



# ABACUSBIO LIMITED

*Make a difference to food production internationally using science & technology*



UK BEEF INDUSTRY:  
**INTEGRATING FEED INTAKE INTO A  
BREEDING OBJECTIVE**

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ABACUSBIO LIMITED

# State of breeding objectives

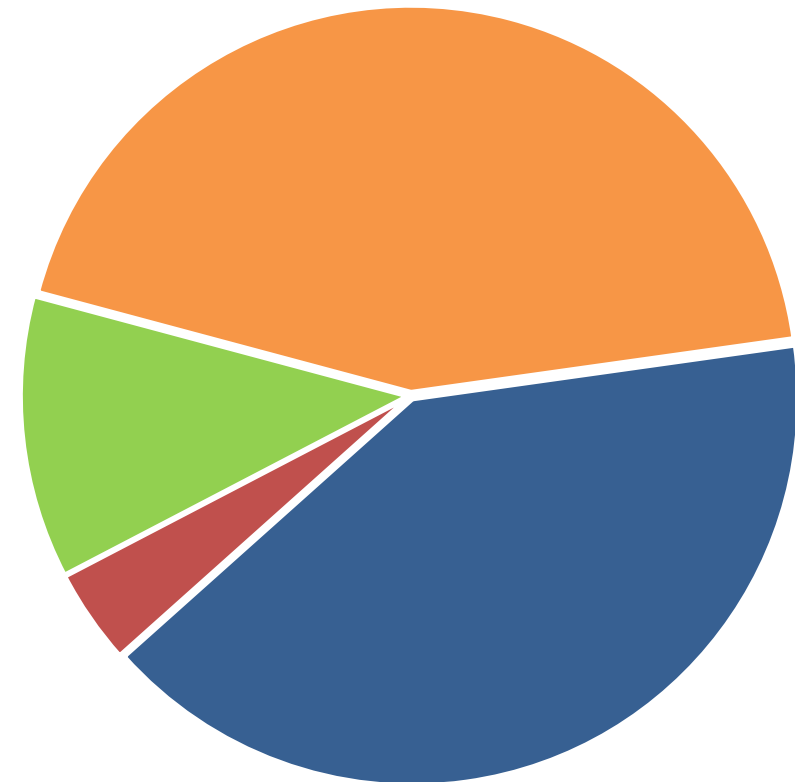
- Last updated 2005 (Roughsedge et al.)
- Include new traits
  - Carcase
  - Feed intake
- Robust & commercially applicable for UK beef breeds
- Trait-by-trait method

# Relative trait importance

Sub Index	Trait
Growth	Carcass weight
	<b>Daily Feed intake</b>
Carcase	<b>Carcase conformation</b>
	<b>Fat score</b>
	<b>Dressing percentage</b>
Calving	Gestation length - <i>Direct</i>
	- <i>Maternal</i>
	Calving difficulty - <i>Direct</i>
	- <i>Maternal</i>
Maternal	Maternal weaning weight
	Age at first calving
	Lifespan
	Calving interval
	Cow Mature weight
	Autumn body condition score

# Relative trait importance

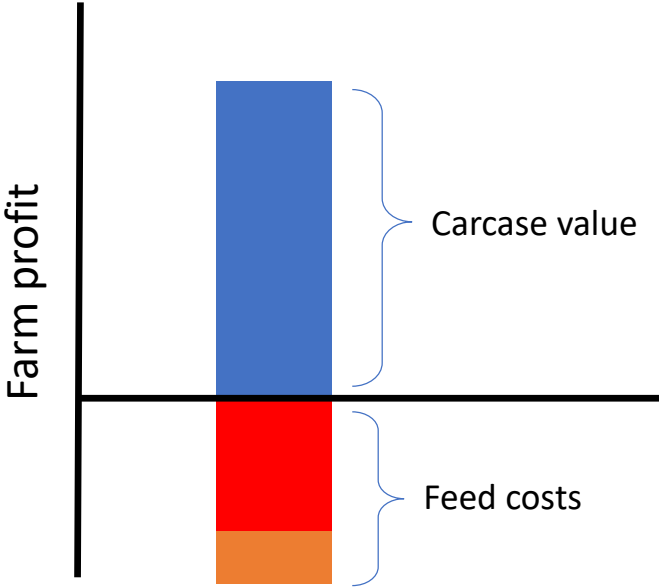
Sub Index	Trait	Importance
Growth	Carcass weight	40.6%
	Daily Feed intake	
Carcase	Carcase conformation	4.0%
	Fat score	
	Dressing percentage	
Calving	Gestation length - <i>Direct</i>	11.8%
	- <i>Maternal</i>	
	Calving difficulty - <i>Direct</i>	
	- <i>Maternal</i>	
Maternal	Maternal weaning weight	43.6%
	Age at first calving	
	Lifespan	
	Calving interval	
	Cow Mature weight	
	Autumn body condition score	



