

METRO VANCOUVER FUTURE OF THE REGION SUSTAINABILITY DIALOGUES

DEMATERIALIZATION: TRANSITIONING TO AN ECONOMY WITHOUT WASTE March 6, 2012, SOUTH

The Future of the Region Sustainability Dialogues are a series of discussions intended to assist decision makers shape the future of the region by inviting a range of views that challenge conventional wisdom and stimulate fresh thought on regional issues. The sessions explore topics such as housing, industry, labour and immigration, drugs and crime, the regional economy, transportation, energy and agriculture. The “issues summary notes,” below, provide an overview of unique points raised in the March 6, 2012, dialogue on dematerialization. Summary notes from each regional dialogue and related board reports are available on the Metro Vancouver website www.metrovancouver.org.

Issues Summary Notes

ABOUT THE TOPIC:

DEMATERIALIZATION: TRANSITIONING TO AN ECONOMY WITHOUT WASTE

- This dialogue explores what dematerialization means and what we can do in this emerging policy area.
- It builds on discussions at the 2011 Metro Vancouver Sustainability Congress, where key sustainability themes including dematerialization were explored. The participants were interested in exploring a number of questions related to dematerialization:
 - What is dematerialization?
 - What does it mean for me as a consumer, business owner, local community representative or decision maker?
 - What can governments do?
 - What can the private sector and academia do?
 - What can we do together?
- Economic growth brings challenges as we try to reconcile the consumption of materials with finite limits on resources extracted from the Earth.
 - We will explore how we can maximize the efficient use of resources in our economic processes and better manage materials through their life cycle.
 - In simpler terms, how can we transition to an economy without waste?

THE DIALOGUE

1.0 The concept of dematerialization

1.1 What does “dematerialization” mean?

- Dematerialization is the implementation of management and design strategies that allow producers to enhance the value of products relative to their raw material and energy inputs.
 - There is overlap between the ideas of dematerialization and decoupling. These terms are roughly synonymous.



1.2 “Dematerialization” is based on ideas of efficiency

- The concept of dematerialization has roots in Victorian-era notions of the efficient use of raw materials and industrial production methods.
 - During the middle decades of the 19th century, there was a fervour surrounding the use of the steam engine, enhancing its efficiency and efficiently using coal.
- In the early 20th century, personalities like Frederick Taylor sought to apply similar principles to the use of labour for industrial production.
 - Taylor did time-motion studies. He went around industrial plants with a stopwatch, timing individual movements of workers, trying to optimize the efficiency of their movements in the process of assembling products.
- More recent antecedents of dematerialization include total quality management, just-in-time delivery and outsourcing of manufacturing operations to low-wage countries.
 - All of these managerial practices were devised to lower costs and increase profits by allocating inputs of labour, energy, materials, time or capital more efficiently.

1.3 Greater efficiency leads to greater consumption of materials

- An outcome of the effort toward efficiency has been lower prices and increased consumptive throughput.
 - When Apple moves its production of iPhones to China, it seeks to exploit the power of efficient production so it can lower the price per unit and expand sales volume.
 - When Coca Cola lightens its beverage containers, the goal is to reduce shipping costs and to enhance profitability.
 - These efficiency improvements translate into cash in the bank, and this money ultimately gets reallocated to other expenditures.
- This quest for enhanced efficiency regularly results in increases in aggregate consumption—exactly the opposite of what we are striving for.
- The fuel-efficient Prius provides an example of how this plays out:
 - I go out and buy myself a Prius.
 - The car is more fuel-efficient than the one I replaced.
 - This lowers my cost of driving, so I will either end up driving more or having savings at the end of the year that I reallocate to other spending—[maybe on airfare to Florida].

1.4 Dematerialization can also increase consumption of materials

- Dematerialization will likely have the same unfortunate and paradoxical effect [of increasing consumption].
 - We may be able to dematerialize on a relative basis so that there is less physical stuff associated with each consumer product.
 - However, we are unlikely to be able to dematerialize, ephemeralize or virtualize quickly enough to offset the dual pressures of lower prices and throughput expansion, which tend to expand aggregate consumption.

2.0 The history and future of dematerialization

2.1 Dematerialization has been happening for 200 years

- Over the last 200 years, the amount of material—steel, wood, coal, aluminum—used per dollar of output has been falling steadily. This process is often called dematerialization.

2.2 Dematerialization can increase by a factor of 10

- Grubler, in his book *Technology and Global Change*, documents how growth has changed our use of materials. He concludes that strong evidence suggests that the material intensity of human society could be further reduced by a factor of 10 or more.
- In our so-called “knowledge society,” a rising proportion of many firms’ costs are in research, development and design, and a shrinking proportion in actual materials used in production.
 - Also, production has been shifting from manufacturing to services, where the use of resources per unit of output is physically less.
 - Production processes themselves have become more efficient in the use of materials and energy, and less polluting.
 - This is driven partly by public policy and partly by the profit incentive, since more efficient methods tend to use less energy and less material inputs.

2.3 Pressure from population growth and higher living standards

- Pressure on the world’s resources has been rising because of rising population and the growing proportion of people who achieve middle class living standards.
 - Although we use less per unit of output, we produce much more output.
- This pressure will be alleviated to some extent when the world’s population stabilizes as it is projected to do some time in this century, at around 10 billion.
 - Educating women in the poorest countries is one of the most effective ways in which population growth is being slowed and will eventually stop. Everything we can do to help this education process is globally useful.

