



UNDERSTANDING OUR NITROGEN IMPACT AT BROWN UNIVERSITY

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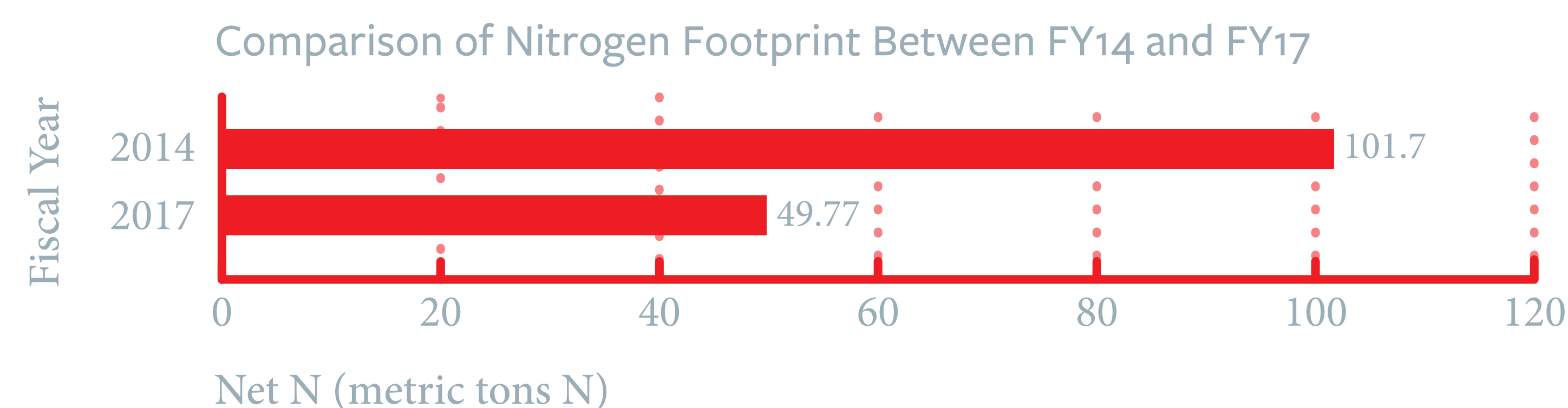


INTRODUCTION

Located in Providence, RI, Brown University is a medium-sized university with an approximate population of 11,000. Led by Professor Meredith Hastings, the University began working on its Nitrogen Footprint in 2013. In 2017, the Office of Sustainability (OS) took over the biannual collection and analysis of data for the footprint. Brown has completed two reports on campus-wide Nitrogen Footprint for FY13 and FY17. We are currently working on our third report for FY18.

SUMMARY OF METHODS

OS staff Erin Royal and undergraduate student interns Rachel Sheinberg and Dorinda Fong led the effort for the FY17 report. Various stakeholders including Dining Services, Facilities Management, the Office of Transportation, and more contribute to the data collection process by using Google Forms. These google forms were developed to streamline the communication and data collection process. Food purchases from Dining are organized and uploaded based on the SIMAP template.



