
Carbon Footprint Symposium

Presentation M. Stein

Carbon Footprint of a Chemical Plant

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Carbon Footprint – Why – Canadian Chemical Industry

Most of the chemical industry in Canada is organized in the Chemistry Industry Association of Canada.

Responsible Care® is the chemistry industry's commitment to sustainability and it compels member companies to work for the improvement of people's lives and the environment.

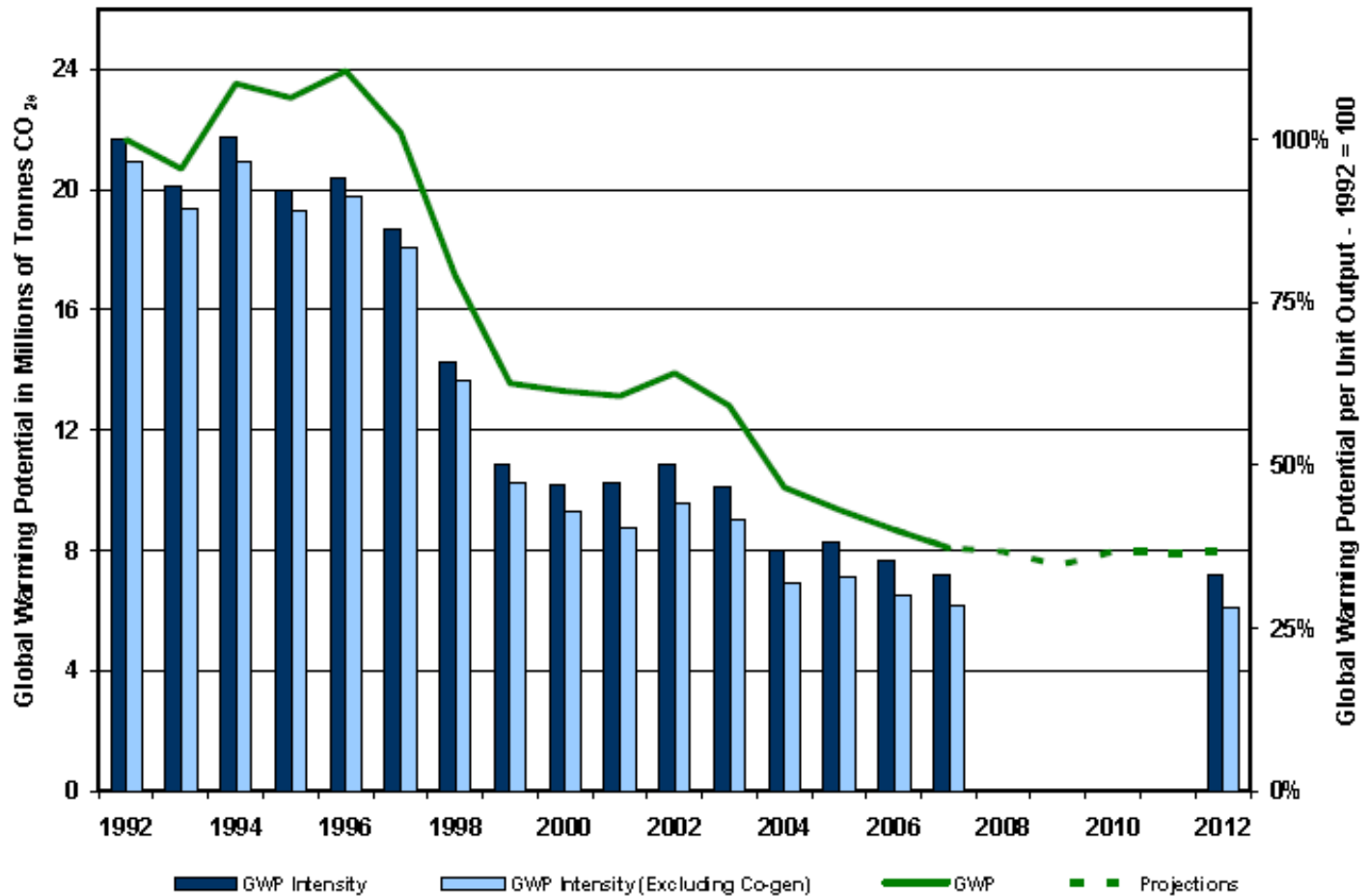
The Chemistry Industry Association of Canada is committed to responding to the serious issue of climate change and made significant progress (66% decline in greenhouse gas emissions since 1992).



