IE371131831160 (-€23)		
Index	Official Genomic Evaluation (*)	Reliability	Weighting on Genomics	DNA Value	Parent Average Evaluation	Reliability	Diff. from Parent Avg	Increase in Reliability
EBI €	26	49%	29%	164	24	30%	+2	19%
Milk Sub Index €	33	67%	60%	26	32	36%	+1	31%
Fertility Sub Index €	17	38%	15%	89	21	23%	-4	15%
Carbon Sub Index €	-14	43%			-15	12%	+1	31%
Calving Sub Index €	-5	41%	7%	1	6	26%	-11	15%
Beef Sub Index €	-3	27%	0%	53	-22	29%	+19	-2%
Maintenance Sub Index €	-2	37%	0%	0	2	22%	-4	15%
Management Sub Index	-4	54%	0%	0	-3	29%	-1	25%
Health Sub Index	3	63%	48%	-3	-2	33%	+5	30%
Milk Sub Index								
Milk (Kg)	362	67%	60%	378	279	36%	+83	31%

# Level of Genotyping After NGP Phase 1

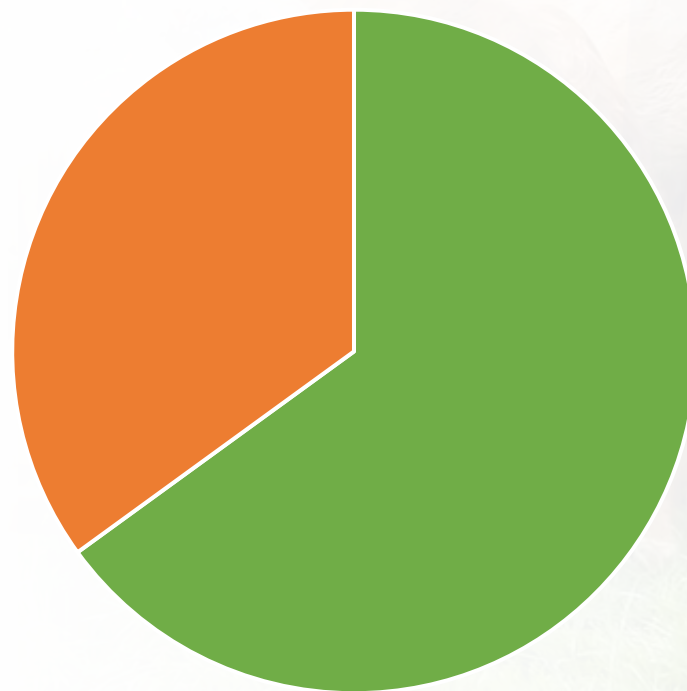
Percentage of National Suckler Herd Genotyped  
2023



