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Allergan's Approach to GHG Emissions Reductions

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ABSTRACT

Allergan, Inc. has developed a greenhouse gas (GHG) emission inventory covering various aspects of its operations. This paper will describe how these emissions were determined and methods for keeping the inventory current. Allergan has also developed a strategy for managing and reducing GHG emissions, which will be presented along with the results to date and future plans for reductions. Allergan has been able to reduce GHG emissions to pre-2000 levels even with significant increases in energy intensive building space. Allergan has also participated in GHG permitting at our Irish facility. The approach to permitting this facility and the management and measurement structures incorporated into the facility overall management will also be presented.

INTRODUCTION

Allergan, Inc., with headquarters in Irvine, California, is a global specialty pharmaceutical company that develops and commercializes innovative products for the eye care, neuromodulator, skin care and other specialty markets. In addition to its discovery-to-development research programs, Allergan has global marketing and sales capabilities in over 100 countries that deliver value to our customers, satisfy unmet medical needs and improve people's lives.

Allergan has long been involved in resource conservation including energy conservation in particular. This history of energy management has allowed Allergan to determine its largest direct GHG emitters and put plans in place to not only reduce energy consumption but in doing so reduce GHG emissions^{1,2}. Allergan has also gone through many organizational changes over the past five years including facility consolidation, remaining facility major expansions, changes in product mix, concentrated efforts regarding energy management and conservation, and the "spin off" of the AMO business from Allergan. These efforts have all had a profound effect on Allergan's energy consumption and greenhouse gas emission reduction performance. The following article describes Allergan's methods for accounting for and reducing GHG emissions. The article also discusses the process for obtaining a GHG permit at our Irish facility as part of the European Union approach to Kyoto Protocol compliance.

MATERIALS AND METHODS

GHG Inventory Methods

Allergan first decided to benchmark current approaches to GHG inventory development using a third party consultant. The review indicated a wide variety of approaches that appeared to cover business areas that were under direct control of the particular business. The approaches were not consistent nor did they cover all areas of GHG impact.

Allergan decided to include in its GHG inventory scope all applicable areas with which Allergan had either direct control or influence. The scope of Allergan's GHG inventory evolved into the following general areas: Allergan manufacturing and R&D operational locations, sales force and executive fleets, product distribution centers, commercial offices, and joint ventures.

Once the GHG inventory scope was determined, the next step was and is to collect data from the various business entities regarding their GHG emissions (Table 1.). Since Allergan has had an active energy management program in place for several years at its R&D and manufacturing locations, the gathering GHG data from these business activities was relatively easy. Each manufacturing location tracks use of hazardous materials. Using the SAP business system, hazardous materials were checked for those that could be considered as potential GHG emissions. The utility tracking system was also used to determine fuel and electricity consumption. Totals GHG emission totals were developed for each location based on 2005 material and utility consumption. Conversion factors were obtained from USEPA Energy Star Program, USDOE Voluntary Reporting of GHG Emissions, and others to convert fuel, electricity, and material consumption into GHG emissions. The raw materials that could also have an impact included various refrigerants used in process and general facility cooling systems such as CFC, HCFC and HFC compounds. These GHG emissions in pounds of each type of refrigerant compound were again accounted for in a separate spreadsheet (Table 2.).

Table 1. 2005 Allergan Energy and Recycling Consumption-Based GHG Inventory Summary

Business Activity	GHG Emissions	Emission Units
R&D/ Manufacturing	86,383	Metric Tonnes CO2 Equivalent
Sales Force and Executive Automobile Fleets	9,221	Metric Tonnes CO2 Equivalent
Commercial Offices	In Progress	Metric Tonnes CO2 Equivalent
Joint Ventures	In Progress	Metric Tonnes CO2 Equivalent
Product Distribution	In Progress	Metric Tonnes CO2 Equivalent
R&D/Manufacturing Pollution Prevention, Waste Minimization, and Recycling	4,118	Metric Tonnes CO2 Equivalent
All Activities	99,722	Metric Tonnes CO2 Equivalent

The next step was to survey the sales force and executive vehicle fleet administrators. In order to determine how many cars were leased in each country, what types of cars were leased, what the fuel type and efficiency of each car leased was, and the number of miles or kilometers driven per year. Once this was determined for each country with this type of operation, the annual fuel consumption was determined and converted into GHG emissions. The fuel efficiency was also determined and varied significantly between countries. A total of fourteen countries participated in this effort.

Finally for 2005 purposes, the effect of waste minimization was factored into the GHG inventory. Allergan participates in the US EPA WasteWise Program and has for several years. Part of the WasteWise process is to submit waste prevention and recycling information annually. Allergan has done this religiously every year since inception of the Program. The WasteWise Program also calculates the avoided GHG emissions based on the type of material waste prevented and recycled. These estimates were used to determine the waste reduction effect on GHG emissions by Allergan.