2.4 Winners and losers as the economy dematerializes

- There will be winners and losers [as change takes place].
 - Our contemporary sustainability debate is framed from the perspective that everybody will be a winner, but it won’t happen like that.
 - There will be some winners and a significant number of losers.
 - The sustainability community has an obligation, as politically problematic as it may be, to begin to lay that out. To do otherwise is to create false expectations that will be dashed.

3.0 Setting priorities in waste reduction efforts

3.1 We should do all we can to reduce waste of materials

- We should welcome methods to cut waste and save materials, both to keep overall costs down and to lower pollution.
 - Some Canadian cities are much better than others at turning garbage and other wastes into usable materials. Best practices should be studied and copied by all cities across the country.
 - Zero waste is never attainable but lowering a waste a great deal below the present level is something to strive for.
- For me, as a representative of the business community, the most important message is that we should do what we can do.
 - [The challenge of sustainability is] so overwhelming that it’s easier to roll over and say “Gee, I can’t do anything; it’s just too big.”
 - But we need to keep chipping away at it.

3.2 We need to conserve resources, not just use them efficiently

- From a sustainability perspective, the ultimate objective is to reduce aggregate throughput of materials and energy, not to pursue the efficiency improvements as ends in themselves.
 - There is a difference between conserving resources and using resources more efficiently.
 - This is a “systems trap.” It is seeking the wrong goal. It confuses ends and means.
 - In the 1970s the prevailing environmental thought was predicated on conserving energy and materials, but policy thinking has shifted to focus on efficiency over the last 30 years.

3.3 Sufficiency rather than efficiency

- There is efficiency but also sufficiency. It’s high time that we have a public conversation about sufficiency—asking ourselves and one another how much is enough.

3.4 Taxing efficiency gains from dematerialization and investing those taxes in sustainability opportunities

- Swinging for the fences on efficiency will only lead to lower prices and increased aggregate throughput. We need the mechanism of a tax, fee or charge to capture efficiency improvements and steer them into investment opportunities that reward subsequent rounds of sustainability enhancement.
 - Without such a mechanism, we’ll end up doing what the individual Prius driver does. The Prius driver finds out at the end of the year that he has \$500 or \$600 in his pocket that he would have spent on fuel, so he takes that \$500 and gets on a plane to Florida, squandering the efficiency gain.
 - You have to be an extremely scrupulous household accountant to be able to measure and capture your efficiency savings and steer them in a direction that doesn’t pull the rug out from under your feet.

3.5 Reducing fossil fuel use is most important

- By far, the main problem facing the world today is not exhaustion of key materials but the lavish use of climate-changing fossil fuels.
 - The most important thing to do is to lower our carbon footprint.
 - Some argue that it is not worthwhile in our small country, given the enormous polluting actions of China, India and the United States. But global attitudes can and do change. We can’t expect the Chinese and Indians whose average citizens are much poorer than ours to put serious effort into reducing their carbon footprint if we will not do the same in developed countries.
- [Dematerialization is slow and difficult, but, fortunately, reducing use of fossil fuels is easy.]
 - Dematerialization—the decline in the amount of materials per unit of output—has been going on through history and will continue to go on.
 - [Increasing dematerialization through] action at the local level and changing attitudes toward obsolescence advertising is difficult. At best we can chip away at the margins.
 - We should make the effort but the changes will be incremental.
 - The good news is that 90% of the world’s problems are to do with fossil fuels and global warming. In that area, we can make big changes fast.

- We should be working extraordinarily hard to stop the climate change to do with global warming.
- Yes, dematerialization, but slowly.

4.0 Policies to reduce use of fossil fuels

4.1 A national policy to reduce dependence on fossil fuels

- Canada lacks a national energy policy that directs us to a long-term goal of reducing our dependence on fossil fuels, and directing those savings to alternate energy research and alternate energy resources so that we get out of the vicious cycle.
 - Sweden has an energy policy that directs the entire country to that goal, and it's almost there.
 - How can we properly cost out energy through taxation, based on the proper cost of carbon and other externalities, so that when we ship our oil to China, China pays the true cost? Externalities such as the loss of our ecological services need to be included in the cost.
- The United States has a de facto energy policy that depends on continued use of foreign supplies and deployment of American military force to keep supply lines open.
 - It isn't a policy for transitioning to a renewable energy economy, but it's a policy.
- The simplest solution would be to change the political system.
 - We know what needs to be done, and an intelligent dictator who is given the job of having an efficient total saving of energy use in 50 years could do it. We'd make a few mistakes, but it could be done.
 - Trying to do it within our political system, with enormous vested interests in the current policy, is difficult. We can only try with public opinion.
 - Technically, we know how to do it, or we could develop technologies that are on the drawing board. Such technologies are expensive but will fall in price once in use.
 - We just don't know how to get the effort [invested] into what we could do.
- Years ago, we did have a national energy policy and it was extremely unpopular in the West. Developing a policy that affects all of Canada is fraught with political peril.

