EDF Greenhouse Gas Emissions Inventory 2014-2017

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Summary

This is our seventh comprehensive greenhouse gas (GHG) emissions inventory report. Our data collection process covers EDF's emissions from travel, office energy, and paper from 2014-2017. Due to the expansion of our global operations, office renovations, and hiring more full-time employees, our total annual emissions have increased from 3400 metric tons of carbon dioxide equivalent ($MtCO_2e$) in 2014 to 3900 $MtCO_2e$ in 2017. While this is a 13% increase, the emissions intensity per full-time employee (FTE) has decreased from 7.6 $MtCO_2e$ in 2014 to 5.9 $MtCO_2e$ in 2017. The total number of FTEs has increased by almost 30% during that period. In addition, the decrease in emissions per FTE may be attributed to increases in telecommuting, lower emission factors, greater energy efficiencies, and improved methodologies for measuring emissions.

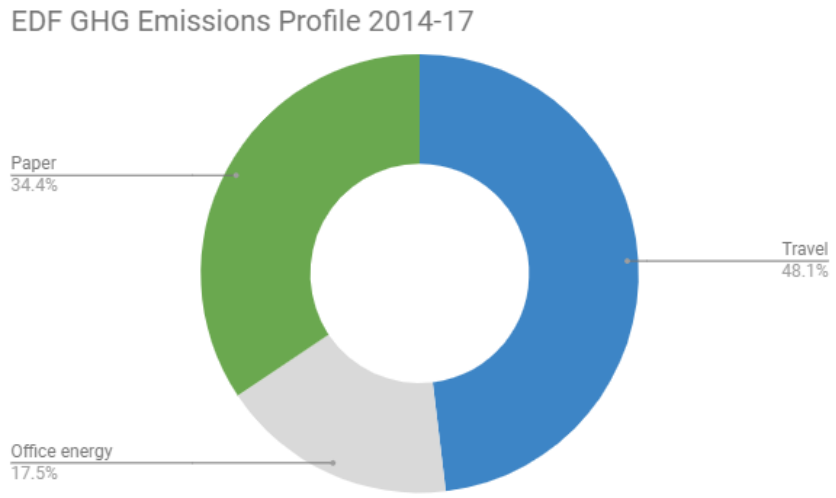
EDF GHG Emissions	2013	2014	2015	2016	2017
Travel Total	**1801**	**1800**	**1500**	**1800**	**1600**
Air	1500	1400	1100	1400	1100
Rail	8	7	5	7	7
Rental Car	36	95	32	32	32
Hotel Stays	75	120	100	120	120
Employee Commutes	182	230	240	250	300
Office Energy Total	**1283**	**800**	**630**	**500**	**450**
Electricity	670	530	520	400	380
Natural Gas	88	170	20	20	21
District Steam	24	89	89	80	48
Oil	501	-	-	-	-
Paper Use Total	**751**	**780**	**1000**	**1300**	**1800**
Office Copy Paper	7	6	6	4	6
Membership Mailing	661	770	1000	1300	1800
Contracted Projects	83	8	4	9	5
Grand Total (MtCO2e)	**3835**	**3400**	**3100**	**3600**	**3900**
Full-time Employee	490	460	510	560	640
Emission Intensity MtCO2e per FTE	7.9	7.6	6.1	6.4	5.9

Historical Emissions Intensity	2008	2009	2010	2011	2012	2013
Grand Total MtCO2e	3800	3540	3880	3509	3553	3835
Full-Time Employee (FTE)	-	325	336	354	401	486
Emissions Intensity MtCO2e/FTE	-	10.9	11.5	9.9	8.9	7.9

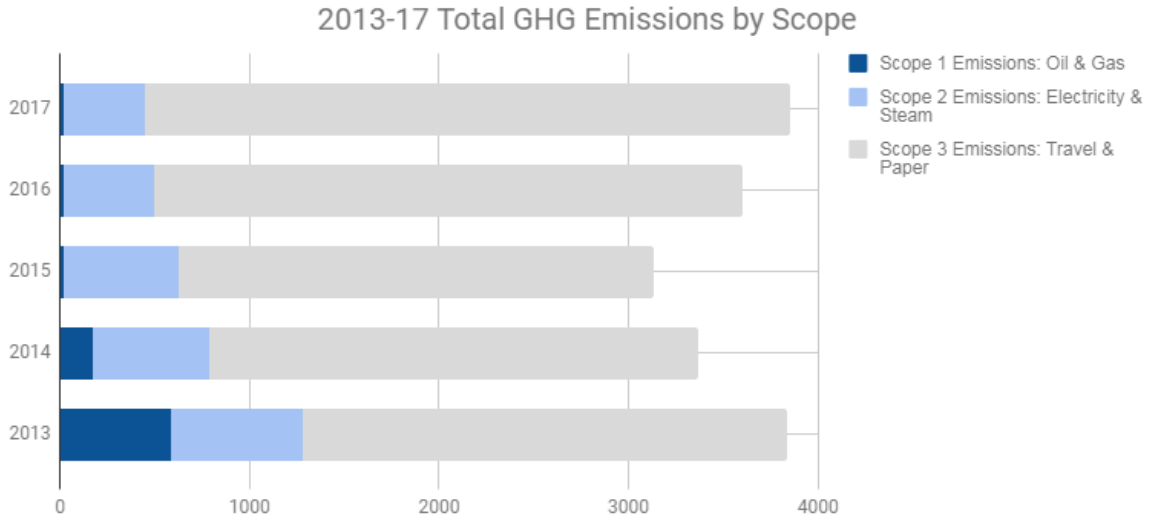
In alignment with our historical inventory, this report incorporates our internal GHG emissions models, which are based on empirical data and supplemented with estimated data/assumptions. We have