Responsible Care®
Our commitment to sustainability.

Carbon Footprint – Basic Challenge

Figure 5.4 Global Warming Potential (GWP) vs Production



Carbon Footprint – Why - Corporate

Corporate:

AkzoNobel: We're committed to reducing our impact on the planet and delivering more sustainable products and solutions to our customers.

One key focus area is the Carbon Management through the Value Chain.

A carbon policy and improvement targets were developed.

Emphasis is on:

- Determining the cradle-to-gate carbon footprint and updating it regularly
- Reduce the cradle to gate carbon footprint
- Provide carbon-efficient solutions to customers

Carbon Footprint - What

Scope – concept

Scope 1 – direct emissions from a plant

**Scope 2 – emissions due to electricity, often purchased
purchased steam is also included (sometimes it is scope 3)**

Scope 3 – emissions due to raw materials, construction work, employee travel... In theory also includes emissions due to the use and disposal of the product.

While scope 1 and 2 emissions are already tracked, there is often little information available regarding scope 3 emissions.

For calculation of the scope 3 emissions, usually a ‘Cradle to Gate’ approach is used – the carbon footprint of a product is determined including all emissions until the product leaves the plant gate. The approach excludes the carbon footprint for use and disposal of the product.

How – Implementation of the Concept

Direct emissions (scope 1 emissions) are usually already known from environmental reporting.

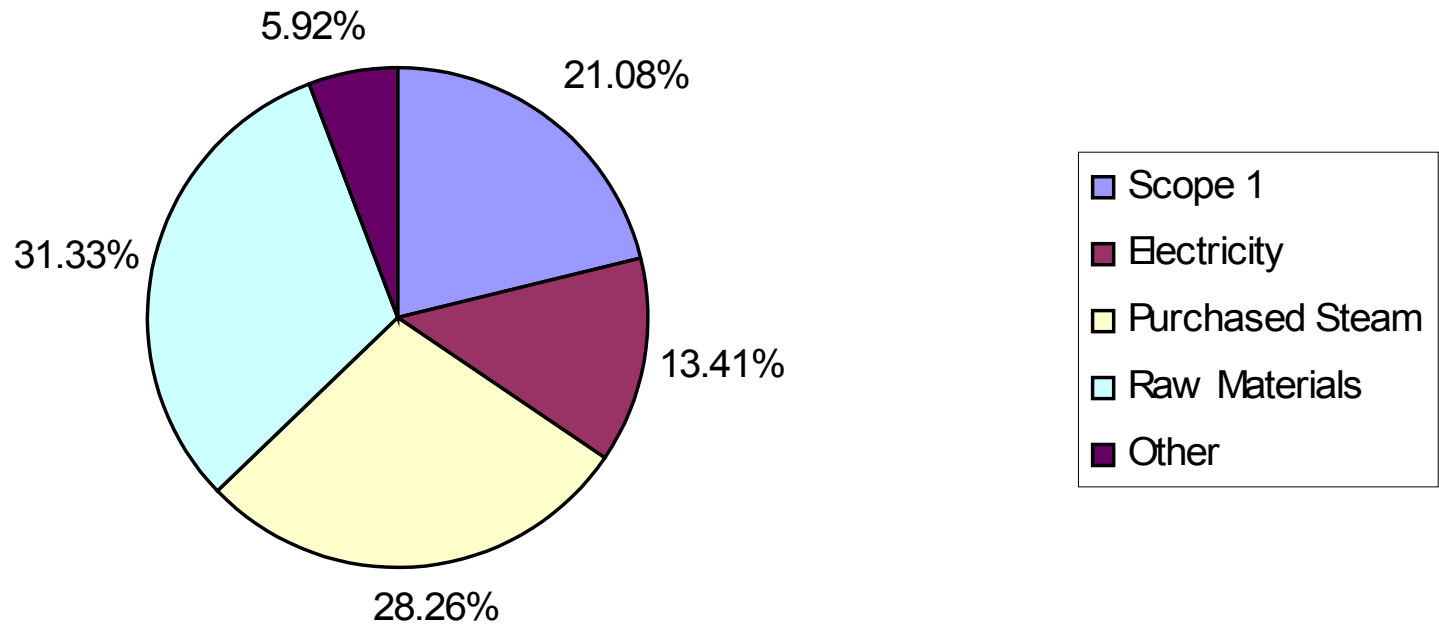
The emissions from purchased electricity can be easily determined if the generating mix is known. The generating mix is usually mentioned in the electricity supplier's annual report.