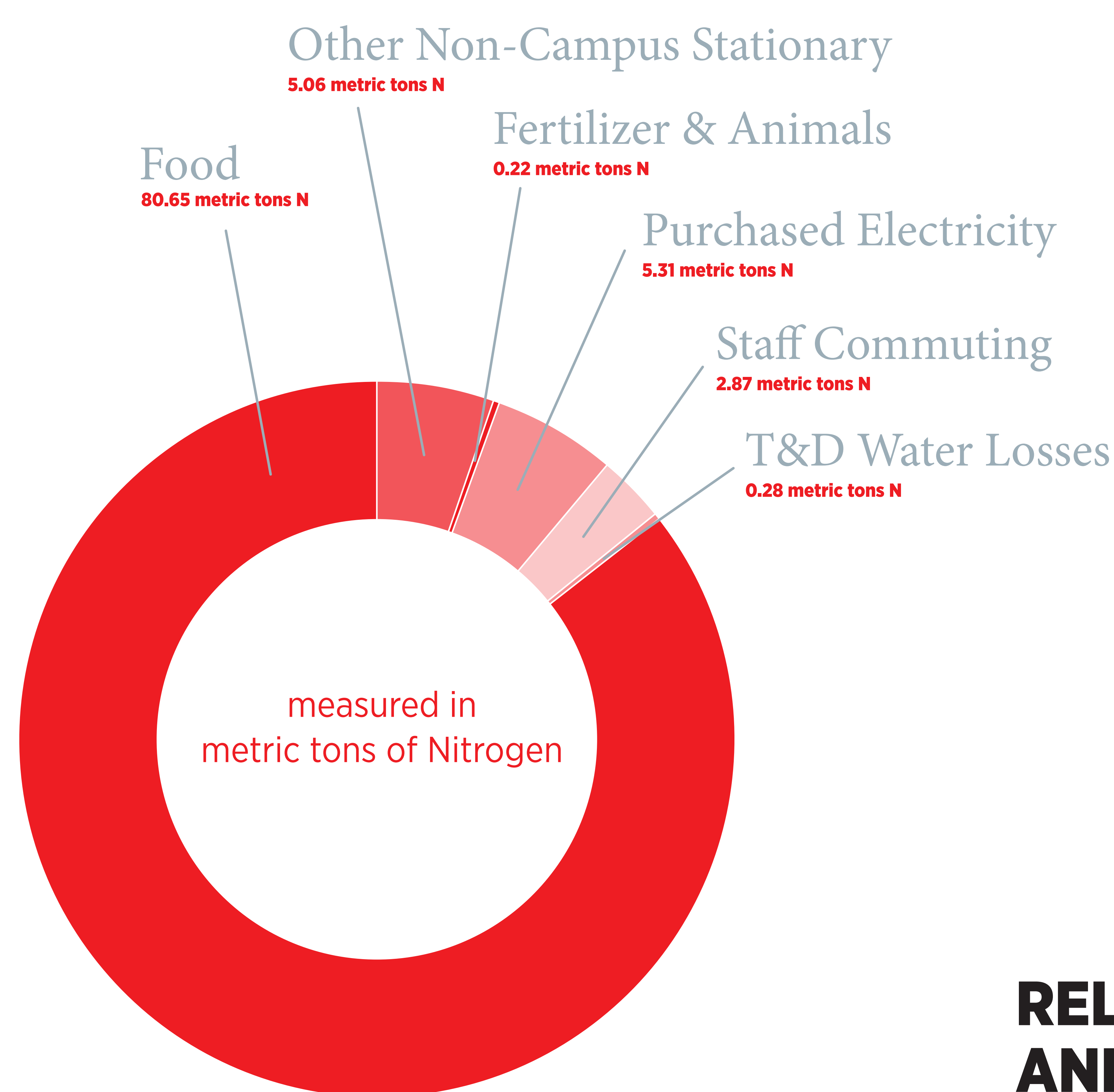
HIGHLIGHTS

- Emissions from our food purchases decreased from 1520t to 1340t from FY14 to FY17. Meat consumption, especially Chicken and Beef, saw the biggest decline (15%). This is largely due to Brown Dining's initiatives on promoting plant-based diets.
- Starting in FY17, Brown has taken significant measures to offset the campus N. footprint. By composting and converting food waste to biodiesel, we diverted 45 metric tons of Nitrogen.
- Emissions from Purchased electricity decreased slightly from 5.70t to 5.31t from FY14 to FY17. However, On-campus stationary fuel increased slightly due to new construction and major renovations.

NOVEL RESEARCH

Brown Professor Meredith Hastings' recent research focuses on the reactive nitrogen cycle. She aims to better understand nitrate deposition in rain, snow, ice, and aerosols, which is the main sink of reactive nitrogen oxides (NO_x) from the atmosphere. She currently serves as the lead PI on the NOAA AC4 project, Tracking Nitrogen Oxides Emissions and Nitrate Formation in Biomass Burning Plumes.