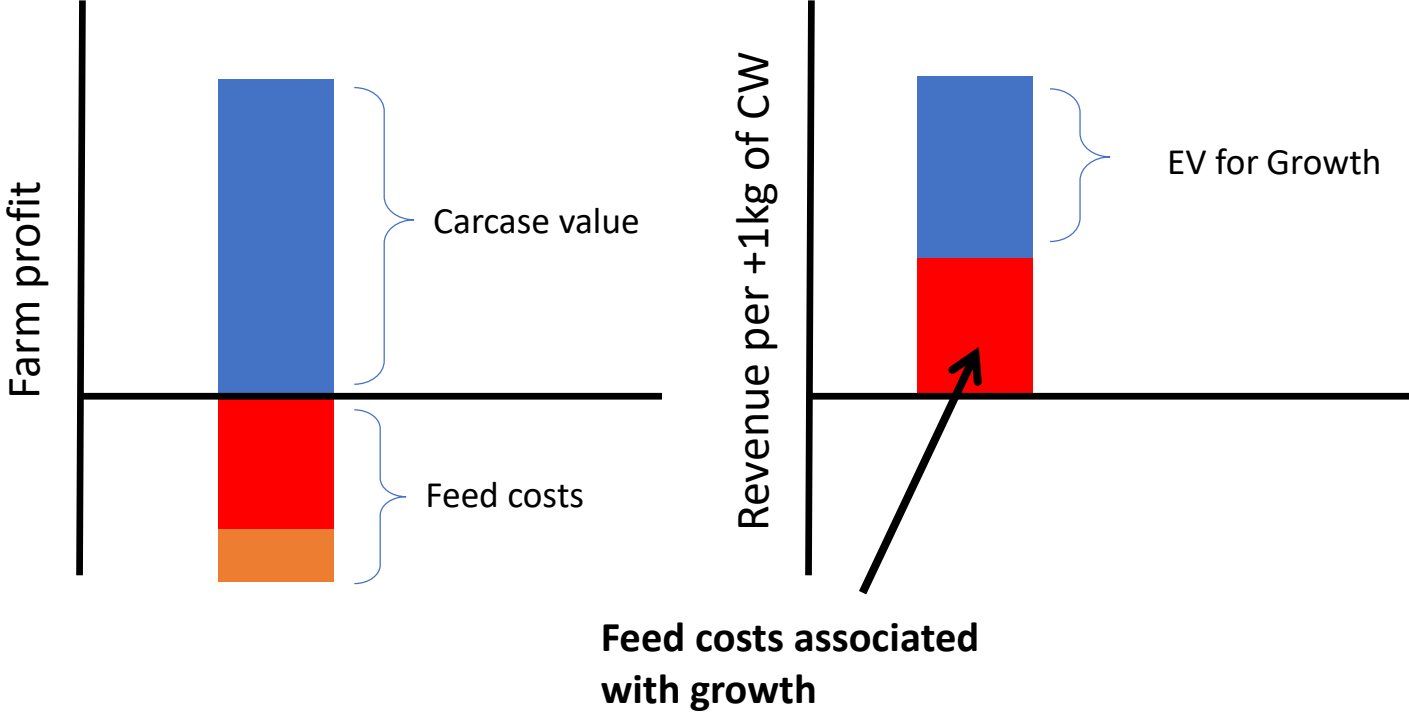
# Selecting for feed efficiency

- Present options for **different definitions** of feed efficiency
  - Total
  - Residual