If steam is generated on site, these emissions are included in scope 1. If steam is purchased, emissions related to its generation are scope 2 or 3 (depends on company definition). Usually the steam supplier can easily provide the emissions related to steam generation.

Third-party data for the carbon footprint of raw materials may exist, may be provided by the vendor, or may have to be estimated.

How - Example

Plant Emissions



Breakdown per product

Relatively easy if it is a plant with very few products.

Use of data from the business management system is problematic: Usually cost allocation to products is reasonably accurate, but the allocation of energy / utility usage has a lot of inaccuracies.

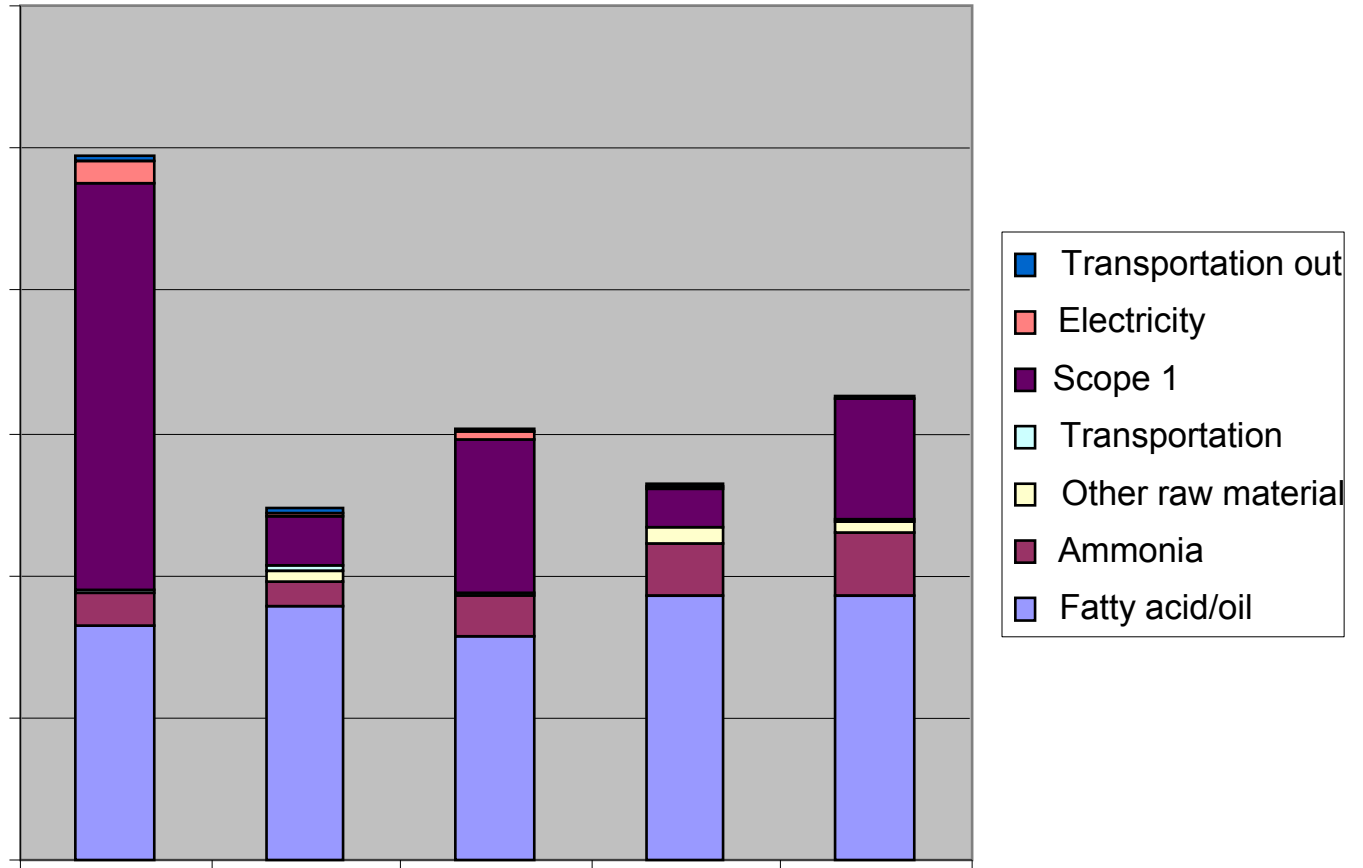
There are also a lot of 'unallocated' utility usage – for example loading, unloading, heating of buildings...

