Report No. 13.2 **Byron Shire Council's Emssions Reporting 2015/16 and 2016/17**
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Planning Policy and Natural Environment

Summary:

In March 2017 Byron Shire Council adopted a zero net emissions target for its operations which increased its ambition from the previous reduction target of 30%. Council has been actively implementing emission reduction strategies and reporting on emissions since 2004. This report details a new emissions baseline for the 2015/16 financial year and reports on the emissions profile of Council for the 2016/17 financial year.

Using the National Greenhouse and Energy Reporting (NGER) methodology emissions were calculated across Council's six sectors for scope 1 (eg. direct emissions such as burning diesel or unleaded fuels) and scope 2 emissions (eg. indirect emissions that come from using electricity produced by the burning of coal at another facility). From 2015/16 to 2016/17 Council experienced a net increase of emissions moving from 25,500 tonnes to 26,300 tonnes of equivalent carbon dioxide (t CO2e).

The development of an Emissions Reduction Strategy, which will replace the existing Low Carbon Strategy has commenced and is the subject of another report titled 'Emissions Reduction Strategy' to this Council meeting.

RECOMMENDATION:

1. **That Council note this report.**

2. **That the calculation of sewage treatment plant fugitive emissions be outsourced using Water and Sewer funds to create an excel model using the NGER methodology that can be used for future reporting years.**

Background

Byron Shire Council adopted the Low Carbon Strategy in 2014 which had the target of reducing Council emissions by 30% from the 2003-2004 levels by 2020. The Low Carbon Strategy identified ways for Council to pursue opportunities for a low carbon, less oil-reliant future. It contained 87 project actions that covered the following areas of carbon, energy efficiency, transport, staff and community engagement, waste, peak oil and water. 100% of the 35 Year 1 priority actions in the Low Carbon Strategy were completed or in progress. The remaining actions will be considered in the preparation of a new Emissions Reduction Strategy.

This report quantifies Council's emissions profile in order to create a new base line for the 2015/16 financial year to suit the Zero Emissions Target as well as report on the 2016/17 financial year emissions.

Zero Net Emissions Target

In March 2017 Council resolved (***Res. 17-086*** relevant parts):

3. That Council commits to achieving a 100% Net Zero Emissions Target by 2025 in collaboration with Zero Emissions Byron (ZEB).

5. That Council commit itself to source 100% of its energy through renewable energy within 10 years.

6. That Council supports the goals of Zero Emission Byron for a Net Zero Emissions Shire in the areas of building, energy, land use, transport and waste.

Adoption of baseline and National Greenhouse and Energy Reporting (NGER) methodology

To align with the Zero Emission Byron (ZEB) ambition, a base line of 2015/16 and a target year of 2025/26 were assigned for Council's emissions profile. To align with a national methodology for monitoring and reporting emissions that provides all relevant calculations and processes for a local government, the "National Greenhouse and Energy Reporting" (NGER) methodology was implemented. Zero Emissions Byron has advised that the NGER methodology will be compatible with their emissions profiling of the Byron Shire community.

Scope of Monitoring and Reporting

In line with the NGER methodology Council will be monitoring and reporting on Scope 1 and 2 emissions:

- **Scope 1** greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity at a facility level. Scope 1 emissions are sometimes referred to as direct emissions. Examples are:

  a) emissions from the burning of diesel or unleaded fuel in vehicles
  b) fugitive emissions, such as methane emissions from landfills or sewage treatment plants

- **Scope 2** greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity. For example, 'indirect emissions' come from the use of electricity produced by the burning of coal in another facility.

Apart from scope 1 and 2 emissions, there also exist scope 3 emissions in the running of any business. Scope 3 emissions come from indirect sources other than electricity. Some examples include contracted services and flying on a commercial airline by a person from another business. Scope 3 emissions will not be reported as part of Council's emissions profile due to the significant

staff resourcing cost involved in trying to procure the data, and in some instances the lack of data available to report.

When Council made its first commitment to reducing greenhouse gas emissions in 2004 the *NGER Act 2007* did not exist. Hence emission sectors such as landfill and sewage treatment plant fugitive emissions were not included. Fugitive emissions are emissions of gases or vapours from pressurised equipment due to unintended or irregular releases of gases. Now with greater understanding of how emissions are created, Council has been able to calculate and include fugitive emissions in its profile to more holistically describe its emissions impact. The scope of Council's emission sectors will be categorised as follows:

a) General Electricity
b) Streetlights
c) Fleet
d) LPG Bottled Gas
e) Landfill Fugitive Emissions
f) Sewage Treatment Plant Fugitive Emissions.

Emissions Sectors of Byron Shire Council

Figures 1 and 2 below show percentage make up of each sector and the total emissions in tonnes for the two reporting years respectively. Together they show the significant contribution to Council's emissions profile from fugitive emissions escaping from the landfill and sewage treatment plants.

