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NEW ZEALAND AGRI-BUSINESS ADVISORS

"Carbon Neutral Project" – The Farmers

King Country River Care

7/11/2024

Scott “Base” system

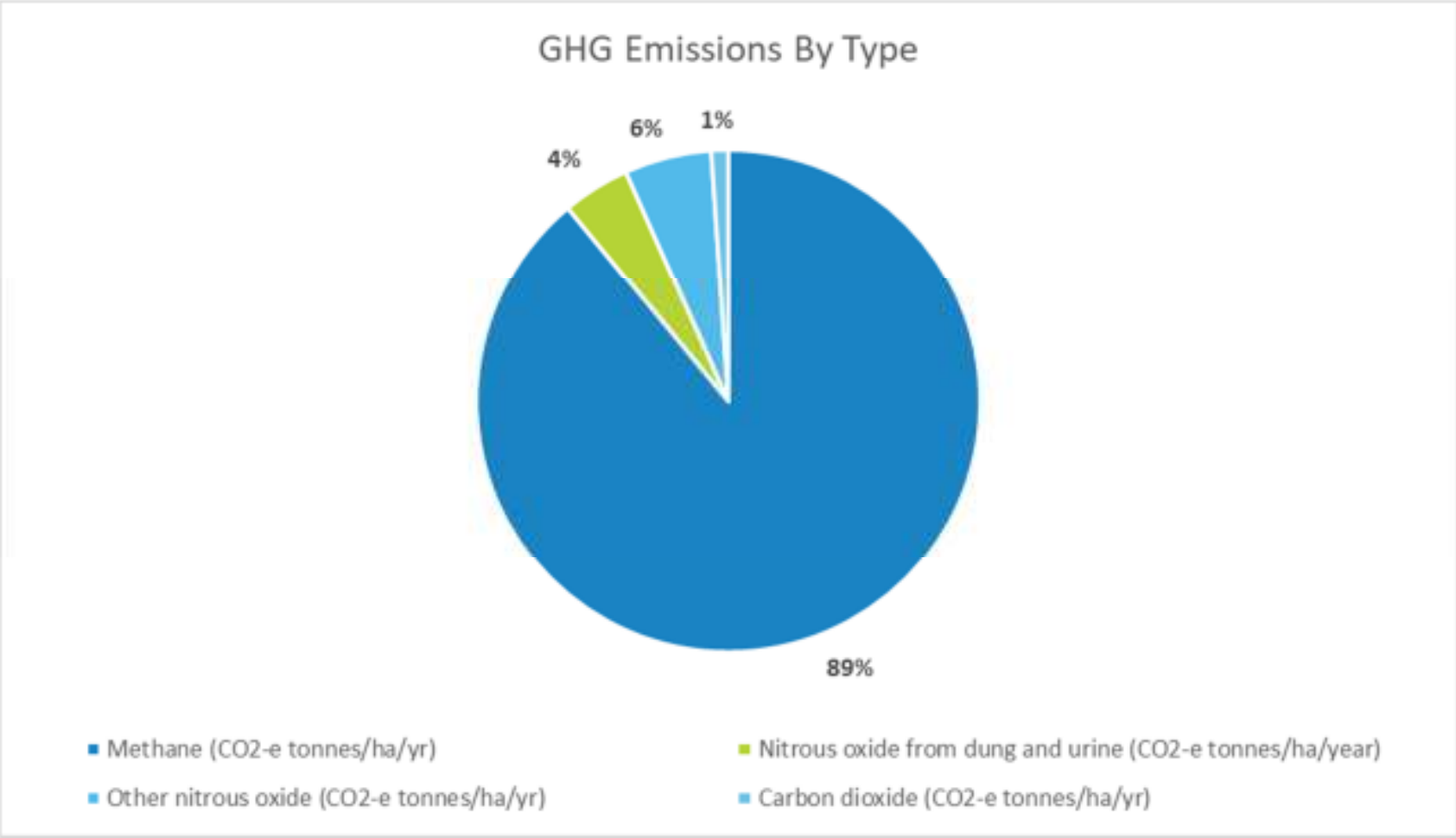
- Related to what Brent has described with key points being:
  - 1,633 ha pasture and bush.
  - Approximately 1,480 ha of pasture.
  - Sheep – 3,000 ewes, 850 replacement ewe hoggets, and 400 sale hoggets.
  - Cattle – 515 VIC cows & R2 heifers, 480 R1 cattle, and 465 R2 finishing steers and heifers.
  - Buy in approximately 250 lambs and 100 mixed sex R2 cattle.
- Meat (carcass) and fibre production of 189 kg/ha
- Farmax farm operating (EBITRD) profitability of $475,000 - $321/pasture ha and $1.69/kg of meat and fibre product.
- Sequestration (tonnes CO_2) modelled to occur from:
  - None from 138 ha of older bush, estuary and other wet retired areas;
  - 5.0 ha of pine at 22.1 tonnes CO_2/ha/year; and
  - 7.3 ha of “younger” bush at 6.8 tonnes CO_2/ha/year.
  - Total of 160.1 tonnes CO_2 sequested per year.

The base system - emissions

Emissions Summary		
Methane (CO2-e tonnes/ha/yr)	2.61	"Average sheep and beef farm emitting **3.6** tonnes CO_2/ha/yr". [1.]
Nitrous Oxide (CO2-e tonnes/ha/yr)	0.29	
Carbon Dioxide (CO2-e tonnes/ha/yr)	0.03	
Total GHG emissions (CO2-e tonnes/ha/yr) - Scope 1 and Scope 2 only	**2.94**	
Emissions from livestock		
Methane	89%	
Nitrous oxide from dung and urine	44%	
Proportion of GHG emissions from livestock	93%	
Other Contaminants		
Nitrogen Loss (kg/total ha)	25.0	
Phosphorous Loss (kg/total ha)	1.17	
Intensity		
Total long-lived gas (Scope 1 and Scope 2) emissions (excluding biogenic methane) per kg of meat and wool (kg CO2-e/kg product)	1.88	
Total Methane (Scope 1 and Scope 2) emissions per kg of meat and wool (kg CH4/kg product)	0.61	
Nitrogen loss per kg meat and fibre produced (kg nitrogen/kg meat and fibre)	0.15	

[1.] https://www.agmatters.nz/farm-types/sheep-and-beef/

The base system - emissions



The scenarios – summary table of differences

Scenario Differences	Base	Scenario 2	Scenario 3	Scenario 4
Pasture area	1,483 ha	1,476 ha	1,476 ha	1,376 ha
Bush and other retired areas	146 ha	146 ha	146 ha	146 ha
Planted area - existing pines	5.0 ha	5.0 ha	5.0 ha	5.0 ha
Planted area - new natives	0.0 ha	2.0 ha	2.0 ha	12.0 ha
Planted area - new "pines")	0.0 ha	5.0 ha	5.0 ha	95.0 ha
Total Sheep	4,300	4,300	4,300	4,300
Cows + R2 Heiefrs (VIC)	515	515	415	415
Yearlings	478	478	528	458
R2 finishing cattle	419	419	491	421
Total Stock Units	13568	13568	13653	12953
SU/ha	9.15	9.20	9.25	9.42

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Lambing % ex ewes (STS)	140%	148%	148%	148%
Lambs from ewe hoggets	700	850	850	850
Lamb carcass weight (kg)	20.5	19.7	19.7	19.7
Number of steers and heifers finished	465	465	539	469
Average heifer carcass weight (kg)	272	272	271	270
Average steer carcass weight (kg)	331	331	328	328
Lambs purchased	250	0	0	0
Cattle purchased (excluding breeding bu	100	100	240	170
Total meat and fibre production	280,934	284,261	281,206	270,512
Meat and fibre/ha	189	193	191	197