Breakdown per Product

The approach chosen to deal with these challenges:

- Allocate all carbon footprint with the exception of raw materials to the main production units (i.e. pretend that no energy is used for the heating of buildings)
- Then determine what carbon footprint is 'picked up' by each pound run through the unit.
- Based on the yields, determine how many pounds are run through the unit for each pound of finished product.
- This makes it possible to determine the carbon footprint for each pound of finished product

Carbon Footprint for a specific Product from Different Plants



Current Problems

There still is some variation regarding the methods used when the carbon footprint is calculated.

The data regarding the carbon footprint of raw materials also varies, and currently at AkzoNobel we do not have a good system to account for regional differences in raw-material carbon footprints (if there are any).

These are problems within one company – currently I would be very careful when comparing the carbon footprint of products from different companies.

AkzoNobel's Carbon Policy – Targets and Ambitions

AkzoNobel will measure the cradle-to-gate carbon footprint of its key value chains in 2009 and update these measurements every 3 years. AkzoNobel will reduce its cradle-to-gate carbon footprint by 10 % per metric ton of product by 2015 compared to 2009.

AkzoNobel aims to control its absolute scope 1 & 2 greenhouse gas emissions (based on its current business portfolio) no higher than 2009 levels by offsetting organic growth entirely by energy efficiency and fuel mix improvements.

AkzoNobel strives for a paradigm shift in carbon management through continuous innovation, aiming to reduce cradle-to-gate carbon footprint by 20-25 % per ton of product by 2020, compared to 2009. AkzoNobel will provide carbon-efficient solutions to customers contributing to the existing AkzoNobel objective of 30 % annual sales from eco-premium solutions by 2015.

Future Intentions

Developing the carbon footprint for sites and products is still an ongoing process. Suppliers are asked to provide a carbon footprint for their products.

An initiative to increase energy efficiency has been started. Larger plants are audited by teams that identify savings opportunities. Currently goals for carbon footprint reduction are set.

It should not be forgotten that Carbon footprinting is one part of the striving for sustainability and the development of more eco-efficient products.

References

Information to AkzoNobel's Sustainability program can be found on:

<http://www.akzonobel.com/sustainability/>

AkzoNobel's position regarding the carbon management through the value chain can be found on:

http://www.akzonobel.com/sustainability/managing_sustainability/key_f

This website also contains a link to AkzoNobel's Carbon Policy.

Information regarding Responsible Care and the commitment to Sustainability by the chemical industry in Canada can be found on:

<http://www.canadianchemistry.ca/ResponsibleCareHome/ResponsibleCareBRCodesofPracticebr.aspx>

References

Stein, M, Khare, A (2009). Calculating the Carbon Footprint of a Chemical Plant: A Case Study of AkzoNobel. Journal of Environmental Assessment Policy and Management, Vol. 11, No. 3

Reduction of Emissions by the Canadian Chemical Industry:
Reducing Emissions 16 – 2007 Emissions Inventory. Can
be retrieved from the CIAC website:

<http://www.canadianchemistry.ca/ResponsibleCareHome/Resp>



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