

Integrating Carbon Management into your Business Processes: Measurement and Reporting

By Francisca Quinn

This is the second article of a three part series, brought to the BOMA Membership by the Energy and Environment Committee.

In our last carbon management advisory, we demonstrated why carbon management is critical to sustaining your building and your business. Carbon management creates asset value through cost savings, risk reduction and reputational benefits.

Since you can't manage what you can't measure, the next step is learning how to track carbon emissions.

While many building owners and managers calculate and report on their property carbon emissions annually, this provides a retrospective analysis only. To manage and reduce emissions on an ongoing basis, carbon management must be integrated into the business process.

First, a Carbon Calculation Recap

As shown in Figure 1 below, calculating emissions is a fairly straightforward task. Carbon emissions are measured by multiplying activity data by emissions factors.

An emissions factor is a fuel-specific ratio that indicates the quantity of carbon output based on the volume of fuels burned.

Steps to Integrating Carbon Management into your Business Process:

1. Record Regularly:

- Designate a specific person to record fuel consumption, including natural gas, electricity, propane, diesel, etc.
- Ensure that information is captured at least monthly to identify consumption patterns.
- Most building automation systems can be programmed to capture sub-metered data and generate reports.

2. Analyze Regularly:

- Assign someone to calculate the emissions, analyze performance and identify trends and reduction opportunities.
- Capture insights to share best practices

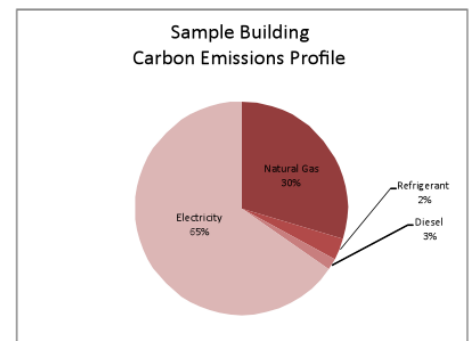


Figure 2 – Sample Building Emissions Profile by Emission Sources

on cost-effective emissions reduction initiatives.

- Gain an understanding of your building's emissions profile (see Figure 2).

3. Report Regularly:

- Integrate carbon indicators into business management as part of regular financial and management reporting.

4. Build Technical Competencies:

- Build technical competencies around



Activity data is collected by meter readings, utility records, fuel invoices, etc.

Emissions factors are published by the Canadian government and vary by emission source, province and reporting year.

Quantity of carbon dioxide can be expressed in kg or tonne.

Figure 1 – Carbon Calculation

carbon calculation methodologies, accounting standards, disclosure requirements and tools and systems.

- Engage a third party to periodically verify your emissions inventory to ensure compliance with standards and identify opportunities for improved data quality.

Use an Appropriate Carbon Accounting Tool

You can develop a carbon accounting tool in-house using a simple spreadsheet or database application (see Loop example in Figure 3). There are also numerous software tools on the market - a recent market research report from Verdantix identified more than 80 applications - which vary in functionality and price.

If your building is part of a larger portfolio, make sure the tool you choose uses the same reporting boundaries and methodologies for each building so that data can easily be consolidated and compared. Ideally, you will also want to use identical indicators, targets and reporting frameworks.

Having worked with more than 20 organizations on carbon accounting, we recommend that you calculate and track emissions for one to two years to identify your needs before deciding on a software solution.

Fuel Type	Baseline Activity	Reporting Activity	Unit	Emissions Factor	Unit2	Baseline Emissions	Reporting Emissions	Emission Reductions	Unit3
Natural Gas	1,000,000	600,000	m ³						
Carbon Dioxide				1.879	kg CO ₂ /m ³	1,879.00	1,127.40	751.60	tonne CO ₂
Methane				0.000037	kg CH ₄ /m ³	0.04	0.02	0.01	tonne CH ₄
Nitrous Oxide				0.000036	kg N ₂ O/m ³	0.04	0.02	0.01	tonne N ₂ O
Sulfur Dioxide				0.0101	g SO ₂ /m ³	10.10	6.06	4.04	kg SO ₂
Nitrogen Oxides				2.5305	g NO _x /m ³	2,530.50	1,518.30	1,012.20	kg NO _x
Particulate Matter 10				0.0314	g PM ₁₀ /m ³	31.40	18.84	12.56	kg PM ₁₀
Particulate Matter 2.5				0.0959	g VOC/m ³	95.90	54.84	38.36	kg VOC
Methoxy				0	g Hg/m ³	-	-	-	g Hg
Electricity	14,000,000	16,000,000	kWh						
Carbon Dioxide				200	g CO ₂ /kWh	3,200.00	3,200.00	-	tonne CO ₂
Methane				0.01	g CH ₄ /kWh	0.16	0.16	-	tonne CH ₄
Nitrous Oxide				0.004	g N ₂ O/kWh	0.06	0.06	-	tonne N ₂ O
Sulfur Dioxide				0.568	g SO ₂ /kWh	9.088.00	9.088.00	-	kg SO ₂
Nitrogen Oxides				0.263	g NO _x /kWh	4,208.00	4,208.00	-	kg NO _x
Particulate Matter 2.5				0.01	g PM _{2.5} /kWh	160.00	160.00	-	kg PM _{2.5}
Particulate Matter 10				0.527	g PM ₁₀ /kWh	432.00	432.00	-	kg PM ₁₀
Particulate Matter 2.5				0.005	g VOC/kWh	80.00	80.00	-	kg VOC
Methoxy				0.0000174	g Hg/kWh	21.84	21.84	-	g Hg
Nuclear waste (strontium)				0.00897	g U ₂₃₅ /kWh	143,840.00	143,840.00	-	g U ₂₃₅
Chilled Water	1,600,000	1,700,000	tonne						
Carbon Dioxide				0.09	kg CO ₂ /tonne	144.00	153.00	9.00	tonne CO ₂

Figure 3 – Screenshot of a Calculation Tool Developed by Loop Initiatives

Next Steps...

Once you have developed a carbon calculation and reporting process, you have set the baseline for successful carbon management. Now the interesting part begins.

In the final article of our series, we will discuss how you can use carbon emissions information to make sound business decisions - such as benchmarking, setting targets, prioritizing investments in energy efficiency and renewable energy - while building a greener brand.

This is the second article in a series of three discussing carbon management in buildings. Look out for the final article, coming soon:

- “Using carbon information in property management: benchmarking, investing and marketing”

Loop Initiatives is a sister company to Halsall. Halsall is a multi-disciplinary building engineering firm with a strong focus on sustainability. Halsall is an active BOMA Ottawa member and

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