4.2 Policies to reduce fossil fuel consumption in metropolitan Vancouver

- Vancouverites should be pressing for the removal of compulsory helmets for cyclists, where the evidence for benefit is equivocal at best.
 - Then the short-term bicycle rental stations that already exist in many cities around the world could be tried wherever population density makes them worthwhile.
- Vancouver's rising population density in the downtown area has reduced total commuting and transport costs [and fuel consumption].
 - Many suburban areas have recently become more willing to authorize secondary suites. Most restrictions on secondary suites should be removed, at least in the nearby suburban areas. This should happen around any main metropolitan area.
 - This would reduce the need to commute from far away and would help struggling young couples to pay the mortgage on a new home.

5.0 B.C. will remain a resource-based economy despite dematerialization

- Although, we will continue to observe dematerialization, and although, with political will, we could dramatically reduce use of fossil fuels within our lifetime without much real cost, B.C. will probably remain a resource-based economy into the future.
 - Manufacturing production that uses resources will continue into the foreseeable future.

- So the B.C. economy will dematerialize to some extent, but less than those economies that use our materials to produce final goods and services.

6.0 The role of Port Metro Vancouver

- Port Metro Vancouver seems to be about materials consumption. Ships are loading and unloading raw materials such as chemicals, coal, crude oil and lumber. Manufactured goods such as televisions, cars and cell phones are also crossing the docks.
- The port's mandate is to operate the port in the best interest of Canadians.
 - People often hear media reports about the port acquiring industrial land or building transportation infrastructure. All of that is in support of the national interest in growing the Pacific gateway.
 - Port Metro Vancouver is tied firmly to an economy that needs to continually grow by consuming materials, but we have to ask if this is sustainable.
 - We would not be serving our mandate by ignoring the sustainability issue.

6.1 Port Metro Vancouver's long-range planning

- Port Metro Vancouver recently entered into a long-range planning process called "Port 2050." You can read about it on our website.
 - We used a scenario planning process, which led us to an ongoing strategic conversation about the emerging future.
 - The intent was to allow us to make better decisions today about our future, while remaining open to shifts in the business environment—shifts such as the transition to an economy without waste.
- [Our planning recognizes that] the current economic growth model for global prosperity will likely remain in place for some time. [It also recognizes that] increasing volatility driven by resource conflicts and climate instability will drive toward an alternative prosperity model.
- [Port 2050 indicates that we must] continue to grow the capacity of the port in a flexible, adaptive manner, regardless of what the global prosperity model is.
 - The scenarios that emerge when we are not able to do that are not attractive.
 - So we will likely continue to focus on capacity development, but we need to be prepared for a shift away from the traditional economic growth model that consumes resources extravagantly.

6.2 Port responses to an alternative economic growth model

- What the alternative growth model will look like is a key question.
 - There has been much speculation on this transition
 - The port is taking this seriously and has created a strategic initiative to address the issue.
 - We are developing tools that will enable us to monitor developments.
- You will likely continue to see ships loading and unloading raw materials and finished products, regardless of what drives global prosperity.
 - However, the nature of the raw materials may change a bit.
 - The mantra "reduce, reuse, recycle" may continue to apply, but reduction of use can only achieve limited success, unless our population stops growing.
 - Similarly, things do wear out eventually and most things can't be recycled indefinitely. Those that can be still consume energy in the recycling process.
- The drive to reduce reliance on natural raw materials is expensive, and Canada will likely continue to supply relatively inexpensive natural materials for a long time.

- As long as that continues, there will be a need for our port to ship the materials to market and to receive finished goods in return.
- The port cannot ignore other possible developments such as eco-industrial networks for local exchanges of energy, industrial feedstock and finished goods.
 - There could be an increasing reliance by industry on materials that are derived from recycled goods or even from materials mined from old landfills.
 - The port is open to ideas about how it should adapt its business model to accommodate those possibilities.
- Port Metro Vancouver’s strategy for taking advantage of change is just to remain open and flexible. The port has already started and will continue to find efficiencies and increase recycling opportunities.

6.3 Why does the port focus on growth if growth is not sustainable?

- You recognize that shipping will not increase indefinitely, yet you are focused single-mindedly on [growth].
 - You are admitting that you are keeping the blinders on, regardless of the global picture. Don’t you find it immoral to continue to pursue a goal that you know is incorrect?
 - You are willing to pave over all the farmland in Delta in order to expand a port that will not be needed. Doesn’t that seem wrong?
- The reality is that the port is mandated by Canada to operate the Pacific gateway—to create a place where Canada’s goods and the things Canada buys can be shipped into and out of Canada on the West Coast.
 - Necessarily, that means we must operate that infrastructure. Nothing that we have seen suggests that Canada will not continue to grow for foreseeable future. That means continuing to create an opportunity to ship goods and raw materials that Canada produces to foreign markets.
 - It’s not realistic to say that the port can stop growing. We will stop growing if there is no demand for things to go through the port.
 - Our challenge is to operate in a way that is sustainable and does not have adverse environmental, social and economic effects.

6.4 The port merely serves the level of demand

- If you are concerned about resource use, you want to tackle it at the beginning or the end. Shipping is in the middle, and there will be a demand for raw materials in B.C. in the foreseeable future.
 - Just not providing the port facilities will just shift [the traffic] to somewhere else, which will not be a useful public policy.
 - Undertaking to build a port with the minimum of pollution and spillover problems, which will serve the global market that wants our resources, seems perfectly reasonable.
- The port brings many jobs to the community, and it is merely managing the consumption that we demand. If it weren’t for the port, there would be more trucks on the road or more trains.
 - I see the container ships nonstop on the river. The amount of consumables that we demand is amazing.

