

A green, semi-transparent globe is the central focus, featuring a path of dark grey footprints that winds across its surface. Above the globe, two large, vibrant green leaves with water droplets are positioned as if they are about to embrace the globe. The background is a soft, light blue gradient with subtle circular patterns at the bottom.

***GREEN HOUSE GAS (GHG)
REPORT 2010***



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INNOVATIVE PRODUCTS

GLOBAL STRENGTH

LOCAL SUPPORT

VACUUM EXPERTISE



Edwards Green House Gas (GHG) Report 2010

1. General

The 'carbon footprint' converts all materials, transport and energy use into an equivalent amount of Carbon Dioxide (CO₂) generated. To calculate Edwards' carbon footprint we have looked at the CO₂ generated by our operations and our products in use in the following key areas:

- Materials • Facilities • Transport • Product use • Abatement

Over our products' life cycle, they can be considered to be 'carbon negative' - as our products remove more CO₂ equivalent than they generate.

- Manufacturing, remanufacturing and product use generates about 2 million tonnes of CO₂ equivalent p.a. at our own facilities, our supply chain and our customers' facilities.
- However, our abatement products prevent the emission of around 6 million tonnes CO₂ equivalent p.a. at our customer facilities.

This report has been prepared to inform internal and external stakeholders about the green house gas emissions and removals due to the manufacture and use of Edwards' products.

It will be made available on our Corporate Responsibility website.

This report has been prepared in accordance with the guidelines given in ISO14064 Greenhouse gases - Part 1: Organization level quantification and reporting of greenhouse gas emissions and removals.

2. Data

Information on Edwards Green House Gas (GHG) emissions is contained in Appendix 1.

3. Background

a) Reporting Organization

Edwards is a leading global supplier of integrated solutions for the manufacture of semiconductors, flat panel displays, LEDs and solar cells. We supply vacuum and abatement technology for the industrial, pharmaceutical, chemical, scientific, process, glass coating and food packaging industries, as well as a wide range of R&D applications.

We are committed to excellence in the management of the environment and health and safety. There are no higher priorities for us than the health and safety of our people and the protection of the environment.



There are two main ways in which Edwards impacts the environment, firstly making our products more efficient and effective at what they do, and secondly managing our impact on the environment within our business.

We care about sustainability and are working to ensure the things we do, and the way we do them, become more sustainable. We have made several major step changes in product design driven by environmental considerations. Efficient use of resources is crucial in our product design and development, lowering cost of ownership for customers with particular emphasis on reducing power and water consumption.

We have ISO14001¹ and ISO9001² third party certifications for our major facilities worldwide.

For more information on Edwards' environmental programme, please refer to the Corporate Responsibility section of our website at www.edwardsvacuum.com

b) Person Responsible

This report has been compiled by Sara Fry, Senior Environmental Health and Safety Manager, FRSH, CEnv, CMIOSH, CPhys, MA Hons (Cantab).

c) Reporting Period

1st January - 31st December 2009

This report will be produced annually. It is valid until 1 year after the date of publication.

d) Organizational Boundary and GHG Inventory

We have defined the boundary of our operations as being the facilities over which we have organisational control, i.e. all quantified GHG emissions and/or removals from facilities over which we have operational control.

In addition, we also consider the GHG emissions and removals provided by our products during use.

In compiling Edwards' Carbon Footprint, we have considered the following during 2009 -

1. Direct Emissions (Scope 1³) - Natural gas consumption at our sites worldwide
2. Energy Indirect Emissions (Scope 2⁴) - Electricity use at our sites worldwide

¹ **EN ISO 14001:2004** - Environmental management systems. Requirements with guidance for use.

² **EN ISO 9001:2008** - Quality management systems. Requirements.

³ **Scope 1: Direct GHG emissions** - Direct GHG emissions occur from sources that are owned or controlled by the company, for example, emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.; emissions from chemical production in owned or controlled process equipment.