# Total vs. Residual for growth

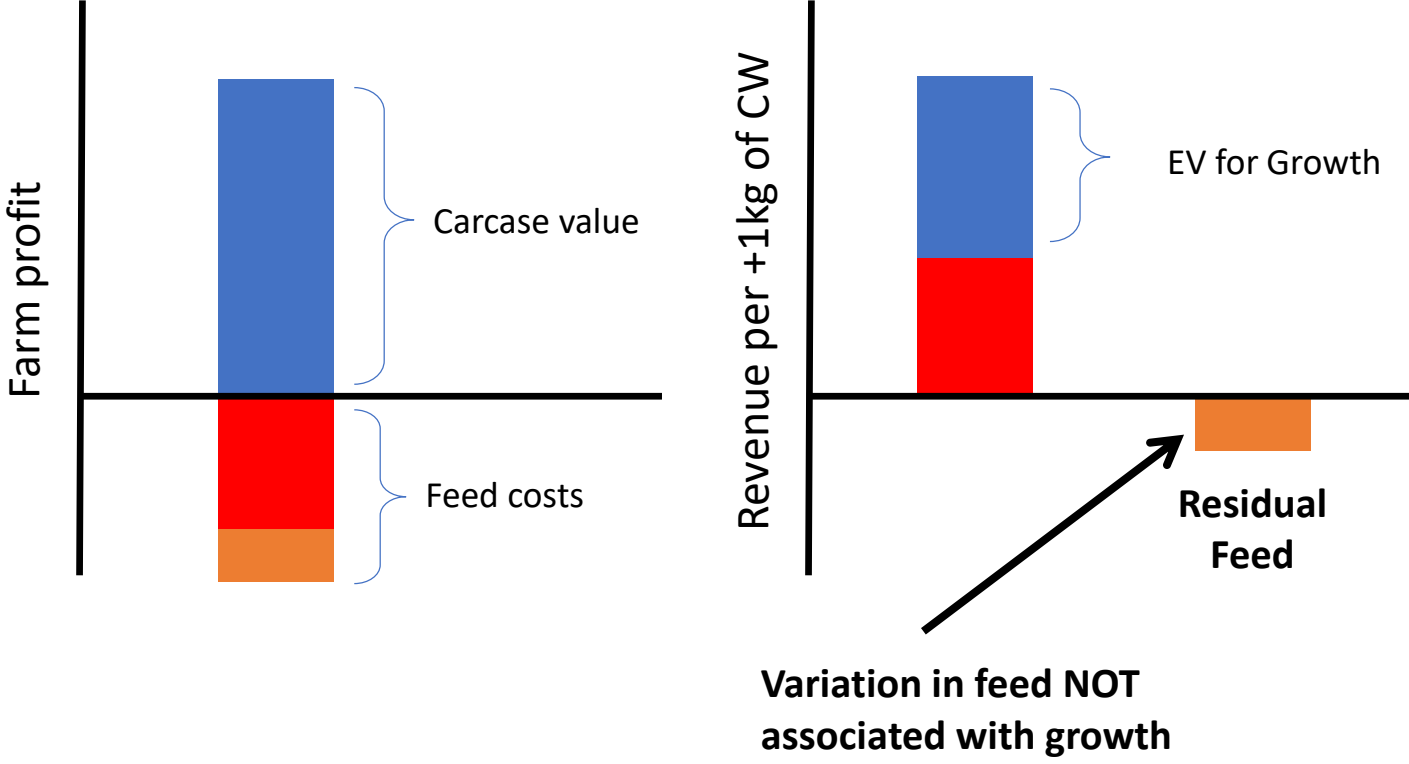


# Total vs. Residual for growth

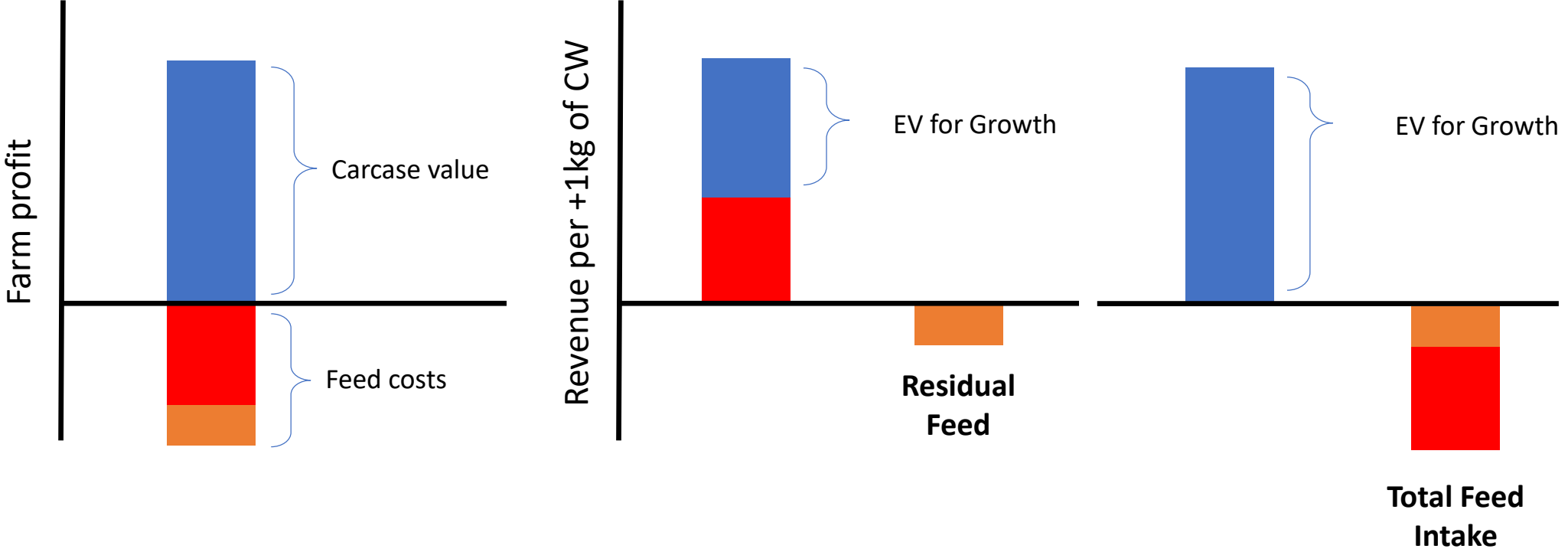




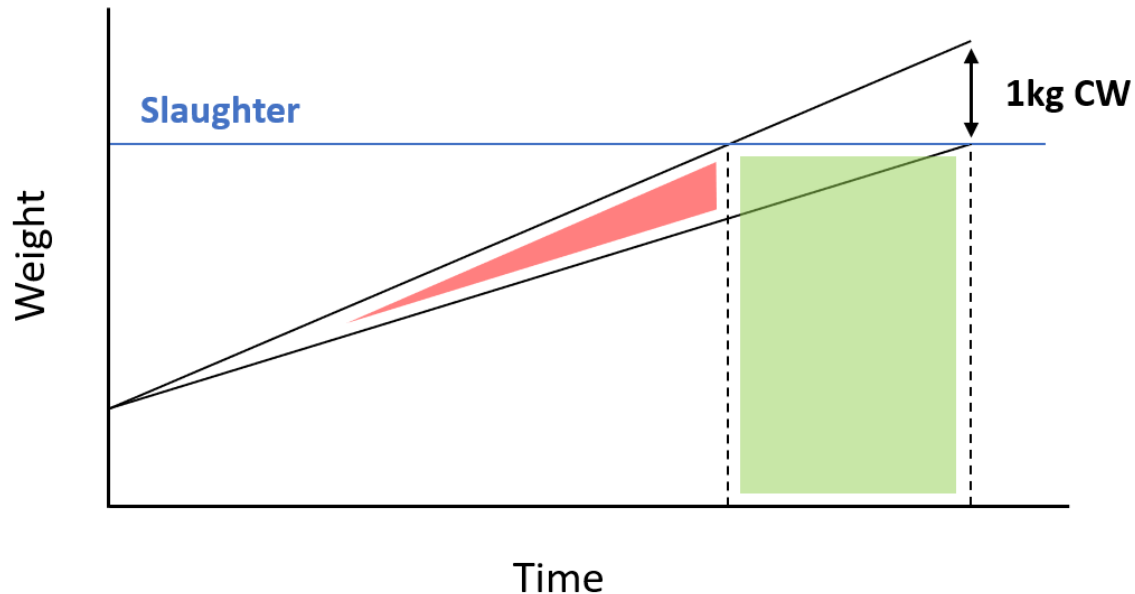
# Total vs. Residual for growth



# Total vs. Residual for