

The Road to Energy Conservation: Climate Smart Steps Which Begin at Home

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Everything we do involves energy consumption. Every breath we take, every move we make. Under current conditions, nearly every daily activity involves the direct or indirect use of a fossil fuel, all of which contributes to global warming: taking a shower, preparing a meal, using a computer, commuting to work or school, to name a few. The United States of America has a current estimated population of 317,788,919 comprising approximately 4.5% of the world's 7,109,521,525 population;¹ yet, as of 2008, the United States ranked second, behind China, by contributing 19% to our planet's greenhouse emissions.² The U.S. Environmental Protection Agency (EPA) reports, based upon 2010 statistics, "the primary sources of greenhouse gas emissions in the United States are[:]" electricity at 34%, transportation at 27%, industry at 21%, commercial and residential at 11%, and agriculture at 7%.³



America, indeed our planet, is in the midst of an energy revolution. Caught amidst a warming climate, established fossil fuel interests and consumer habits, America has one foot still firmly entrenched in the use of fossil fuel and a second foot with a directed, but nascent, toehold on use of renewable energy derived from wind, water and the sun. Accessing fossil fuel for mass consumption involves first obtaining long-term property rights to target, extract, store, and sell the minerals, oil or gas. It represents a proprietary approach to energy. Renewable energy, in contrast, involves a democratic approach to energy. While situating windmills and solar panels may involve entering into a lease or license agreement, no one owns the source of energy itself, namely, the wind or the sun.⁴ To the extent it is embraced as the energy source of choice, renewable energy, particularly if it is decentralized, will result in a loss of control by a relative few of the billions of dollars currently earned annually from the mining, processing, storage and sale of fossil fuel.

Fossil fuel has become harder and more expensive to access and more destructive of the environment, whether it be from strip-mining for coal, mining for tar sands, or use of high volume slick water hydraulic fracturing combined with horizontal drilling to extract mile or more deep natural (methane) gas. Yet, incorporating renewable energy options into mainstream use presents a variety of challenges; primary among them are established federal subsidies to the fossil fuel industries. Between 1950 and 2003 the United States government granted \$470 billion in subsidies to the fossil

fuel industry compared to \$23 billion granted to renewable energy firms.⁵ The oil and gas industry-related lobbying efforts and campaign contributions represent a formidable presence in federal and state government; the effect of this presence can influence which bills survive the legislative process and actually become enacted into law.

Currently, the House of Representatives is controlled by the Republican Party, the majority of whom favor the continued use of fossil fuel. It is therefore unlikely that President Barack Obama will be able to advance a renewable energy agenda through Congress, although President Obama did make such an appeal during his 2012 State of the Union address when expressing the intention of his office to address the urgency of climate change.⁶ Change from Washington is more likely to come through administrative regulation from the Environmental Protection Agency (EPA), a point the President referred to as his alternate route if Congress fails to cooperate. The stimulus money previously provided by the federal government to encourage growth in the renewable energy sector is currently unavailable. Yet, as part of the so-called "fiscal cliff [legislation], Congress [did] authorize a one-year extension for the wind protection tax credit."⁷ However, experts speculate that such a short renewal term will limit the wind industry's ability to innovate beyond current technology and recommend instead a multi-year extension to inspire advancement in the technology, while simultaneously phasing out the tax credit component as cost and performance parity develops between wind technology and other energy sources.⁸ Even assuming the expanded opportunity to develop wind technology, human nature in the form of NIMBYism (not in my backyard)⁹ militates against a swift shift toward this renewable energy option. However, educating and involving public participation from the inception of the planning and siting process, instead of after-the-fact rubber stamping, present a more viable approach toward community buy-in, and could help facilitate government benchmarks for reducing greenhouse gas impacts.¹⁰

Other suggestions for meaningful advancement in the energy shift away from fossil fuels and toward solar or other intermittent sources involve developing "innovations in energy storage or in smart-grid technologies that make it easier for utilities to deal with fluctuations in power."¹¹ Further, consideration should be given to avoid replacing one industrial-scale option with another even when the energy involves a renewable source such as wind or sun.