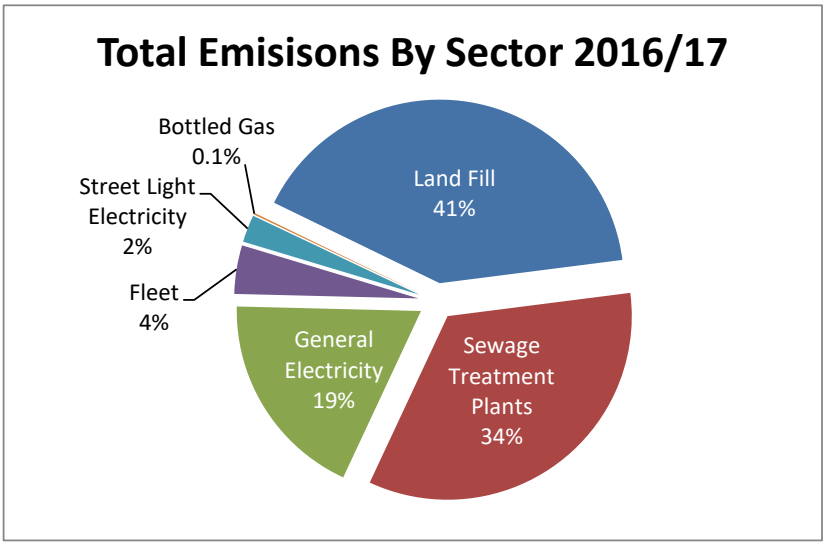

Figure 1 – Total Emissions by Sector 2016/17

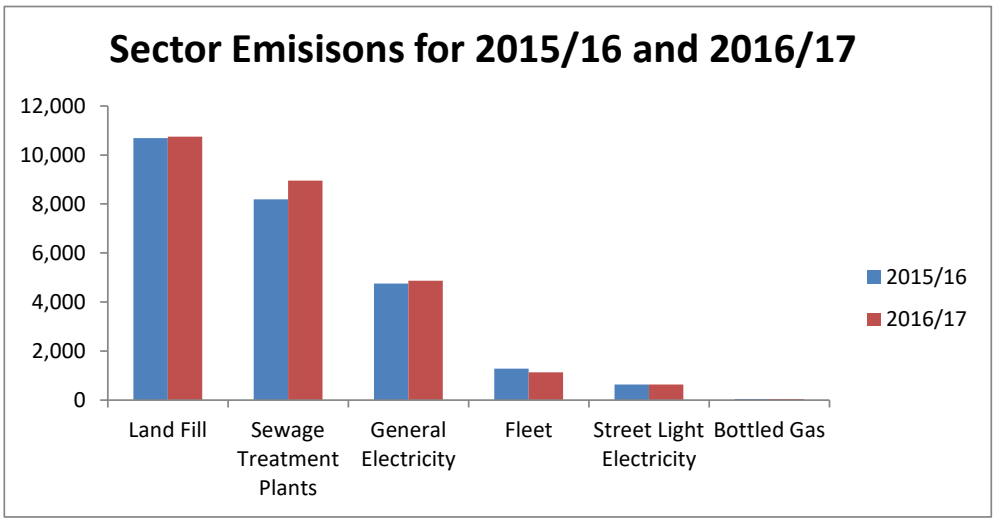

Figure 2 – **Byron Shire Council Emissions by Sector**

From the 2015/16 baseline to 2016/17 Byron Shire Council has experienced a net increase in emissions moving from approximately 25,500 tonnes to 26,300 tonnes of equivalent carbon dioxide (t CO2e).

Figure 3 below displays the increase in context to the zero net emissions target. In all instances throughout this report the projections towards the zero net target has been displayed as linear. This is not to say that Council's journey towards the target will in fact be linear. At this stage it is impossible to accurately project the reduction path without the Emissions Reduction Strategy being written and key major projects defined and time lined. This report does not seek to outline in depth how the target will be reached but will provide the inventory of emissions for the baseline and current emissions profile so that such planning can occur meaningfully.