Table 2. Allergan CFC, HCFC, and HFC Summary

Year	Units	1990	1991	2002	2003	2004	2005
Total HCFC Use	lbs	7,426	7,426	3,656	2,725	2,725	2,725
Total CFC Use	lbs	829,587	881,655	3,373	2,411	2,411	2,411
Total HFC Use	lbs	N/A	N/A	7,570	8,900	8,900	8,900
Total HCFC, CFC, HFC Use	lbs	837,013	889,081	14,599	14,036	14,036	14,036
Total HCFC Emissions	lbs	negligible	negligible	negligible	negligible	negligible	negligible
Total CFC Emissions	lbs	829,587	881,655	negligible	negligible	negligible	negligible
Total HFC Emissions	lbs	N/A	N/A	negligible	negligible	negligible	negligible
Total HCFC, CFC, HFC GHG Emissions	Metric Tons	377	401	negligible	negligible	negligible	negligible

The next steps for Allergan will be to approach the commercial offices and product distribution centers for GHG emissions based primarily on fuel and electricity consumption. The final step for Allergan's inventory scope will be to approach the joint venture partners requesting that they supply GHG emissions information. At this time, Allergan has not included product transportation as part of the scope of the GHG inventory process but may in the future.

GHG Emissions Reduction Methods

As stated above in the GHG inventory process and in previous papers and articles, Allergan's energy management program has been very successful at reducing direct GHG emissions resulting from fuel consumption and indirect GHG emissions resulting from electrical consumption at our R&D and manufacturing locations. Allergan has been reporting specific projects to the USDOE Voluntary Reporting of Greenhouse Gas Emissions for several years.

Allergan has also been actively eliminating ozone depleting compounds in manufacturing processes and cooling systems. In 1990 through 1993, several of the contact and intraocular lens cleaning processes employed CFC-113. In 1992 and 1993, alternative water-based cleaners were substituted for CFC-113 in these processes. Most of the HVAC chillers operated using CFC-11 as the refrigerant. These chillers have gradually been replaced with non-CFC refrigerants including HCFC and HFC. The maintenance of the chillers has been rigorous including capturing all refrigerants prior to any maintenance as well as constant checks for leaks. This has resulted in a 99% reduction in CFC-11 and CFC-113 consumption by Allergan since 1990. These are also significant GHG emissions and have much greater warming potential than the carbon dioxide emissions related to fuel and electrical consumption.

The GHG inventory process for other parts of the business not previously considered was an eye opener. There are significant emissions related to sales force and executive vehicle fleets. There are also significant differences in the efficiency of vehicles between various regions. Future reductions in this area will include improving fuel efficiency of particular vehicle fleets and testing of new technologies such as hybrids in the fleet vehicles.

On the transportation side, even though Allergan has not included transportation of product in the scope of the GHG inventory at this point, there are simple opportunities to reduce GHG emissions that will be implemented in the future. Examples of these included, requiring trucks to turn off their engines while waiting to load or loading operations are being conducted at Allergan R&D, manufacturing, and distribution center locations and requiring routine maintenance.

GHG Permitting Methods

Allergan Pharmaceuticals Ireland is going through the process of obtaining a GHG permit through the Irish EPA in compliance with the European Union (EU) approved Irish National Allocation Plan. Allergan first had to determine if a GHG permit was required. The threshold test was to determine if the Irish facility had the potential to generate more than 20 MW of power based on fuel-consuming equipment. Allergan compiled a list of direct-burning fuel-consuming equipment which consisted of three boilers and four emergency generators. The fuel consumed for all these pieces of equipment is diesel fuel. The fuel consumption under worst case operating conditions

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was calculated. The worst case assumed that all equipment was operating at 100% of capacity and therefore consuming the maximum amount of fuel. In this case, the worst case scenario showed Allergan Ireland having the potential to generate over 21 MW of power. Therefore, Allergan exceeded the minimum threshold and did require a GHG permit.

The next step was to determine the amount of fuel consumed by each piece of equipment over the previous two-year period as well as the current fuel consumption rate. These annual consumption data provided to the Irish EPA in a GHG permit application. These data were averaged by the Irish EPA. Conversion factors were determined by referring to the National Energy Foundation located in the UK. The fuel consumption was then converted into GHG emissions and an emission cap for the facility was established. The GHG permit was valid for a three period between 2005 through 2007. In 2008, the GHG permit will be renewed with an automatic 5% reduction in the GHG emission cap established in the original permit. This will be in effect through 2012. Further reductions in GHG emissions are not clear at this point.