Current Government Action

The Obama administration is taking steps to curb greenhouse gas emissions. First ushered in under the Carter administration in 1975 following the 1973 oil embargo, in August of 2012, the Obama administration issued the final

version of new rules for the so-called Corporate Average Fuel Economy (CAFE).¹² CAFE was enacted to reduce greenhouse gas pollution from new cars and light trucks by requiring automakers to increase the average fuel efficiency of trucks and cars to 35.5 miles per gallon for the 2017 model year and 54.5 miles per gallon for the 2025 model year.¹³ Another example of the President's effort is the Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units, including new fossil-fuel power plants, proposed by the EPA on March 27, 2012.¹⁴ The rule would set national limits on the amount of carbon pollution that new fossil-fuel-fired electric utility generating power plants can emit and in effect would ban new coal-fired power plants that do not capture carbon dioxide emissions.¹⁵ A third example is the Renewable Fuel Standard Program pursuant to which the EPA is "developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel."¹⁶ EPA projects that, "[b]y 2022, the Renewable Fuel Standard (RFS) program will reduce greenhouse gas emissions by 138 million metric tons, about the annual emissions of 27 million passenger vehicles, replacing about seven percent of expected annual diesel consumption and decreasing oil imports by \$41.5 billion."¹⁷

Americans consume greenhouse gases at a rate which is grossly disproportionate to our presence on the planet. While the Obama administration takes steps, as indicated above, given an intractable Congress, legislative action to further curb greenhouse gas emissions is unlikely to occur in the current term. While limitations imposed through federal regulations can be expected to continue, in the immediate term, they are likely to target industry and commerce, not the individual American citizen. New York's plan for addressing climate change is more targeted toward the individual. In his State of the State Address, Governor Andrew Cuomo announced the intention to create the:

New York Greenbank, which is a \$1 billion bank to leverage public dollars with private sector matched money to spur the clean economy. We want to extend New York's sun solar jobs program at \$150 million annually for 10 years to increase solar panel installation for homes and business...and we want to invest in an electric car network to reduce reliance on fossil fuels, installing a statewide network of charging stations and have New York be one of the forerunners in this race all across the country.¹⁸

America's greenhouse gas emissions from non-industrial activities of daily living, such as home energy consumption and transportation choices, contribute to the compromised air we breathe. Once we assert control over the sources and amounts of energy we consume in our immediate environment, we can improve air quality conditions for our personal health. Currently, the New York State

Energy Research and Development Authority (NYSERDA) encourages New Yorkers to make their homes more energy efficient through systemic upgrades. On a cumulative basis, these energy upgrades can substantially reduce demand on the utility to burn the coal or natural gas which fuels the utility's generation of the heat and electricity we consume. From the consumer's perspective, the process toward residential energy efficiency involves a qualified contractor performing a visual inspection, health and safety testing of appliances that use oil or gas, such as furnaces, boilers, hot water heaters and stoves; energy efficiency tests to identify air leaks and the quality of home insulation; analyzing the findings, proposing energy efficiency upgrades; and installing recommended measures. Grants and low interest loans are available for qualifying homeowners. Federal tax credits may also be available for qualifying upgrades.¹⁹ In addition to improving air quality, these upgrades provide added comfort to a residence, long-term reduced monthly maintenance costs and can potentially result in the increased resale value of the home. While utilities are required to offer these programs, consumers are not obligated to take advantage of them. Even with long-term cost savings as a carrot, barriers such as funding and amortizing the cost of the work, unfamiliarity with the process and consumer inertia appear to interfere with a more robust outcome. An example of local government asserting control over energy consumption involves local laws which prohibit cars and buses from idling.²⁰ This has the effect of eliminating emissions of tons of unnecessary carbon dioxide into the local atmosphere. This inures to the health benefit of school children, adults and older adults who would otherwise inhale the poisonous fumes.²¹

Given the complex current political climate coupled with American's dependence on fossil fuel, the transition to renewable energy can be expected to take many decades. Revolution by definition involves evolution. Evolution for purposes of this discussion involves some shifts and some changes. The energy conservation examples given above do not involve giving up consumption of fossil fuel; they involve shifts in overall consumption. While government plays a role in the evolution of energy shifts and changes, human adaption to these shifts and changes plays a formidable role which is not often discussed and is the focus of this article. Both shifts and outright changes are required to make the transition less abrupt and more sustainable. Education provides a basic tool for facilitating a shift in understanding; change can follow.