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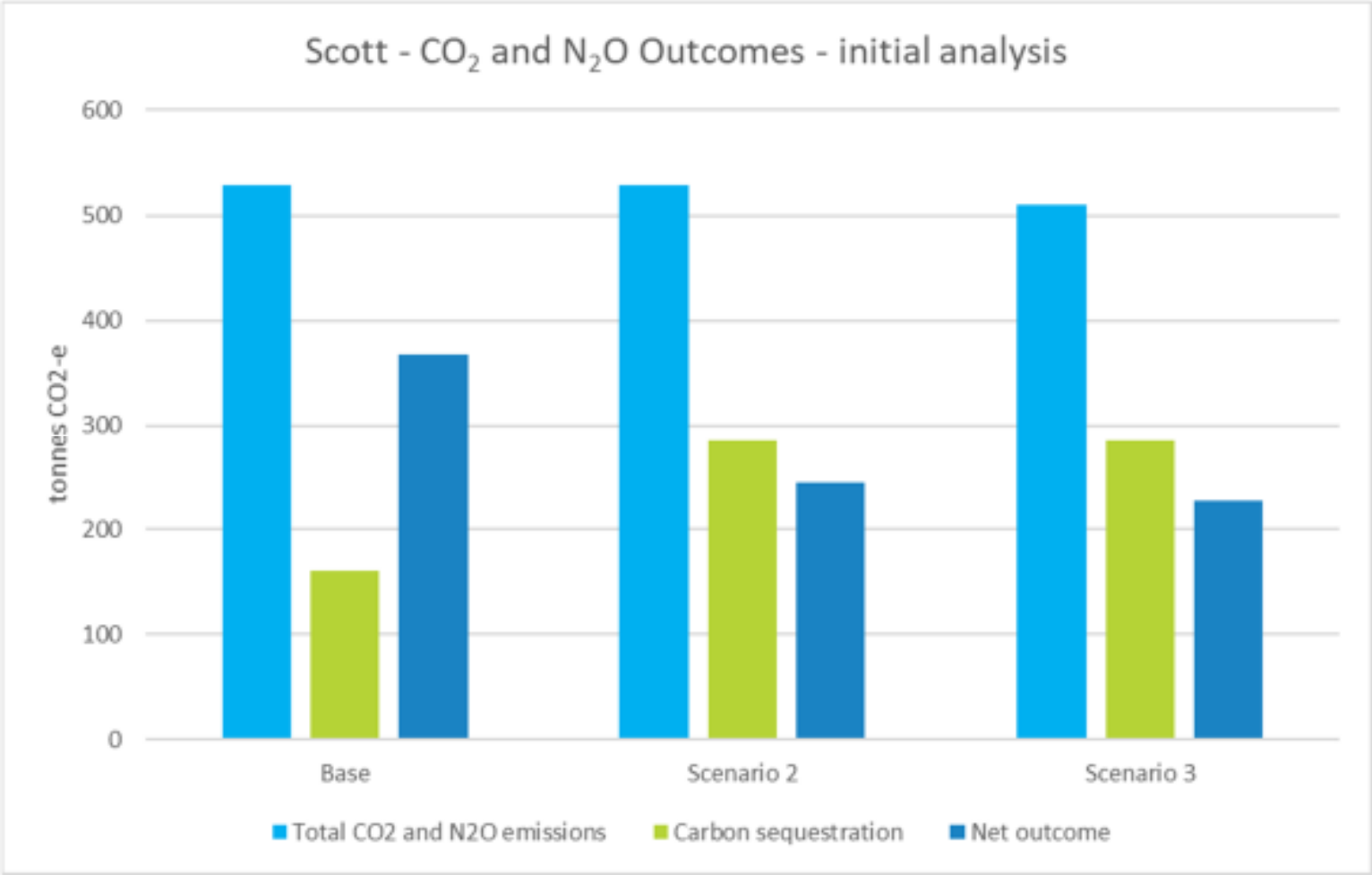
Changes to CO_2 and N_2O



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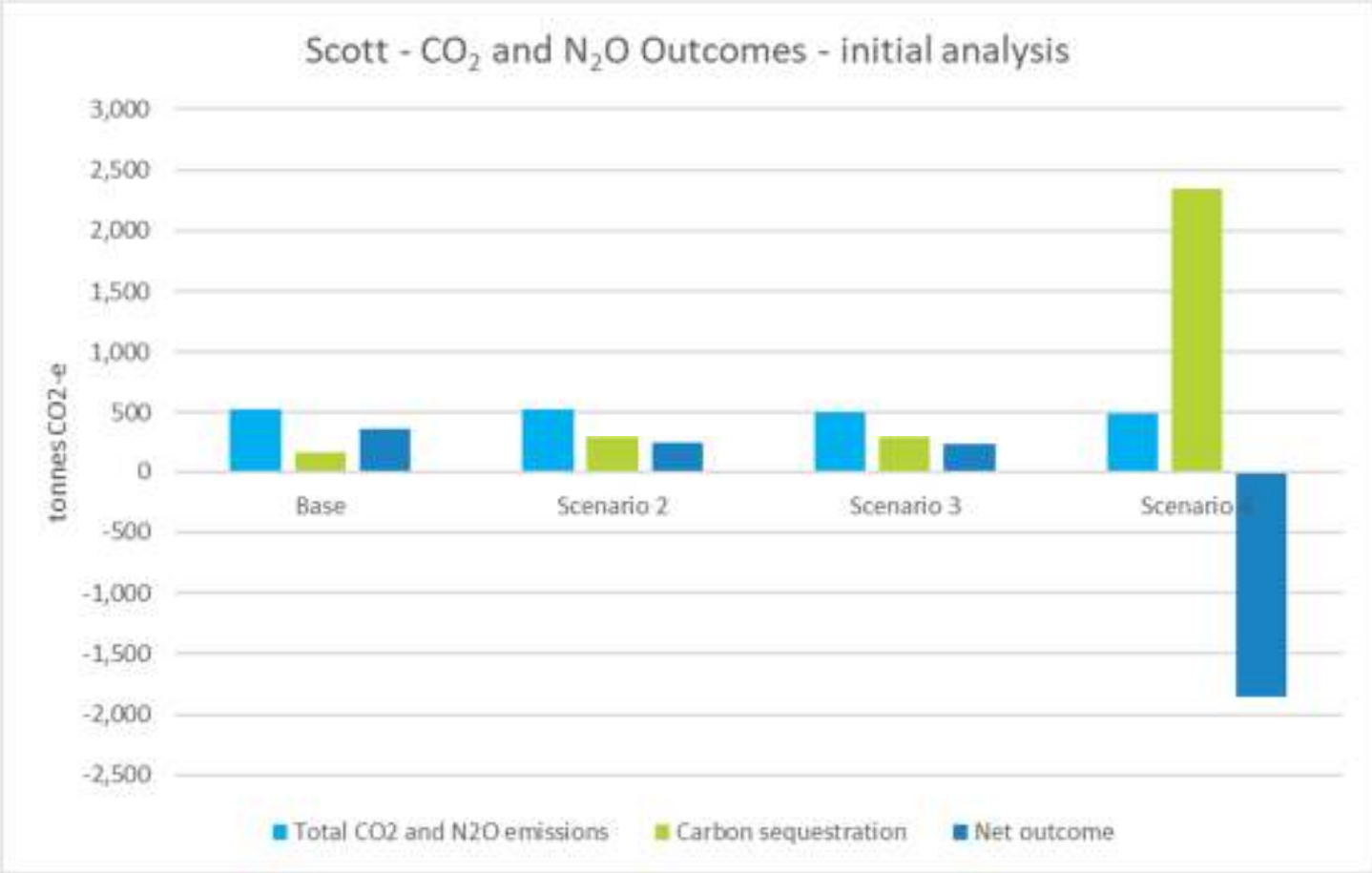