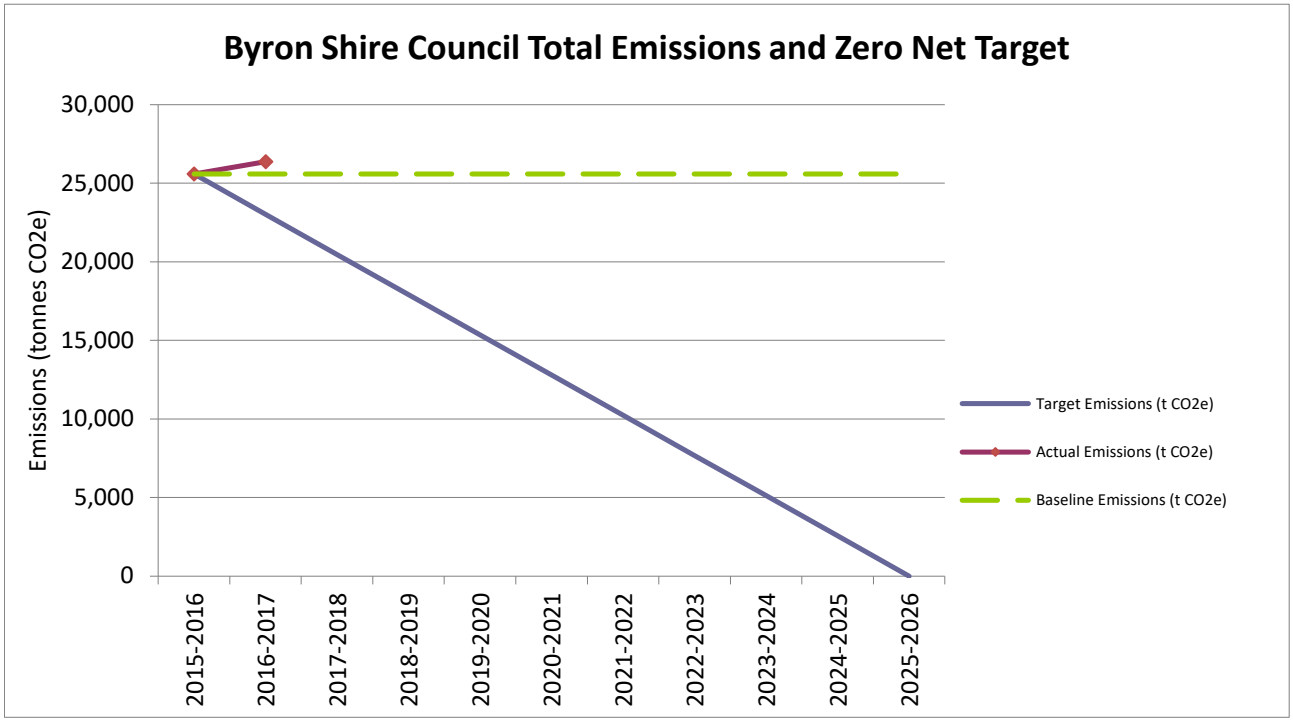

Figure 3 – **Byron Shire Council total emissions and zero net target**

a) General Electricity

The general electricity sector increased by approximately 137,000 kWh from 2015/16 to 2016/17. This 115 tonne increase has resulted in being 590 tonnes above the projected target of 4,275 tonnes for 2016/17. See Figure 4 and Table 1.

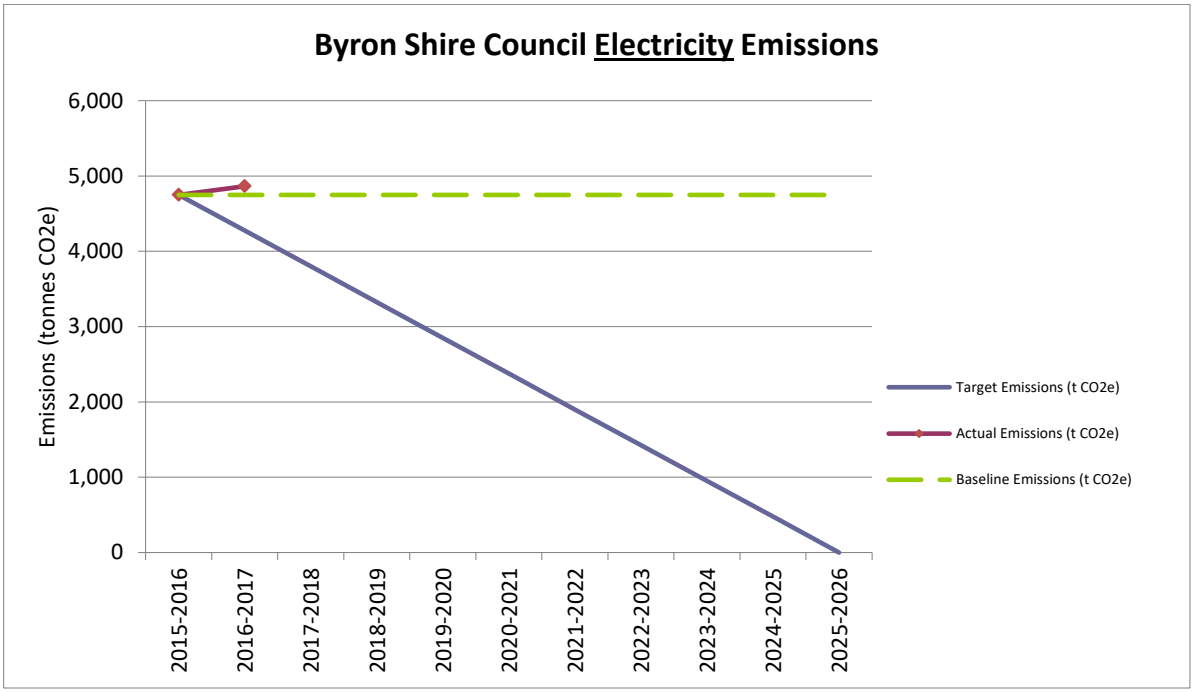

Figure 4 - Byron Shire Council Electricity Emissions

Table 1: Electricity Emissions

	2015-2016	2016-2017
Consumption (kWh)	5,654,481	5,791,542
Cost ($)	$1,155,601	$1,205,135
Base Line Emissions (t CO2e)	4,750	4,750
Target Emissions (t CO2e)	4,750	4,275
Actual Emissions (t CO2e)	4,750	4,865
Trending (t CO2e)		+590

Table 2 below shows the cost of electricity used across each Council asset type to put into perspective the cost of the emissions.