growth

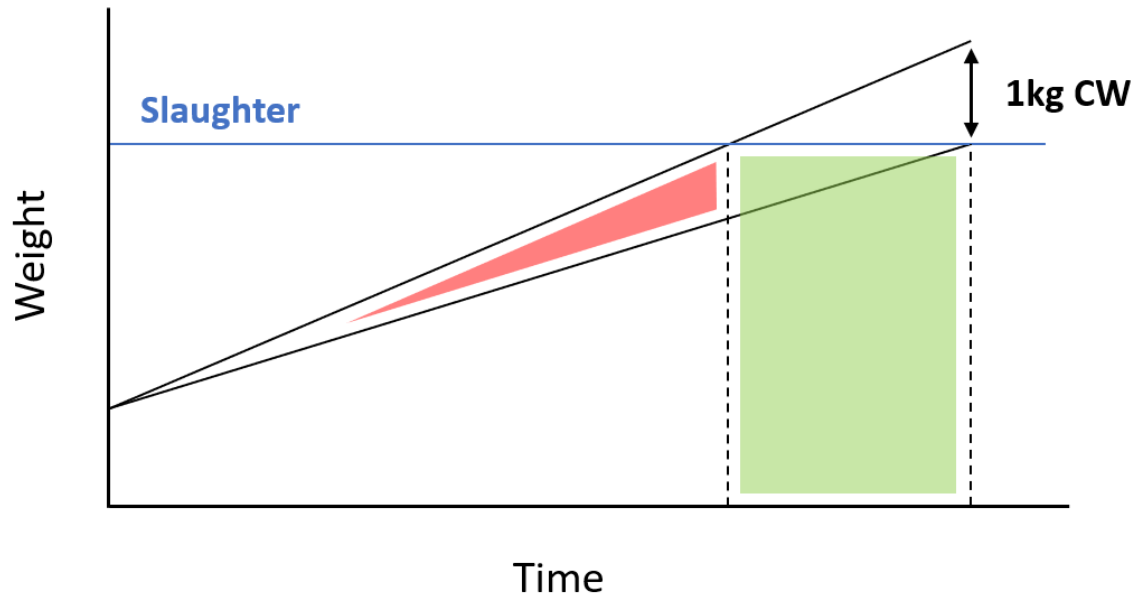


# How to value growth (CW)?



- Constant slaughter weight
  - Early at same CW
  - Marginal value of feed approaching zero
- Value = feed savings
  - Constant CW means no revenue change