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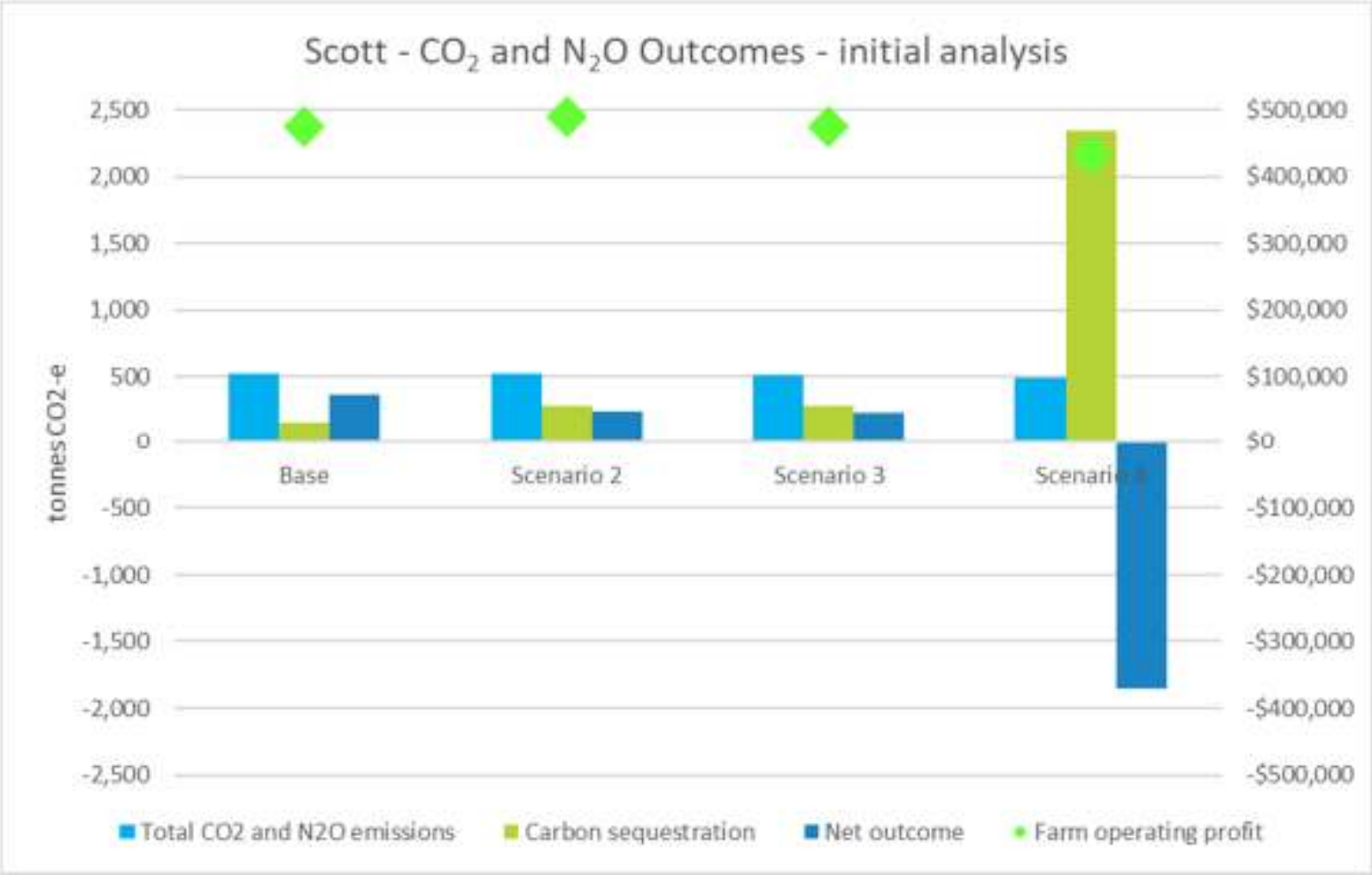

Changes to CO_2 and N_2O

- There will be net-zero carbon dioxide and nitrous oxide emissions options (under the project parameters) for this farm operation.
- Affect on profitability will be minimal.
- But under current rules it will take an investment in planting to create/increase on-farm sequestration to achieve the net-zero position.
- But it is a “jig-saw” … different trees and it takes time for the sequestration to semi- stabilize.

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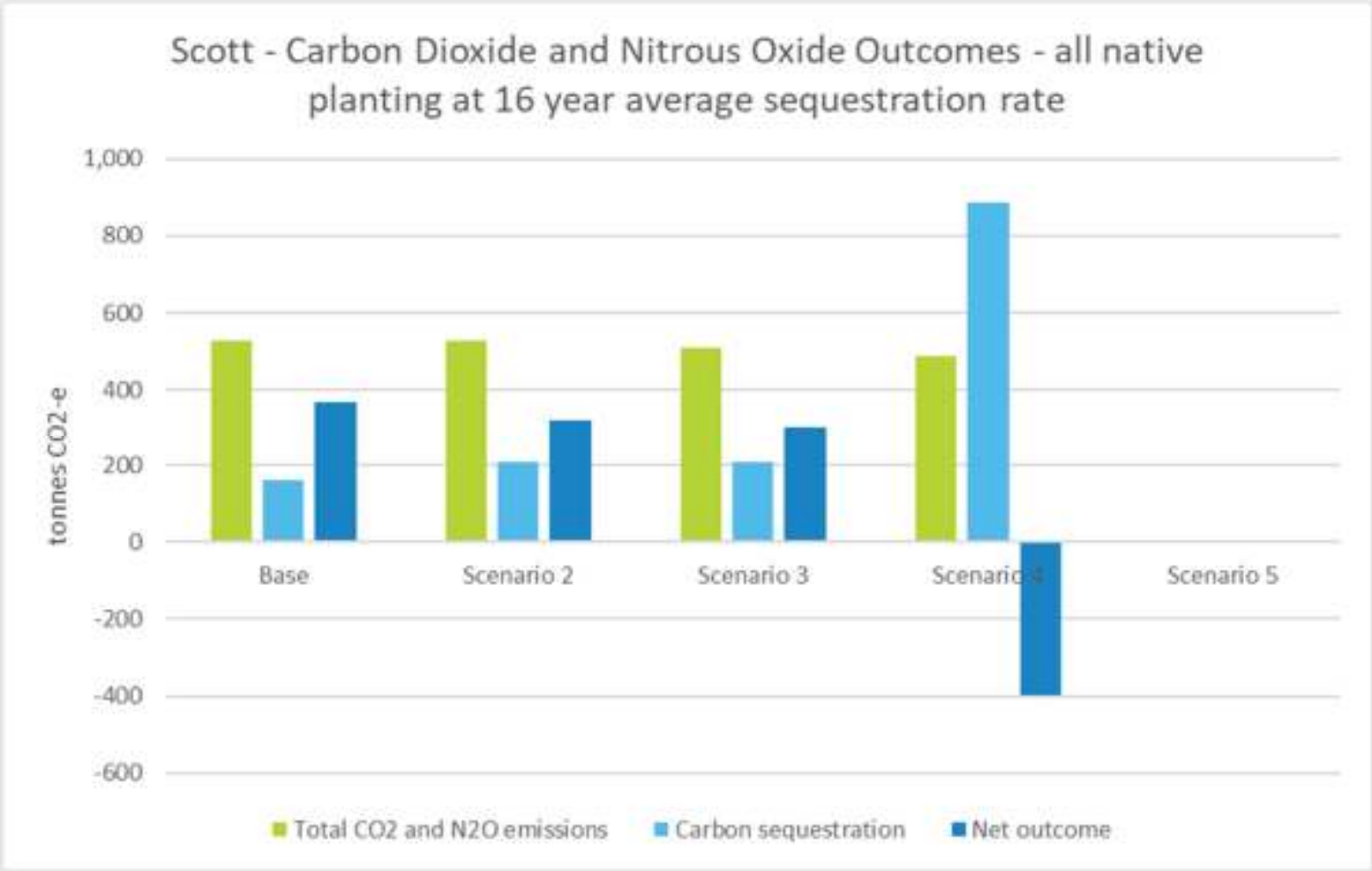