Table 2: Cost of Electricity by Asset Type

Asset Type	2016/17 Cost ($)	% of Total
Wastewater Collection & Treatment	$723,211	60
Administration Building	$108,485	9
Caravan Parks	$76,410	6
Pools	$48,536	4
Sports Fields	$48,444	4
Water Supply	$43,656	4
Libraries	$41,182	3
Community Buildings/Halls	$37,439	3
Other	$77,772	6

***NB Costs and consumption are not directly related due to the impact of demand charges and fees. (eg The water pumping infrastructure makes up 4% of Council's costs but not 4% of its electricity use).*

Figure 5 below shows the proportion of electricity used from each asset type with the waste water collection and treatment sector using 65% of the total. The significance of the waste waster sector dominates the energy story for Council and increases in this area can engulf savings in other areas rapidly. For example the West Byron Sewage Treatment Plant had a 128,947kWh increase between 2015/16 and 2016/17 from a combination of increased pumping of re-used water to Byron Bay, extra flows and the addition of treating landfill leachate. This increase hides the significant 7,445 kWh savings from the LED lighting retrofit program at the depot.

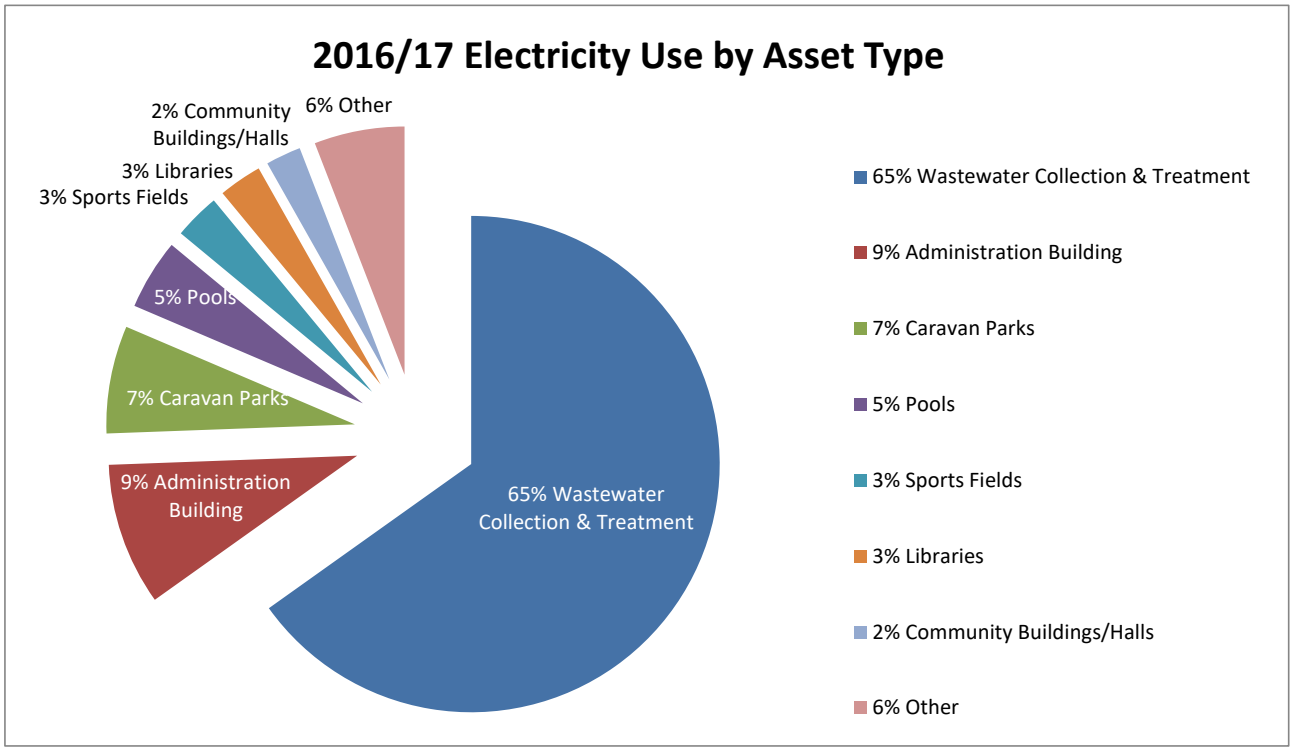

Figure 5 – 2016/2017 Electricity Use by Asset Type

Energy efficiency measures continued to be implemented across Council but it is apparent that savings created in the waste water collection and treatment sector are of high priority. There will always be a need for large energy consumption in this sector and a move to renewable energy sources will be a necessity to meet the zero net emissions target.