6.5 How meaningful is the protocol between the port and the Tsleil-Watuth Nation?

- Does the signed protocol between the port and the Tsleil-Waututh, People of the Inlet, mean something or is it merely cosmetic?
 - The Tsleil-Watuth Nation has expressed concern about tanker traffic under the Iron Workers Memorial Bridge.
- It absolutely meant something. Our relationship with the Tsleil-Waututh is very important to us, as it is with other First Nations in the area where we operate.
 - That protocol is successful partly because it creates an opportunity for two-way dialogue for sharing our concerns and interests.
 - We've heard the concerns about tanker traffic and we take them seriously. We take our responsibility to deliver all kinds of shipping traffic safely from a human and business and particularly environmental perspective very seriously.
 - We will continue to find ways to work with the Tsleil-Waututh to make sure their interests and concerns are addressed.

6.6 Global warming, sea level rise and flooding of port infrastructure

- The more successful Port Metro Vancouver is [in growing], the more likely the port is to be flooded out due to global warming. [This is a concern, as] there has been considerable public investment in the infrastructure.
- Regarding sea level rise, the Canadian Hydrographic Service says the high water risk is 5 metres chart datum. Port infrastructure used to be built to 6 metres, and, since about 25 years ago, we have been building to 7 metres.

7.0 The role of the Strathcona Business Improvement Association

- The Strathcona Business Improvement Association is located in one of the inner city neighbourhoods in Vancouver.
 - Strathcona is one of the founding neighbourhoods in Vancouver and has industrial roots. It used to be a vibrant logging and fishing community. Manufacturing and light industry are still strong.
- The Strathcona association is one among 22 BIAs in Vancouver, and BIAs are scattered around North America and Europe as well.
 - The broad mandate of a BIA is business promotion. There are many ways to interpret your mandate within that.
- The Strathcona BIA decided a few years ago to implement the Green Zone Initiative as a core mandate.
 - It is a mandate to work with our businesses to integrate more sustainable practices into their operations.
 - It has been very successful.
 - One of the key strategies is collaboration among businesses and organizations in the community, because there is a limit to what any one business can achieve.

7.1 The Strathcona BIA's Resource Exchange and Resource Park

- Through the Green Zone Initiative, we have implemented the Resource Exchange and the Resource Park.
 - The Resource Exchange is a materials trading network, where businesses that are looking to dispose of materials can repurpose them through finding partnerships in the community. Another business, organization or individual integrates the materials back into the supply chain, so the materials don't go to disposal or recycling.

- Resource Park will be a local depot to handle compostables and recyclables from our member businesses and organizations. It is a localized way of processing these materials. It is the culmination of a Zero Waste Challenge with 15 businesses in support of Metro Vancouver’s program, trying to find ways to reduce the waste output from our businesses.
- Using waste products as inputs for other activities or operations creates efficiencies and reduces transportation and waste hauling costs.
 - This has resonated well with our member businesses, which are always looking for ways to increase efficiencies and lower costs.
 - Increasingly, they are discovering other benefits such as marketing opportunities. Consumers are becoming more insistent on seeing social and environmental benefits integrated into business practices.
- The Strathcona BIA has been working with the City of Vancouver and Metro Vancouver to pilot these initiatives in Strathcona, with a view toward implementation of similar systems in other neighbourhoods.

7.2 The Strathcona BIA works closely with neighbouring communities

- How do you see the Strathcona Business Improvement Association’s relationship with Gastown, Vancouver’s Chinatown and the Downtown Eastside?
- We work closely with our neighbouring business associations.
 - We worked closely with the Hastings Crossing BIA, which is the newest BIA in Vancouver, on sustainability programs and have created partnerships with them.
 - We’ve also been working on expanding our Zero Waste Challenge results with our neighbouring BIAs by helping to integrate these programs into their operations.
 - We are considering not just environmental sustainability but also social sustainability, and have partnered with social sustainability organizations in the area for delivery of our sustainability programs. The social enterprise Mission Possible works with people who are trying to overcome barriers to poverty and homelessness and addiction through dignified, meaningful employment. Through the Resource Exchange, which is a materials exchange network, as well as the Zero Waste Challenge, [we provide work for] these people who are looking for opportunities to turn their lives around. That allows us to create many positive community partnerships.
- Does dematerialization offer any advantages to the community on the East Side?
- Yes. In terms of sustainability and dematerialization, finding different economic models could be key a key strategy to create economic development in the area and meaningful opportunities for people. They are not always having to be on the receiving end but can become active contributors to the community.

8.0 Reducing food waste

- The amount of food that goes to waste is upward of 50%, whether at the field, processing or fridge level. What can we do about this huge problem?
- As part of the Zero Waste Challenge, we did a study of what types of materials that could be diverted [from the waste stream] to create the maximum impact, and one of those was organic wastes.
 - Through our pilot program, huge amounts of organic waste have been diverted.
 - Through the Resource Park, we are looking to break down the organic materials onsite and repurpose them, for example as worm castings, through the community.
 - That’s a huge resource that has until now just been taken to the landfill.

8.1 Expiry dates lead to food waste

- The imposition of expiry dates is one of the causes of food waste. It has led supermarkets throwing out enormous amounts of food.
 - In some jurisdictions it's illegal even to give food away a day after the expiry date.
 - We've gone too far in the direction of trying to save people from a little bit of contamination and have created a great deal of waste.
 - We should rethink how we label food with expiry dates. A big reduction in waste could be achieved there.