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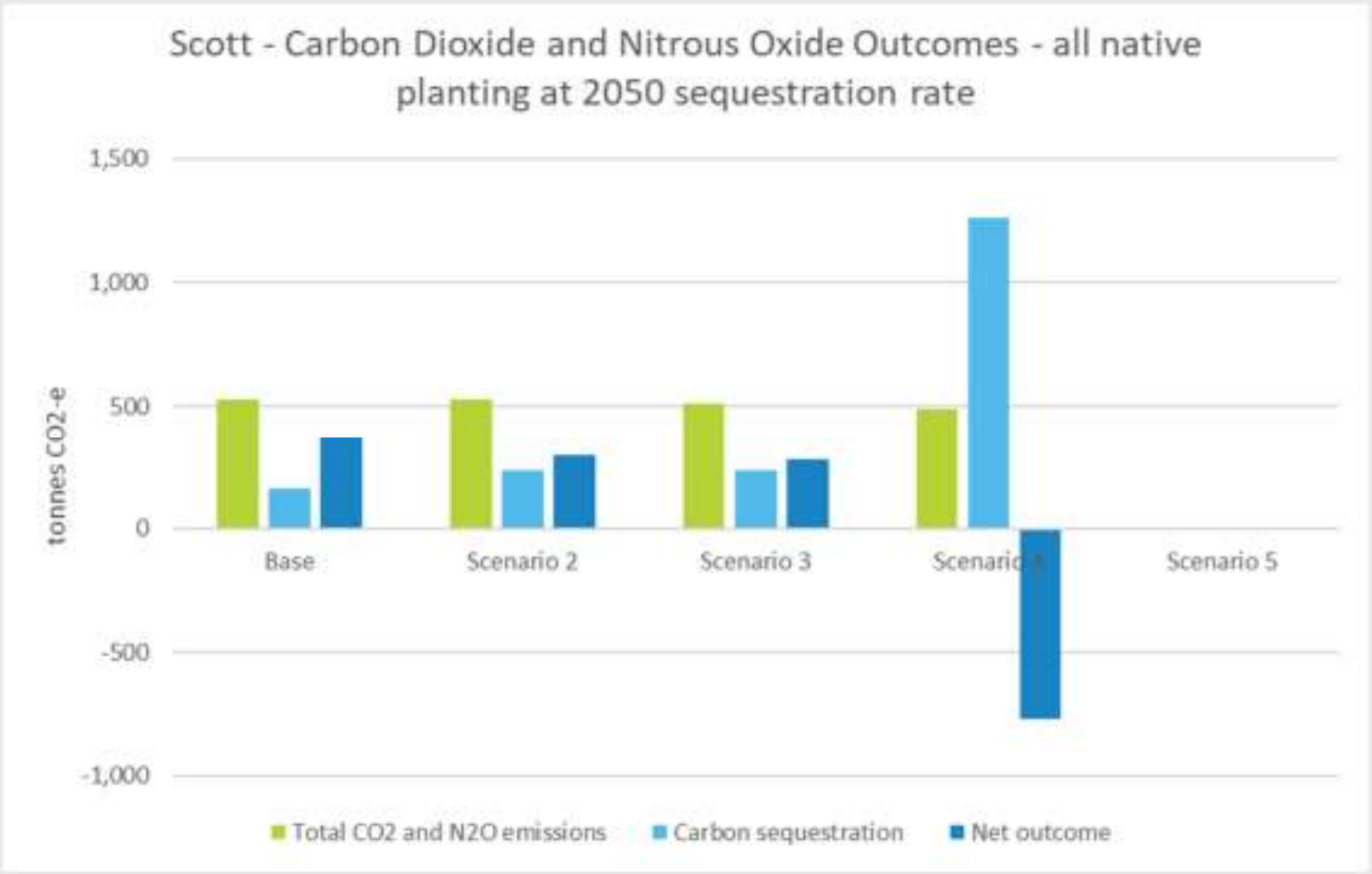
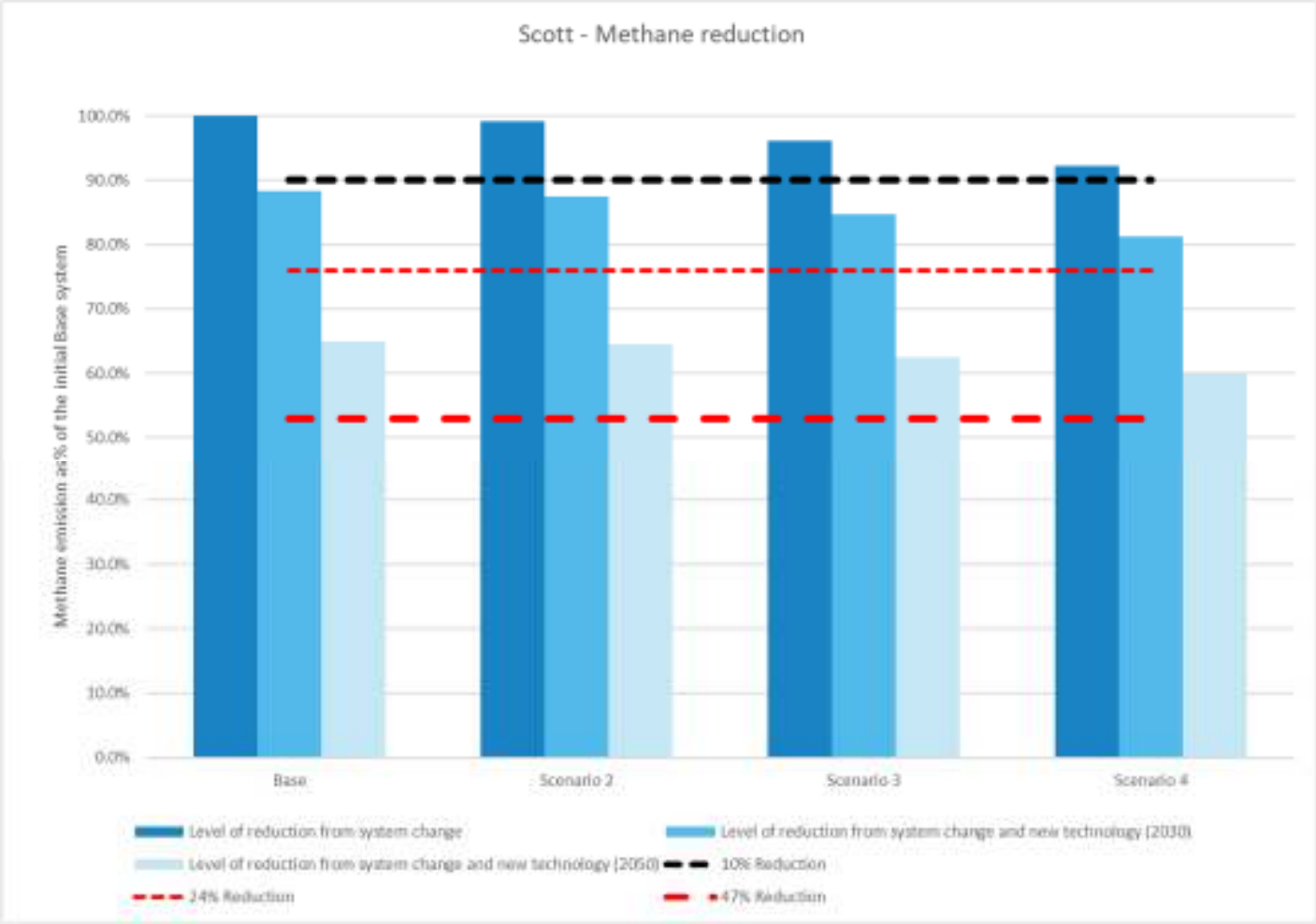


