

# Farm Carbon Navigator



# User Manual

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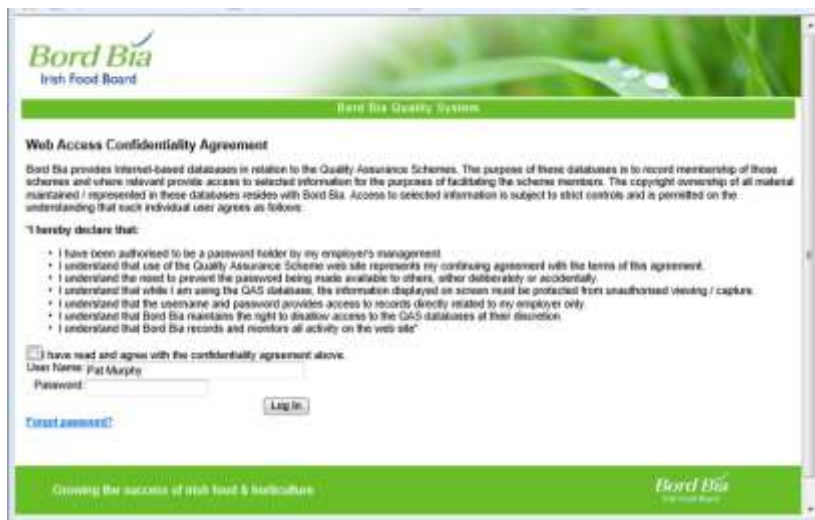
# 1 Getting Set Up

To use the Carbon Navigator you must first receive training and register. Your account will be set-up when you apply for training. You will be given details of your username and password at training.

- If, after training, you do not have an account please contact [pat.murphy@teagasc.ie](mailto:pat.murphy@teagasc.ie)
- If you are unsure if you were issued with an account go to section **1.1.2 Checking for your account**
- If you have forgotten your password go to section **1.1.3 Forgotten your password.**

## 1.1 Username and Password

Go to the Bord Bia QAS website <https://qas.bordbia.ie>

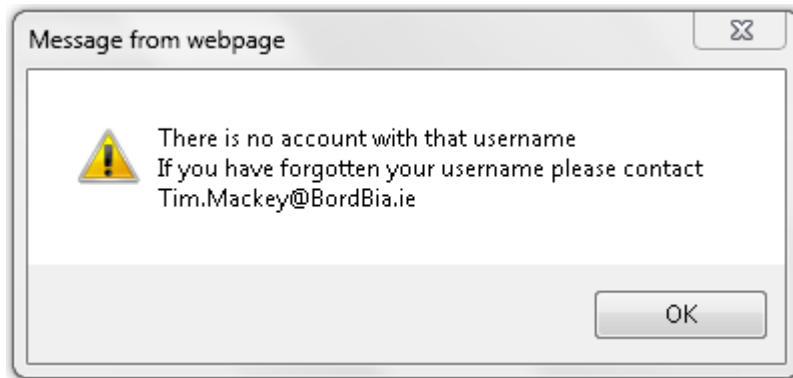


### 1.1.1 Login to the Carbon Navigator

- Username:- *firstname surname* (e.g. pat murphy – normally unless there is already a user with this name in which case a number will be added)
- Password Enter password given to you
- Make sure you tick the box accepting the confidentiality agreement
- Click on the **Log In** button

### 1.1.2 Checking for your account

- Enter a username in the format *firstname surname* (e.g. Tom Murphy)
- Click on the Forgot password button (1)
- If you do not have an account the following dialogue box will appear
- Please contact [pat.murphy@teagasc.ie](mailto:pat.murphy@teagasc.ie) to have an account established



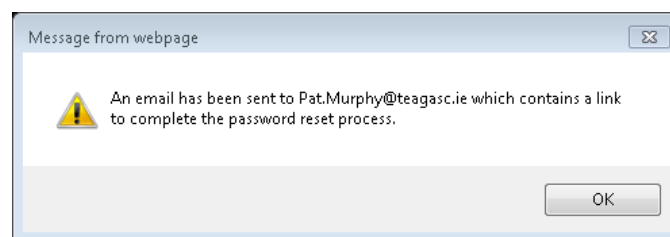
- If you do have an account proceed to get a new password as outlined in **1.1.3**

### **Forgotten your password**

#### **1.1.3 Forgotten your password**

If you have forgotten your password you can retrieve a new one

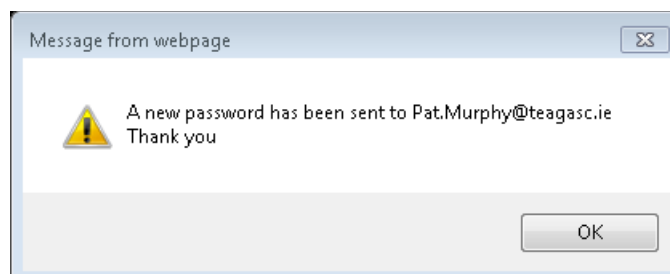
- Enter a username in the format *firstname surname* (e.g. pat murphy)
- Click on the Forgot password button.
- The following dialog box will appear.



- Go to your email and you will see a message containing the following

A request has been submitted to reset the password for Joe Bloggs.  
If you did not submit this request, please ignore this email.  
If you would like to reset the password, please click on this link to confirm:  
<https://qas.bordbia.ie/fp.aspx?2b8364dxxxxc48xxxxc4f9bb603232fc>

The following will appear in your browser



A new password will be sent to your email account. Use this password to access your account. After you login you will be able to change your password to one which you will more easily remember if you wish. See section **1.2 Changing your password**.