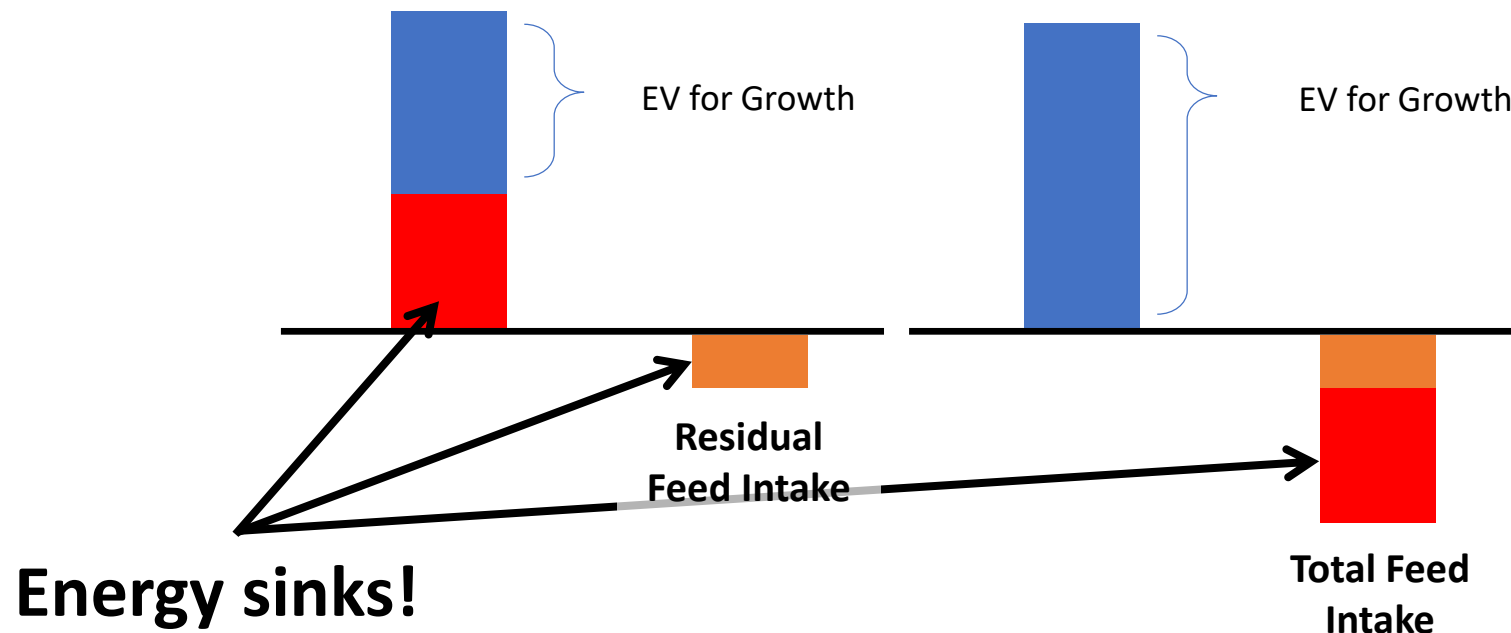
# Value of early slaughter



- Total feed intake
  - $CW = \text{Early}$
  - Extra feed costs are captured by Total F.I.
- Residual
  - $CW = \text{Early} - \text{Growth}$
  - Residual F.I. measures feed **NOT** captured by growth