Currently, consumers gravitate toward the cheap price of natural gas through the pull of brilliant advertising. Popular slogans such as "clean fuel" and "energy independence" use sound bites to create a "feel good" perception of a product without the Talmudic commentary which would be likely to sour the purchase. While natural gas burns clean, the multi-step heavy industrial gas extraction lifecycle may be as deleterious, or more so, to the environment than the carbon dioxide which results from burning coal, as discussed more fully below. While typical Ameri-

cans may not be able to control which proposed legislation becomes considered in the U.S. Congress, as consumers we can take notice of the hidden costs associated with what we consume, and adjust our purchases or not purchase at all. According to a recent report, when including externalized costs associated with fossil fuel consumption, renewables are getting cheaper and fossil fuels are becoming more expensive.²² When one reads about the cheap cost of fuel, what gets reported omits the “U.S. prices account for the externalities associated with fossil fuels like pollution, cancers, military protection, or global warming.”²³ In America, those externalities are paid for by the consumer/taxpayer, not by the coal and gas energy producers.²⁴

The fossil fuel industry doesn't pay a penny of the cost of rapidly accelerating climate change. Or the healthcare costs from exhaust- and refinery-driven diseases and deaths from air, water, and other pollution. Not to mention the community costs of decreasing property values when a coal plant is put in your backyard. Nor do they put a cent toward the cost of our Navy keeping the oil shipping lanes open or our soldiers “protecting” the countries that “produce” all that oil.

All of these externalities come with fossil fuel production, but pretty much don't exist with renewable energy production. And those externality costs are not only not paid for by the fossil fuel industry—they're never even mentioned in the corporate-run “news” media in America.

Research from the Annals of the New York Academy of Sciences concludes that the total cost of these externalities, if paid by the polluters themselves, would raise US fossil fuel prices by as much as nearly \$3/MWh. And that's an extremely conservative estimate. Which puts wind power on parity with coal in America.²⁵

Public policy and rules of law play a central role in the energy choices available to Americans. As environmental, economic and political conditions change, so will the manner in which our elected officials determine their support. This will not occur in a vacuum. Abraham Lincoln was quoted to say, “[t]he best way to predict your future is to create it.” A primary force for influencing legislative change involves voting representatives into and out of elected office. In addition, population growth and expansion of populations into the middle class will place ever increasing demand on finite natural resources such as the water we drink, the soil which grows our crops and the trees which provide our oxygen and shade. The growing impact of a warming climate as reflected in the draft National Climate Assessment presents a serious picture evidenced by serial flooding on the one hand and prolonged droughts on the

other, which stifle water supply and the resulting agricultural economy.²⁶ These forces will combine over time to make change. Likewise, the professed commitment from President Obama to tackle climate change could carry weight if it is met with the respect of members of Congress, as could the intended state programs supported by Governor Cuomo. Yet, while legislative action at the federal, state and local level matter, we can neither wait for the government to solve all of our energy problems, nor can we expect a quick fix. Even assuming Americans have legislative support to prioritize renewable energy projects, will we, as citizens-consumers, follow in our daily behavior to do what is in our own individual and societal best interest, for the short-term and the long term? Or will the need for immediate gratification cloud our decisions? The American consumer, separate and apart from the government, must decide to change. Thus, while Washington and Albany provide the level of governance possible given current political realities, presented here is basic information for making shifts and changes at the local level and in our personal lives.

This article begins by defining basic terms, such as greenhouse gases, consumption, and waste. The role of human nature is next considered, since our behavior figures prominently into the evolutionary equation of our energy shifts. Finally, methods for adapting to change in a natural and respectful way are identified for use at the community level and on a personal basis.

The Basics

A greenhouse gas is any gas that absorbs and releases radiation in the atmosphere. Greenhouse gases include carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, hydrochlorofluorocarbons, halons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.²⁷ “While greenhouse gases allow the sun's energy to enter the earth's atmosphere, instead of letting it re-radiate [the gases] back into space as infrared radiation, these gases absorb [the] infrared radiation and trap it in the [Earth's] atmosphere.”²⁸ Daily human activity is a primary driver of this phenomenon, known as the greenhouse effect, which is contributing to climate change and the impacts of climate change, such as extreme and destructive weather patterns. “Greenhouse gas emissions occur naturally through biogenic processes such as the decomposition of biological materials, forest fires, and fermentation.”²⁹ Greenhouse gases also occur through anthropogenic (human) sources.³⁰ The primary greenhouse gases that are emitted into the atmosphere by human activities include carbon dioxide (CO₂) and methane (CH₄).