## 1.2 Changing your Password



BEEF & LAMB

[Bord Bia : Beef & Lamb](#) > [Teagasc Admin](#) > [Advisor Dashboard](#)

### Advisor Dashboard

Menu Options

<b>Authorisation</b>	<a href="#">Access Request Form</a>	<a href="#">Complete Access Request</a>
<b>Profile</b>	<a href="#">Update Profile</a>	
<b>Add New Clients without Bord Bia Authorisation</b>	<a href="#">Beef</a>	<a href="#">Dairy</a>

### Edit Profile

<b>Username</b>	Test
<b>Email</b>	<input type="text" value="nmpteagasctest1@gmai"/>
<b>Agency Name</b>	<input type="text" value="Teagasc"/>
<b>Agency Code</b>	<input type="text" value="AGY11152"/>
<b>Navigator Training Date</b>	<input type="text" value="dd/mm/yyyy"/>
<b>Set New Password</b>	<input type="password" value="....."/>

- Click on Update Profile
- When prompted
  - Enter your new password
- Your password will now be changed for subsequent logins

## 2 Client Data (NB)

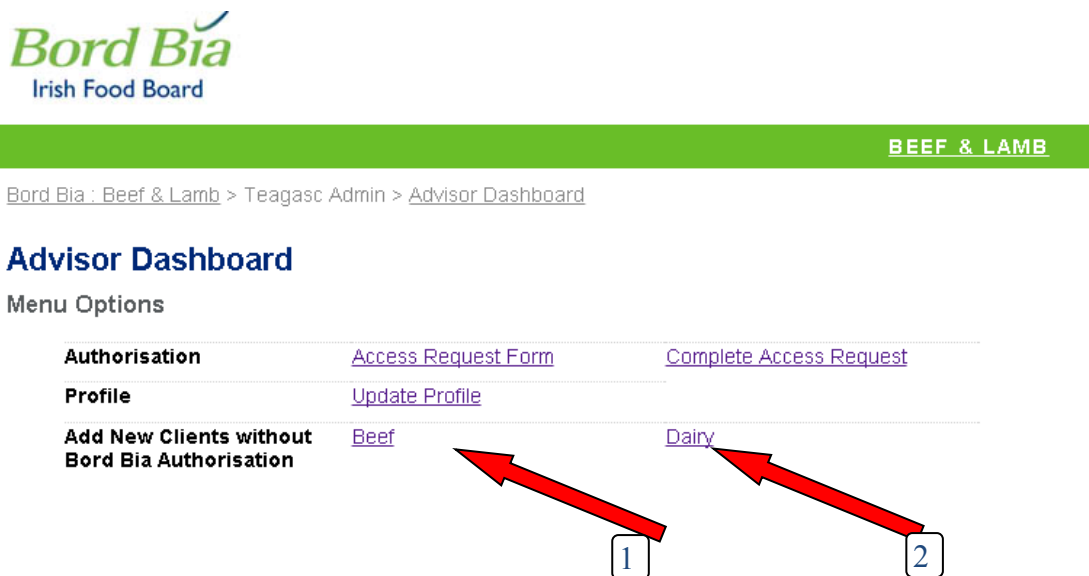
The Beef Carbon Navigator can be used with two distinct groups of clients:

- Clients with data entered through the Bord Bia BLQAS (Beef and Lamb Quality Assurance Scheme)
- Clients without Authorisation
  - Non Members
  - Members but not using – eg Doing Beef CN for a farmer who is a member of BLQAS but not DAS

Where there is client data in BLQAS or DAS that is being accessed by an adviser there must be permission in place for the adviser to access that data under data protection legislation.

### 2.1 Setting up a farmer not in BLQAS or DAS

Go to Adviser Dashboard. . Click on Beef (1) or Dairy (2) to select the enterprise.



The screenshot shows the Bord Bia Irish Food Board website. A green navigation bar at the top right contains the text "BEEF & LAMB". Below this, a breadcrumb trail reads "Bord Bia : Beef & Lamb > Teagasc Admin > Adviser Dashboard". The main heading is "Adviser Dashboard". Underneath, there is a "Menu Options" section with a table of links:

<b>Authorisation</b>	<a href="#">Access Request Form</a>	<a href="#">Complete Access Request</a>
<b>Profile</b>	<a href="#">Update Profile</a>	
<b>Add New Clients without Bord Bia Authorisation</b>	<a href="#">Beef</a>	<a href="#">Dairy</a>

Two red arrows point from the "Beef" and "Dairy" links to boxes labeled "1" and "2" respectively, indicating the steps to select an enterprise.

#### 2.1.1 Farmer Setup

- The Carbon Navigator Data Entry Screen will appear

## Teagasc / Bord Bia Farm Carbon Navigator - BEEF

Helping Irish Farmers Reduce Their Carbon Footprint

Herd

H1234567

Update

[Print](#)

- Enter the Herd No and Click Update
- You will go to the data entry screen and the screen will be blank
- Remember to click on update to compute outputs when data has been inputted



### Teagasc / Bord Bia Farm Carbon Navigator - BEEF

Helping Irish Farmers Reduce Their Carbon Footprint

Herd: **H1234567** [Update](#) [Download Export File](#) [Return to dashboard](#) [Print](#)

Farmer Name:

County:

Soil Type:

Area farmed (ha):

Average number of suckler cows:

Average number of yearling calves:

Potential impact of meeting all targets

0% €0

Year 2018		Current	Target	Chart	CO <sub>2</sub> e change	€ benefit
Rearing season - suckler cows	Turned Date	01/01	01/01		0%	€0
	Hoarding Date	01/01	01/01			
Rearing season - yearling calves	Turned Date	01/01	01/01		0%	€0
	Hoarding Date	01/01	01/01			
Age at first calving	Age at first calving (months)					
	Calving rate (calves/ewe)					
Live weight performance	System				0%	€0
	Lifetime live weight per day of age (L)					
Nitrogen efficiency	Total C <sub>60</sub> and equivalent N in C <sub>60</sub> (t)	0.00	0.00		0%	€0
	Total urea used (t)	0.00	0.00			
	Total concentrate fed (t)	0.00	0.00			
	Output kg beef live / ha	0.00	0.00			
Burry Spread Feeding	N in Spring	100	100		0%	€0
	N Excess following fall cut	0	0			
	N taken in Summer	0	0			
	Application Method	Trailing/shed	Trailing/shed			

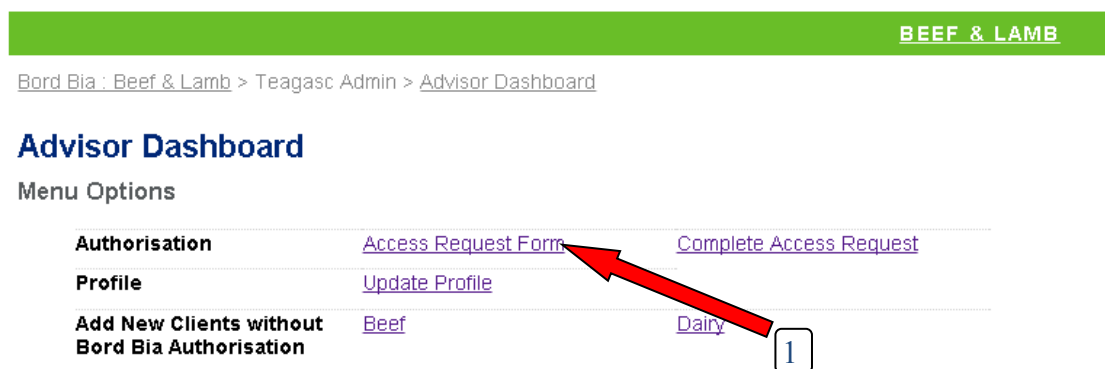
[Update](#)

## 2.2 Setting up a farmer who is a member of BLQAS

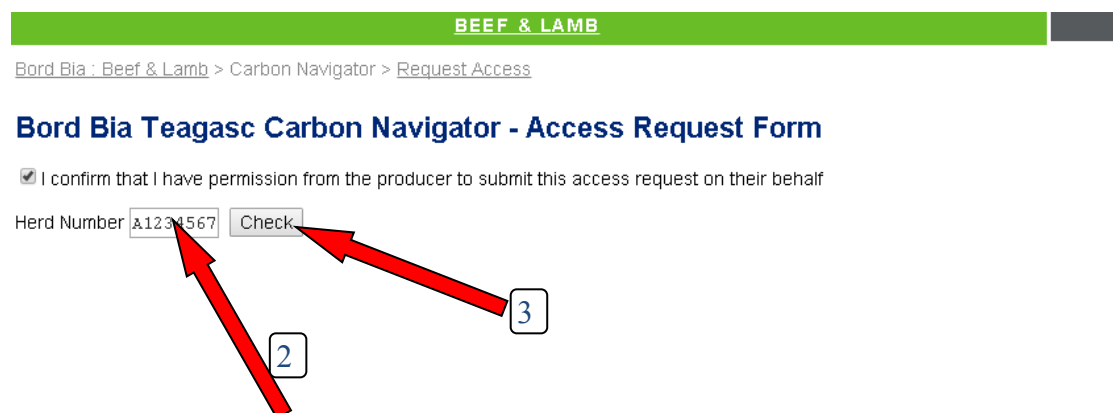
### 2.2.1 Accessing a Client (Access Request Form)

In discussing with farmers it is important to point out that this permission will only give access to a limited amount of data which is required to complete the Carbon Navigator and not to the complete Bord Bia data-set.

Once the farmer is assigned to the adviser you can access information in the dairy and beef carbon navigator.

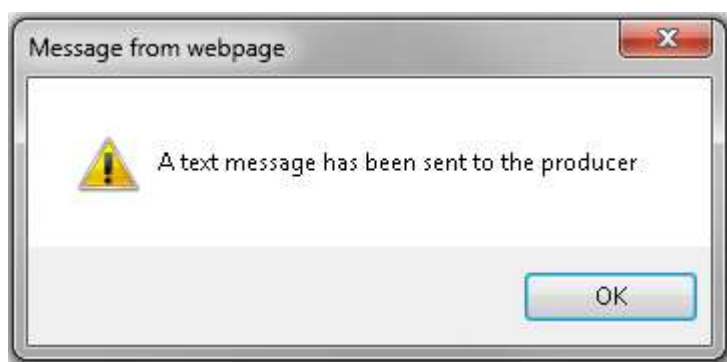


- At the Adviser Dashboard Main Menu select Access Request Form(1)
- Enter the Herd Number (2)
- Click on Check