Note: Definitions from the Green House Gas Protocol at <http://www.ghgprotocol.org/files/ghg-protocol-revised.pdf>



3. Other Indirect Emissions and Removals (Scope 3⁵) -
 - Embodied energy of the materials contained in our products
 - Transport of our product by 3rd parties from manufacturing site to customer
 - Energy use by our product installed base at our customers' facilities
 - electricity and methane
 - CO₂ equivalent abated by our product installed base at our customers' facilities

e) Direct GHG Emissions (i.e. Scope 1 emissions)

Edwards direct GHG emissions are very limited.

Natural gas consumption at each of our sites worldwide is reported by each facility via the annual Edwards Environmental Survey. This is recorded in this report in tonnes of carbon dioxide equivalent, CO₂e⁶.

Edwards is a manufacturer of machinery and does not use global warming gases in its manufacturing or remanufacturing processes.

f) Biomass

Edwards does not generate CO₂ emissions from the combustion of biomass.

g) GHG Removals

Edwards does not have any direct GHG removals.

We have Indirect GHG Removals due to the operation of our abatement equipment at customer facilities.

Edwards' abatement products destroy perfluorinated compounds (PFC's) used in the equipment in which semiconductor chips are manufactured. These can be can be thousands of times more harmful than CO₂; the degree of harm is measured using the global warming potential (GWP⁷), where CO₂ = 1. For example, CF₄ = 6,500 and SF₆ = 23,900.

⁴ **Scope 2: Electricity indirect GHG emissions** - GHG emissions occur from the generation of purchased electricity consumed by the company. Scope 2 emissions physically occur at the facility where electricity is generated.

⁵ **Scope 3: Other indirect GHG emissions** - Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services.

⁶ **CO₂e – Carbon dioxide equivalent** - the unit for comparing the radiative forcing of a Green House Gas to carbon dioxide. The carbon dioxide equivalent is calculated using the mass of a given GHG multiplied by its global warming potential GWP.

⁷ **GWP – Global Warming Potential** - the factor describing the radiative forcing impact of one mass-based unit of a given GHG relative to an equivalent unit of carbon dioxide over a given period of time. GWP for a 100-year time horizon, as published by the Intergovernmental Panel on Climate Change (IPCC) in their 1996 reporting guidelines for national GHG gas inventories, are listed in Annex C of ISO14064-1.



Our reporting of Indirect GHG impacts therefore includes the CO₂ equivalent abated by our product installed base at our customers' facilities - in tonnes of CO₂e.

h) Excluded GHG Sources or Sinks

We have excluded from quantification the following direct or indirect GHG sources whose contribution to GHG emissions is not significant, or whose quantification would not be technically feasible or cost effective.

- Very small amounts of solvent used manufacture or remanufacture
 - All major cleaning processes are water based.
- Employee travel or commuting
- Waste disposal

i) Indirect GHG Emissions

- **Indirect Energy GHG Emissions (Scope 2)**

We have quantified the indirect GHG emissions from the generation of imported electricity for all Edwards' sites worldwide - in tonnes of CO₂e.

Electricity use at each of our sites worldwide is reported by each facility via the annual Edwards Environmental Survey. This is recorded in this report in tonnes of CO₂e.

We do not consume imported heat or steam.

- **Other indirect GHG emissions (Scope 3)**

We have quantified the indirect GHG emissions/removals from the following GHG sources and sinks, based on the requirement to inform internal and external stakeholders about the green house gas emissions and removals due to the manufacture and use of Edwards' products.

- Transportation of the organization's products by another organization;
 - Source = Transport of our products from manufacturing site to customer
- GHG emissions/removals from the use of the organization's products and services;
 - Source = Energy use by our product installed base at our customers' facilities
 - electricity and methane
 - Sink = CO₂ equivalent abated by our product installed base at our customers' facilities
- GHG emissions from the production of purchased raw or primary materials.
 - Source = Embodied energy of the materials contained in our products

j) Historical Base Year and Base-Year GHG Inventory



The historical base year for GHG emissions and removals for comparative purposes is 2006. This is the first year in which we compiled GHG data. Data is available for 2006, 2008 and 2009.

k) Changes to the base year GHG data, and any recalculation of the base year GHG inventory

The data reported for each year covers the sites operated by Edwards during that year. Over the period since 2006, a number of sites have been sold or closed, as our manufacturing base is consolidated into fewer, larger sites.

