



# Mobile Dispensing System (MDS) Environmental Impact Study

## Report Summary

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## Executive Summary - Study of Environmental Impact

### Native Green Mobile Dispensing System Cleaning Products vs. Conventional Ready-to-Use

**Objective:** The objective of this project was to compare the life cycle impacts of conventional packaging of surface cleaners with the packaging of surface cleaners based on the Mobile Dispensing System (MDS). In the MDS system, the cleaner is distributed in concentrated form, in cartridges. The product is diluted at the cleaning location through a simple process of adding water to the empty bottle, placing the cartridge in the bottle neck, applying the spray fixture, and shaking. Following initial purchase of the empty bottle plus cartridges, consumers can purchase refill cartridges and do not need to acquire a new bottle. Cartridges are packaged in PET blisters. The specific system chosen for analysis was glass cleaner in 32-oz PET spray bottles. The package systems compared include the primary package (bottle, sprayer, labels, etc.) and the distribution packaging (corrugated boxes, pallets, stretch wrap). Additional details are provided in the methodology section. The evaluation of life cycle impacts comprises both life cycle inventory information, which is simply a tabulation of the inputs and outputs associated with the package systems being compared, and an evaluation of selected environmental impacts of those inputs and outputs. In any study of this type, assumptions must be made. We have attempted to clearly indicate all significant assumptions, throughout the report. Our guiding principle in making assumptions was to be conservative – meaning that if the assumptions might “favor” either the MDS or the conventional system, the assumption chosen would favor the conventional system. Therefore, conclusions drawn from the data presented are robust; in most cases, the differences found in favor of the MDS system are likely even larger than those presented here.

This study compared the life cycle impacts of glass cleaner in conventional 32-oz. capacity PET plastic spray bottles and glass cleaner using the Native Green Mobile Dispensing System (MDS) with refill cartridges. Averages of 10 fills and of 20 fills per bottle of the Native Green MDS were compared with standard non-refillable bottles. In both cases, the Native Green MDS provided a variety of environmental benefits. As would be expected, these benefits increased with more fills per bottle. However, they were quite large even at the conservative 10 fill per bottle level. Often, comparison of environmental costs and benefits of competitive package systems is difficult because tradeoffs are involved, with one system providing benefits in some areas, and the other system benefits in different areas. In this case, however, analysis is simple. The Native Green MDS provides benefits across the board: in material use, energy consumption, greenhouse gas emissions, air pollutants, water pollutants, and solid wastes. Figure ES1 illustrates the savings in total material use, energy, and greenhouse gas emissions provided by the Native Green MDS. Figure ES2 shows the decrease in selected air and water emissions.



Figure ES-1 Proportional values of material use, energy for manufacture of packaging systems, and greenhouse gas emissions for conventional window cleaner systems, Native Green MDS averaging 10 fills per bottle, and Native Green MDS averaging 20 fills per bottle.

