

West Coast Forum Research Work Group

Topic 1 – Waste Prevention

Summary of Research Findings and Gap Analysis

Topic 1: Finding and comparing waste prevention strategies for governments, local businesses, and households

RESEARCH QUESTION(S)

- What waste prevention techniques, practices and approaches have proven effective as measured by greenhouse gas emission reduction; or as measured by prevalence of organizational or consumer participation; or by other means?
- What strategies, techniques, practices and approaches have been tried but not significantly evaluated or not yet been tried but have been proposed that are considered to have the greatest potential?
- Can the results of the various techniques, practices and approaches be compared or are there fundamental differences in the way they are measured across studies? If comparable, what is the comparison?
- How do the costs and cost savings for these compare? What factors influence the cost and what strategies can be used to reduce the cost?

SUMMARY OF KEY FINDINGS

General

Waste prevention seems to be a confusing term to some people. This document uses a fairly standard definition of waste prevention, as practices that reduce solid waste generation, including actual avoidance in generation and reuse; recycling and composting are not included in this definition. However, it was apparent throughout the readings that the term waste prevention is not always used consistently. Sometimes the definition was confused with recovery or some management efforts of waste such as recycling and composting. Waste prevention seems to imply that some form of waste is already generated and needs to be managed. It would make sense for recycling and composting to be included if one assumes that the waste is already generated. Recycling can also be a barrier to waste prevention; not only because recycling is often considered the same as waste prevention but because some believe that by recycling their contribution to “being green” has been fulfilled and no other actions are necessary.

Measurement, Evaluation and Analysis of Residential Waste Prevention

The actual evaluation of waste prevention and its potential of instruments and measures is severely lacking. There was some evaluation found in the literature review, but it was not comprehensive (e.g., some focused only on household consumption). One article, *Delivery and impact of household waste prevention intervention campaigns*, attempted to analyze the effects education campaigns had on household waste prevention. This article was a fairly comprehensive evaluation of how the campaigns

were measured in the participating households although understanding which measurement directly correlated with specific actions was not easily determined.

Some of the main conclusions from this report specific to household education campaigns were:

- Household tonnage: food waste prevention, food waste composting, and bulky item reuse offer the greatest tonnage reduction potential. Food waste prevention may offer the greatest potential, but hasn't been sufficiently evaluated.
- Cross-cutting waste prevention outreach campaigns, or integrating a range of intervention tools and campaign ideas, to households may reduce tonnage 2 – 4%.
- Unlike recycling, waste prevention actually consists of hundreds of discrete and largely independent actions. Instruments aimed at individual actions (junk mail, diapers, bags, etc.) each have limited tonnage potential (typically less than 3% reduction of total Municipal Solid Waste (MSW) but collectively may be more significant).
- New and different ways of delivering outreach campaigns are needed to help households distinguish waste prevention from recycling and engage new audiences.
- Data collection needs to be improved in order to be used for future campaigns.
- Small group interventions showed a great deal of promise, but the question remains as to whether you can scale them up to a larger audience and reach the same impact as well as to what the cost would be.
- Trying to engage households in waste prevention is difficult and requires a lot of effort. It is best for staff who deal with household waste directly to approach the topic with selected participants.
- Community development can provide households ownership of the waste prevention project. Show the household their direct contribution to improving their community to improve results.
- Use people that have a lot of enthusiasm and are viewed as local champions because they have a big impact. Make sure these “local champions” feel supported and have the information they need.
- Promote campaigns by a very specific topic (junk mail) instead of smart shopping.
- Self-weighing of trash appears to have a motivating role for participants to actually reduce waste.

Considerations/Best Practices

Several other articles also discussed recommendations or lessons learned from dealing with individuals. Some of the other recommendations to keep in mind when trying to engage individuals in waste prevention are:

- Green purchasing may be a barrier to prevention – if the conservation-minded think that their product is “eco-groovy”, they will not bother to use less of it. This relates to the reducing vs. shifting consumption that is discussed in topic 3 Consumer Behavior. Basically, to the extent that waste prevention is about “being less bad” as opposed to a more holistic “good”, it may not align with the broader changes that are needed to transition to sustainability (a shift from “lower environmental impact” approaches to “low/no impact” approaches).
- Waste prevention programs - especially outreach/education programs - are often informed by the “rational choice” model of consumer behavior. The rational choice model suggests that by simply providing information and/or financial incentives people will change their behavior. This model has been widely discredited as being incomplete. Simply providing information and changing financial incentives may not be sufficient. (In fact, more information isn't necessarily better.) Pro-

environmental behavioral change has to be a social process; change social norms, not individual practices. Collective solutions are needed that change the circumstances in which individual choices are made, in order to make waste prevention actions more convenient, habitual, and/or socially “normal”.

Business Waste Prevention Findings

Overall, this area of waste prevention seemed to be less studied than residential waste prevention, although one report (Oregon DEQ, 2007) summarized a variety of studies documenting waste prevention potential in the non-residential sector, covering a large and diverse set of actions. One of these studies, prepared for Alameda County, involved over 450 telephone interviews and site visits that documented adoption rates for 95 different waste prevention practices.