Methane results



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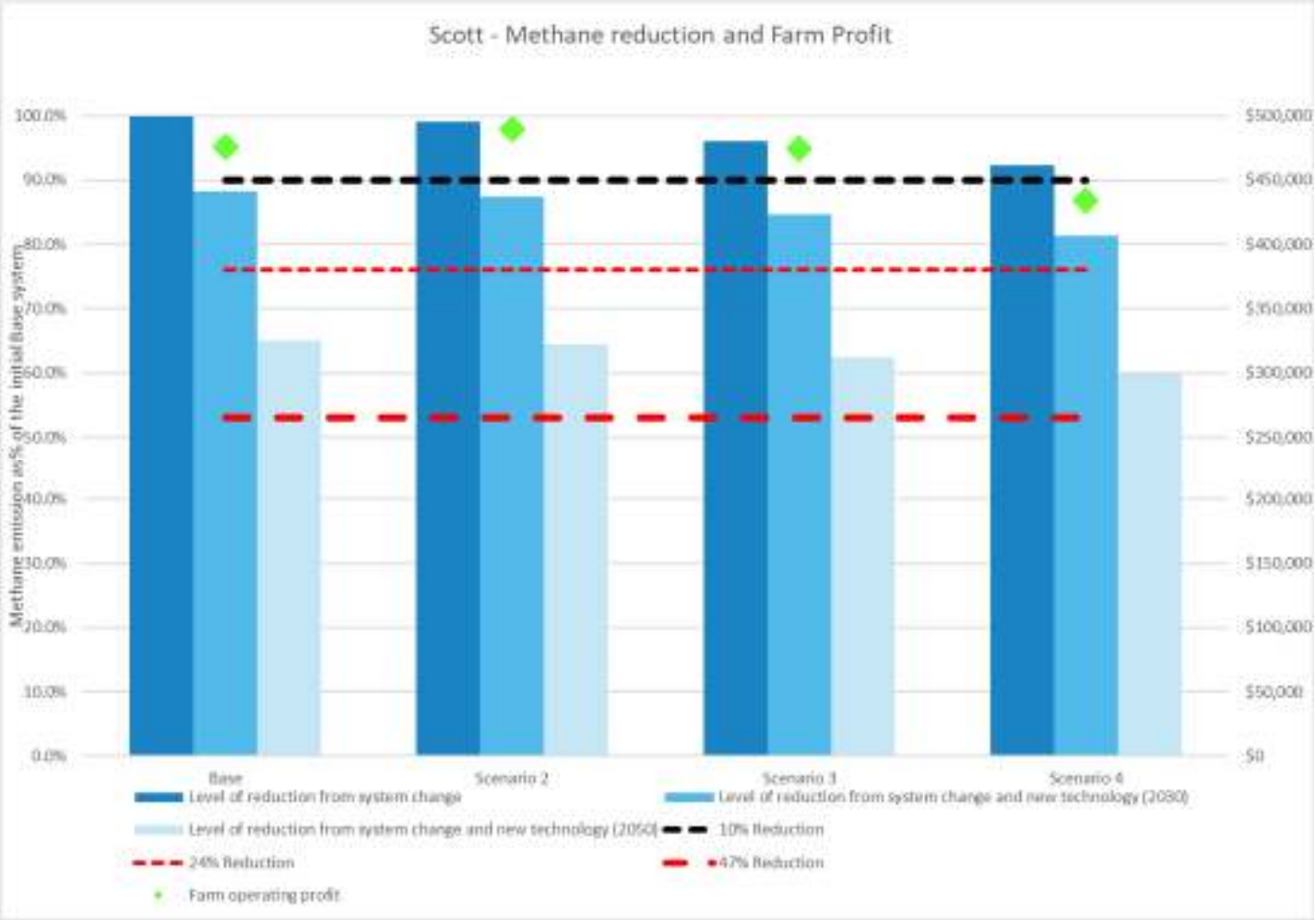
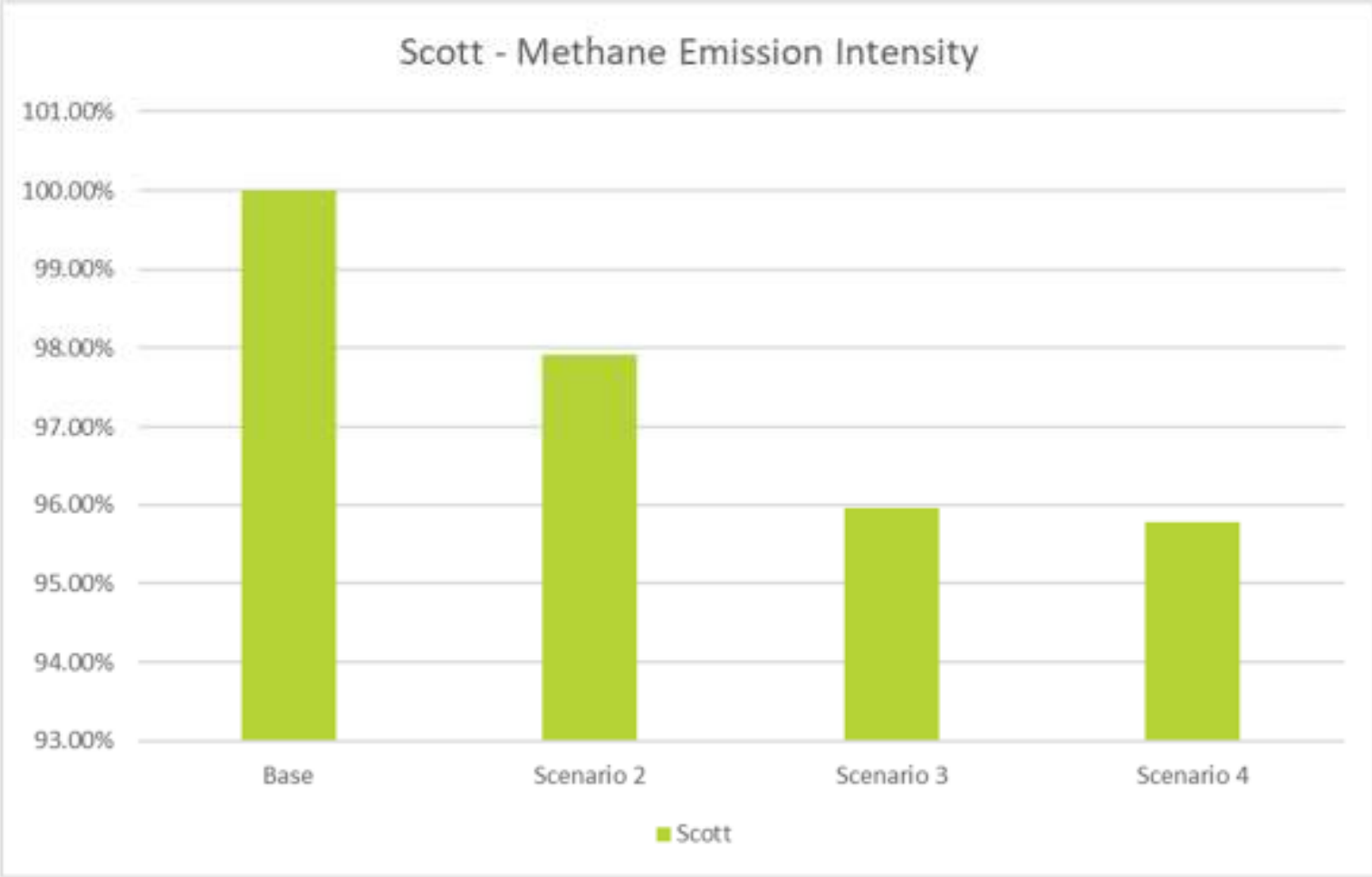