The organization does not recalculate its base-year GHG inventory to account for changes in facility production levels, including the closing or opening of facilities.

l) Quantification Methodologies

Edwards has used the following quantification methodologies to reasonably minimize uncertainty and yield accurate, consistent and reproducible results.

Calculation based on -

- GHG activity data multiplied by GHG emission factors
 - Transport of our product by 3rd parties from manufacturing site to customer (Scope 3)
 - CO₂ equivalent abated by our product installed base at our customers' facilities (Scope 3)
- the use of models -
 - Embodied energy of the materials contained in our products (Scope 3)

Combination of measurement and calculation -

- Intermittent measurement plus,
- Calculation based on data multiplied by GHG emission factors
 - Direct Emissions (Scope 1) - Natural gas consumption at our sites worldwide
 - Energy Indirect Emissions (Scope 2)- Electricity use at our sites worldwide
 - Energy use by our product installed base at our customers' facilities (Scope 3)
 - electricity and methane

The organization has recorded the following, separately at facility and organization levels - using tonnes as the unit of measure and converting to tonnes of CO₂e using appropriate emissions factors:

- Direct GHG emissions (factory natural gas use)
- Energy indirect GHG emissions (factory electricity use)

Other indirect GHG emissions (Scope 3, as listed above) are recorded at organization level.

m) Changes to Quantification Methodologies

There are no changes to quantification methodologies previously used.

When we first published our 2006 Carbon Footprint, this included an estimated value for 'embodied energy in materials'. This has been recalculated as we now have much more



extensive data on embodied energy from the work which our 3rd party consultants have done in analysing our major product ranges. The new number is lower than our original conservative estimate.

n) GHG Emission or Removal Factors

GHG emission factors have been used to convert the following into tonnes CO₂e -

- electricity and natural gas use
 - source - Defra⁸ GHG Conversion factors
 - UK conversion factors as the highest energy using sites are based in the UK
- air transport tonne km
 - source - Defra
- road transport tonne km
 - source - Transport Watch UK
- sea transport tonne km
 - source - Defra
- kg of embodied materials
 - source = Giraffe Innovation Ltd, ecodesign and carbon reduction consultants
- kg PFC abated
 - source = Intergovernmental Panel on Climate Change (IPCC) reporting guidelines for GHG gas inventories

There is no change to the GHG emission or removal factors previously used.

o) Impact of Uncertainties on the Accuracy of the GHG Emissions and Removals Data

The following emissions have little uncertainty being calculated from site data and well recognized conversion factors - Direct emissions; Energy Indirect emissions; Other Indirect Emissions - Transport.

The following 'Other Indirect Emissions' have more uncertainty as they involve an estimate of -

- The installed base of our products - Energy use by our product installed base; CO₂e abated by our product installed base.
- The CO₂e/kg of product mass (based on a detailed studies of six major product types conducted by a firm of third party consultants) - Embodied CO₂e of the materials in our products

p) Report Preparation and Format

This report has been prepared in accordance with the guidelines given in ISO14064 Greenhouse gases - Part 1: Organization level quantification and reporting of greenhouse gas emissions and removals.

q) Report Verification

⁸ Defra - UK Government - Department for Environment, Food and Rural Affairs



Edwards GHG inventory and report has been compiled internally and has not been externally verified.

Independent consultants have been used in some areas - for example to compile the embodied energy data for materials used in Edwards products, and to collate electricity and gas data for our UK sites.

r) Document retention and record keeping

Edwards has procedures for document retention and record keeping as required by ISO9001 and ISO14001 certifications held by all major facilities.