included emissions from scope 1, 2, and 3 sources. Our averaged emissions profile from 2014-2017 shows a breakdown of approximately 48% travel emissions, 34% office energy, and 18% paper.

Emission Sources	2013	2014	2015	2016	2017
Scope 1 Emissions: Oil & Gas	589	170	20	20	21
Scope 2 Emissions: Electricity & Steam	694	619	609	480	428
Scope 3 Emissions: Travel & Paper	2552	2580	2500	3100	3400



An analysis of our 2014-2017 GHG inventory by scope reinforces the importance of including indirect sources from scope 3. Scope 3 emissions account for approximately 82% of our emissions profile in 2014-2017 and include the following: air travel, rail travel, rental car, hotel stays, employee commutes, office copy paper, membership mailings, and contracted print projects. We seek to improve our methodology, both in terms of data collection and analysis, bringing increased integrity to the data and understanding our carbon footprint holistically. Our recommendations to improve future carbon inventories are summarized in the final section of this report.



Travel Overview

The following section discusses emissions from air travel, Amtrak, and commuting.

Air Travel – Summary

Business travel by air is consistently the largest component of EDF's carbon footprint, accounting for over 50% of total emissions from 2014-2017. Over the last few years, travel emissions have decreased from 1400 MtCO2e in 2014 to 1100 MtCO2e in 2017. However, the number of miles flown has increased from 7.4 million to 8.1 million miles. This difference can be attributed to more employees flying in economy class on long-haul flights from 2014-2017. The Climate and Energy program, as well as Oceans, account for half of EDF's travel emissions. We also found that only 3% of the travelers account for 25% of EDF's travel emissions. Analyzing emissions by flight type and department/program helps us better focus our efforts on areas of air travel that will help reduce emissions.

Total Airline Emissions by Department 2014-2017

	2014		2015		2016		2017	
Program	**Metric Tons CO2e**	**% Air Travel Emissions**	**Metric Tons CO2e**	**% Air Travel Emissions**	**Metric Tons CO2e**	**% Air Travel Emissions**	**Metric Tons CO2e**	**% Air Travel Emissions**
Oceans	211	18%	275	25%	411	30%	284	25%
China	12	1%	13	1%	20	1%	6	1%
Climate and Energy	428	28%	265	24%	292	21%	321	28%
Ecosystems	146	14%	106	10%	105	8%	107	9%
EDF + Biz	143	12%	81	7%	87	6%	88	8%
Global Strategy	75	2%	79	7%	72	5%	29	3%
Development	68	6%	51	5%	80	6%	95	8%
Executive Office	141	8%	106	10%	168	12%	78	7%
IT Operations	5	0%	4	0%	4	0%	3	0%
Marketing	42	4%	28	3%	31	2%	34	3%
Health	7	0%	6	1%	10	1%	13	1%
Office of Chief Economist	26	1%	8	1%	14	1%	11	1%
Office of Chief Scientist	28	2%	38	4%	35	3%	32	3%
Corporate Services	10	0%	3	0%	4	0%	4	0%
Political Affairs	1	0%	1	0%	4	0%	8	1%
Finance	4	0%	6	1%	7	0%	5	0%
Human Resources	6	0%	7	1%	13	1%	9	1%
Miscellaneous	21	2%	5	0%	0	0%	4	0%
Unknown	33	2%	5	0%	13	1%	16	1%
Total Airline Emissions	**1408**	**100%**	**1087**	**100%**	**1370**	**100%**	**1145**	**100%**