Carbon dioxide is a naturally occurring greenhouse gas that enters the atmosphere when fossil fuels and biomass are burned, solid waste rots, through deforestation, certain chemical reactions and land use changes, and other industrial processes.³¹ Natural gas is derived from “[u]nderground deposits of gases consisting of 50 to 90 percent methane (CH₄) and small amounts of heavier gaseous

hydrocarbon compounds such as propane (C₃H₈) and butane (C₄H₁₀).³² According to the EPA, methane is “a hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO₂).”³³ “Methane’s lifetime in the atmosphere is much shorter than carbon dioxide (CO₂), but [methane] is more efficient at trapping radiation than [carbon dioxide]. Pound for pound, the comparative impact of [methane] on climate change is over 20 times greater than [carbon dioxide] over a 100-year period.... Globally, over 60% of total [methane] emissions come from human activities.”³⁴

The important fact to keep in mind is that energy conservation efforts require we focus on our “greenhouse gas” footprint, not singly on carbon dioxide, methane, nitrous oxide, the fluorinated gases, or ozone. For example, by reducing the emissions of carbon dioxide through regulating coal fired energy plants we succeed by reducing CO₂ emissions; however, if in so doing we escalate the use of natural (methane) gas, we then have to contend with the effects of a “greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide.” It is for reasons such as this that electing to simply consume less avoids trading one energy source with baggage for another.

Consumption and Waste, Defined

“Consumption” can be defined as “the direct use of energy and use of energy-intensive goods and services. Energy-intensive goods and services include food, clothing, transportation, heating, cooling and electricity. Consumers make purchases based upon a real need (hunger, physical comfort) or a perceived need (keeping up with the Jones). Environmental forces which influence consumer purchases come from cultural cues, targeted marketing, a person’s friends, family and colleagues. In addition, social media and the Internet facilitate one’s ability to translate an impulse into an immediate purchase. This has the potential to contribute to waste. “Waste” in this context involves any consumer-good or service which is purchased or otherwise obtained but not fully consumed. Examples abound. Waste includes such practices as sending uneaten food to the landfill, discarding a plastic bag after a single use, opening a window in an inefficiently over-heated home, leaving on lights throughout a vacant building, and idling vehicles.

Consumption and use of energy and energy-intensive goods and services are optimally understood and can be more efficiently controlled if viewed not simply in a linear way, but as linked to and intertwined with fundamental aspects of our activities of daily living. Consider, for example, “Energy is required to treat wastewater and transport drinking water; water is required to make electricity and produce transportation fuels, energy and water are required to grow food; an increasing portion of certain crops is being used for fuel instead of food; and water quality can be adversely impacted by food and energy production.”³⁵

In a joint report between the McKinsey Global Institute and McKinsey’s Sustainability & Resource Productivity

Practice, entitled, *Resource revolution: Meeting the world’s energy, materials, food and water needs*,³⁶ the authors state

[i]n just the past ten years, demand from emerging markets, particularly Asia, has erased all of the price declines [for natural resources] of the previous 100. A number of factors are conspiring to create a risk that we might be entering a new era of volatile prices over the next two decades. Up to three billion people could join the middle-class, boosting demand at a time when obtaining new resources could become more difficult and costly. The stress on the resource system is likely to be compounded by increasing links between resources that mean that price shocks in one can swiftly transmit to others. In addition, environmental deterioration, driven by higher consumption, is making the supply of resources—particularly food—more vulnerable.³⁷

Juxtaposed against this global perspective is a Natural Resources Defense Council (NRDC) report entitled, *Wasted: How America is Losing up to 40 Percent of its Food from Farm to Fork to Landfill*,³⁸ revealing that Americans annually throw away 40% of the food we produce valued at approximately \$165 million, with the average family responsible for an annual average of 20 pounds a month or two-thirds of a pound per person each day, which translates into annual, per family, waste totaling \$2,275.³⁹ Reducing our annual food loss by 15% would save enough food to feed 25 million Americans for one year. Food retailers lose approximately \$15 billion annually in perishable food such as fruit and vegetables, with approximately one-half of the nation’s supply not eaten; some of this is due to overstocking. Retail food waste also results from consumer misunderstanding over the “use-by” and “best-by” labeling of such items as milk, bread and cheese to mean the product is no longer edible instead of still edible although not its freshest. Likewise, bruised fruit or vegetables may be overlooked for purchase based on their outward appearance, even though they maintain their flavor and nutritional value.