■ Genotyped

# Level of Genotyping **After NGP Phase 1**

Percentage of National Suckler Herd Genotyped  
After NGP Phase 1

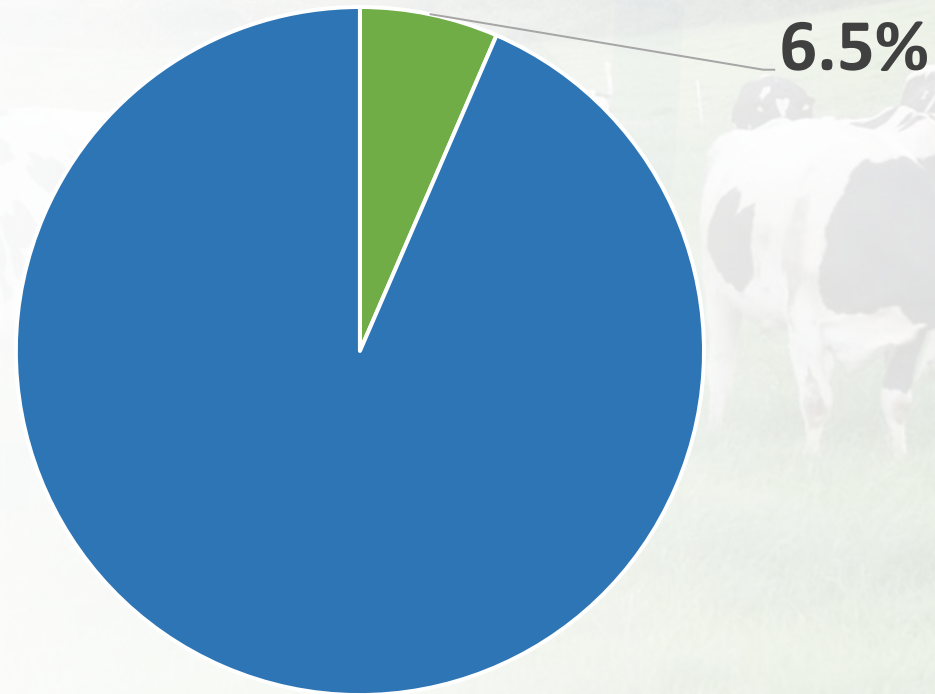


■ Genotyped



# Level of Genotyping After NGP Phase 1

Percentage of National Dairy Herd  
Genotyped 2023

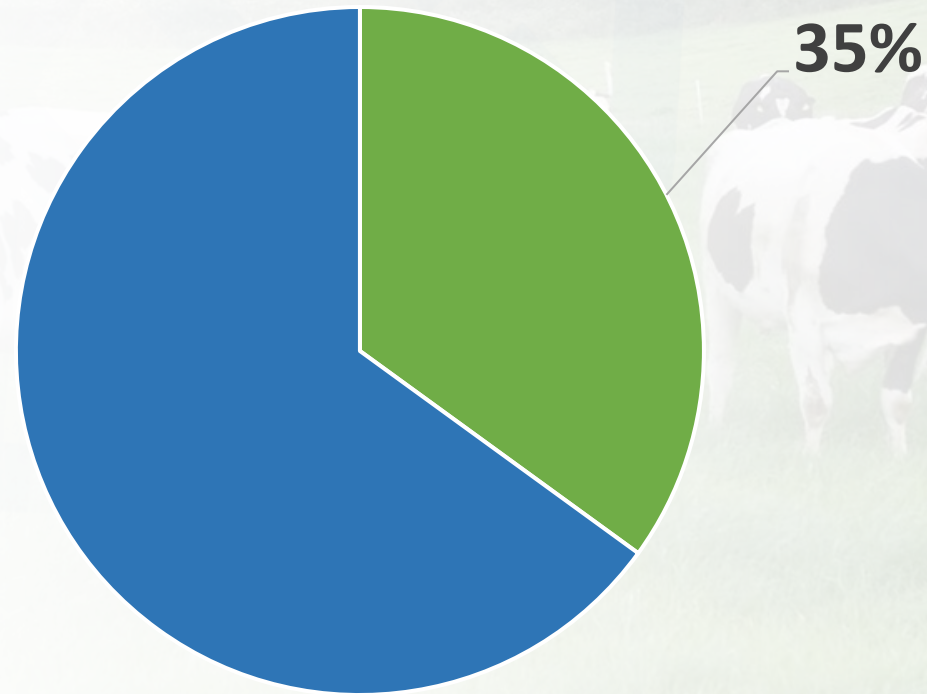


■ Genotyped



# Level of Genotyping After NGP Phase 1

Percentage of National Dairy Herd  