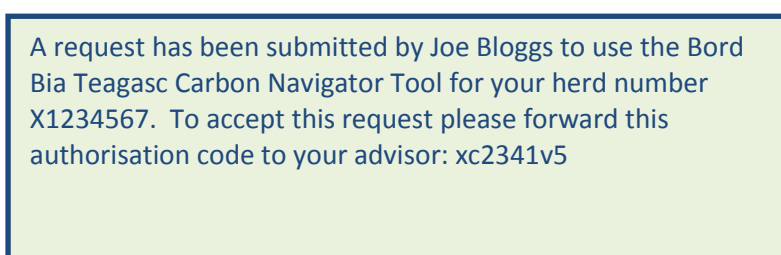




The Following Dialogue Box will appear



A text message will be sent to the client

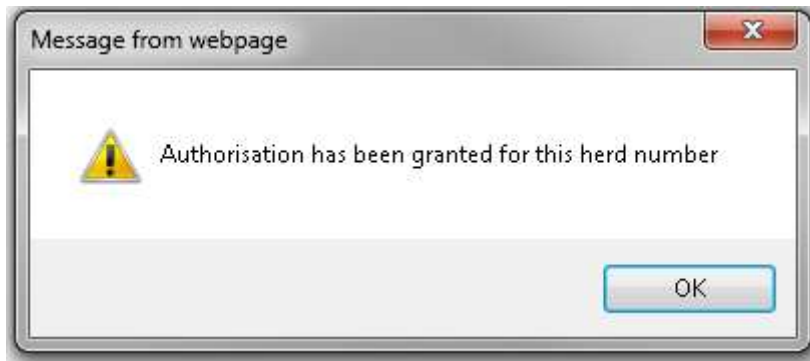


This text indicates that a request has been submitted by the user for access to the farmers details to complete the carbon navigator. At the end of the text is an authorisation number which the farmer will have to give the adviser to proceed.

### 2.2.2 To activate the Client Access

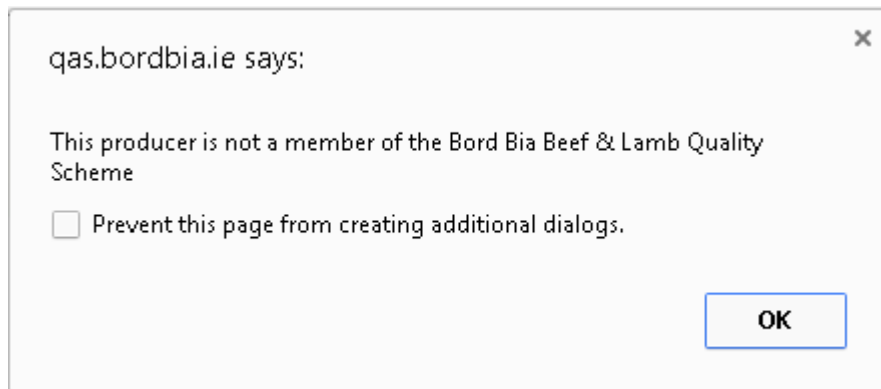
- In the Adviser Dashboard click on **Complete Access Request**
- Enter the herd number
- Enter the authorisation code (from farmer SMS message)
- Click on the confirmation tick box
- Click on the Complete Access Request Button
- You will be informed that authorisation has been granted





### 2.2.3 Client Not a Member

- The following Dialogue Box will be shown
- Enter Client without Bord Bia Authorisation



### 2.2.3 Other Messages

#### Incorrect Authentication Code

- Check Herd Number and authentication code and try again

#### Already Have access for Herd Number

- Go to your Dashboard and check list of clients

### 3 Using the Beef Carbon Navigator

The Beef Carbon Navigator is accessed at <https://qas.bordbia.ie>. Tick Box and enter username and password and click Log In

#### 3.1 Selecting Farmer

Bord Bia : Beef & Lamb > Teagasc Admin > [Advisor Dashboard](#)

#### Advisor Dashboard

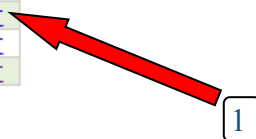
##### Menu Options

<b>Authorisation</b>	<a href="#">Access Request Form</a>	<a href="#">Complete Access Request</a>
<b>Profile</b>	<a href="#">Update Profile</a>	
<b>Add New Clients without Bord Bia Authorisation</b>	<a href="#">Beef</a>	<a href="#">Dairy</a>

##### Carbon Navigator Access

**4 herds, click links for beef or dairy navigator**

Herd No		
B1080607	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
B1111199	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
O1360316	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
Y185056X	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>



##### Clients without Bord Bia authorisation

**5 herds**

Herd No		
B0000000	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
D9999994	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
D9999995	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
D9999996	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>
D9999997	<a href="#">Beef Navigator</a>	<a href="#">Dairy Navigator</a>

- Click on Dairy or Beef Carbon Navigator for the relevant herd number
- The top list are clients for whom you have Authorisation
- The bottom list are for clients for whom you do not have authorisation
- Click on the link to the required navigator (1)
- A blank navigator screen will be presented or if a member of BLQAS or DAS data from the database will be pulled in.