Air Travel – 2014

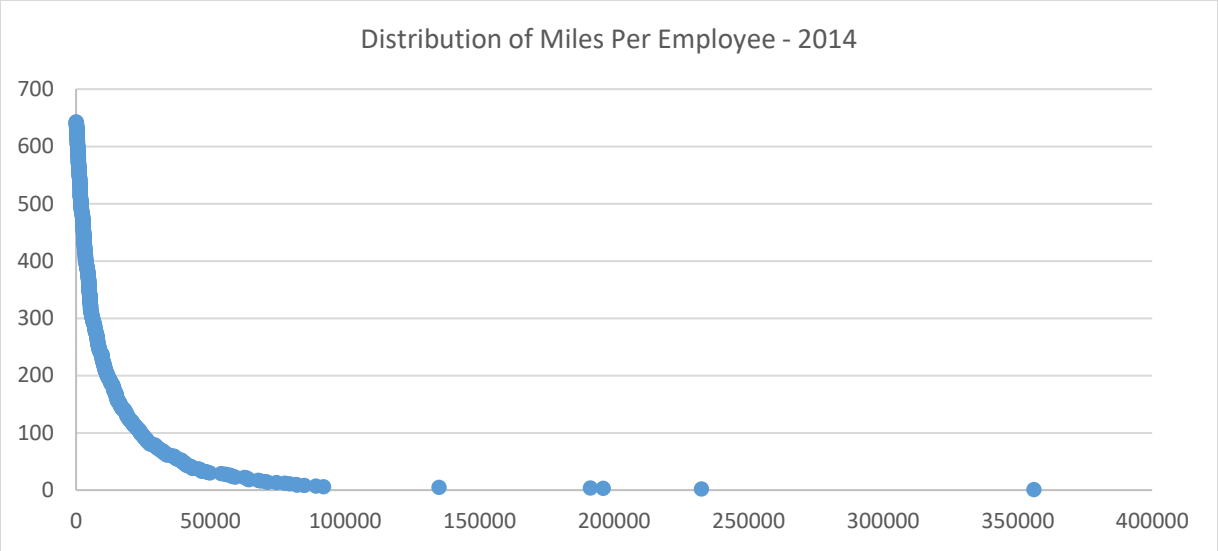
Approximately 48% of the miles traveled were on long-haul flight segments (742 miles or longer). Although domestic flights (less than 223 miles) have higher emission rates, these segments account for only 2% of travel emissions.

The Climate and Energy, Oceans, and Ecosystems programs collectively account for 60% of EDF's air travel footprint, with Climate and Energy being the top emitter at 28% (see table below).

Program	Percent	Total MtCO2e
China	0%	12
Climate and Energy	28%	428
Corporate Services and Risk Management	0%	10
Development	6%	68
Economic Policy and Analysis	1%	26
Ecosystems	14%	146
EDF + Business	12%	143
Environmental Health	1%	7
Executive Office	8%	141
Finance	0%	4
Human Resources	0%	6
IT Operations	0%	5
Marketing	4%	42
Miscellaneous	2%	21
Oceans	18%	211
Office of the Chief Scientist	2%	28
Political Affairs	0%	1
Unknown	2%	33
Global Strategy	2%	75
Grand Total	**100%**	**1,408**

Looking at the distribution of total miles flown in 2014 per individual in US offices, we find that the top 3% of travelers account for a majority of the miles flown and corresponding emissions. Of the 643 distinct passengers, the top 17 individuals account for 25% of EDF's overall travel emissions. The chart below illustrates this distribution, showing the total miles traveled in 2014 by each passenger.

Program	Business	Economy	First	Total
Domestic	0%	2%	0%	2%
Long	19%	27%	3%	48%
Short	17%	33%	0%	50%
Total	**35%**	**62%**	**3%**	**100%**



Air Travel – 2015

Approximately 80% of the miles traveled were on long-haul flight segments (860.6 miles or longer). Although domestic flights (less than 257.2 miles) have higher emission rates, these segments account for only 4% of travel emissions.