Genotyped After NGP Phase 1



■ Genotyped

# Lab Infrastructure



WEATHERBYS  
SCIENTIFIC



eurofins



**ThermoFisher**  
SCIENTIFIC

Axiom Propel Express  
384HT Workflow



ICBF Custom, IDB  
version 5  
SNP Chip

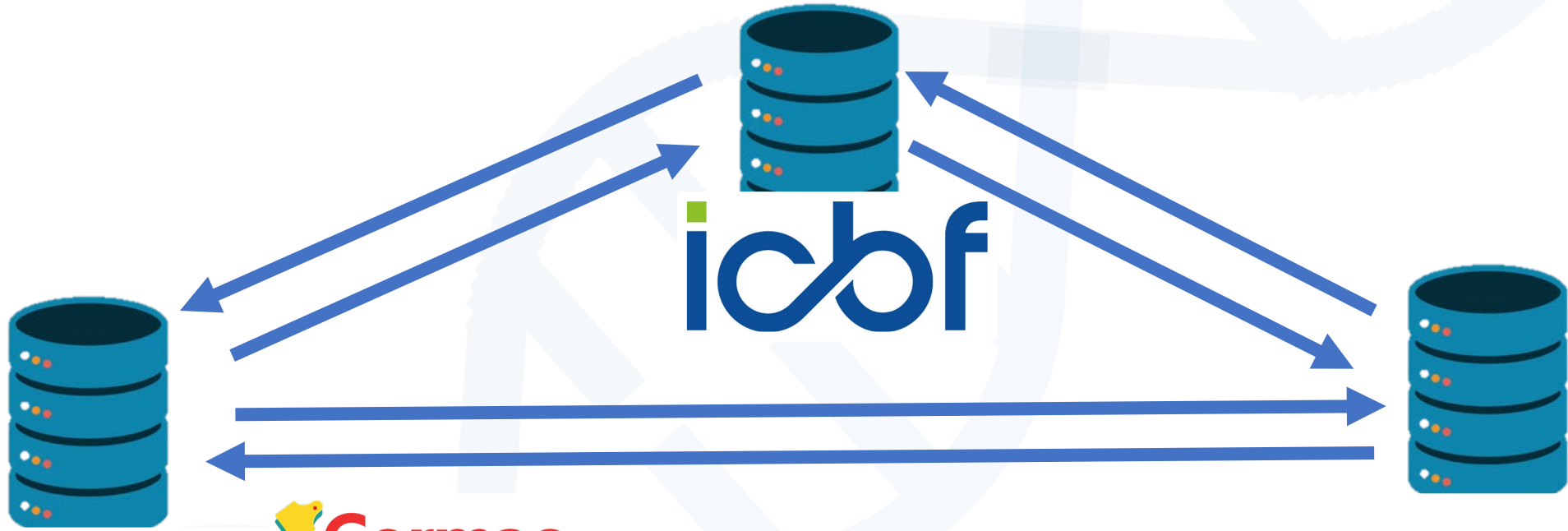




# NGP Phase 2 – 2024 - 2027



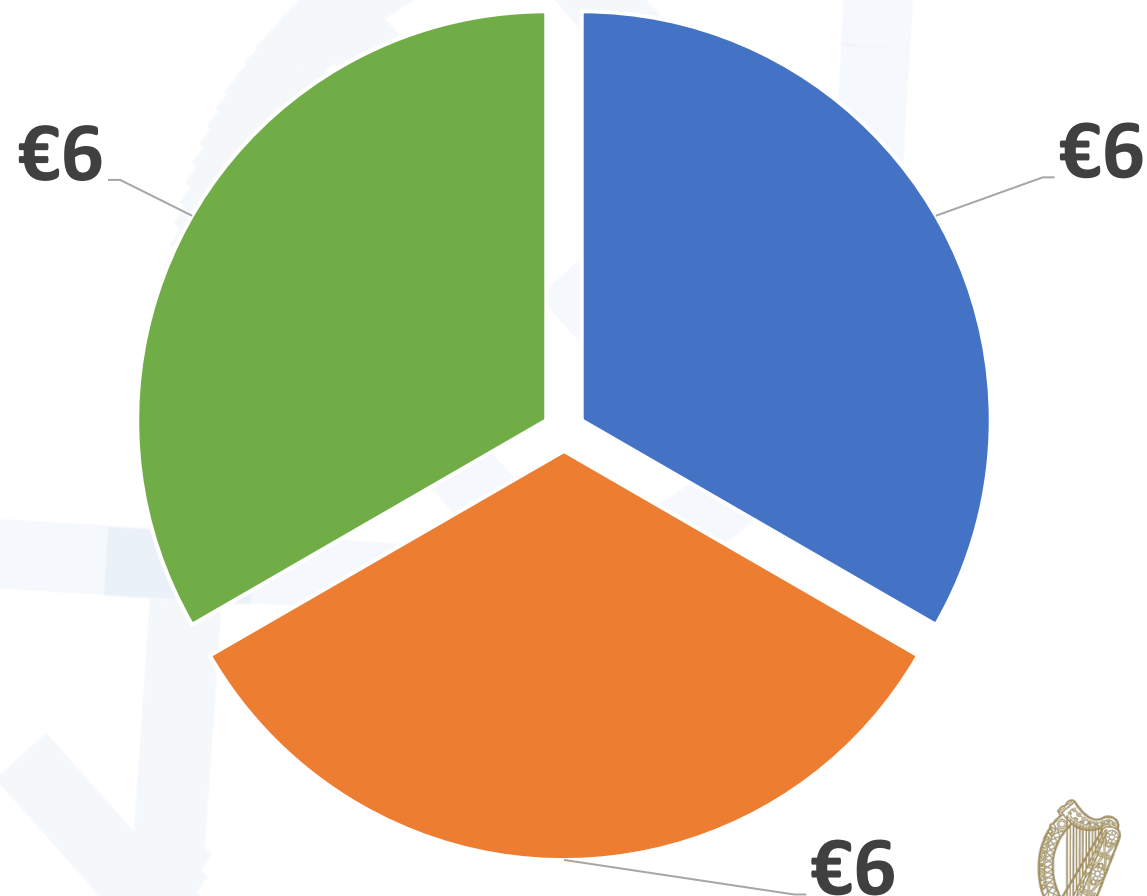
# NGP Phase 2 (2024 – 2027)