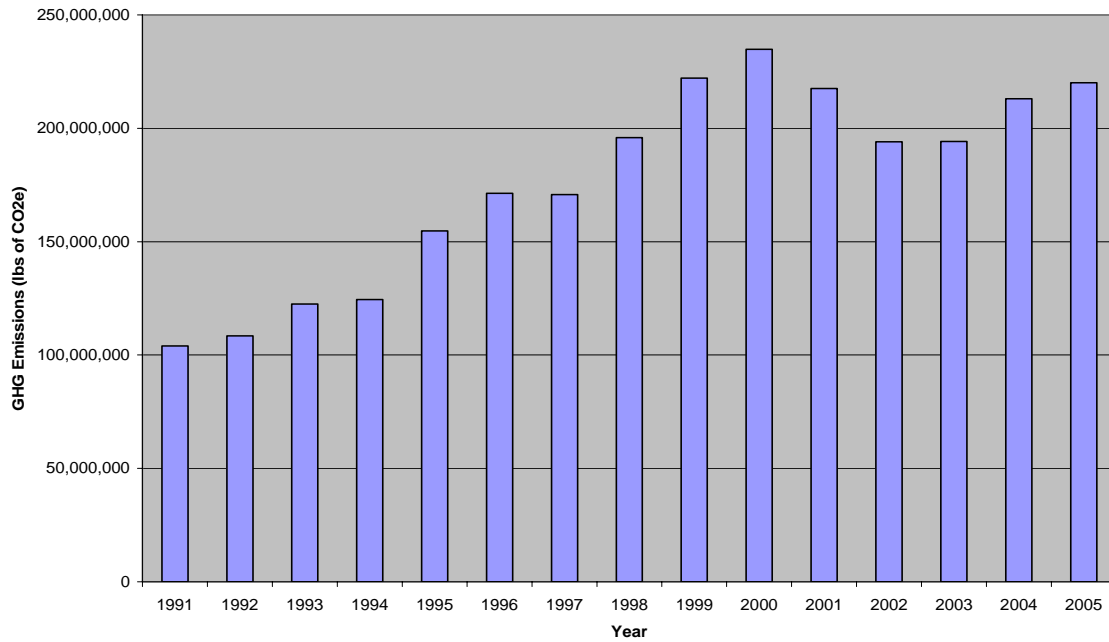
The GHG permit also requires monitoring of fuel consumption as well as monitoring of other energy consuming systems as well as third party verification of the systems operability and data integrity. Annual reports must be filed with the Irish EPA detailing the performance of the system. Fuel consumption by the facility, which causes the emission of GHG in excess of the permit cap, requires Allergan to pay additional penalty fees based on those excess GHG emissions.

RESULTS AND DISCUSSION

Allergan has been able to assemble a GHG inventory based on a limited scope relatively quickly due to data gathering and reporting mechanisms already in place. The inventory is reveal some disparities that Allergan had not considered nor thought were as significant as they appear they might be. These disparities included differences in fuel consumption and fuel efficiencies of the various vehicle fleets around the world, the impact of vehicle fuel consumption versus manufacturing and R&D facility fuel and electricity consumption, and the significant impact that pollution prevention, waste minimization and recycling have on GHG emissions.

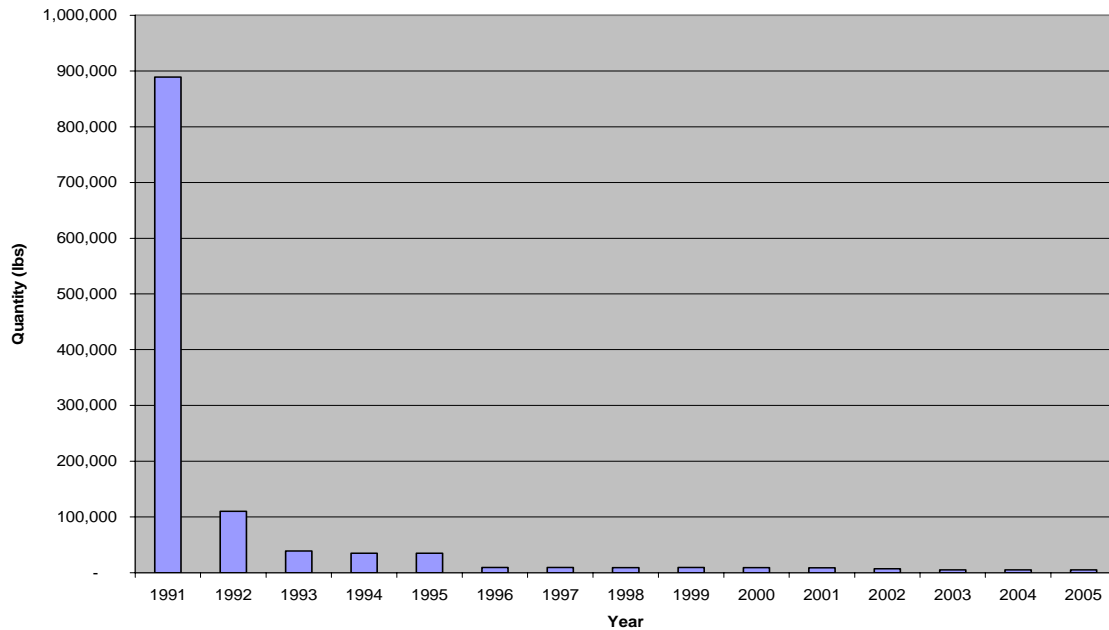
The inventory also identified that Allergan through its Energy Management Policy and Plan and waste minimization/recycling efforts had targeted the most significant GHG emission sources which were the R&D and manufacturing facilities. The reductions that have been achieved by the implementation of energy efficiency and waste reduction projects are significant as shown in Figure 1 as carbon dioxide equivalent. Allergan has been able to hold GHG emissions at pre 2000 levels even with significant expansion of existing facilities along with more energy intensive facility requirements with these expansions and upgrades of existing facilities.