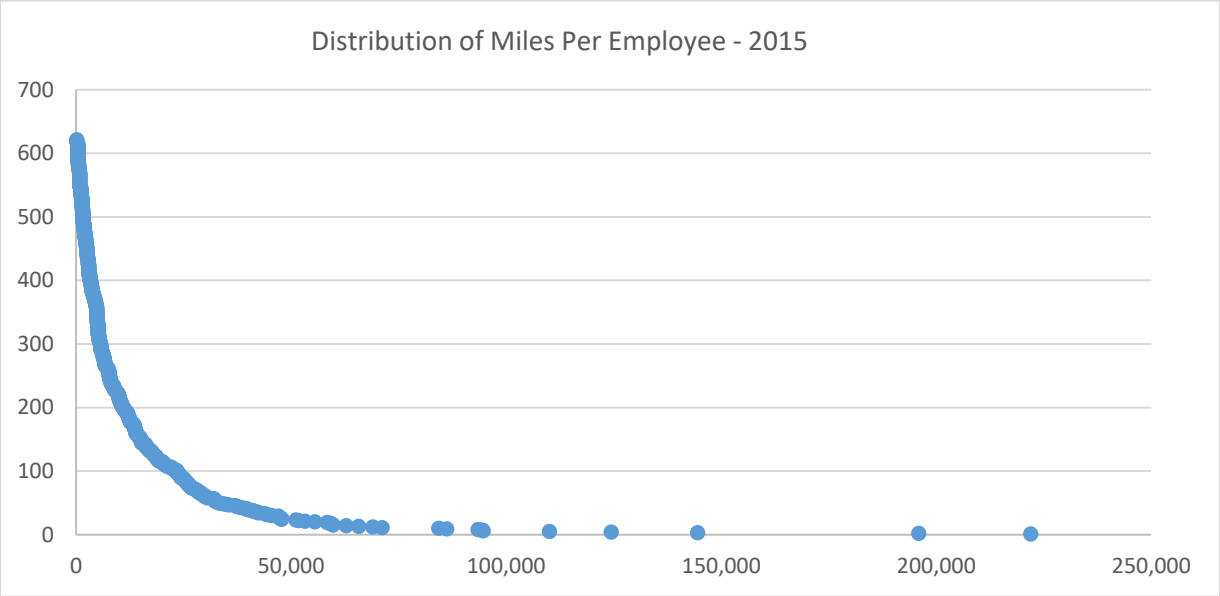
Flight Type	Business	Economy	First	Grand Total
Domestic	0%	4%	0%	4%
Long	24%	54%	2%	80%
Short	0%	16%	0%	16%
Grand Total	**24%**	**73%**	**2%**	**100%**

The Oceans and Climate and Energy programs collectively account for 49% of the air travel emission in 2015. These two programs account for 18% of EDF's total GHG footprint in 2015 (see table below).

Program	Percent	Total MtCO2e
China	1%	13
Climate and Energy	24%	265
Corporate Services and Risk Management	0%	3
Development	5%	51
Economic Policy and Analysis	1%	8
Ecosystems	10%	106
EDF + Business	7%	81
Environmental Health	1%	6
Executive Office	10%	106
Finance	1%	6
Human Resources	1%	7
IT Operations	0%	4
Marketing	3%	28
Miscellaneous	0%	5

Oceans	25%	275
Office of the Chief Scientist	4%	38
Political Affairs	0%	1
Unknown	0%	5
Global Strategy	7%	79
Grand Total	**100%**	**1,087**

Looking at the distribution of total miles flown in 2015 per individual in US offices, we find that 2% account for a majority of the miles flown and corresponding emissions. Of the 621 distinct passengers, the top 12 individuals account for 25% of the overall travel emissions. The chart below illustrates this distribution, showing the total miles traveled in 2015 by each of the 621 individuals.



Air Travel – 2016

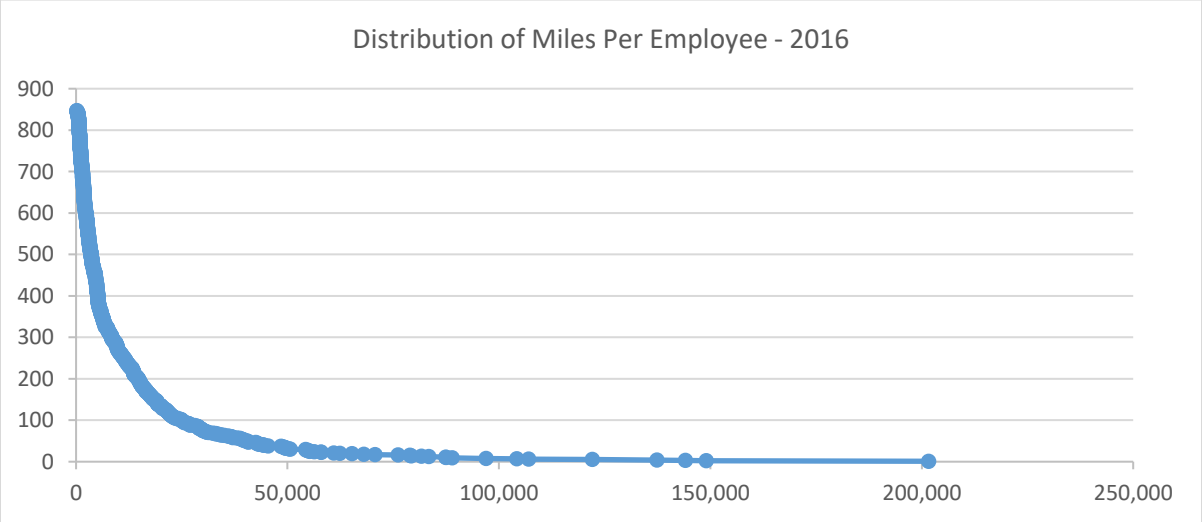
Approximately 82% of the miles traveled were on long-haul flight segments (860.6 miles or longer). Although domestic flights (less than 257.9 miles) have higher emission rates, these segments account for only 3% of travel emissions.