The controlled sources of data for Edwards GHG reporting system include,

- Environmental Survey computer database (site electricity and gas use).
- MAAPICs production system (Bill of Material data for embodied materials)
- SAP sales system (annual units sold)
- Product instruction manuals (product weight and energy use)
- Logistics' department records of product shipments (weights and destinations)

This information, in paper, electronic or other format, is maintained in accordance with the organization's ISO9001 information management procedures for document retention and record keeping.

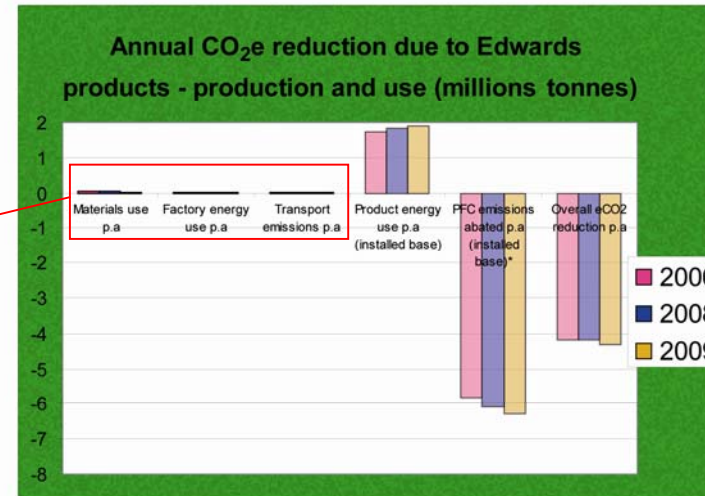
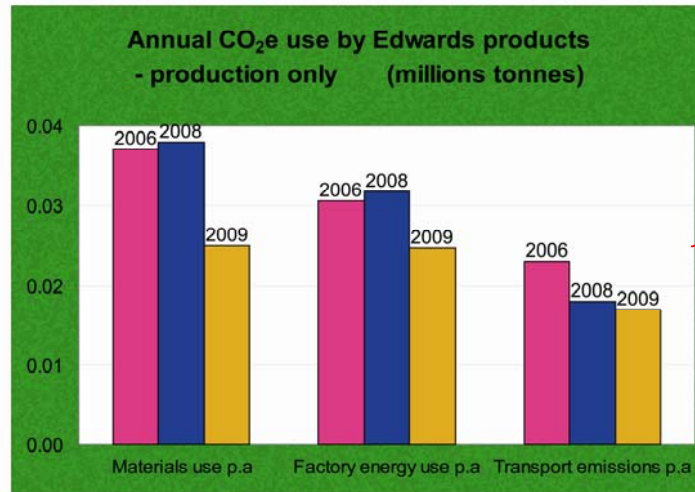
In addition, the following sources of information are used,

- Consultant Resource (emissions conversion factors for embodied energy in materials)
- Internal Product Marketing Resource (installed base numbers)



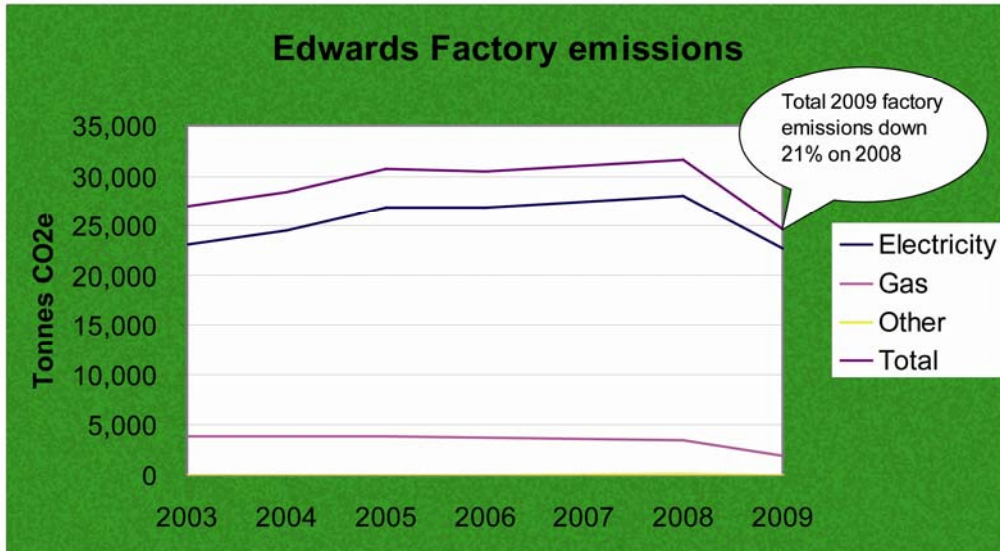
Appendix 1 - Edwards GHG Emissions 2006-2009

