State of Oregon
Department of Environmental Quality Memorandum

Date: November 23, 2009

To: Environmental Quality Commission

From: Dick Pedersen, Director

Subject: Agenda item L, informational item: Life cycle study of water delivery systems
December 10-11, 2009 EQC Meeting

Why this is Important

DEQ periodically uses life cycle assessments to help determine the potential environmental impacts of products, processes or services through production, usage and disposal. Such assessments help DEQ estimate, for example, possible impacts on emissions of greenhouse gases and toxic pollutants, and help provide useful information to both consumers and producers of goods.

Background

DEQ commissioned a study to assess the life cycle environmental impacts of drinking water delivery systems, and found that the results support DEQ's Strategic Directions and principle of reduction and reuse before recycling. The study compares 48 different scenarios and examines a range of environmental effects across the entire life cycle of single-use, five-gallon reusable and tap water delivery methods. The life cycle includes extracting raw materials from the earth, such as coal, oil and minerals; producing energy resources and packaging materials; water treatment; bottling; transportation, consumer transport; dishwasher use; and disposal, recycling and composting.

This study was conducted as part of DEQ's Waste Prevention Strategy, which focuses on reducing waste generation (the "reduce, reuse" part of "reduce, reuse, recycle"). DEQ has observed that many Oregonians express the belief that recycling products makes the purchase of such products environmentally benign. DEQ commissioned the study in part to evaluate and communicate the environmental benefits of recycling over disposal, but more importantly, reduction over recycling.

Key findings

The study, "Life Cycle Assessment of Drinking Water Delivery Systems: Bottled Water, Tap Water and Home/Office Delivery Water," concludes that drinking tap water in refillable bottles or dishware is the more environmentally friendly action when compared to other forms of obtaining and consuming drinking water, including buying water in bottles and recycling the bottles.

Other key findings from the study include:

- The majority of the environmental effects from bottled water occur from manufacturing and, for water shipped long distances, transportation. This means that the method used by consumers to obtain drinking water (tap vs.

bottle) has a greater environmental impact than whether single-use bottles are recycled or not.

- Recycling water bottles offers moderate environmental benefits, and consumers who choose to drink from single-serve bottles should continue to recycle. Purchasing and recycling a typical water bottle reduces energy consumption by 24 percent and greenhouse gas emissions by 16 percent over the entire life cycle, compared against purchasing and disposing of the same water bottle in the garbage.
- Consuming the same quantity of water from the tap in an average reusable bottle, even if washed frequently in a high water and energy using dishwasher, reduces energy consumption by 85 percent and greenhouse gases by 79 percent, again compared against purchasing bottled water and disposing of each bottle in the garbage.
- Even the best performing bottled water scenario, which uses and recycles a lightweight bottle not yet available in Oregon, has global warming impacts 46 times greater than the best performing tap water in the study.
- For individuals drinking water from the tap, environmental impacts are typically small and dominated by the energy used to heat water for washing reusable bottles or cups. Using energy-efficient appliances, washing less often, and running the dishwasher only when full are the most environmentally significant behaviors for these individuals.
- If bottled water must be purchased, DEQ recommends using the thinnest bottles and purchasing water that is bottled locally. Impacts of driving to the store can also be large, so avoiding extra shopping trips helps, as does recycling when the single-use bottles are emptied.
- Degradable plastics may worsen global warming by contributing to the production of methane in municipal solid waste landfills.

The study also contains information that producers can use to make their packaging less harmful to the environment. A key finding is that many of the environmental effects result from resin manufacturing, and making bottles thinner is one of the most important options for bottlers. Using recycled content and supporting increases in recycling helps too, but these benefits are generally smaller.

Next steps

The study's results were released November 18, and DEQ staff will present the information to a number of stakeholders, partners and interested parties throughout late 2009 and early 2010. DEQ staff are focusing outreach on the message "reduce first, then recycle."

Attachments

A. Life cycle Assessment of Drinking Water Systems: Bottled Water, Tap Water, and Home/Office Delivery Water Executive Summary

Available online or upon request

1. Life cycle Assessment of Drinking Water Systems: Bottled Water, Tap Water, and Home/Office Delivery Water Final Report with Appendices
http://www.deq.state.or.us/lq/pubs/docs/sw/LifeCycleAssessmentDrinkingWaterFullReport.pdf

2. Supplemental Report: Comparing Prevention, Recycling, and Disposal.
http://www.deq.state.or.us/lq/pubs/docs/sw/LifeCycleAssessmentDrinkingWaterSupplement.pdf

Approved:

Section: _____

Division: _____

Report prepared by: David Allaway and Abby Boudouris
Phone: (503) 229-5479 and (503) 229-6108