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Department of Agriculture,  
Food and the Marine

# NGP Phase 2 (2024 – 2027)

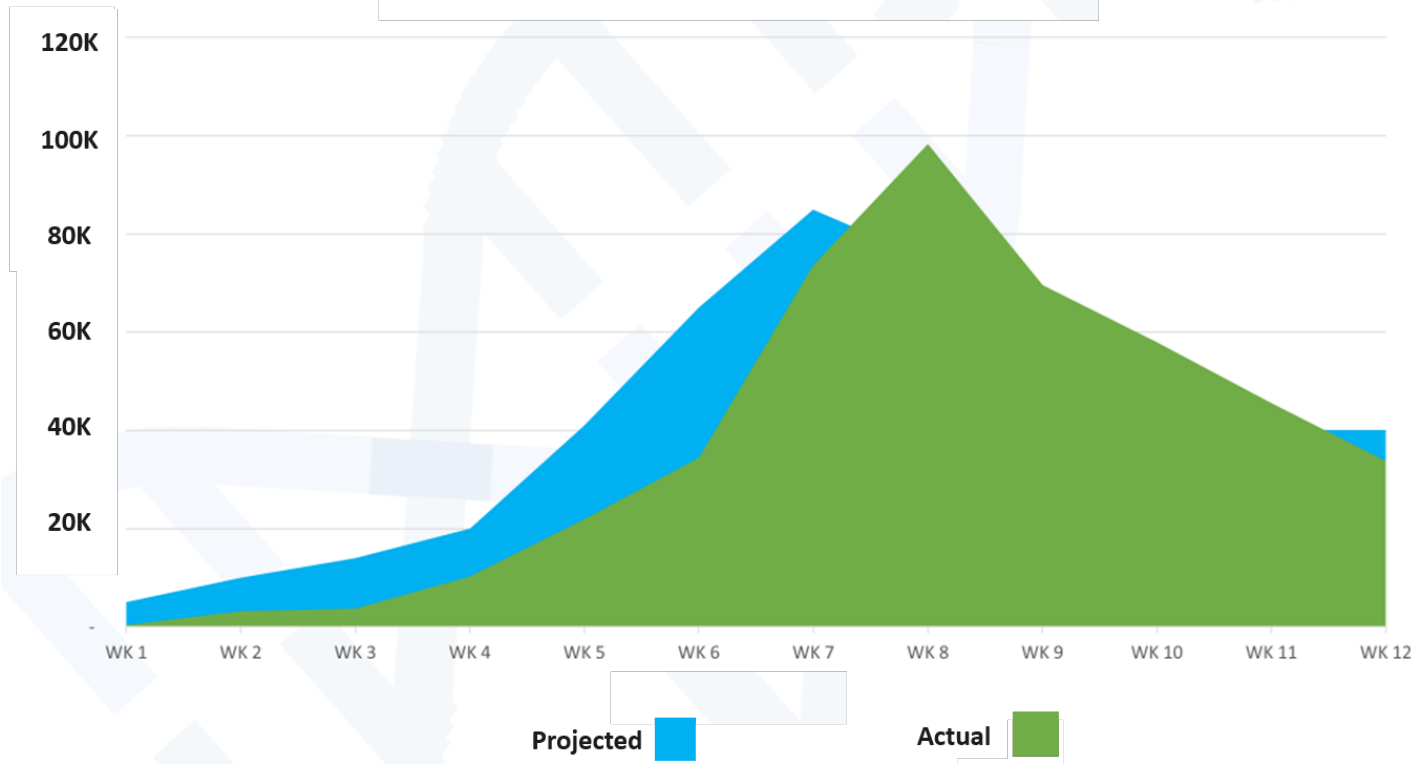
## Contribution to Calf Genotypes



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Department of Agriculture,  
Food and the Marine

# NGP Phase 2 (2024 – 2027)

Calf Sample Processing Forecast vs Actual 2024 (per week)