9.0 Unintended consequences

9.1 Unforeseen negative consequences of sustainability initiatives

- There are often serious [unforeseen] consequences when we make changes.
 - In the 1980s in the building industry, we made major shifts in energy R2000 building, but also created the monster of leaky condos on the West Coast, costing more than \$1 billion and rising probably to \$2 billion.
 - Are you seeing anything similar in certain industries or sectors as we make these shifts—trying to do better but actually causing other problems?
- I endorse the new book *The Conundrum* by David Owen, a staff writer for the *New Yorker*. The subtitle is: *How Scientific Innovation, Increased Efficiency and Good Intentions Can Make Our Energy and Climate Problems Worse*.

9.2 Electrification of vehicles may lead to more burning of coal

- One of the potentially grave consequences of electrifying our vehicles is that we may have to burn coal to produce electricity.
 - Over the next 5 to 10 years, as we increasingly electrify the vehicle fleet and plug-in hybrid cars become commonplace, those in environmental circles will tend to celebrate.
 - We fail to recognize that, especially in the United States with its old and decrepit infrastructure, we will end up burning coal to produce electricity to power cars.
 - There is no systematic planning on how to embark upon a large-scale transformational reorganization of the energy infrastructure and mobility system.
 - Our electrical system has difficulty carrying the load that it's obligated to carry today, and now we're going to add another mega-user to the system.
 - We see these knock-on effects of strategies that are implemented with good intentions because we rush ahead without any real forethought.

9.3 Large-scale solarization means toxic solar panels will end up in the landfill

- Another major problem is that we are involved in large-scale solarization but the lifespan of a solar panel is only 15 or 20 years, and there is a lot of nasty stuff involved in the manufacture of that equipment.
 - We are unconsciously creating, 15 years out, a large-scale hazardous waste disposal problem.
 - This is already beginning to rear its head in Germany, because Germany is farther ahead than the U.S. and Canada.
 - Those solar panels will begin to show up in landfills.

10.0 Localization

10.1 Trying sustainability projects on a local level first

- Why not start [solarization and vehicle electrification] projects on a smaller scale within a community, then a city, then grow larger?
 - You mentioned that solar panels last only 10 to 15 years and will most likely go into the landfill, and that, with electric cars, [the grids in] both the United States and Canada are at capacity.
 - Maybe [starting at a local level] can get some of the problems out of the way before you go global.
- You're right. Working on these problems on a national scale can be daunting. In North America there are hundreds and probably thousands of cases of fascinating social experiments with local energy production.
 - [Many] local communities are taking hold of their electricity production needs and claiming autonomy from their utility companies.
- When you start on a local basis, you can do it in a more cost-effective manner.
 - For example, with the Resource Exchange and the Resource Park, we are working with tens of thousands of dollars to get these things up and running.
 - [With that small investment,] just in the last 18 months, we have diverted several tonnes of materials that otherwise would have gone to landfill.
 - It's very quick to get things up and running with just a few people.
- It was astounding to see how, through our Zero Waste Challenge program, 15 small businesses in our area were able to reduce waste. Think about that on global basis.

10.2 Celebrating social rather than technological innovation

- We tend to celebrate technological innovation, but community energy co-operatives and associations are fascinating examples of social innovation and entrepreneurship that are equally or more important.
 - [Social innovation] will become more important in our efforts to figure out what will ultimately be sustainable in the future.
 - In political circles, particularly south of the border, there is a tendency to disparage social innovation.
 - But community energy co-ops and efforts by local individuals and communities, whether through transition towns or other relocalization projects, are more fascinating than General Electric being able to come out with some new solar panel that has a higher efficiency rating than last year.
 - There is untapped potential.
 - When we talk about funding and resources, the focus is on research, science and technology, but we already know what to do. We have the technologies.
- There is much to be said for local initiative.
 - In the United States, the federal government is backtracking on pollution and other things under pressure from the Republicans. The progressive states are doing much more in a positive way.
 - In Canada, the cities are far more interested than the federal government in [sustainable development].
 - To promote the idea of local procurement—buying locally rather than from Chile—the place to start is locally.

- The public needs to be persuaded that it's worth the effort, and then you have to work through governments. It's much easier to put pressure on local governments than it is on a federal government.
- One of the lessons is to start at the local level rather than top-down.

11.0 Government investment in R&D for sustainable development

- What role does the provincial government play in development of new technologies and international trade? Is it relying on private investors?
 - We are working with two technology companies in the Lower Mainland that are internationalizing their operations where their opportunities are growing. The difficulty is that larger corporations have a budget for R&D and can sustain the development process.
 - Small entrepreneurs have difficulty and enormous stress levels. We all know friends who have developed technologies but have got to the end of their rope. They know their technology can work but they don't have any more money to invest.
 - This is challenging in a 3-, 5- or 10-year window of change for a technology that is surfacing, and it takes that much time to develop.
 - Is there a role for government to backstop it, or does the private investor just have to take a huge risk, possibly failing three times and succeeding the fourth time?

12.0 Recycling and product design

- How many have seen the short educational video *The Story of Stuff*? Please watch it.