## 3.2 Data Entry - Summary - Beef

1. Enter base data on the farm
2. Enter current and target information for each of the Carbon Navigator Measures
3. Click on **Update**
4. A graph will be shown indicating performance against peers at current performance and at planned future performance
5. The percentage of enterprise GHGs which will be reduced by reaching target performance
6. The financial benefit to the farmer by achieving the target
7. Enter advice Data in text boxes and click **Save Measures**
8. Print the Carbon Navigator

### 3.2.1 Farmer Data (1)

Enter all fields of farmer data which are not already pre populated. If data is incorrect you can correct it

Notes

- Enter Farmer Name
- County and soil type – Enter the county selecting the appropriate region. Enter soil quality. This provides a basis for assessing grazing season length.
- Enter the area farmed – Estimate the area used for the beef enterprise
- Enter the average no of suckler cows currently on the farm
- Enter the average number of yearlings and followers

### 3.2.2 Carbon Navigator Measures (2)

There are six measures in the Beef Farm Carbon Navigator

- Grazing Season Length
- Age at first calving
- Calving Rate
- Live weight performance
- Nitrogen Efficiency
- Slurry Spread Timing

BEEF & LAMB Dairy

Bord Bia / Beef & Lamb > Carbon Navigator > Teagasc / Bord Bia Farm Carbon Navigator

### Teagasc / Bord Bia Farm Carbon Navigator - BEEF

Helping Irish Farmers Reduce Their Carbon Footprint

This facility will supply Farm Enterprise Information collected at the last audit to the Carbon Navigator.

Herd:     per herd number

Farm Name:   
 County:   
 Soil Type:   
 Area farmed (ha):   
 Average number of suckler cows:   
 Average number of yearlings/followers:

Potential impact of meeting all targets  
-11.9% +€4208

Year 2013	Current	Target	Chart	GHG change	€ benefit	
Grazing season - suckler cows	Turnout Date	01/Apr	17/Mar		-2.2%	+€813
	Housing Date	01/Nov	10/Nov			
Grazing season - yearlings/followers	Turnout Date	01/Apr	17/Mar		-1.6%	+€116
	Housing	01/Nov	10/Nov			
Age at first calving	Age at first calving (months)	29.00	28.00		-0.3%	+€221
Calving Rate	Calving rate (calves/cow)	0.80	0.85		-4.1%	+€946
Live weight performance	System	Steers & Heifers	Steers & Heifers		-0.3%	+€1197
	Lifetime live weight per day of age (g)	800	850.00			
Nitrogen Efficiency	Total CAN and equivalent N in Compounds (t)	6.00	5.00		-0.8%	+€100
	Total urea used (t)	0.00	2.00			
	Total concentrate fed (t)	40.00	40.00			
	Output kg beef live / ha	480.00	500.00			
Slurry Spread Timing	% in Spring	20	40		-2.7%	+€65
	% Summer following 1st cut	50	60			
	% Later in Summer	30	0			
	Application Method	Splash Plate	Splash Plate			

### 3.2.3 Current and Target (3)

The Current data column should reflect the current level of performance on the farm (without undue influence from an unusual event such as poor weather leading to very late turnout etc. The Target column should reflect the level of performance or change that is possible and planned over the next three years.

NB Click on **UPDATE**

When all data has been entered click on the Update Button and the results will be calculated. The graphs indicating current and target performance compared to peers is represented graphically (4). The second last column estimate the % reduction in enterprise GHG emissions that would be expected to accrue if targets are met.(5). The last column estimates the increased profitability arising from achieving the targets (6)

## 4 The Carbon Navigator Measures Advice Sheet

Each Carbon Navigator completed under the Beef Data and Genomics Scheme and the KT Group Scheme must have an advice sheet completed. The purpose of this is to provide a guide to the farmer on the changes in practice at farm level required to reach the targets set. It also provides a basis for the annual review of progress.

The system provides a “start” to the advice sheet by allowing the user to begin to populate the advice sheet with a number of pre-scripted options. These options need to be edited to provide appropriate advice for individual farmers. Additional advice may be typed as appropriate.

The screenshot displays the 'Possible actions to reduce GHG emissions' section of the advice sheet. It is organized into several sub-sections, each with a list of actions and a corresponding input field for the user to provide advice. The sub-sections include:

- Stocking Systems Change:** Lists actions such as 'Effective pasture management can reduce GHG emissions', 'Reduce nitrogen fertilizer use', 'Use cover crops', and 'Improve soil health'. The input field contains the text: 'Reduce nitrogen fertilizer use to 150kg/ha and use cover crops to improve soil health and reduce GHG emissions. Use cover crops to improve soil health and reduce GHG emissions. Use cover crops to improve soil health and reduce GHG emissions.'
- Age at Breeding:** Lists actions such as 'Reduce age at breeding', 'Increase age at breeding', and 'Use genetic selection for early calving'. The input field contains the text: 'Reduce age at breeding to 2.5 years and use genetic selection for early calving to reduce GHG emissions. Use genetic selection for early calving to reduce GHG emissions. Use genetic selection for early calving to reduce GHG emissions.'
- Farming Efficiency:** Lists actions such as 'Improve feed efficiency', 'Reduce feed waste', and 'Use feed additives'. The input field contains the text: 'Improve feed efficiency to 1.2 and reduce feed waste to 5% to reduce GHG emissions. Use feed additives to improve feed efficiency and reduce GHG emissions. Use feed additives to improve feed efficiency and reduce GHG emissions.'
- Low Input Performance:** Lists actions such as 'Use low input systems', 'Reduce fertilizer use', and 'Use cover crops'. The input field contains the text: 'Use low input systems to reduce GHG emissions. Reduce fertilizer use to 150kg/ha and use cover crops to improve soil health and reduce GHG emissions. Use cover crops to improve soil health and reduce GHG emissions.'
- Waste Efficiency:** Lists actions such as 'Reduce methane emissions', 'Improve manure management', and 'Use biogas'. The input field contains the text: 'Reduce methane emissions to 10% and improve manure management to reduce GHG emissions. Use biogas to reduce GHG emissions. Use biogas to reduce GHG emissions.'
- Water Efficiency:** Lists actions such as 'Reduce water use', 'Use water saving devices', and 'Use cover crops'. The input field contains the text: 'Reduce water use to 10% and use water saving devices to reduce GHG emissions. Use cover crops to improve soil health and reduce GHG emissions. Use cover crops to improve soil health and reduce GHG emissions.'
- Other possible actions to reduce GHG emissions:** Lists actions such as 'Age at Breeding', 'Farming Efficiency', and 'Low Input Performance'. The input field contains the text: 'Age at Breeding, Farming Efficiency, Low Input Performance, Waste Efficiency, Water Efficiency, Other possible actions to reduce GHG emissions.'