Flight Type	Business	Economy	First	Grand Total
Domestic	0%	3%	0%	3%
Long	26%	55%	1%	82%
Short	0%	15%	0%	16%
Grand Total	**26%**	**73%**	**1%**	**100%**

The Oceans and Climate and Energy programs collectively account for over 51% of the air travel emission in 2016. These two programs' travel emissions account for 20% of EDF's total GHG footprint in 2016.

Program	Percent	Total MtCO2e
China	1%	20
Climate and Energy	21%	292
Development	6%	80
Economic Policy and Analysis	1%	14
Ecosystems	8%	105
EDF + Business	6%	87
Environmental Health	1%	10
Executive Office	12%	168
Finance	0%	7
Human Resources	1%	13
IT Operations	0%	4
Marketing	2%	31
Oceans	30%	411
Office of the Chief Scientist	3%	35
Political Affairs	0%	4
Unknown	1%	13
Corporate Services and Risk Management	0%	4
Global Strategy	5%	72
Grand Total	**100%**	**1,370**

Looking at the distribution of total miles flown in 2016 per individual in US offices, we find that 3% account for a majority of the miles flown and corresponding emissions. Of the 847 distinct passengers, the top 18 individuals account for 25% of the overall travel emissions. The chart below illustrates this distribution, showing the total miles traveled in 2016 by each of the 847 individuals.



Air Travel – 2017

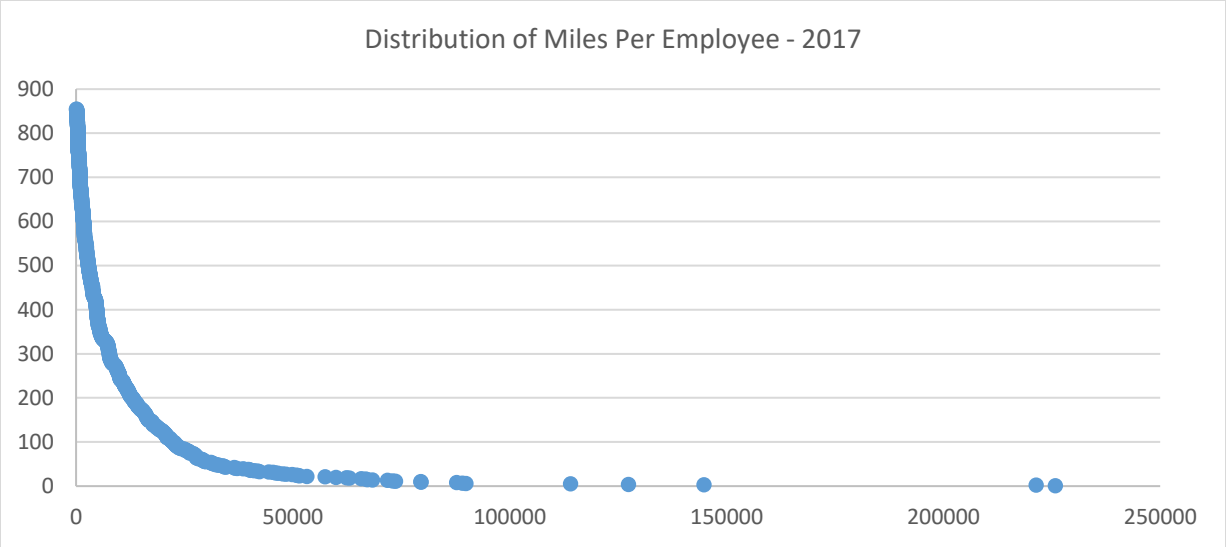
Approximately 82% of the miles traveled were on long-haul flight segments (848.8 miles or longer). Although domestic flights (less than 259.1 miles) have higher emission rates, these segments account for only 3% of travel emissions.

Flight Type	Business	Economy	First	Total Emissions
Domestic	0%	3%	0%	3%
Long	19%	62%	1%	82%
Short	0%	15%	0%	15%
Total Emissions	**19%**	**80%**	**1%**	**100%**

The Climate and Energy and Oceans programs together account for 53% of the air travel emission in 2017. These two programs' travel emissions account for 16% of EDF's total GHG footprint in 2017 (see table below).

Program	Percent	Total MtCO2e
China	6	1%
Climate and Energy	321	28%
Corporate Services and Risk Management	4	0%
Development	95	8%
Economic Policy and Analysis	11	1%
Ecosystems	107	9%
EDF + Business	88	8%
Environmental Health	13	1%
Executive Office	78	7%
Finance	5	0%
Human Resources	9	1%
IT Operations	3	0%
Marketing	34	3%
Miscellaneous	4	0%
Oceans	284	25%
Office of the Chief Scientist	32	3%
Political Affairs	8	1%
Unknown	16	1%
Global Strategy	29	3%
Grand Total	**1,145**	**100%**

Looking at the distribution of total miles flown in 2017 per individual in US offices, we consistently find that only 3% account for a majority of the miles flown and corresponding emissions. Of the 855 distinct passengers, the top 18 individuals account for the most miles and 25% of the overall travel emissions. The chart below illustrates this distribution, showing the total miles traveled in 2017 by each of the 855 individuals.