# Records & accuracy

- Not all energy sinks recorded accurately on all selection candidates

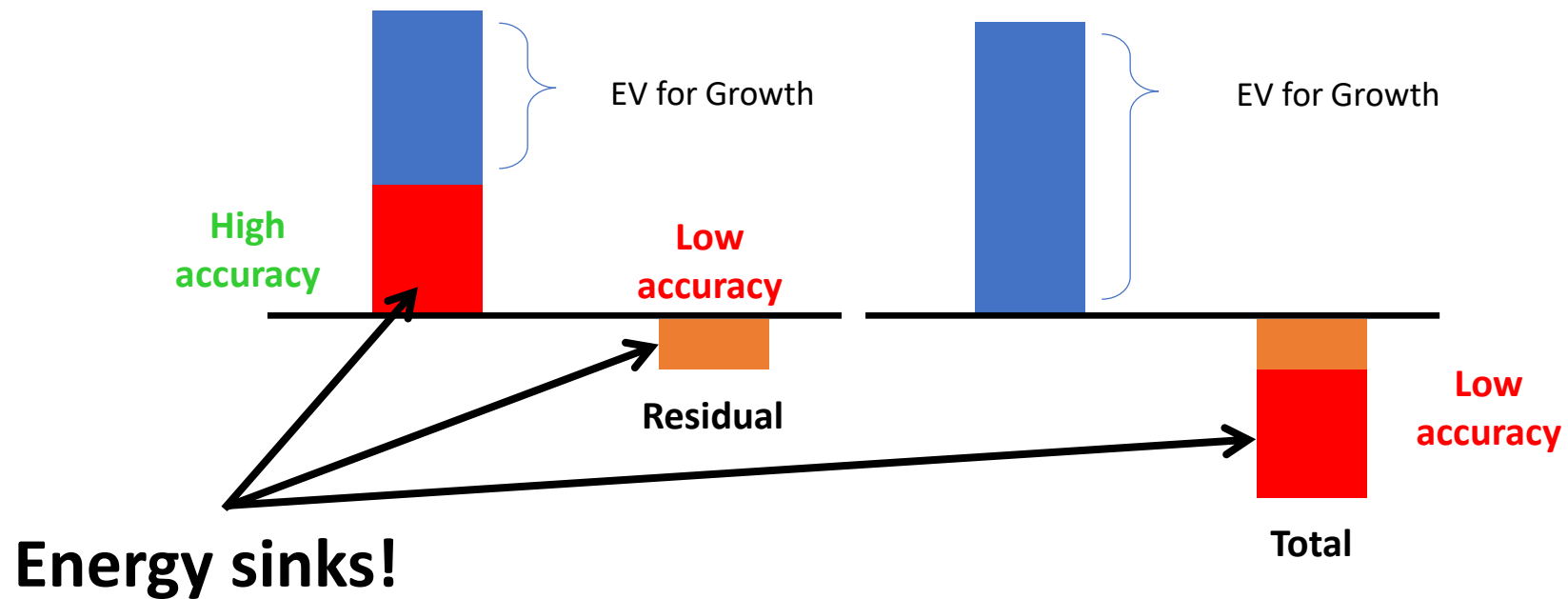


# Records & accuracy

- Feed intake
  - Measured in narrow window, on few animals
  - Most animals low accuracy (by pedigree relationship)
- Growth
  - Measured on all animals
  - Most animals very high accuracy (own record)

# Records & accuracy

- Residual feed intake more accurate



# Total Feed Intake

Total Feed Intake OR Residual Feed Intake	★ Bull 43564 ★	
	Index	+44
	Growth	+16
	Feed Intake	+8
	Reproduction	+21

- Impact
  - Underestimate feed costs
  - Over select for growth
- Advantages
  - Simple
  - Referred by farmers
- Terminology



# Future work

- Predict response to selection
- Establish feed intake and GHG changes from selection on the index
  - Gross emissions
  - Intensity (emissions per kg output)