A detailed analysis of Council's available feedstocks for Bio Energy was undertaken in early 2017 which showed there are enough resources to warrant a facility in the Shire. A pre-feasibility study has been commissioned into the type of technology appropriate for Council's feedstocks and the projected cost benefit of such a project. The results of the pre-feasibility study are due in early 2018 and will be a critical part of the waste water collection and treatment sectors transition towards zero net emissions.

b) Streetlights

The streetlight sector is a significant user of electricity and is highly regulated via a service agreement with Essential Energy. The 8,200 kWh increase is attributed to a number of streetlights being installed in new subdivisions in Mullumbimby and Bangalow. As urban areas expand it will be important to ensure the most energy efficient option is chosen wherever possible.

Planned reduction measures in this sector include the commitment to a recent offer by Essential Energy to conduct a bulk replacement of streetlights to LED technology for Category P (low traffic residential) areas. Works are scheduled for November 2018 and will create a substantial energy saving but will not show a decrease in energy use until 2019.

Figure 6 and Table 3 show the emissions profile of the streetlight sector. Council is trending at 63 tonnes above the target emission of 572 tonnes CO2e for the 2016/17 financial year. The slight 1 tonne reduction in actual emissions, despite the increased consumption of kWh, is due to the lowering of the national emissions factor for grid purchased electricity due to more renewable energy being on the national network generally.

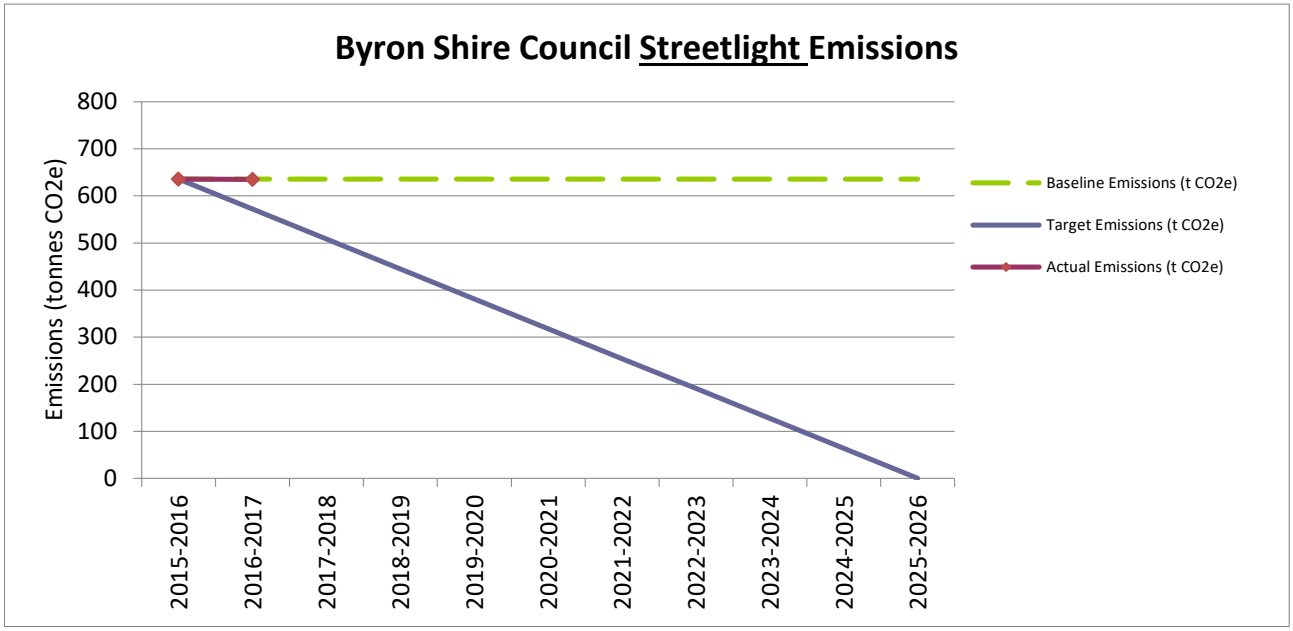

Figure 6 – 2016/2017 Byron Shire Council Streetlight Emissions

Table 3: Streetlight Emissions

	2015-2016	2016-2017
Consumption (kWh)	756,699	764,912
Cost ($)	$314,425	$336,809
Base Line Emissions (t CO2e)	636	636
Target Emissions (t CO2e)	636	572
Actual Emissions (t CO2e)	636	635
Trending (t CO2e)		+63

c) Fleet

Emissions from Council's fleet sector includes all diesel and unleaded petrol consumed from both the bulk fuel stores at the depot, quarry and landfill and the fuel used in the passenger vehicles issued via star cards at commercial fuel stations.