Emissions intensity - methane



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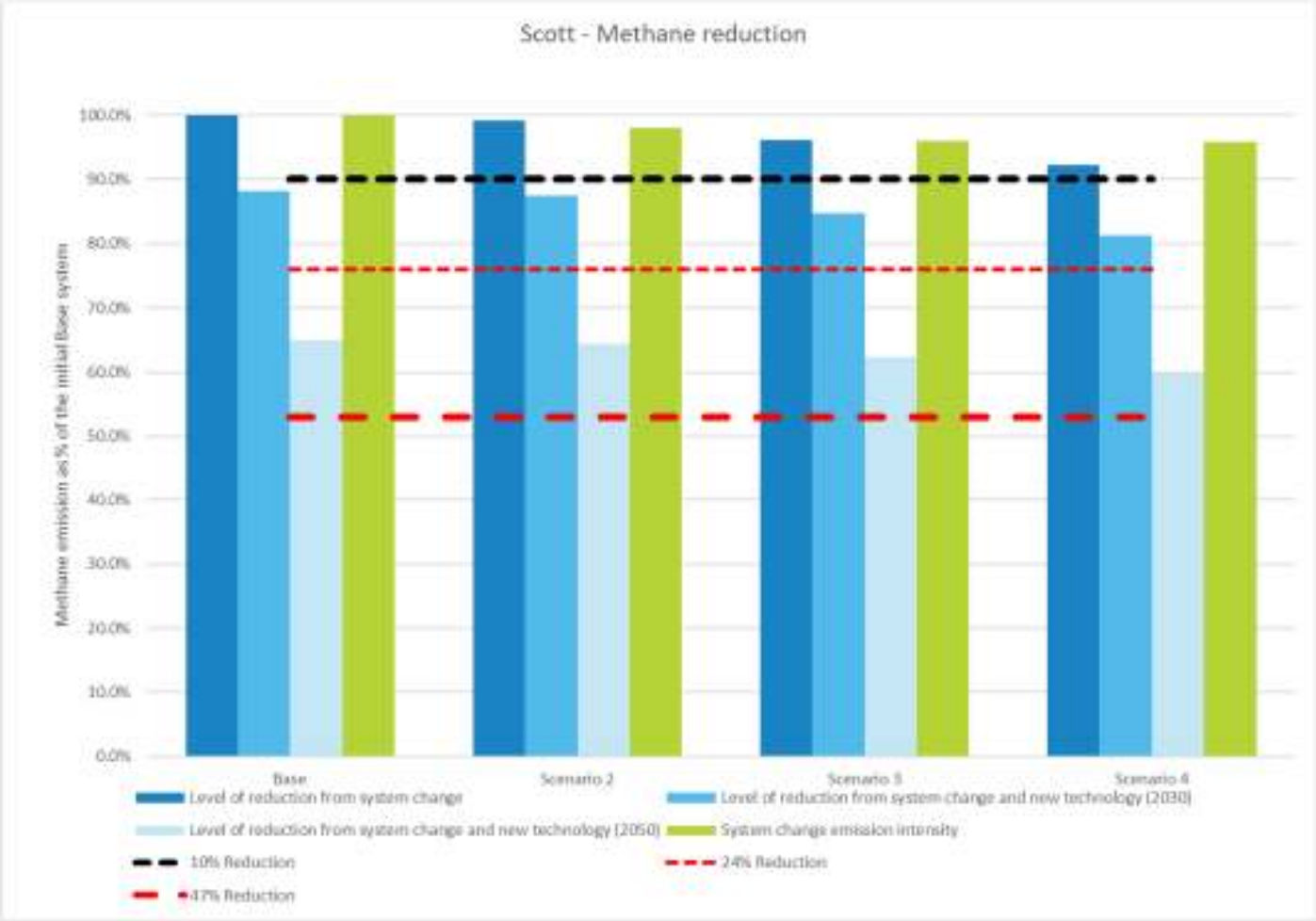
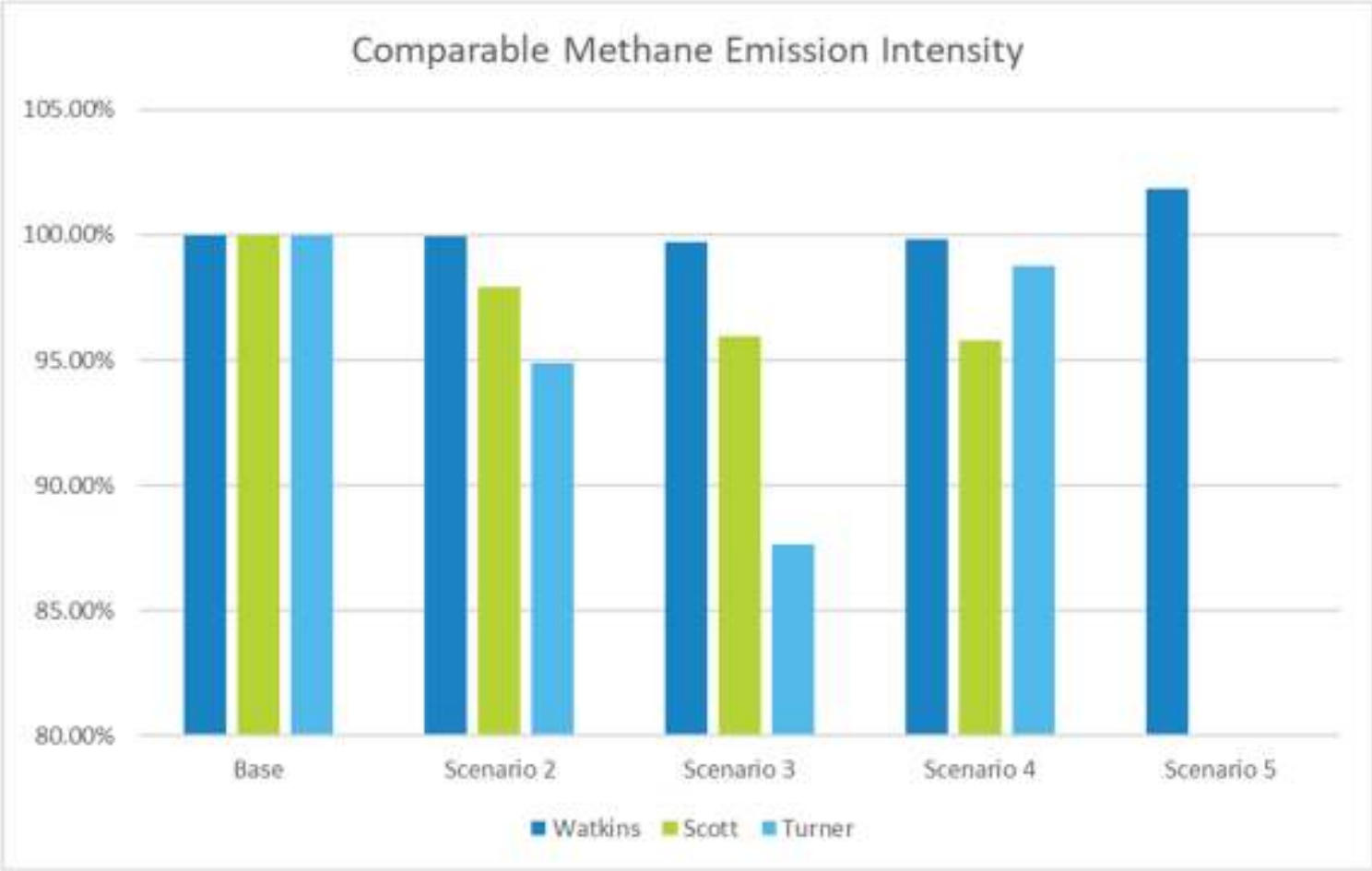
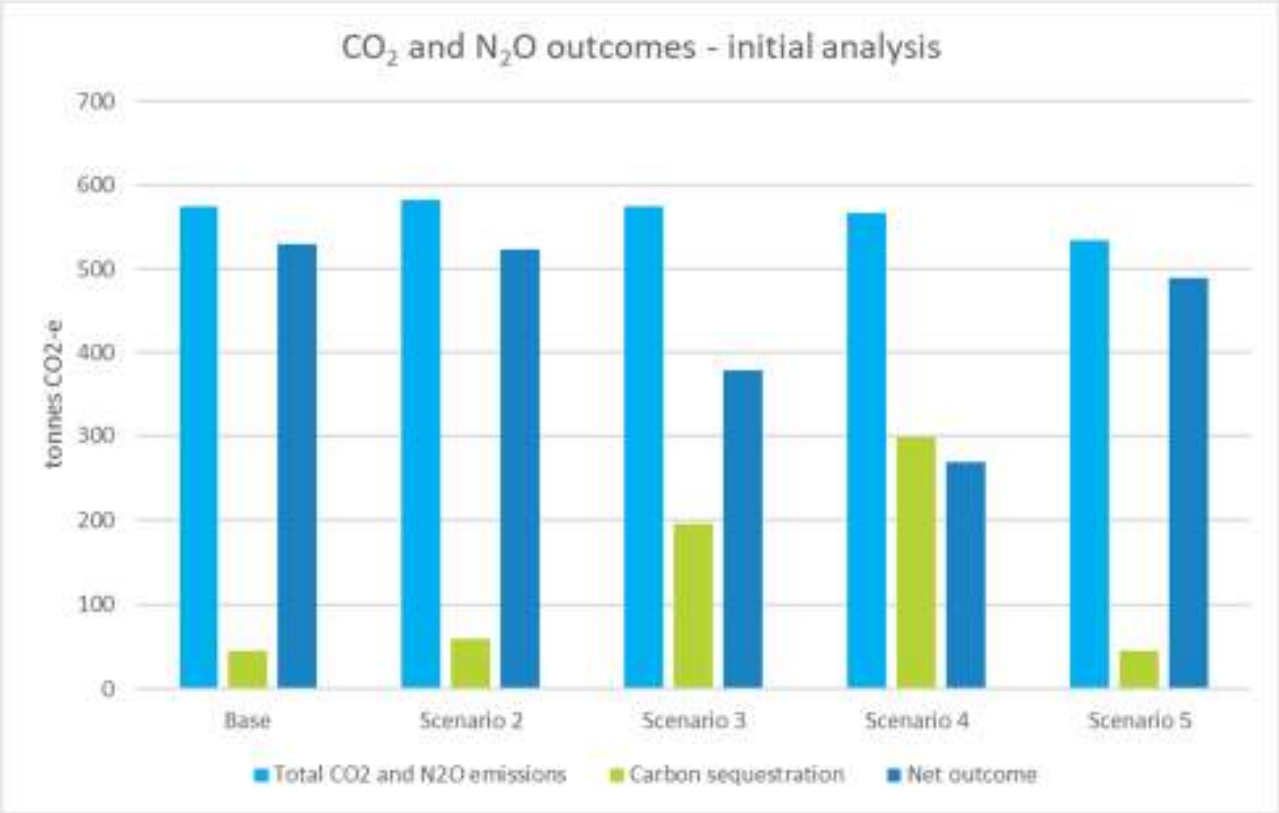