12.1 Recycling consumes more energy than it saves

- For most recycling streams, a comprehensive life cycle analysis would show a negative net energy result, because of the amount of energy required to run the collection system and to remanufacture the materials.
 - [Recycling] just creates a patina of environmental responsibility.
 - The engineers who understand the life cycle analysis realize that recycling is little more than a feel-good gesture.

12.2 Because of product design, most recycling is downcycling

- Ecological designer Bill McDonough talks about how the current recycling economy throughout North America practices downcycling rather than recycling.
 - Because the products of our consumer economy do not have their afterlife designed into them (their afterlife is that they are destined for a landfill), when we do recycle them, all we are doing is creating relatively short-term transit locations for those molecules to be stored before they eventually find their way to a landfill.
 - For instance, when we dutifully recycle aluminum cans, the aluminum isn't being upcycled to make the wings of jet aircraft; it's being used to make rudimentary products that will wear out quickly and will ultimately be disposed of.
 - The plastics that we recycle are used to make speed bumps and park benches with a useful life of 10 or 15 years. After that, the integrity of the molecular composition of those materials is shot.
 - Until we begin to think more creatively not at the back end but at the front end, and empower ecological designers to make changes, I don't see much hope in improving the present level of reusability of materials.

- You get a good feeling from throwing something into the [recycling] box, thinking it will shoot off somewhere on its own and repurpose itself into something that is reusable. But the reality is that, to get anything somewhat usable, there is still an extensive process to go through.

12.3 Regulating and promoting product life cycle design

- Government could regulate industry, requiring it to take product life cycle, reusability and recyclability into consideration at the design stage.
- A better way would be to have government enable research and development toward making it economically desirable to design for life cycle, so that industry does it of its own accord.

12.4 Including life cycle cost on the price tag of a product

- Has anyone considered, in the pricing of a product, also listing the price considering the entire life cycle?
- It is being done on national basis in Sweden.
 - Most supermarket products now have a consumer-usable life cycle analysis on the package that tells you how many grams of carbon and so forth are associated with its manufacture.
 - It's the beginning of a process of putting that information into the hands of consumers, but I wonder what people will ultimately do with it.
 - We've had nutrition labels on food packages in the United States for an entire generation and at the same time we have one of the highest rates of obesity.
- Is that Swedish program driven by public policy or the private sector?
- It was imposed by government.
- You also see it in the U.K.
 - Tesco has begun to put carbon information on some of its in-house products.
 - Marks and Spencer is beginning to do the same thing.
 - You are beginning to see major retailers trying to promote a degree of carbon literacy.

13.0 Increasing durability and reducing obsolescence

13.1 Reducing obsolescence in electronic products

- Obsolescence is designed into the products that we consume, and lengthening the fashion cycle of our electronics holds serious potential.
 - Consumers don't need to rush out to the Apple store every time a new version of an iPhone comes out.
 - We do have the power within us to reject the degree to which fashion is designed into what we consume.
- It is consumer driven to a great extent.
 - I complained to my computer supplier that my old hard drive used to last 10 years and now it collapses after 3 years. He said that nobody will buy a 10-year-old computer because the technology is changing so fast.
 - This is typical of a new technology that is changing rapidly, and we live in a world where the technology is changing fast.
 - So you can't impose [a longer product life for electronics]. You have to think of ways to address it in a more fundamental manner.

- [Manufacturers don't want consumers to be able to buy used electronics.]
 - B.C.'s electronics recycling program gathers the electronics for smelting in Trail. This is considered an end-of-life program, not a recycling program, and it uses [the electronics] as energy.
 - A second program managed by electronics retailers failed when it couldn't get the membership required under the EPR regulation for a stewardship program. It couldn't get the membership because the manufacturers don't want the products to be recycled and redistributed.
 - Manufacturers want the electronics smelted so that you have to buy new.
 - There is a lot of money in this industry, and that keeps us from going forward.

13.2 If electronics were leased, they would be designed and built to last

- Consumers would relate differently to electronic products if they were only available on a lease or rental basis.
 - We live in a world where we think we have to own something to have use of it, but the photocopier industry has an unusual model where most consumers don't own their own machines.
 - It's been in the interest of Xerox to build durable machines to be leased out. When the machines wore out, Xerox would recover the machines and re-engineer the components and subassemblies to fit into new machines.
 - If we had a subscription plan for our cell phones, the rate of product obsolescence would be much slower because the fashionability would be drained away.
 - When Bell Canada ran the telephone system, you rented your phone and the phone didn't break—that big modular telephone with the dial on the face. AT&T had an incentive to design and build durable products.
 - As electronics have become fashion goods, they've subscribed to a model appropriated from the garment industry.

13.3 Lack of durability of modern kitchen appliances

- [Kitchen appliances that used to last a lifetime now wear out in 18 months.]
 - I have had the same toaster for all my 50 years of married life, and it works well. It was made in Canada and is robust beyond belief.
 - The recent series of tea kettles lasted 1.5 to 2 years and got turfed out because they couldn't be repaired. I had enough and bought a hand-spun copper kettle made in England for \$125, and it will certainly last me the rest of my life.
- Everything is so globalized that the consumer has no way of getting at the people who produce the toaster that fails in 18 months.
 - We've farmed out our industrial capacity in North America, so we don't know who's making these things and there is no accountability.