1. Edwards Overall 'Carbon Footprint' - Scope 1, 2 and 3 Emissions

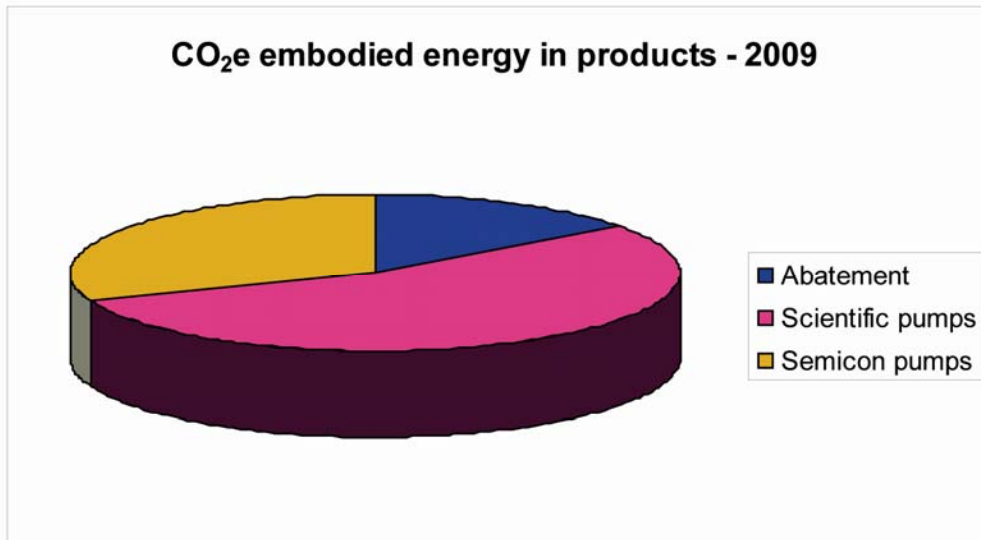




2. Direct Emissions (Scope 1) - Natural gas consumption at our sites worldwide
 And Energy Indirect Emissions (Scope 2) - Electricity use at our sites worldwide