The emissions attributed to Council's fleet reduced from 1,279 tonnes to 1,128 tonnes. This 151 tonne decrease places this sector 23 tonnes ahead of the target projection for the 2016/17 financial year, refer to Figure 7 and Table 4.

When preparing this year's emissions inventory for the fleet sector, a major flaw in the Authority data capture function was identified for bulk fuel use, which removed the ability to attribute fuel issued to individual plant numbers. As such, the emissions for the bulk fuel had to be calculated from "delivery purchases" as opposed to "fuel stock issues". Unfortunately this has meant that it is

impossible to drill down further to ascertain the reason for the reduction in fuel usage. Avenues are being investigated to rectify this situation and move to a more digital way of issuing fuel at the depot. This will enable more detailed analysis and tracking of Council's bulk fuel use in the next reporting year.

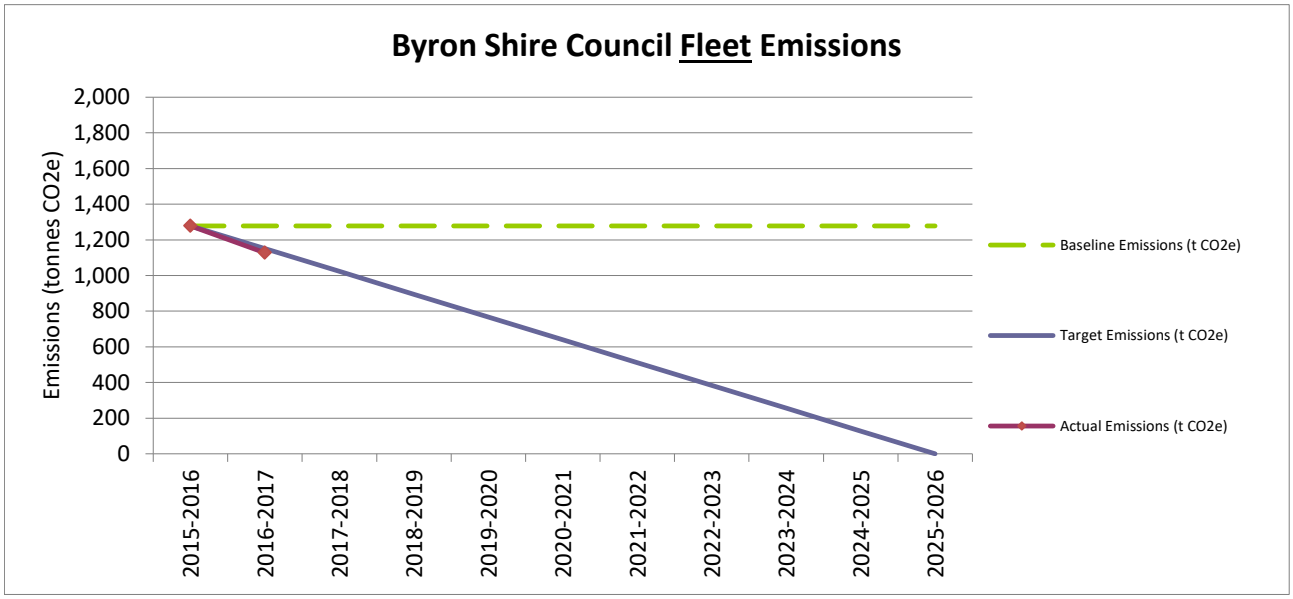

Figure 7 – 2016/2017 Byron Shire Council Fleet Emissions

Table 4: Fleet Emissions

	2015-2016	2016-2017
Consumption (kL)	482	427
Cost ($)	$482,922	$438,480
Base Line Emissions (t CO2e)	1,279	1,279
Target Emissions (t CO2e)	1,279	1,151
Actual Emissions (t CO2e)	1,279	1,128
Trending (t CO2e)		-23

d) LPG Bottled Gas

Byron Shire Council uses LPG bottled gas in both its holiday parks and at Sandhill's Child Care Centre. The emissions impact of bottled gas was 41 tonnes in the 2015/16 financial year reducing to 39 tonnes in 2016/17 shown in Figure 8 below. Despite the reduction it was not quite enough to meet the projected target of 37 tonnes for the 2016/17 financial year. The primary user of bottled gas is the First Sun Holiday Park which accounts for 75% of the total. Bottled gas is used for boosting the solar hot water system at the amenities block (installed 2014) and as instantaneous gas hot water heating in all the cabins. Water saving shower heads have already been installed and there is minimal other efficiencies to be gained.

For the minimal cost to Council for the gas and the minimal emissions impact of this sector, it is recommend that this sector be offset by the other renewable energy projects Council is pursuing.