### 4.1 Entering Data in Advice Sheets

Enter and amend advice as follows

- Click on the tick box beside the appropriate advice item. It will populate the advice box
- Edit or add to the item as required
- Add line spacing to improve clarity
- Highlight and delete any not required text

### 4.2 Additional Measures

The final section of the advice sheet contains a number of other actions which may improve carbon efficiency on the farm. Select and provide additional advice on how the measure might be implemented

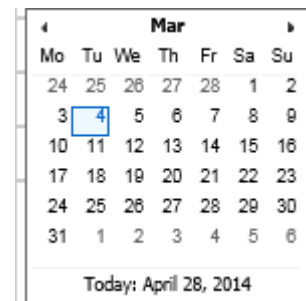
## 5 The Carbon Navigator Measures - Beef

### 5.1 Grazing Season Length

Increasing the grazing season length lowers GHG emissions in three ways

- Grazed grass in the early and late grazing season is a higher quality more digestible feed than grass silage leading to reductions in the proportion of dietary energy lost as methane.
- Higher quality feed leads to improvements in animal productivity
- The shorter housing season leads to reduced slurry methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions from storage and energy use from spreading

- Click in the input cell for Turnout Date – Part Time. A calendar will appear.
- If the month is correct click on the date
- If the month is incorrect click on the appropriate arrow beside the month and select the appropriate month
- Click on the date
- Repeat for other actual and target dates
- Alternatively you can type in the date in the format dd/mmm (03/Mar)



### 5.2 Age at first Calving

The average age at first calving for replacement heifers on Irish suckler herds is 30.5 months while the top 10 per cent of herds achieve an average figure of 26 months.

- Lower age at first calving reduces the lifetime emissions burden of the cow and, correspondingly, the emissions per kg of beef produced through enteric fermentation, feed energy and manure management emissions.
  - It is estimated that the impact of age at first calving is to increase GHG emissions by 0.3% / kg beef carcass for month that first calving is greater than 24 months
  - The economic impact is estimated at €1.65 per day per suckler cow in the herd
- Enter the current average age at first calving on the farm. (For most herds this will be automatically available to the system from ICBF / CMMS Data).
  - Enter the target for 3 years ahead

### 5.3 Improving Calving Rate

On a significant number of Irish farms there is a scope for improvement in the performance with respect to calving rate. Figures from the Irish Cattle Breeding Federation (ICBF) indicate that the average calving rate on recorded Irish suckler herds is 0.84 calves per cow per year with the top 10% recording a rate of 0.93.

- The suckler cow is a significant environmental “overhead” (in the order of 70-80 kg methane per annum). Higher calving rates will reduce the GHG emissions burden per kg beef produced.
- The BeefGEM model ([Foley \*et al.\*, 2011](#)) indicates a GHG emissions reduction factor of 0.8% / kg beef carcass per unit increase in calving rate.
- The economic impact is €8.60 per Livestock unit per 1% increase in calving rate ([Crosson and McGee, 2012](#)).

- Enter the current average calving rate for the farm
- Enter a target for calving rate in 3 years

### 5.4 Increased Weight Gain

The impact of improved average lifetime daily gain for beef production systems is to dilute the GHG emission association with production.

- Absolute GHG emissions, which are related to enteric fermentation, feed provision and manure management, increase on a per animal basis since the quantities of feed consumed and manure produced are greater. However GHG emissions per unit of beef produced are reduced since the greater quantities of beef produced more than offset the increase in GHG emissions.
- The impact of increased weight gain on GHG emissions is estimated at 0.01% per kg beef carcass per g increase in lifetime average daily gain for beef cattle systems
- The economic impact is estimated at €0.63 per g improvement in daily gain ([Schulte \*et al.\*, 2012](#)).

- Select the appropriate system from the list
- Indicate the daily liveweight gain in grams/day
- Enter target data



## 5.5 Improved N Efficiency

The computation is based on LCA (Life Cycle Analysis) figure including emissions related to both the manufacture of Nitrogen and emissions on application. Increasing N efficiency can be achieved through

- the increased use of clover in swards
- improving soil fertility
- Improved grassland management and utilisation
- improvements in the timing and application of fertiliser nitrogen and
- the application of the most appropriate N fertiliser type for the prevailing conditions. (Urea v CAN)

- Enter the total quantity of CAN based N used on the beef enterprise For any compound the equivalent can be calculated using the following formula
  - $(\text{Tonnes X \% Nitrogen}) / 27.5$
- Enter tonnes of Urea based N used on the beef enterprise
- Enter tonnes of Meals fed
- Enter output of Beef liveweight per Ha
- Repeat for Targets

## 5.6 Improved Slurry Management

Improving manure management can reduce the GHG emissions associated with manure through a transition from summer application to spring application of manure and the use of low-emission application methods.