Other farmer results



Other farmer results - Watkins

- Watkins – 365 ha dairy operation with 265 ha milking platform, 95 ha runoff/other pasture, 18 ha other, with an existing 7 ha contributing to sequestration and 35 ha bush and retired areas not contributing.



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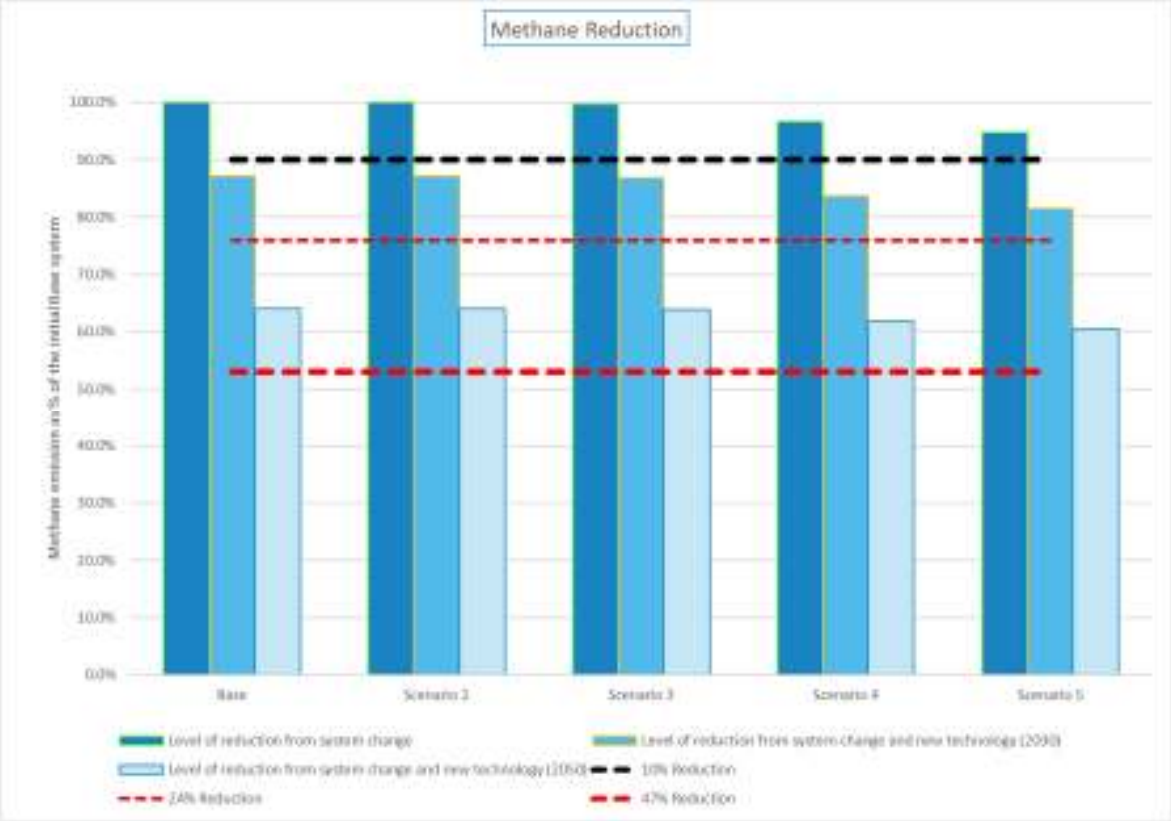
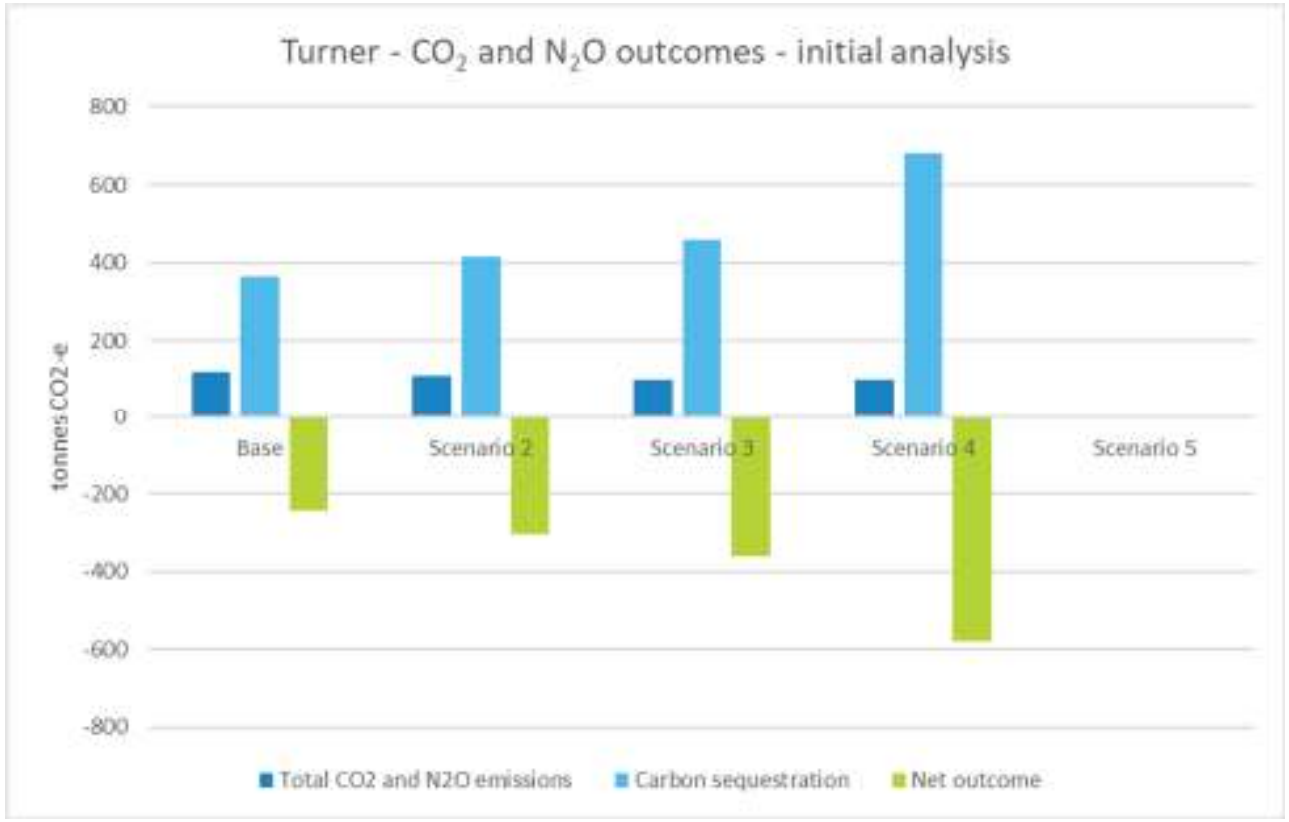