Figure 1. Greenhouse Gas Emissions Trend



Allergan's participation in various voluntary programs such as USEPA Energy Star Program, USEPA Waste Wise Program, and the USDOE Voluntary Reporting of Greenhouse Gas Emissions has helped to establish projects implemented and results achieved in each program. The Energy Performance Indicator (EPI) being developed for the pharmaceutical industry has helped Allergan establish how well the company performs as well as best practices being implemented by top tier companies.

Figure 2. Ozone Depleting Compound Use Trend



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Allergan as stated above has had an active program to reduce ozone depleting compound use and consumption since 1991. Figure 2 shows the amount of ODC in pounds at Allergan locations per year. The focus through 1993 was on the use of these materials in production processes. The second focus after 1993 was on the use of these materials as refrigerants in HVAC chiller systems. These efforts have resulted in a 99% reduction in CFC-11 and CFC-113 consumption by Allergan since 1990. These are significant GHG emissions and have much greater warming potential than the carbon dioxide emissions related to fuel and electrical consumption.

Allergan has identified gaps in data available concerning commercial offices, distribution centers, and joint ventures. Allergan will be collecting data representing these areas in 2006 and forward. Allergan will also pursue opportunities to reduce GHG emissions related to fleet vehicles in particular in the USA, Canada and Australia. Fuel efficiency can be improved in these vehicle fleets. The EU fleet vehicles have the highest average fuel efficiency at 41 miles per gallon and Australian fleet vehicles have the lowest average fuel efficiency at 18 miles per gallon. One opportunity is to test hybrid car functionality in Australia and the USA. This could double the fuel efficiency for both these fleet vehicles.

The Allergan Pharmaceuticals Ireland GHG permit has increased the need for diligence regarding energy conservation and efficiency. The facility is now limited in potential expansion due to this permit. The GHG emissions have placed a control limit on the amount of steam that can be produced which ultimately impacts all manufacturing processes as well as comfort air conditioning. The permit also requires third party verification which is a first for any of the permits currently held at any Allergan location. This third party verification is in addition to regulatory agency reviews, self reporting and audits. An opportunity for Allergan Pharmaceuticals Ireland is to switch fuel from diesel fuel to natural gas. Unfortunately, at this time natural gas is not available at this location. Other ongoing opportunities include maintaining the boiler efficiency and evaluating any new product or process transitions for energy efficiency, in particular related to steam and hot water requirements.

CONCLUSION

Allergan has taken the management of energy, refrigerants, materials and wastes very seriously. In so doing, Allergan has been able to demonstrate that Allergan GHG emissions are identified in a current inventory. The inventory scope is expanding to account for other GHG emission sources under the direct control and some that are not under the direct control of the company. Allergan has demonstrated competence in not identifying the GHG emissions but also in reducing the GHG emissions significantly with more reductions expected in the future.

Allergan will continue to demonstrate leadership in the area of GHG emission reduction. Part of these reductions have and will come from energy management and efficiency measures, some will come through effective waste management and recycling, some will

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come through innovative designs for buildings and processes, and finally through effective goal setting and project implementation.

Allergan now has added impetus to reduce GHG emissions due to its acquisition of a GHG permit which among other requirements caps the GHG emissions for its Irish facility at 2005 GHG emission levels. The GHG permit now forces Allergan to be creative in regards to planning for the Irish facility. At this point, this has not been an issue for Allergan to manage but it could be a significant issue for this facility in the 2008 through 2012 period. However, there are some alternatives that Allergan will implement as they become available to it in the coming years such as fuel switching and new technology such as fuel cells. Allergan looks forward to the challenge.

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KEY WORDS

GHG Inventory
GHG Permit
Energy Management
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Fuel Efficiency