Broad categories of actions documented in the other literature included product stewardship, policy changes and green design. Government programs seemed to have a hard time impacting waste prevention through policy but were much more successful in managing waste after it was created. This could be because government plays a much more explicit role in waste management than it does in product design. One area that seemed to show promise in business waste prevention was influencing purchasing. Creating the demand for a product whether it is from the consumer or government can influence how a manufacturer designs the product. Government is a large purchaser and can use this power to try and institute change at the design stage. Below are some other takeaways from business waste prevention:

- Light-weighting, which is a reduction in the amount of packaging used for a product, has resulted in significant waste prevention.
- “Upstream” policy changes aimed at increasing product durability, extending warranties may lead to greater prevention of waste, but have not been sufficiently evaluated.
- The impact of product stewardship on waste prevention appears weak. There may be significant potential through approaches such as extended warranties. Product stewardship should be focused on reducing full life cycle impacts, as opposed to single attributes such as waste prevention.
- Life cycle analysis can be used to rank the relative environmental benefits/impacts of different waste prevention measures, as demonstrated by Oregon DEQ’s green building study. Not all measures (practices) are equal; the environmental benefits of different measures may be several orders of magnitude (a factor of 1,000 or more) apart. However, evaluation of the potential impact of policy instruments is less advanced.
- Minimization of waste is driven by cost of raw materials and not by the cost of waste.
- External stakeholders and customers seem to drive sustainability for businesses but this doesn’t necessarily equate to waste prevention.
- A potential waste prevention instrument would be for manufacturers and environmental authorities to work on product design together.

Rebound Effect

The rebound effect occurs when a consumer engages in a behavioral change that saves them money; the savings are then used in some other manner, with resulting environmental (and economic) impacts. Rebound effects are sometimes classified as “direct” or “indirect” based on whether the rebound is related to the original behavior. For example, purchasing a more fuel efficient car and then driving more miles (due to fuel savings) is a “direct” rebound effect; purchasing a more fuel efficient car and then using the

savings to eat out more often would be an “indirect” rebound. There were a few articles that discussed actions that could be taken to avoid negative environmental consequences from rebound effects.

Rebound effect needs to be considered – both direct and indirect rebounds. Some possible counter actions that can be taken to challenge the impact from rebound effects are:

- Take money saved and invest it in natural capital. Natural capital is the extension of capital to environmental goods and services. Natural capital is investing in natural resources, land or the ecosystem for the long-term. For example, purchasing and planting hundreds of trees provides a new forest for the future.
- Intervene with prices to shift money flows from more detrimental activities to an average set that are less detrimental per amount spent.
- Change the shape of economic activities, for example, the relative structure/composition of the economy.
- Short-cut the scope of the economy by work sharing. Transform technological progress directly into leisure as an alternative form of welfare, in contrast to higher consumption.

Potential Roles for Government and Considerations/Best Practices

There were several actions that were recommended in the articles that could be taken to achieve waste prevention. A lot of them had not been tried and evaluated and some of them had not even been tried. Below are some of the roles that government could play in waste prevention that showed promise.

- Establish a strong policy foundation.
- Provide positive, inspiring, radical examples.
- Provide convincing evidence via research.
- Incentive structures (taxes, subsidies, penalties). Remove virgin material extraction subsidies.
- Facilitate conditions and situational factors.
- Product standards.
- Building standards.
- Create media standards that would limit exposure to product advertising (e.g., advertising aimed at children).
- Marketing standards (e.g., green marketing/green-washing).
- Enhancing social and cultural fabric.
- Helping/encouraging/incenting/requiring businesses to change practices.
- Government operation/performance, including clearer/better environmental purchasing criteria.

Overall, the research did come to a consensus on certain best practice strategies that should be considered when working on waste prevention. They are:

- Single actions will be less effective; interventions need to be integrated in a coherent overall strategy.
- Consider operating waste prevention in a broader/more holistic sustainable consumption framework.
- Focus on priority materials and/or sectors.
- Partnerships will be very important.
- Policy approaches should be flexible and will need a wide set of new skills

- Policy instruments should be checked with respect to their ability to react quickly and dynamically to changes in markets.
- A user-friendly database with life-cycle environmental, social and economic impacts of products should be compiled.
- Good evaluation is important.
- Be careful with incremental measures, which may undermine deeper change.
- Be careful with economic instruments, which can erode the more fundamental values-based approach aimed at shifting cultural foundations of household behavior.
- Effort should focus on reducing overall consumption, rather than increasing efficiency.
- Symbolism matters.

STATE OF KNOWLEDGE AND INFORMATION GAPS

Information needed to answer the specific questions around this topic area is incredibly incomplete. One of the most comprehensive literature reviews (in the UK), which involved reviewing more than 1,000 documents, still found large and significant data gaps.