13.4 Incorporating the price of obsolescence into new technology

- What about incorporating the cost of replacing old technology into the cost of the new technology?
 - For example, when a new computer comes out, everybody has to drop the old one, even though it is still functional technology, because it becomes obsolete due to incompatibility with new operating systems.
 - The new technology should incorporate the cost of replacing the old and functional but obsolete technology.

- It's a good idea in principle but it's technically difficult to [assess] what the cost is.
 - We should incorporate social costs into prices through taxes.
 - Clearly, one of the social costs is getting rid of an old item when you displace it.
 - But how would you really calculate the social cost, say, of the incandescent light bulb being displaced?

14.0 B.C.'s recycling and producer responsibility programs

14.1 Extended producer responsibility in B.C.

- Extended producer responsibility is a major mechanism in B.C. and most of North America for diverting [waste from landfills].
 - Manufacturers are responsible for making sure that every bit of material used in the production of their goods can be recycled and doesn't go to disposal.
 - Are there other practical economic drivers, either from the consumptive end or manufacturers' end, to make [EPR] more comprehensive and to speed it up? Should this be global?

14.2 Expanding the refundable deposit system to more products

- The one recycling effort in the province that doesn't cost the taxpayers a cent is the [bottle] deposit system.
 - [Because of the refundable deposit,] those materials are worth something. We have binners digging through the garbage looking for containers because they are a source of revenue.
 - Nobody has any idea what 1 million beverage containers looks like until they stand at a depot and stare at a wall of them.
 - The Bottle Depot Association has been pushing for more deposit-bearing systems, because if your mayonnaise and mustard jars and shampoo bottles have a deposit on them, they will be returned for recycling. People will take them out of the Blue Box, and the blue box will disappear.
 - If, [in addition,] the manufacturers were regulated to put at least 25% recycled content into their products and their packaging, we would create demand for the recycled materials, taking a huge bite out of our waste system.
 - The problem is that [refundable deposit systems] aren't as lucrative as advance disposal fees.
 - What research is there on deposit systems and their effects on waste reduction?
- One of the benefits of a deposit system is that it makes people aware of the environment.
 - One key to getting to better place is education. People need to understand what the problem is before they can find ways to address the problem.

14.3 Advance disposal fees for packaging in B.C.

- B.C. is looking at a packaging program in the next two years that [will include] the price of the [packaging] materials in the cost of the product.
 - Ontario tried to put an advance disposal fee on every item and show it on the receipt, which almost led to a mutiny.
 - In two years' time when we're wondering why the cost of living has gone up, it will be because of the hidden packaging disposal fee.
 - That will drive people to shop elsewhere, possibly over the Internet.
 - If there were [refundable] deposits on more things, [it would work better].

14.4 B.C.'s electronics recycling program supports obsolescence

- We had two electronics programs in B.C. until a couple of years ago. The one that still exists, under the Electronics Association of B.C., is managed by Encore and gathers the electronics for smelting in Trail.
 - This is considered an end-of-life program, not a recycling program. [The electronics are] used as energy, and that's misleading to the public.
 - We had a second program, which was managed by electronics retailers. They couldn't get the membership required under the EPR regulation to have a stewardship program, because the manufacturers don't want the products to be recycled and redistributed.
 - Manufacturers want the electronics smelted so that you have to buy new.
 - There is a lot of money in this industry, and that keeps us from going forward.
 - My directors at the Bottle Depot Association always said to me, when you don't understand something, watch where the money is going.

14.5 Problems with EPR for small appliances

- An EPR program was launched in 2011 for small appliances, but people don't know where to return them.
 - All small appliances now have an advance disposal fee.
 - There is supposed to be somewhere for you to take back the debris when they explode after a few weeks, but the steward for the program has not advertised the collection sites.
 - As a result, people are not aware of the program or where to bring the discards, but they continue to pay on those products.

15.0 The role of incineration

15.1 Pros and cons of incineration

- What are the effects on the recycling stream of incineration?
 - Incineration makes good economic sense but creates toxic waste and air pollution. Also, once incinerated, the material is gone forever.
- The kind of incineration that pollutes the atmosphere is dreadful and we should control it, but I don't see that it would be impossible to incinerate materials in a way that is not harmful to the environment.
 - You have to get rid of the waste somehow. You can reduce waste but you will always have waste.
 - So, in principle, there is nothing wrong with incineration that is environmentally clean.
- Recycling and incineration don't address the fact that dematerialization requires everyone to consume less.
 - The out of sight, out of mind mentality that is coupled with incineration and recycling needs to be addressed if society is to embrace dematerialization.

15.2 Incineration in Europe

- It seems that in Europe it's all being closed down.
- I'm not sure incineration is being closed down in Europe.
 - There is a generation of technology implemented in the last 10 years in Europe that hasn't come to America.

15.3 Incineration in America

- What's happening in America with incineration?
- We don't do much incineration in the United States.
 - The number one export from the United States is waste paper that we send to China. The second-largest is waste electronics that we again send to China.
 - We are exporting the adverse environmental effects of our consumer lifestyle.
- It's one of the success stories of American environmentalism that incineration has been so singularly opposed that no facilities have been sited and that option is not available.

15.4 A successful recycling program can make incinerators redundant

- Holland's 15 working incinerators are not operating at capacity because the recycling efforts have been so successful that Holland is running out of garbage to incinerate.
 - The people who are used to recycling are not willing to put their stuff in the garbage for incineration.
 - The problem is that the government has a long-term contract with the company that built those incinerators.
 - So the Dutch who pay €120 a tonne to burn their own garbage are negotiating a contract with Italy and France to subsidize their garbage. The Italians will pay €70 a tonne and the Dutch will subsidize it by €50 per tonne.
 - There are big long-term problems with the incineration project. We have to look at the big picture.