Amtrak

Travel emissions from Amtrak Rail account for ~0.20% of EDF's total GHG emissions. The table below summarizes the total emissions from rail in 2014-2017.

Total Intercity Amtrak Miles and Emissions			
Year	**Program**	**Rail Miles Traveled**	**MtCO2e**
2014	All Programs	150000	7
2015	All Programs	120000	5
2016	All Programs	150000	7
2017	All Programs	150000	7

Commuter

EDF commuter data from 2014-2017 were not surveyed and therefore based on assumptions made from previous reports. We assumed that employees traveled 20 miles/day, 5 days/week, for 47 weeks/year in the following distribution:

- 10% of FTEs drive alone
- 10% carpool
- 40% take the rail
- 30% take the bus
- 10% have zero emission methods of transportation (walking, biking, etc.)

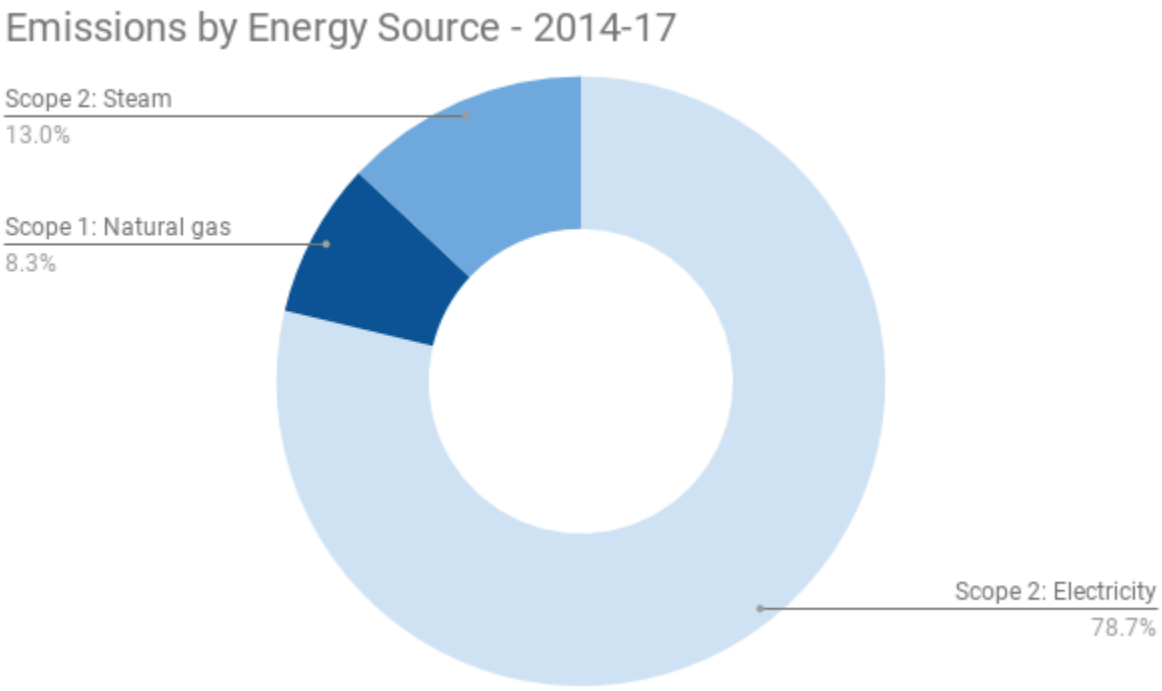
Commuter Emissions		
Year	**Sum Emissions MtCO2e**	**Emissions per capita MtCO2e**
2017	296	0.46
2016	250	0.45
2015	242	0.48
2014	235	0.51

Energy Overview

From 2014 to 2017, EDF reduced its energy usage about 10% annually. In 2014, EDF emitted 800 MtCO2e and 450 MtCO2e in 2017 – a 43% reduction from 2014 levels. In 2013, the NY office transitioned from using fuel oil to natural gas. This change reduced EDF's overall energy footprint and EDF offices are now powered by electricity, natural gas, and steam. The significant reductions to energy emissions can also be attributed to the adoption of more efficient technologies, teleworking, and cleaner energy sources. As EDF continues to grow its staff and expand its offices, it will be critical to continuously track our energy usage.