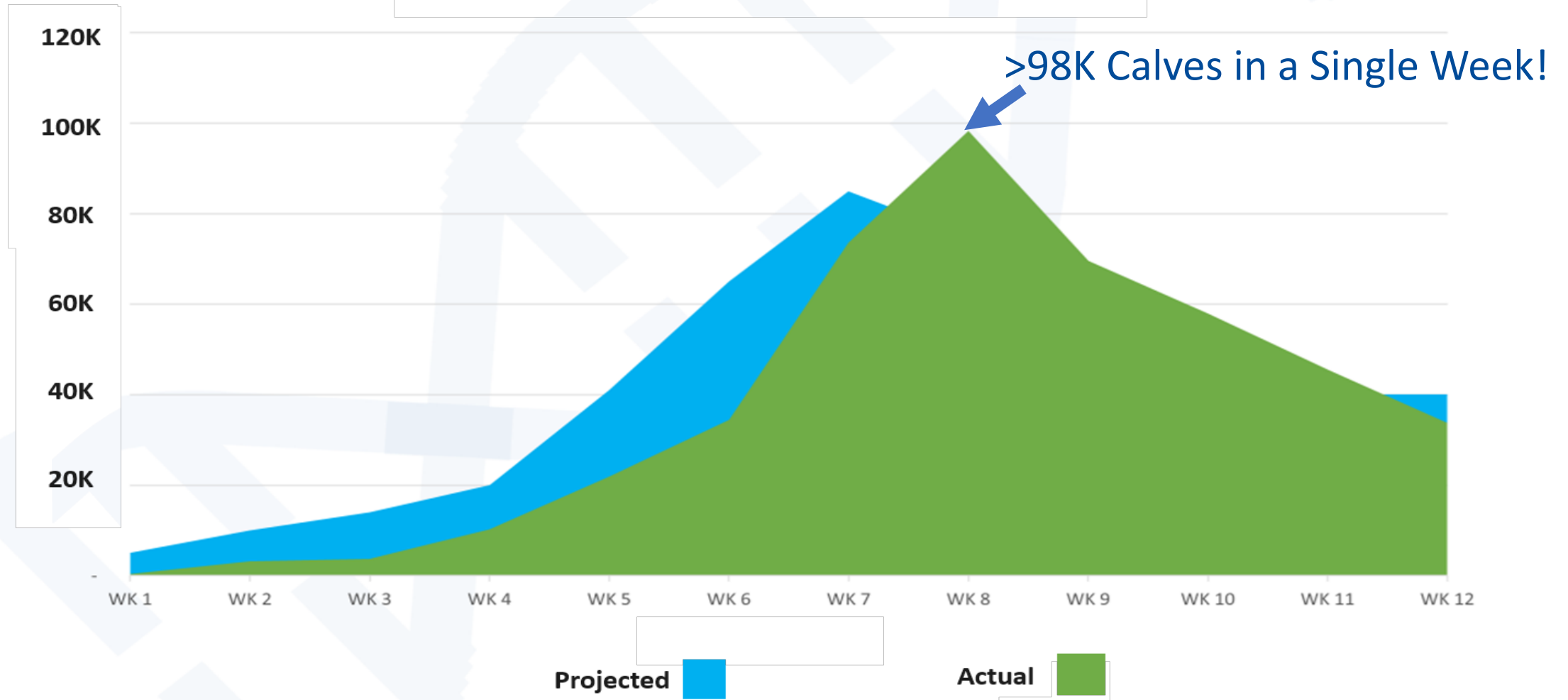


563,000 Genotyped  
and Registered by end  
of April

35% of all calves!