- One of the challenges is that, unlike recycling, waste prevention consists of many discrete and somewhat unrelated actions.
- Measurement of waste prevention is a challenge for many reasons including the difficulty of defining the “counterfactual assumption” (what waste generation would have been in the absence of the waste prevention action).
- More pilot programs are needed, and these programs need to be better evaluated.
- It will be important to keep the distinction clear between waste prevention and waste recovery. Even some of the literature reviewed failed to maintain this distinction, reporting on recycling activities and characterizing them as “waste prevention”.
- Some of the literature identifies broad areas that may be worth further exploration, such as how to achieve significant reductions in the wasting of food, and how to extend the durability of consumer goods (through warranty changes, etc.). There is no shortage of topics that could be researched.
- Life cycle analysis can be used to evaluate the relative impacts and benefits of specific practices (measures), and the field would benefit from more research of this type; but evaluation of the different instruments (policy, outreach, etc.) to achieve changes in those measures is also lacking.

BIBLIOGRAPHY

Cox, J; Giorgi, S; Sharp, V; Strange, K; Wilson, D; Blakey, N. "Household waste prevention - a review of evidence," *Waste Management & Research* 28 (3, Sp. Iss. SI): p 193-219. Mar 2010.

Fedrigo and Tukker. "Blueprint for European Sustainable Consumption and Production." European Environmental Bureau. March 2009.

Fehr, M., Calçado, M. D. R., & Romão, D. C. "The basis of a policy for minimizing and recycling food waste." *Environmental Science & Policy*, 5 (3), 247-253. June 2002.

Fischer, Christian. "Evaluation of waste policies related to the Landfill Directive: Finland." European Environmental Agency. March 2008.

Floros N.; Vlachou A. "Energy demand and energy-related CO SUB 2 emissions in Greek manufacturing: Assessing the impact of a carbon tax." *Energy Economics*, v27, n3 (387-413). 2005.

M.K. Harder and R. Woodard, "Use of home food digesters to reduce household waste", *Waste and Resource Management* (2009) 162 Issue WR2.

Jackson, T. (2005) "Motivating Sustainable Consumption." *Sustainable Research Network*: London.

Jacobsen, Henrik and Kristoffersen, Merete. "Case studies on waste minimization practices in Europe." *European Environmental Agency*. 2002.

Kotchen M.J.; Moore M.R. "Conservation: From voluntary restraint to a voluntary price premium." *Environmental and Resource Economics*, v40, n2 (195-215). 2008.

Krantz, R. (2010), A New Vision of Sustainable Consumption. *Journal of Industrial Ecology*, 14: 7–9.
Mazzanti M.; Montini A.; Zoboli R. "Municipal waste generation and the EKC hypothesis new evidence exploiting province-based panel data." *Applied Economic Letters*, v16, n7. 2009.

Melanen, M. "Finnish Waste Policy: Effects and Effectiveness," *Resources, Conservation and Recycling*, v35, n1-2, p1 (15). 2002.

Oregon Department of Environmental Quality. "A Life Cycle Approach to Prioritizing Methods of Preventing Waste from the Residential Construction Sector in the State of Oregon." Phase 2 Report, Version 1.4. Prepared for DEQ by Quantis, Earth Advantage, and Oregon Home Builders Association. <http://www.deq.state.or.us/lq/sw/wasteprevention/greenbuilding.htm>

Oregon Department of Environmental Quality. "Other States and International Efforts: A Summary of Selected Waste Prevention and Reuse Programs and Initiatives Outside of Oregon." Prepared for DEQ by Tellus Institute and Cascadia Consulting Group, 2006.

Oregon Department of Environmental Quality. "Product Stewardship and Extended Producer Responsibility as a Policy Approach for Waste Prevention." 2007.

Oregon Department of Environmental Quality. "Waste Prevention in Businesses: An Overview of Waste Prevention Potential, Benefits, and Barriers." 2007.

Salhofer, S. "Potentials for the Prevention of Municipal Solid Waste," *Waste Management*, v28, n2, p245(15). 2009.

Sanne C. "Dealing with environmental savings in a dynamical economy - how to stop chasing your tail in the pursuit of sustainability." *Energy Policy*, v28, n6-7 (487-495). 2000.

Scholl G.; Rubik F.; Kalimo H.; Biedenkopf K.; Soebach T. "Policies to promote sustainable consumption: Innovative approaches in Europe." *Natural Resources Forum*, v34, n1 (39-50). 2010.

Schumacher I. "Ecolabeling, consumers' preferences and taxation." *Ecological Economics*, v69, n11 (2202-2212). 2010

Sharp, V; Giorgi, S; Wilson, D. "Delivery and impact of household waste prevention intervention campaigns (at the local level)," *Waste Management & Research*, 28 (3, Sp. Iss. SI): p 256-268. Mar 2010.

Thøgersen, J. (1999). Spillover Processes in the Development of a Sustainable Consumption Pattern. *Journal of Economic Psychology*, 20, 53–81.

Timmer, V., Prinet, E., and Timmer, D. "Sustainable Household Consumption." Prepared by the Consumers Council of Canada for the Office of Consumer Affairs, Industry Canada. March 2009.