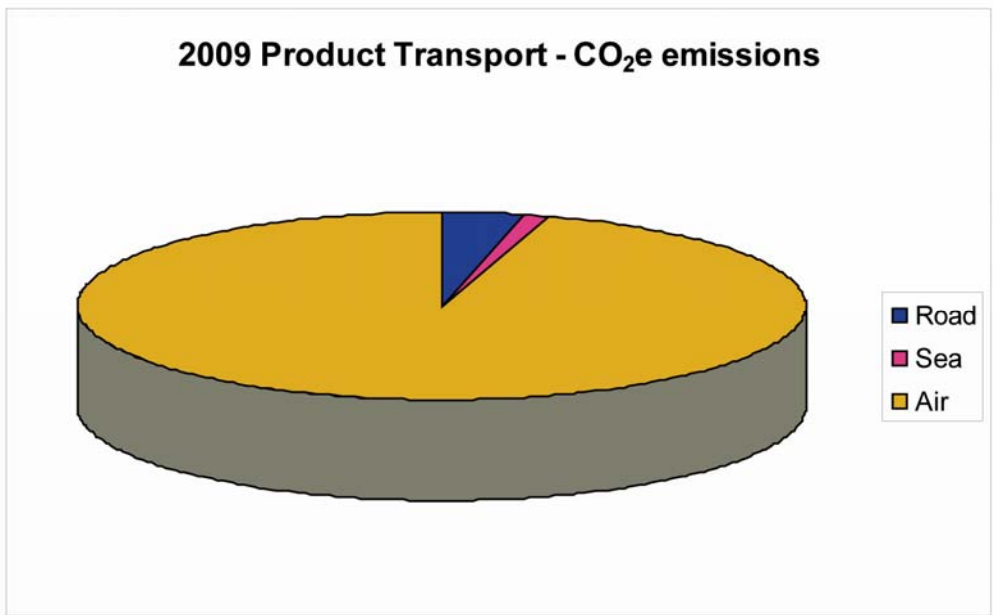
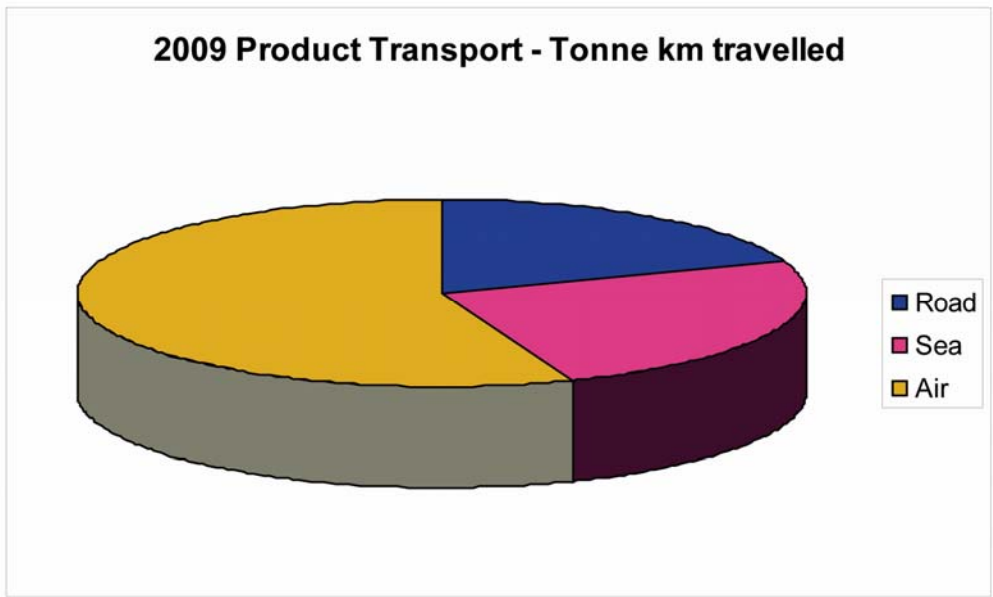


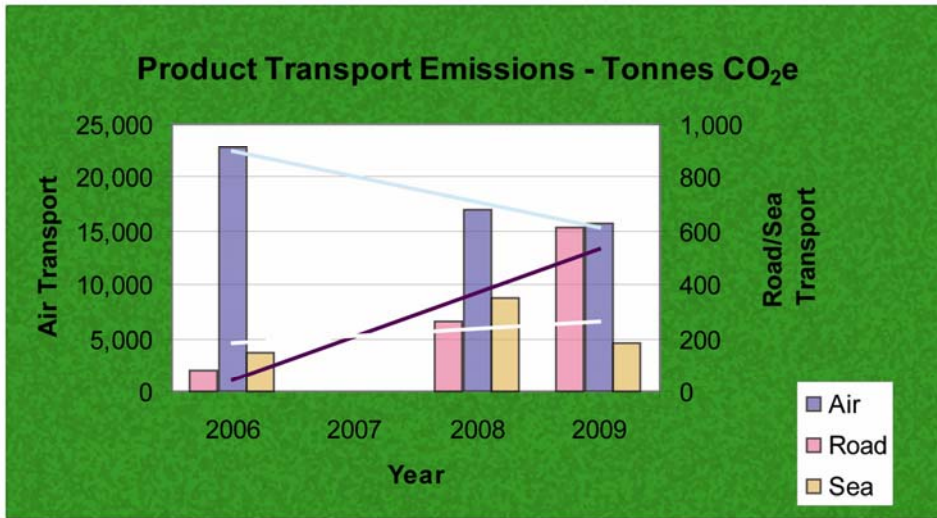
3. Other Indirect Emissions and Removals (Scope 3) -
 3.1. Embodied energy of the materials contained in our products