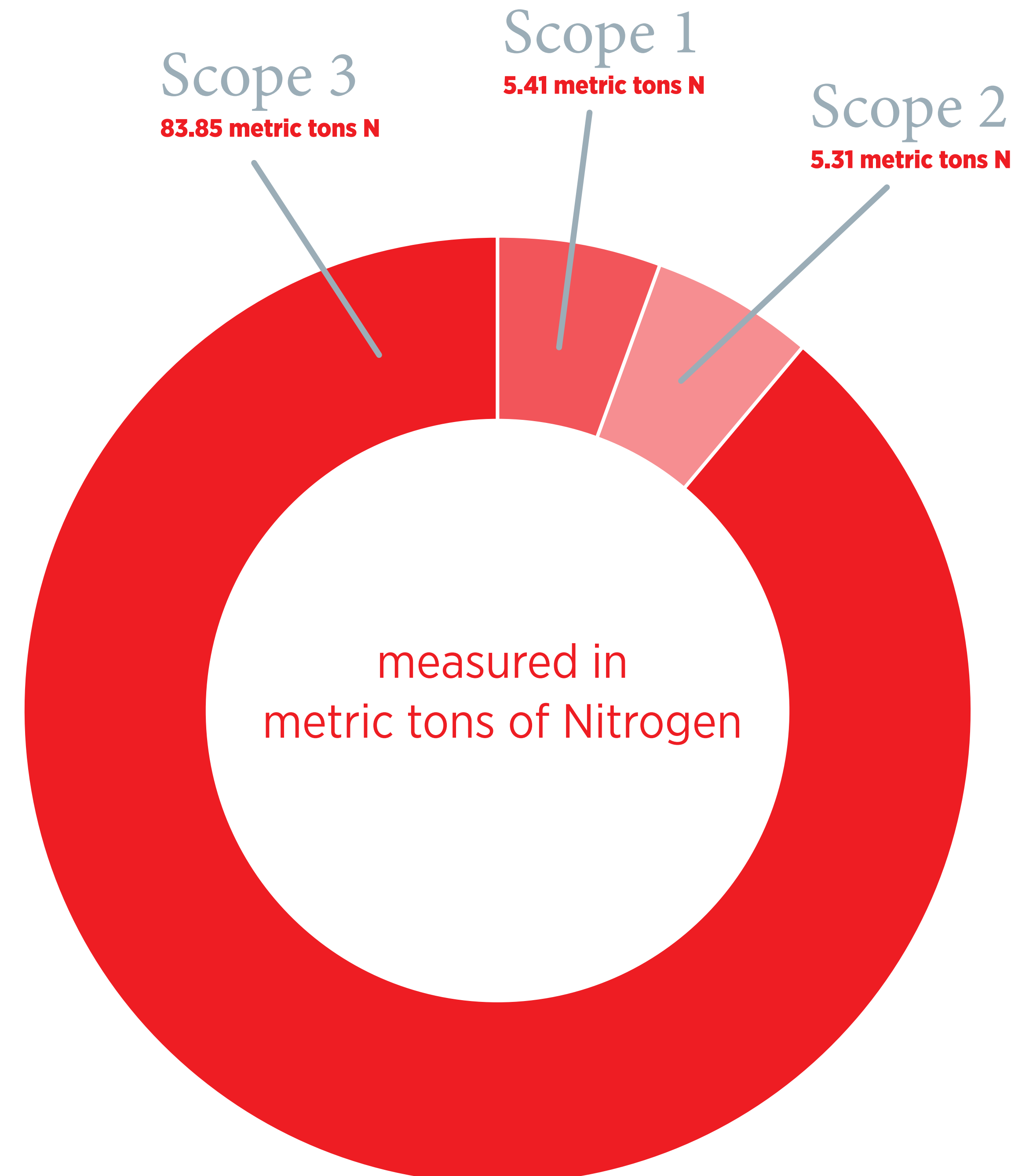
FY17 Nitrogen Emission by Source



NEXT STEPS

- Uncertainty and error persisted in our data in the last two reports. Transportation Fuel, for instance, included all university fleets in FY14 but only the Facilities Management's Fleet in FY17. Waste and Wastewater had small values and we could not verify the data sources. Additionally, Student and Staff Commuting data were extrapolated from old surveys, which had limited accuracy in reflecting the total travel mileage.
- As a next step, we are working closely with our stakeholders to develop a data reporting protocol to improve accuracy and streamline the process. We are currently collecting data for FY18 and plan to use this report as our campus baseline.
- To improve the data quality on daily commuting, we have revised the commuting survey and plan to send it out annually in the Fall semester to all community members.

FY17 Nitrogen Emission by Scope



RELATIONSHIP OF CARBON AND NITROGEN AT BROWN:

We recently set a goal to reduce our GHG emissions by 75% below 2017-2018 levels by 2025 and to achieve net-zero by 2040. As nitrogen is a GHGe, the goals we develop in our new Sustainability Strategic Plan will reflect steps we need to take and programs we need to establish around both C and N reduction.

N FOOTPRINT PROJECTIONS AND SOLUTIONS:

We are working towards reducing our footprint with better access to alternative transportation options, a focus on plant-based meal options in dining, and moving away from fossil fuel use to heat, cool, and power our buildings thanks to a solar site in development in Rhode Island.

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