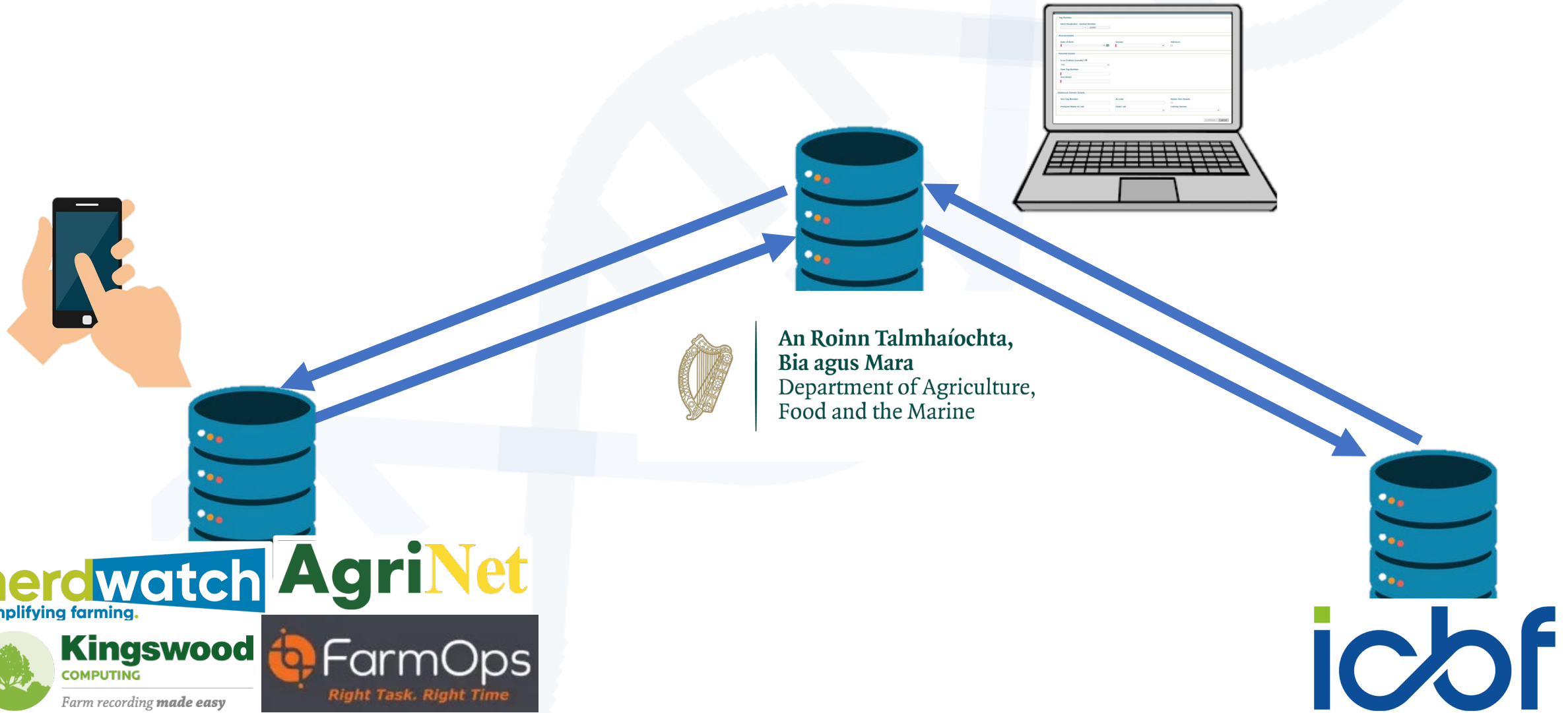
# NGP Phase 2 (2024 – 2027)

Calf Sample Processing Forecast vs Actual 2024 (per week)