16.0 Changing our culture of consumption

16.1 Reducing consumption by restricting advertising

- One of the most effective ways of reducing material throughput is by imposing restrictions on advertising.
 - In Europe, particularly in the Nordic countries, there are significant prohibitions on advertising to children.
 - In the United States, we actively target children as young as six months.
 - It is important to recognize the current proliferation of advertising and the extent to which consumerism is baked into our bones.
- Information exchange is now so easy that people find out about stuff simply by talking to their friends, bypassing advertising. They hear about new features and new apps from friends.
- The advertising industry now uses "buzz advertising," where your friends may be being paid to tell you [about new features and products].

16.2 Celebrating durability and organizing to have products repaired locally

- Because everybody has the same problem with consumer appliances failing over 18 months, you and your neighbours could organize and commit yourselves to maintaining the livelihood of someone locally who could make a go of being a repair person.
 - The economics of doing appliance repair fell apart 20 or 30 years ago. You used to be able to get your television, toaster and tea kettle fixed.
- Anybody who has had to get a computer fixed by the manufacturer knows that you have to send it to who-knows-where, and then it gets sent to India, and then maybe 6 to 8 weeks later it comes back to you.

- We need to rethink how we can create economies that celebrate durability.
 - The larger problem is that we've lost our linguistic and cultural capacity to think about and speak about enoughness and product durability. If a thing breaks, most people got out and buy another one for \$18.
 - The case is made that we are too materialistic, but really we are not materialistic enough. We don't develop enough of an emotional attachment to our products to encourage us to seek out someone to repair them when they fail.

16.3 Choosing to buy electronics that use standard batteries or chargers

- We need to become aware of our choices as consumers.
 - A typical example would be a telephone that I bought for \$20, with a battery replacement cost of \$15.
 - Why do we buy things that need specialized batteries? We should look at standardization.
 - I learned my lesson with my phone. When I bought my camera, I chose one that uses standard batteries.
- The cell phone chargers are now changing to a universal standard.

17.0 Businesses and sustainability

17.1 Working with business to achieve sustainability

- The Green Party of B.C. believes that we can make the biggest and fastest changes by working with companies. One person on a board of directors can decide to make a change, and that change is relatively instantaneous.
- Many businesses are interested in adopting sustainable practices but they need strategies to help them implement those things.
- [Engaging a business owner] is a rapid way to implement sustainable practices.
 - Many small businesses embrace the ideals of the owner.
 - If the owner is on board with sustainable practices, that encompasses the staff from top to bottom.

17.2 Communicating in language that small businesses can relate to

- It's important to be able to message what you are trying to communicate in language that stakeholders can relate to.
 - [The Strathcona Business Improvement Association] has had to find different ways to talk about sustainability, usually by not using the word "sustainability" with our membership.
 - We've had opportunities to help Metro Vancouver and the Vancouver Economic Commission and also the city's sustainability team with this.
 - They told us how they hadn't had success with small business adopting their sustainability programs, and we helped them understand that you need to message it in a way that's very easy to understand, and you need to have very low barriers to participation.

17.3 Small businesses need to communicate with other local stakeholders

- How do we communicate solutions, turning them into learning experiences?
- It's very important for the Strathcona Business Improvement Association to do this, particularly because of the social challenges in our area, and the fact that when people think of business they think of BP and Cargill.

- Communication is important to make sure that we can leverage the community’s assets.
- Because we’re a smaller organization, it’s much easier to make changes happen through partnerships.

17.4 Engaging businesses in the sustainability project

- Throughout your lives you interact with all sorts of businesses, and you shouldn’t be afraid to ask businesses what they are doing to make things better.
 - But ask in a kindly way. Maybe even ask what you can do to assist, because they’re just doing their jobs, employing people and putting money into the economy that creates our whole lifestyle.
 - Too often, we separate business from everything else, and there is a “head-butt” in the middle.
 - It doesn’t have to be that way. If we all work together it will be a lot better.
- Remember that the economy is not good or bad; it just is.
 - It’s what we do with it that makes it good or bad.
- No one wants to be painted as the enemy—even the enemy.
 - Perhaps, if we take a different approach from time to time, we can get a message delivered.
 - For the most part, the business community is eager to help.

18.0 Changing behaviour by educating the right people

- We are waste management company and it’s important that our customers understand what is recyclable, what is compostable and what they can do to help the environment, the Greenest City 2020 initiative and the Zero Waste Challenge.
 - You can do anything and everything—you can tell 10 different people and educate the tenants, but if you haven’t educated the janitorial staff, everything will go into the garbage.

19.0 Doing what we know is right rather than what is expedient

- How do we convince ourselves as a society to do the right thing all the time?
 - We all have conflicts between doing what we know is the right thing and the thing that is expedient.
 - For example, the port has a comprehensive garbage separation system with five or six bins for separating the recyclables and the organics for composting. The problem is that these bins are in our lunchroom but we are spread out and often have lunch at our desk, where we have just two bins—one for paper and one for everything else. Do we take everything to the lunchroom and throw it in the correct bin? We’ve since addressed that.