- Spring application reduces  $\text{NH}_3$  emissions following land spreading due to the more favourable weather conditions at that time of year.
  - Storage losses are reduced due to the shorter storage period
  - The reduced  $\text{NH}_3$  losses increases the fertiliser replacement value of slurry, and therefore reduces the total fertiliser N inputs and reduces associated emissions from manufacture and spreading
  - Low emissions application technologies such as trailing shoe leads to reduced  $\text{NH}_3$  losses and increases the fertiliser replacement value of slurry
- Enter the % of the annual slurry application in the three periods
    - Spring Jan – April, Summer May – June, Late Summer July – October
  - Enter the current and planned application method. Select the method used for the majority of the slurry spread

## 6 The Carbon Navigator Measures - Dairy

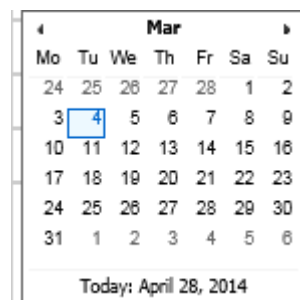
When base data and data for each measure is entered click on update and the results and graphics will be displayed. If some of the graphs do not display look closely at the input data.

### 6.1 Grazing Season Length

Increasing the grazing season length lowers GHG emissions in three ways

- Grazed grass in the early and late grazing season is a higher quality more digestible feed than grass silage leading to reductions in the proportion of dietary energy lost as methane.
- Higher quality feed leads to improvements in animal productivity
- The shorter housing season leads to reduced slurry methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions from storage and energy use from spreading
- € • The financial benefit comes from the improved output due to better quality feed and the requirement to make less silage

- Click in the input cell for Turnout Date – Part Time. A calendar will appear.
- If the month is correct click on the date
- If the month is incorrect click on the appropriate arrow beside the month and select the appropriate month
- Click on the date
- Repeat for other actual and target dates
- Alternatively you can type in the date in the format dd/mmm (03/Mar)



Mar						
Mo	Tu	We	Th	Fr	Sa	Su
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

Today: April 28, 2014

## 6.2 EBI

Increasing genetic merit via EBI has the capacity to reduce emission intensities through four mechanisms

- Improving fertility reduces calving intervals and replacement rates, thus reduces enteric CH<sub>4</sub> emissions per unit of product.
- Increasing milk yield per unit of grazed grass and improving milk composition increases the efficiency of production, which decreases emissions per unit of product
- Earlier and more compact calving increases the proportion of grazed grass in the diet and reduces culling and replacement rates.
- Improved survival and health reduces deaths and disease incidences, reduces replacement rates and emissions
- € • Estimates from surveys on farms indicate that the impact on actual profitability exceeds the predicted level.

- Enter EBI for the previous year. Enter target for 3 years ahead

## 6.3 Improved N Efficiency

The computation is based on LCA figure including emissions related to both the manufacture of Nitrogen and emissions on application Increasing N efficiency can be achieved through

- the increased use of clover in swards thereby reducing N usage
- better soil fertility management
- Effective grazing management leading to high levels of grass production and utilisation
- improvements in the timing and application of fertiliser nitrogen and
- the application of the most appropriate N fertiliser type for the prevailing conditions. (Urea v CAN)
- The economic benefit arises from two factors:
  - € ○ Reducing the amount of Nitrogen applied
  - Urea is cheaper per kg N than CAN or compounds

- Enter the enterprise stocking rate in Kg N / Ha
- Enter the quantity on CAN based N used per Ha on the Dairy enterprise (For any compound the equivalent can be calculated using the following formula (Kg Spread X % Nitrogen) / 27.5
- Enter Kg / Ha Urea based N used on the Dairy enterprise
- If organic manure is imported estimate the Kg N / Ha

(+/- M3 of Slurry \* N Content (2.7 kg /M3) \* Availability (40%)) / Dairy Ha

- Enter Kg of Meals fed / Cow
- Enter Output of Milk Solids / Cow
- Repeat for Targets

## 6.4 Improved Slurry Management

Improving manure management can reduce the GHG emissions associated with manure through a transition from summer application to spring application of manure and the use of low-emission application methods.

- Spring application reduces NH<sub>3</sub> emissions following land spreading due to the more favourable weather conditions at that time of year.
- Storage losses are reduced due to the shorter storage period
- The reduced NH<sub>3</sub> losses increases the fertiliser replacement value of slurry, and therefore reduces the total fertiliser N inputs and reduces associated emissions from manufacture and spreading
- Low emissions application technologies such as trailing shoe leads to reduced NH<sub>3</sub> losses and increases the fertiliser replacement value of slurry
- € • The improved utilisation of slurry reduces the amount of fertiliser to be purchased and thereby increases profitability

- Enter the % of the annual slurry application in the three periods
  - Spring Jan – April, Summer May – June, Late Summer July – October
- Enter the current and planned application method. Select the method used for the majority of the slurry spread

## 6.5 Energy Usage

Energy usage accounts for a relatively small amount of total system emissions on dairy farms. However, they can be significantly reduced. In a detailed examination of 21 farms, electricity consumption ranged from 53 to 108 Watts per litre produced and cost from 0.23 to 0.76 cent per litre produced. Three key areas were identified as having significant potential to reduce energy costs and energy related emissions.