Emissions by Year (MtCO2e)				
Energy	**2014**	**2015**	**2016**	**2017**
Electricity	529.76	521.98	401.67	379.92
Natural gas	167.55	20.16	19.46	20.86
Steam	89.34	89.34	79.55	47.89
Fuel oil	0.00	0.00	0.00	0.00
Total Emissions (MtCO2e)	**786.64**	**631.47**	**500.68**	**448.67**
% Change from previous year		**-19.73%**	**-20.71%**	**-10.39%**

From 2014-2017, EDF's average emission profile was made up of 8% scope 1 emissions for natural gas, and 92% scope 2 emissions for electricity (79%) and steam (13%). The trends for steam and electricity had minor fluctuations over the years, however, natural gas emissions significantly dropped after 2014 as there were unusually high natural gas emissions from the San Francisco office that year.



Emissions by Office				
Year	Office	Total Emissions (MtCO2e)	Emissions Per Square Foot (kg CO2e/sf)	Emissions Per Capita (MtCO2e/FTE)
2017	AUS	4.60	0.28	0.08
2017	BEN	6.37	4.57	2.59
2017	BOS	8.92	0.05	0.31
2017	BOU	31.89	5.76	1.72
2017	NYC	165.66	3.31	1.01
2017	RAL	78.17	6.69	3.59
2017	SAC	5.72	2.20	0.41
2017	SFR	17.12	1.19	0.23
2017	WDC	45.80	1.12	0.30
2017	China	6.41	0.81	0.25
2017	MEX	5.00	2.47	0.62
2017	LON	4.68	0.003	0.51
2016	AUS	4.93	0.30	0.09
2016	BEN	6.32	9.87	3.53
2016	BOS	0.45	0.00	0.02
2016	BOU	32.70	5.91	2.26
2016	NYC	177.85	4.04	1.20
2016	RAL	87.41	7.48	4.14
2016	SAC	3.89	1.50	0.48
2016	SFR	16.86	1.18	0.22
2016	WDC	4.43	0.11	0.03
2016	China	6.08	1.49	0.32
2016	MEX	4.72	2.33	0.65
2016	LON	4.14	0.002	2.04
2015	AUS	4.64	0.28	0.09
2015	BEN	4.99	7.79	1.66
2015	BOS	10.73	0.05	0.39
2015	BOU	35.99	6.51	2.18
2015	NYC	190.83	4.34	1.44
2015	RAL	83.04	7.11	4.05
2015	SAC	3.14	1.21	0.56
2015	SFR	15.88	1.11	0.23
2015	WDC	4.40	0.11	0.04
2015	China	5.58	2.35	0.29
2015	MEX	4.77	2.36	0.64
2015	LON	3.91	0.002	1.93
2014	AUS	3.84	0.23	0.08

2014	BEN	22.04	34.44	7.35
2014	BOS	103.02	0.53	4.18
2014	BOU	29.56	5.34	1.80
2014	NYC	200.97	4.57	1.72
2014	RAL	85.34	7.30	4.52
2014	SAC	3.49	1.34	0.54
2014	SFR	17.30	1.21	0.26
2014	WDC	157.44	4.05	1.45
2014	China	5.55	2.33	0.33
2014	MEX	5.49	2.71	0.71
2014	LON	1.50	0.001	0.83

FTE Data			
By Year			
Year	All FTE	FTE Offices (excludes remote)	% Remote
2017	643.91	574.25	10.82%
2016	561.58	493.53	12.12%
2015	506.95	469.93	7.30%
2014	462.32	433.8	6.17%

Paper Overview

Paper emissions have increased from 22% to 47% of total emissions from 2014-2017. The Membership Department's paper use (in the form of mailings to existing, former, and prospective members account for approximately 99% of paper emissions).

Paper Use Emissions					
Mailing Category	**2013**	**2014**	**2015**	**2016**	**2017**
Membership Mailings	661	770	1,047	1,259	1,781
External Print Projects	18	8	4	9	5
Office Copy Paper	7	6	6	4	6
Total	**686**	**784**	**1,056**	**1,272**	**1,792**

The Membership Department categorizes its mailings into six primary groups: Acquisition, Appeals, Reinstatements, Solutions, Newsletters, Renewals, and Cultivation. More than half of the paper used is for Acquisitions, and as a result, accounts for over 50% of the emissions. Reinstatements and Appeals collectively account for another 25%, while the remaining categories (Solutions, Renewals, and Cultivation) account for last 25% of paper emissions.

Recommendations

Based on the methodology of previous reports and our experience writing the 2014-2017 GHG report, we would like to make the following recommendations for the future:

Energy

For collecting office energy and building data, we need to consider 1) reaching out to building management directly, or 2) create a streamlined process where office managers regularly report data – for this option, we could consider using Workday.

Throughout the energy data collection process, we noticed many gaps in the data and in some cases, data that were entered by mistake.

Travel

Air, rail, car, and hotel data from Ovation (or any travel agency EDF hires) does not completely capture all employee travel. Employees are able to book their travel through personal or EDF credit cards. To better capture our travel emissions, we recommend retrieving records from finance. All travel is coded under a few naturals, along with receipts which will contain information about trips. If possible, it would be helpful to collect non-travel agency affiliated trip details within Concur.