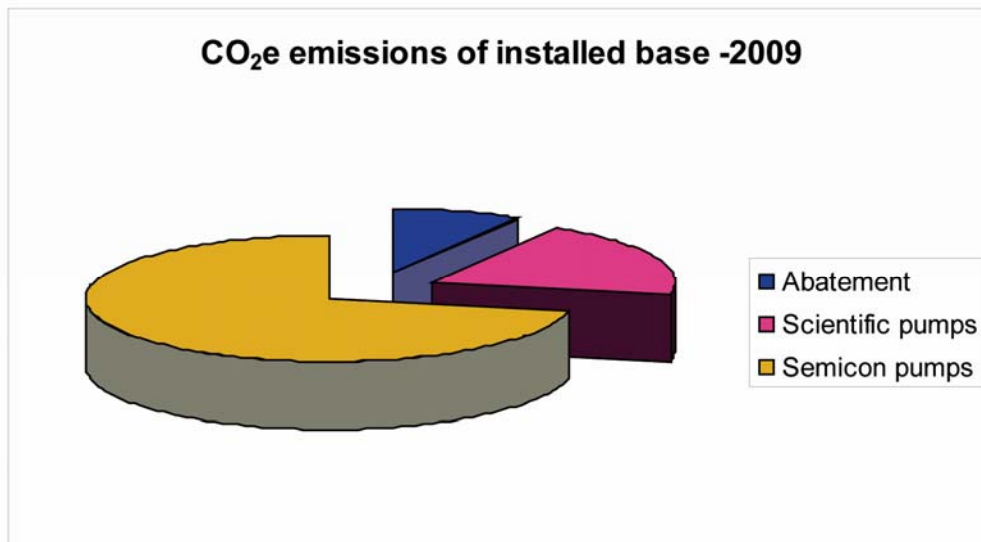


3.2. Transport of our product by 3rd parties from manufacturing site to customer



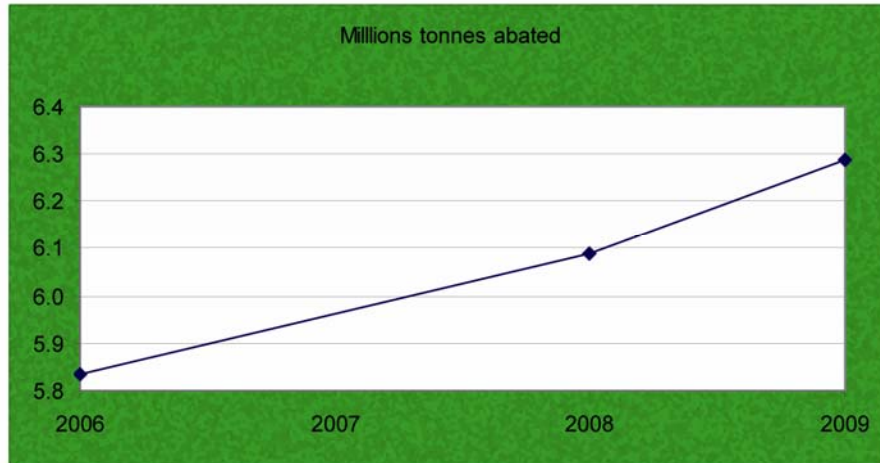


3.3. Energy use by our product installed base at our customers' facilities electricity and methane





3.4. CO₂ equivalent abated by our product installed base at our customers' facilities



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