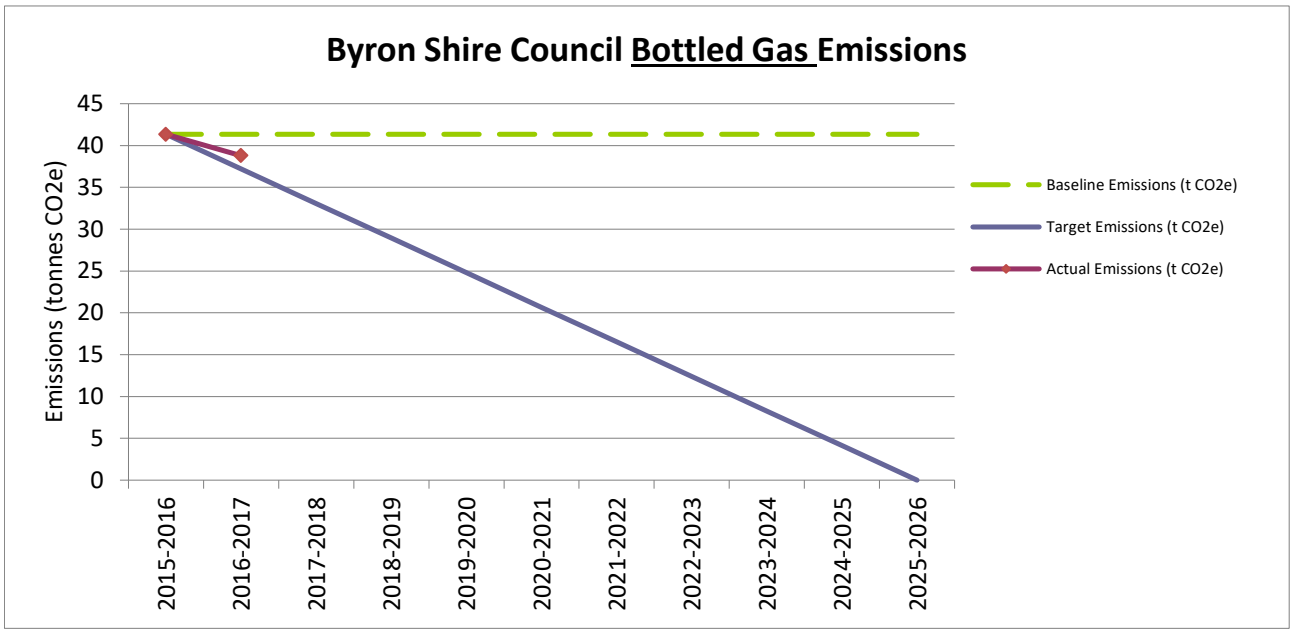

Figure 8 – 2016/2017 Byron Shire Council Bottled Gas Emissions

Table 5: Bottled Gas Emissions

	2015-2016	2016-2017
Consumption (L)	26,541	24,905
Cost ($)	$17,913	$14,931
Base Line Emissions (t CO2e)	41	41
Target Emissions (t CO2e)	41	37
Actual Emissions (t CO2e)	41	39
Trending (t CO2e)		+2

e) Landfill Fugitive Emissions and Flare

Emissions from Council's landfill are now being included in Council's emissions inventory. The fugitive emissions from the landfill are only the emissions released by the landfill itself. Emissions from running the landfill such as fuel in the heavy plant, or electricity to run pumps and lighting have been attributed to other sectors of the emissions inventory. The landfill fugitive emissions are significant at over 10,000 tonnes per annum which is greater than the electricity, streetlight, fleet and bottled gas sectors combined.

Council's landfill is not currently operational and has an interim cap applied to the most recently operated Southern Expansion cell (the remainder of the older landfill has had a final cap applied). Municipal residual waste is currently disposed of outside the Shire by a third party and therefore was not considered inside the definition of "operational control" of Council. The emissions from this waste are not monitored or reported on by Council. The NGER methodology was used to calculate the landfill's fugitive emissions out to the target year of 2025/26 because the landfill is closed. This is shown by the orange line in Figure 9.

Council operates a landfill gas capture and flare system at the Myocum landfill to minimise odour and reduce emissions. In 2015 Council entered into a Carbon Abatement Contract with the Australian Federal Government through the Carbon Farming Initiative to supply accredited carbon offsets form landfill gas flaring operations. This was part of the Australian Government's "direct action" plan to meet the national emission reduction targets of the Paris Climate Agreement. Council entered into a reverse auction contract to supply carbon offsets until 2022. Council can count the emission reduction made by the flare for the Myocum landfill for its own emissions target so long as it is clearly understood that this reduction is also being attributed to meeting the national

target. That is to say, the flare related emission reduction is not additional to the national emissions reduction target, it is part of it.

The primary way of reducing the fugitive emissions is by way of methane capture and flaring. With the flare already installed and no plans to expand the capture system the amount of emissions able to be flared will reduce inline with the reducing fugitive emissions naturally occurring as the landfill ages. Large scale projects either through carbon sequesting tree planting or renewable energy projects will be necessary to offset the emissions from the landfill to achieve a zero net emissions target by 2025/26.