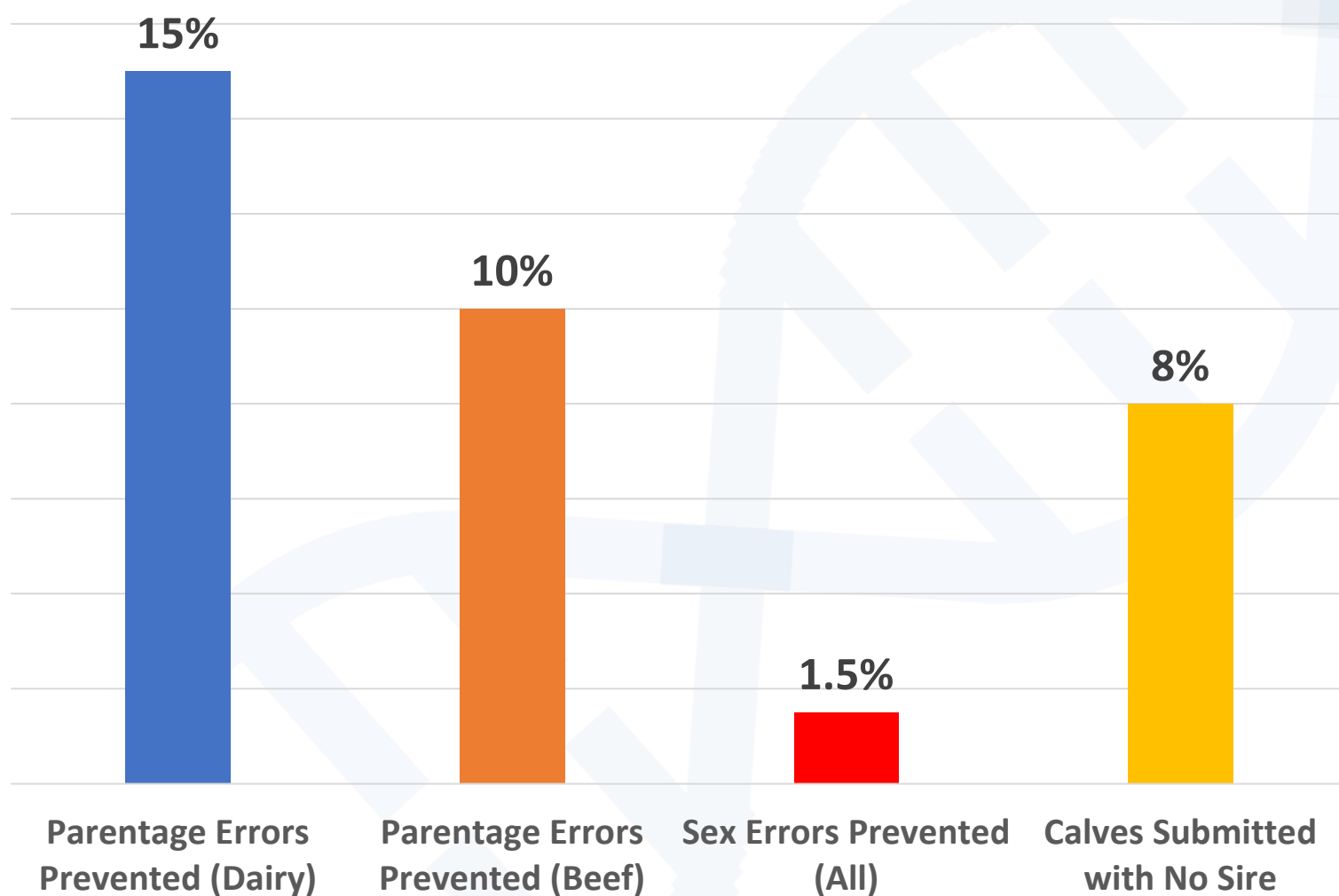


# NGP Phase 2 (2024 – 2027)

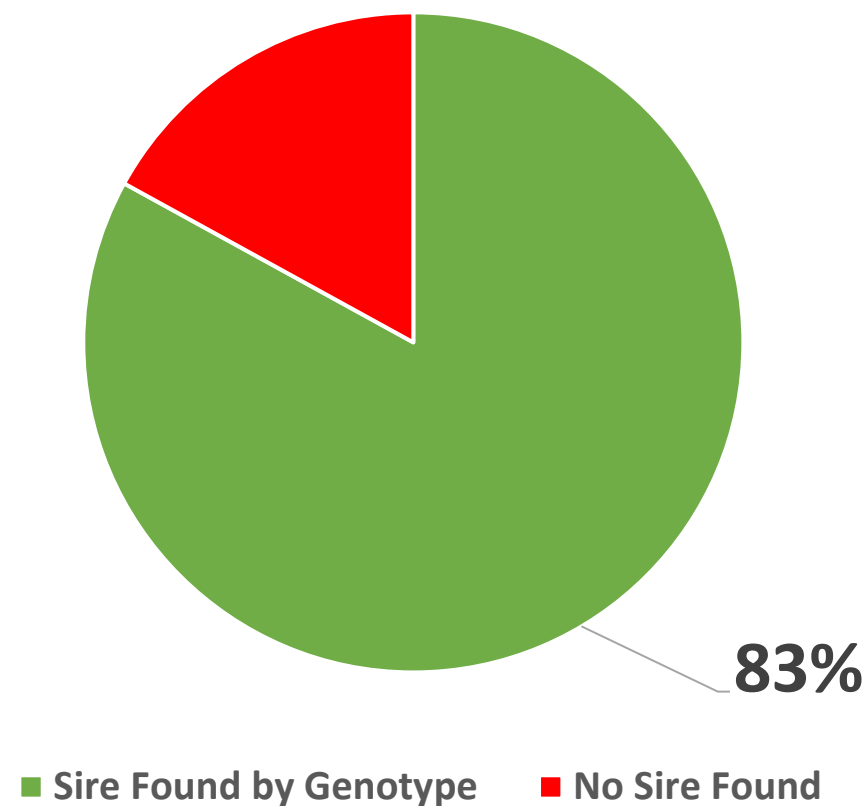




# NGP Phase 2 (2024 – 2027)



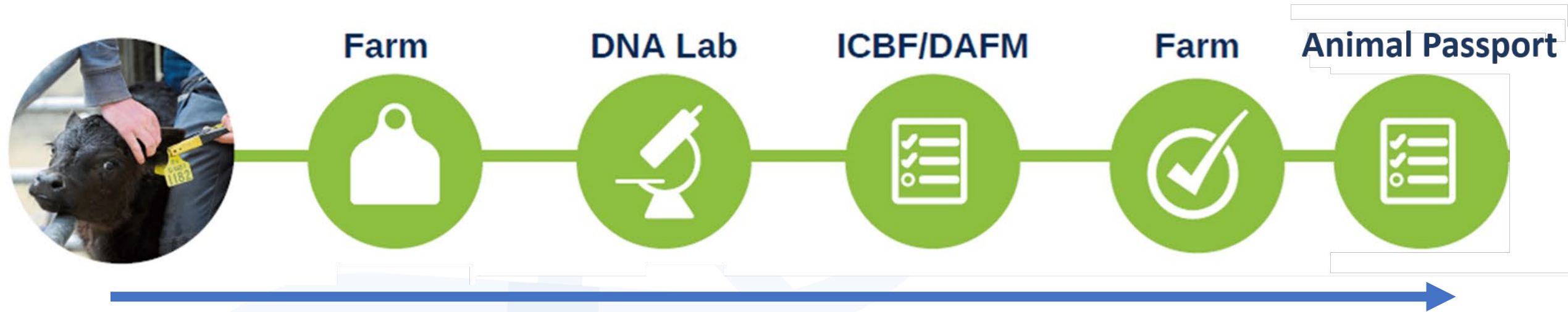
Where No Sire Recorded by Farmer





# NGP Phase 2 (2024 – 2027)

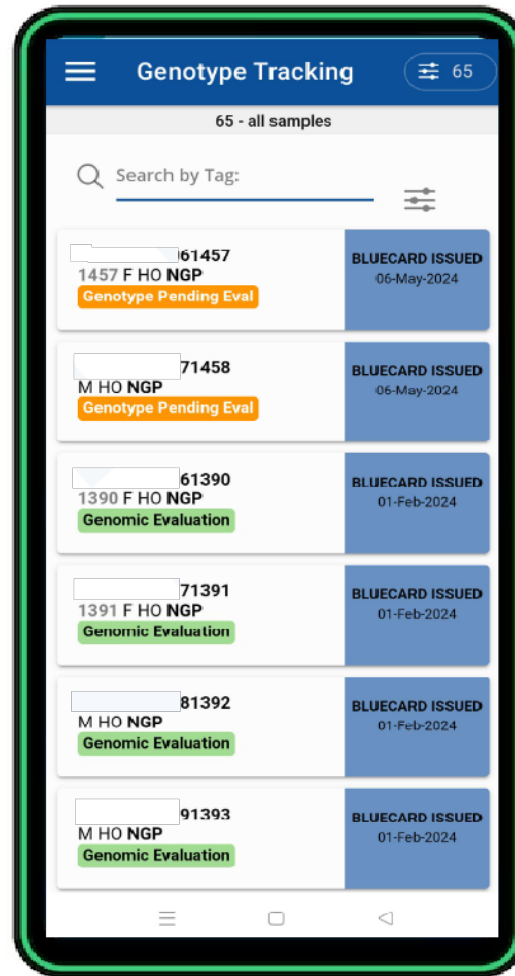
## *Typical DNA Registration Timeline*



**Average Birth to Passport issued = 13 days**

**Each Calf received Genomic Evaluation within 2 weeks of Registration**

# NGP Phase 2 (2024 – 2027)







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# Where to Next?



Loading Genotypes = 100%



## Any Questions?

# Our Farmer & Government Representation



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Bia agus Mara  
Department of Agriculture,  
Food and the Marine



# Our AI & Milk Recording Organisations



# Our Herdbooks



# Acknowledging Our Members