Other farmer results - Turner

- Turner – 381 ha sheep and beef property with existing 15 ha contributing to sequestration and 78 ha bush and retired areas not contributing.



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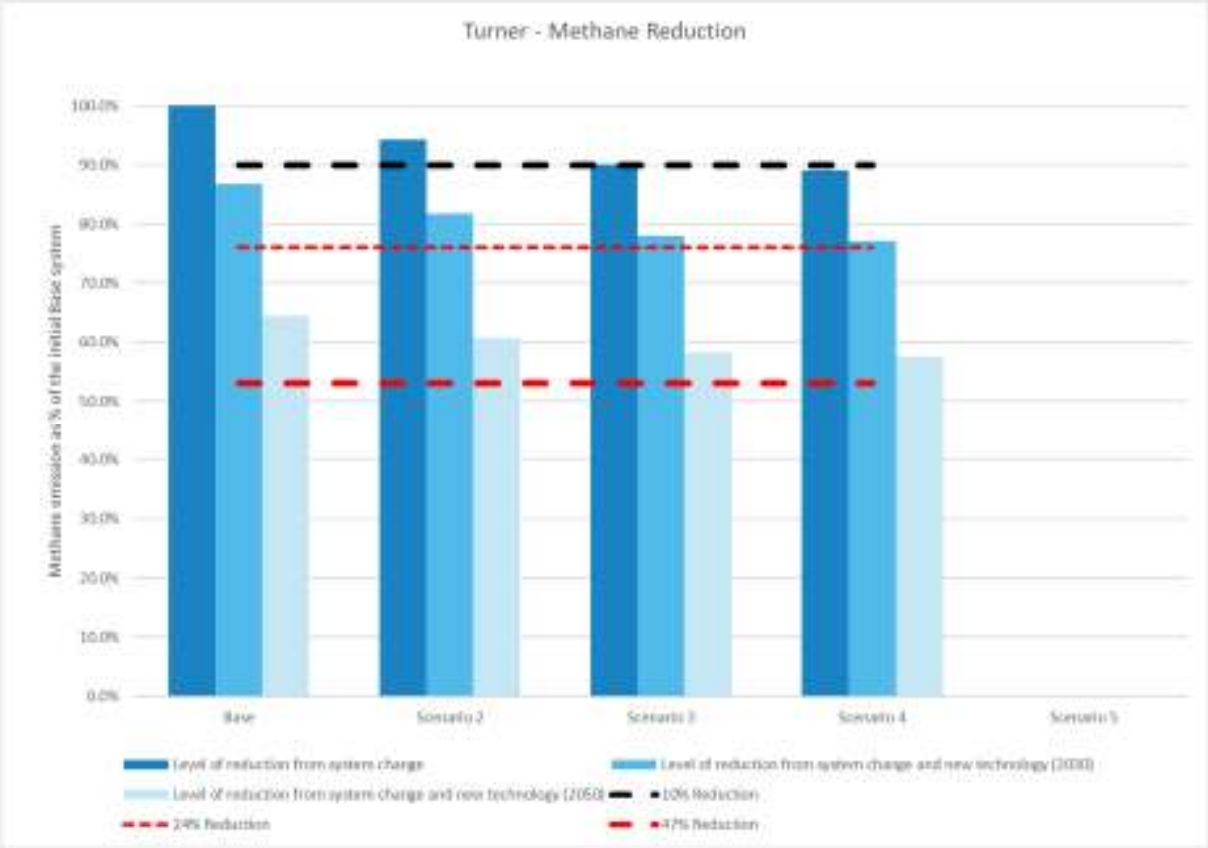

Conclusions

1. Excluding bio-genic methane it is possible to make changes that result in **a net-carbon zero emissions position**.
2. You **maybe in that position now** – this will depend on the area and type of vegetation you have on hand, and what is determined as an allowable rate of sequestration for each different block of vegetation.
3. A reduction in gross methane emissions will require a reduction in feed used – changes that result in **less pasture grown** and/or less feed imported onto the farm.
4. Trees – new trees/vegetation have a role to play, there is flexibility, can be "right tree in the right place" approach.
5. **Unless** you are **dramatically changing** your feed use level, achieving the agriculture sector reduction targets on an individual farm will most likely require the use of **new "lower methane genetics"** and/or the **successful development and use of** new vaccine/inhibitor technology.
6. You can **start a methane emissions reduction plan now**. This will most likely be for your customers (namely our processors) and debt access advantages. There will be a focus on methane emissions intensity and gross methane emissions. If your emissions intensity is improving, you may not have to reduce your gross emissions.
7. BUT … the possibility of a **cost being applied to methane emissions has not gone away**.

What the hell might I do now?

1. You should choose a method of calculating your GHG emissions – which means which model and who – including you! You may have an existing regulatory requirement that this can be linked too.
2. MPI was (and is) building a model for the pending regulatory requirements – but in the meantime …?
3. Understand your existing non-pasture vegetation:
   - Mapping for areas and locations;
   - Description by age and type;
   - Possible contribution to sequestration; and
   - Remember – can only "sell it once".
4. Keep learning about this issue:
   - There is unlikely to be a magic bullet that makes it go away completely; and
   - In the future it will likely link into other considerations – freshwater management and biodiversity.
5. Ask about what is involved to get premium for your product or a discount on your loan – or is it just the new BAU?
6. Listen out for what is happening in the industry and regulatory space. Please contribute your thoughts to that process.

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