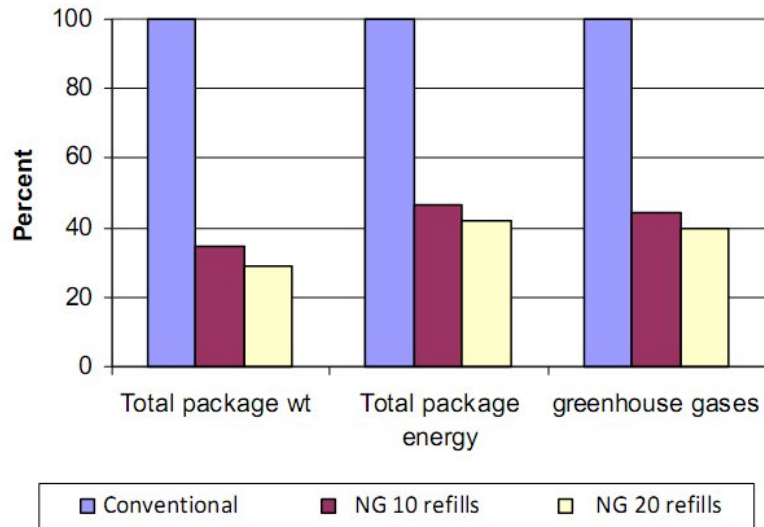
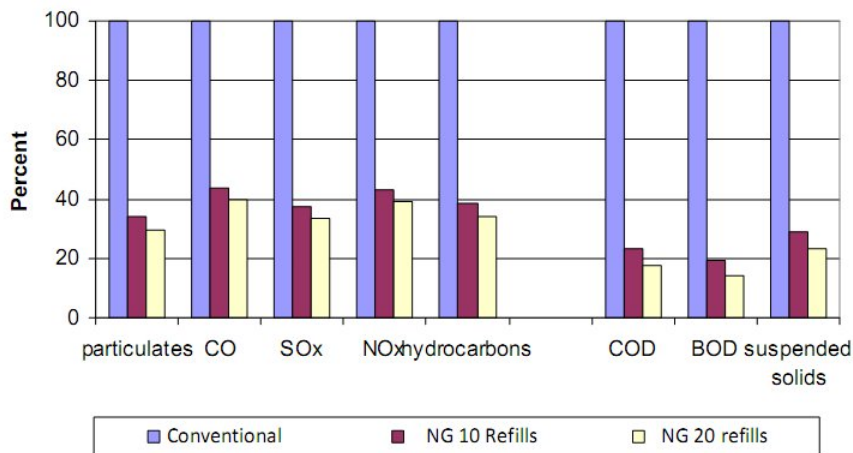
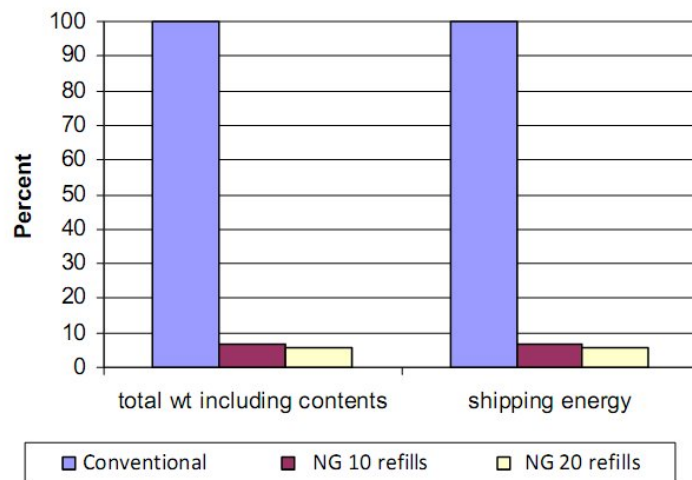


Figure ES-2 Proportional values of selected air emissions (particulates, carbon monoxide, sulfur oxides, nitrogen oxides and hydrocarbons) and in selected water emissions (chemical oxygen demand, biological oxygen demand and suspended solids) for manufacture of packaging systems for conventional window cleaner systems, Native Green MDS averaging 10 fills per bottle, and Native Green MDS averaging 20 fills per bottle.



There are also significant savings in energy and emissions associated with transport of the filled packages to the retailer (and smaller savings associated with transport from the retailer to the end use location). Figure ES3 illustrates the reduction in weight and in shipping energy associated with distribution by truck from the filler to the retailer, assuming energy use is proportional to weight of the load.

Figure ES-3 Proportional values of energy associated with transport of filled packages to retailer for conventional window cleaner systems, Native Green MDS averaging 10 fills per bottle, and Native Green MDS averaging 20 fills per bottle.



We did not examine MDS products averaging greater than 20 fills, although the trigger spray is robust enough to handle a significantly larger number, and the bottle should also be able to do so. An indication of the effects of a larger number of refills is provided by the comparison between the 10 fill and 20 fill systems. As the average number of refills increases, the differences between the conventional and MDS also increase, further favoring MDS.

Despite these limitations of the study, the message is clear. The Native Green Mobile Dispensing System provides significant environmental benefits across an array of categories, compared to conventional packaging for surface cleaners. The assumptions used in this analysis were chosen to minimize, rather than to add to, the differences between the systems. Therefore, actual differences are even larger than those presented here.