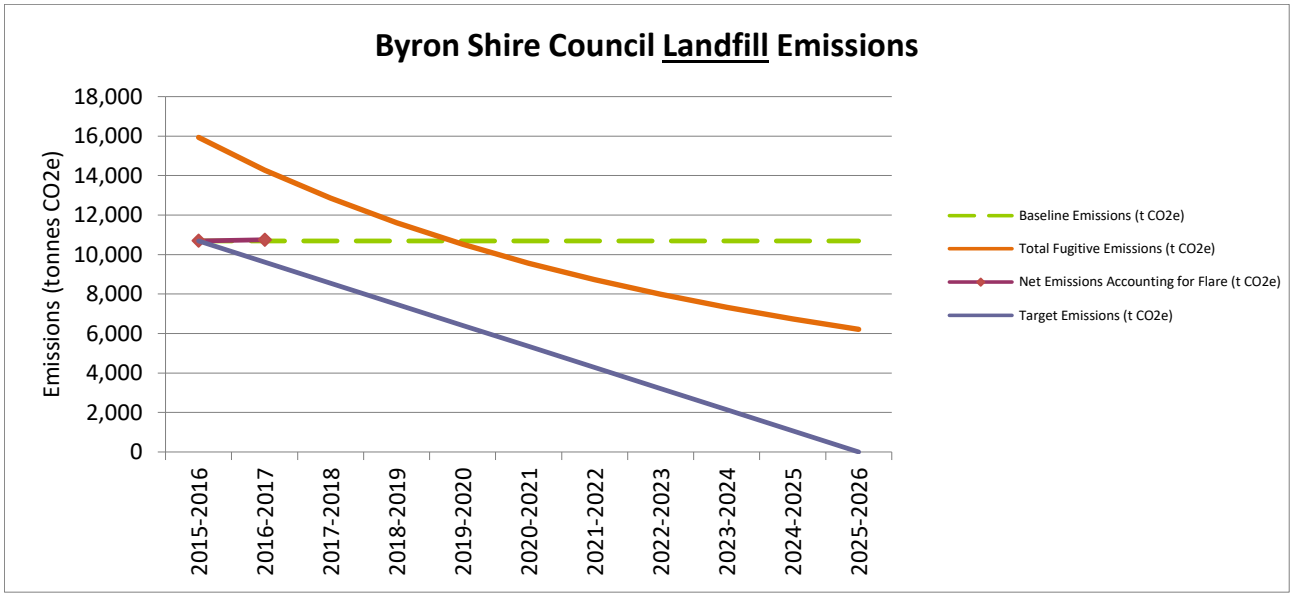

Figure 9 – 2016/2017 Byron Shire Council Landfill Emissions

Table 6: Landfill Fugitive Emissions

	2015-2016	2016-2017
Total fugitive emissions from landfill (t CO2e)	15,931	14,283
Emissions abated from flaring (t CO2e)	5,241	3,539
Base Line Emissions (t CO2e)	10,690	10,690
Target Emissions (t CO2e)	10,690	9,621
Net Emissions (t CO2e)	10,690	10,744
Trending (t CO2e)		+1,123

f) Sewage Treatment Plants – Fugitive emissions

Byron Shire Council owns and operates four sewage treatment plants. The treating of waste water is energy intensive as outlined previously in the electricity section of this report. In addition to the energy needed to run the facility, other emissions known as 'fugitive emissions' also occur. These fugitive emissions occur as a result of the organic matter in the waste water decomposing in the ponds as it is being treated.

The fugitive emissions of a facility are highly dependent on the volume of flow treated and the treatment methods used. Table 7 below shows that the fugitive emissions from the sewage treatment plants are almost as significant as the landfill fugitive emissions at over 8,000 tonnes per annum. As outlined earlier, the pre-feasibility study into bio energy potential at Council's sewage treatment plants will be critical in reducing and offsetting emissions from this sector by 2025/26. Additionally the next planned upgrade of the West Byron Sewage Treatment Plant is in 2025 where it will be upgraded to a covered anaerobic treatment system to capture biogas directly from the plant itself. By capturing the emissions directly from the ponds significant savings can be made.

Table 7: Sewage Treatment Fugitive Emissions

	2015-2016	2016-2017
Total Annual Flow Processed (kL)	3,254,852	3,541,529
Greenhouse Gas Emissions (t CO2e)	8,190	8,955
Base Line Emissions (t CO2e)	8,190	8,190
Target Emissions (t CO2e)	8,190	7,371
Trending (t CO2e)		+819

Due to resourcing issues, Council's Utilities Team were unable to complete the emissions calculations using the NGER methodology. An alternative methodology using IPCC Emissions Factors was used to prepare an indicative estimate of emissions from this sector. Moving forward it will be necessary to outsource the calculation of Council's Sewage Treatment Plant fugitive emissions to align with the NGER methodology and accurately set a meaningful baseline for this sector.

Financial Implications

Emissions reduction can both cost Council and save Council depending on the project and as such will need to be assessed on a case by case basis as part of the development of Council's Emissions Reduction Strategy.

Statutory and Policy Compliance Implications

Council has no statutory obligations to report its emissions inventory.