Regarding employee commutes, EDF could conduct annual surveys to get a better sense of how employees travel to and from the office. This will also help us better understand how telecommuting has impacted EDF's carbon footprint.

Paper

Paper purchases and records should also be collected on an annual basis from office managers. In addition, with EDF's recent implementation of Papercut, this will provide more data on paper usage per employee.

Other

FTE Data

For FTE data, it would be ideal for HR to compile the data on an annual basis for our records. The data would include: employee ID, employee type, office, start date, end date, and hours worked each week.

Sustainability Council

We recommend restoring EDF's Sustainability Council in order to create an updated sustainability guidebook, provide recurring training sessions and materials to staff, manage the GHG inventory and report writing, and carbon offset purchasing. Sustainability Council members could serve 1-2 year terms as well as represent EDF employees in terms of gender, age, job function, program/department, and location.

Appendix

Travel Assumptions

Airfare/Rail

- Sold vs Exchanged: Ovation's reporting format changed in 2015, making it difficult to determine what the original flights were for tickets that were exchanged. As a result, we cannot identify the original ticket that was associated with the exchanged ticket, so both "sold" and "exchanged" tickets were included in this assessment. Exchanged tickets only account for approximately 5% of airfare and rail emissions so its impact is nominal. In an effort to minimize overestimating our emissions, an assumption was made that any sold or exchanged ticket value of "0" or less would be eliminated from this assessment.
- Misc. vs Unknown: Statement information was associated with a specific program code. In instances where there was a code that fell under several programs, it was considered miscellaneous (MISC). For individuals with no program code, they were categorized as UNKNOWN.
- Flight Type & Emission Factors: Trip lengths and associated emission factors were defined by Defra's annual report for that respective year.

Rental car

- Average Miles: traveled by car per day was assumed to be 29.2 miles/day. This number came from a study by AAA Foundation which conducted a national survey in 2014 determining that the average miles driven by Americans per day was 29.2 miles.
- Annual emissions was determined by multiplying # days rented x miles driven.

Hotel stay

- Emission Factors for Hotels: Annual Defra emission factors for that respective year and country were used. However, for countries not included in Defra's database, an average from current/existing countries was used. Annual emissions were determined by country specific EFs multiplied by number of nights stayed.

Energy Assumptions

- Overall, we received the majority of 2014-2017 office energy data from office managers across EDF, with the exception of a few offices. Below is an outline of the missing data and the process for calculating assumptions:
  - Boston steam energy 2015
    - For Boston, we were only missing one year of data so we copied 2014 figures for 2015. We chose 2014 because the numbers were higher than 2016
  - London office energy use 2014-2017.
    - For the London office, we made assumptions on energy use based on office size and number of FTEs.
    - We used the Mexico office as a reference point since it was similar in size and #FTEs and scaled the energy use relative to #FTEs.
  - New York natural gas usage 2014-2017
    - The NY's natural gas numbers are scaled from the SF office's historic natural gas data.

        - The NY office's size is approximately triple of the SF office, so the SF natural gas usage numbers were multiple by 3.
        - Since we do not have any natural gas data from the NY office (since the transition from fuel oil), the numbers were averaged across the months throughout the years.
    - Sacramento office energy use (electricity) 2015-2016
        - For Sacramento, we made assumptions based on # FTEs. The # FTEs in 2017 were more than double compared to 2014.
    - DC office energy use
        - 2015-2016 energy usage is unusually very low (lower than the Sacramento office).
        - We reached out to the building's management to get a better understanding of why the figures were so low, but we did not hear back.
- Emissions factors
    - CO2e emission factors were updated for all offices and energy types, with the exception of:
        - MEX and China office emission factors were the same ones used in the 2013 report
        - Natural gas emission factors are the same ones used in the 2013 report
    - Electricity emission factors were updated to 2014 factors from eGRID (EPA).
    - District steam emission factors were updated.
    - 2014 EFs from Defra were pulled for the London office's electricity usage.

Paper Assumptions

Office paper

- Limitation: Office Depot provided data on paper purchased, but it was for only part of the year (e.g. 3/1/17-1/31/18). They could not provide reports by calendar year or historical reports dating back to more than two years. Thus, it is imperative to collect this data on an annual basis. Currently, there is no way to break out the data by year, so all data in a given report was included for this assessment.
- Assumptions: Assumptions were made for 2014-2015 since historical records could not be provided. Office paper emissions were determined by taking an average across 2013, 2016, and 2017. Similar to previous years, emission factors were taken from environmentalpaper.org. The same EFs were used from 2013.

Membership mailing

- Paper emissions tripled in 2017, primarily due to Membership Mailings. Exact methodology from 2013 was implemented and no assumptions were made.

External printing

- Same methodology and EFs from Office Paper were used to calculate External Printing. No assumptions were made.