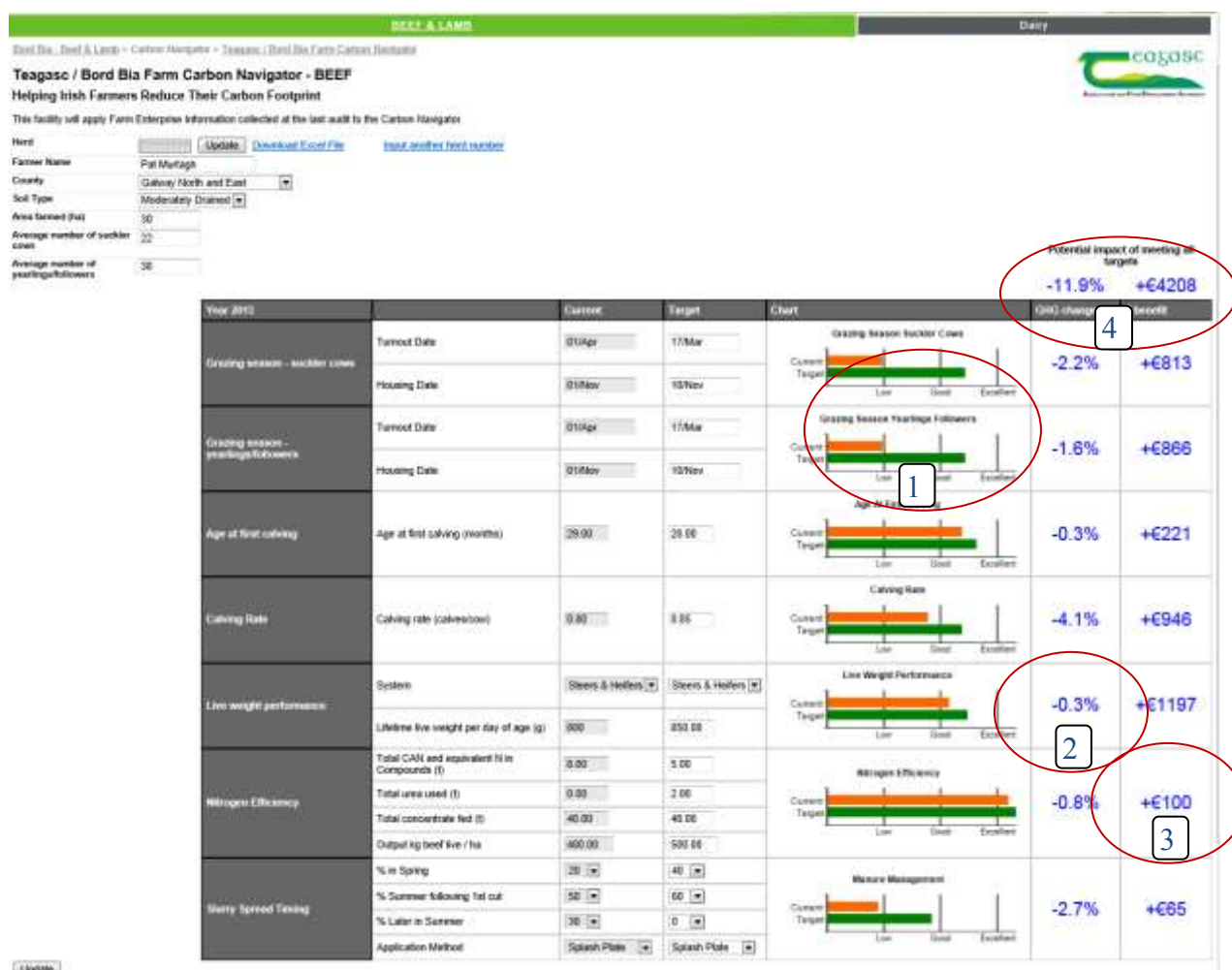
- effective pre-cooling in a Plate Heat Exchanger
- the use of Variable Speed Drive (VSD) Vacuum Pumps and the
- presence of energy efficient water heating systems
- Increase income arises from saving in electricity cost which can be used to offset the capital costs and ultimately to increases in farm income

€

- Tick the box if a plate cooler is used. As many plate coolers do not operate at an optimum level relative to the flow of milk it may be useful to check the temperature of the milk entering the tank from the cooler. Enter the temperature if it can be measured.
- Indicate if a variable speed vacuum pump is used.
- Indicate the type of water heating system used.
- Repeat for Targets

## 6 Interpreting the Results

### 6.1 The Results Sheet



1. The Graphs. The graphs indicate the performance of the farm relative to other farmers. The orange bar indicates a comparison of current performance against other farmers and the green indicates how the farmer would rate if 3 year targets were achieved.
2. The GHG Change Column indicates the predicted % reduction in enterprise GHG emissions from achieving the target performance outlined
3. The € Benefit indicates the increase in profitability of the farm from achieving the target performance
4. The overall impact of all of the measures is set out at the top of the columns. This indicates the overall potential impact on GHG emissions and profitability of reaching all the targets set.

At any point the inputs may be altered and results calculated by clicking on update.

## 7 Printing Results

Printing from the Beef Carbon Navigator is straightforward.

- In you internet explorer screen menu
- Click on **File**
- Click on **Print**
- Select the printer (or click Print for Default)

To preview the printout

- In you internet explorer screen menu
- Click on **File**
- Click on **Print Preview**

## 8 Download Excel Worksheet

The Carbon Navigator is calculated using an excel spreadsheet. At the top of the screen there is a menu item – Download Excel File. This allows the user to download the spreadsheet which contains a more detailed version of the Carbon Navigator.

- Click on Download Excel File
- Select Open, Save or Save As
- Open – Starts excel and opens the file
- Save – Saves to a default folder (which will be difficult to locate)
- Save as – Saves to a folder of your choice
- After saving you will be given an opportunity to open the file