According to the NRDC report, the majority of food loss occurs in restaurants and in America’s home kitchens; the reasons are larger portions, between 2 and 8 times larger than the government-recommended serving, and uneaten leftovers. Food waste extends beyond the food itself to include the energy and water used to grow, transport and store the food. Approximately 25% of the freshwater consumed in this country goes to food that is not eaten. Approximately 2.5% of America’s energy budget, or the equivalent of hundreds of millions of barrels of oil, is thrown away each year as food waste.⁴⁰ The uneaten food further accounts “for conversion from forests, grasslands and wetlands to agriculture,” which if left undisturbed would “potentially reduce our adverse impact on biodiversity.”⁴¹

In America, food waste has increased by 50% since the 1970s and currently constitutes the single largest component of solid waste sent to America's landfills and incinerators.⁴² Americans pay for garbage pick-up on property tax bills or through private carting contracts. Thus, to the extent we discard what we don't eat, we are paying twice. Waste pick-up constitutes a line item on municipal budgets which can be reduced through local law and self-imposed behavior. Examples of local action to address waste include: community composting and using the compost as fertilizer to grow crops; and sending excess home-grown food to food banks.⁴³ Food Shift, established in Oakland California in 2011, raises awareness about food waste and provides tips, tools and resources to businesses and the community to change food waste behavior.⁴⁴ In addition, municipalities such as the City of Santa Monica, California and Charleston County, South Carolina are adopting food waste collection and composting programs.⁴⁵

How can we Americans incorporate information about energy conservation into our own daily activities to accomplish the shifts needed to make change? It depends upon the individual. A person's world view will inform how he or she perceives data and how he or she acts on it. Age, socio-economic class, gender, life experience and other criteria will add to the mix. While no silver bullet or singular approach exists to facilitate change, an understanding of what motivates people and what inhibits people from taking action can inform how government shapes public policy and how people in their own right, without governmental intervention, can initiate and effect meaningful change. Once the motivations and inhibitors are identified, the secondary consideration involves addressing the goal to make focused consumer choices while navigating a multi-tasking culture and tempering our penchant for instant gratification with deliberative delay in our consumer choices to avoid unnecessary purchases that lead to unnecessary consumption and unnecessary waste. The challenge requires *mindful* consumption. How can this be accomplished? One step at a time. What follows is some insight into familiar human emotions: guilt and happiness and how they apply to making sustainable consumption choices.

The Role of Guilt

A recent Eco Pulse survey conducted on "green guilt" found that 39% of Americans experience guilt from wasting food.⁴⁶ According to the survey results, "women out-paced men [by experiencing guilt] about wasting food, using paper towels, buying cleaning supplies with strong chemicals, eating meat and other behaviors. Consumers who earn \$75,000-\$99,000 per year felt more guilt than others about wasting food, whereas those earning \$100,000 or more were more likely to say they felt no guilt at all. In her book, *Big Green Purse*, author Diane MacEachern points out that women control 85 cents of every consumer dollar. Thus, educating women, in particular, about the impacts of consumer waste holds great potential for success. The Eco-Pulse survey, which polled 1,013 people, also found 27% of those surveyed felt guilt about leaving lights on when

leaving a room, 27% for wasting water, 22% for failing to unplug chargers for electronics and 21% for not recycling. In addition, 20% of those surveyed experienced guilt over forgetting to bring a reusable bag to the store, 9% for not purchasing energy efficient bulbs, 7% for not sticking to an energy-efficient thermostat setting, 6% for not being careful about how long and when they water the lawn, and 6% for using chemical lawn or plant fertilizers. Survey results reveal that certain of these behaviors, which result in minimal guilt, such as light bulb purchases, are the types of consumer choices which can yield sizable energy efficiency and costs savings. This suggests a need to redouble efforts to educate consumers about their choices since easy shifts can result in significant environmental and economic benefits. While guilt presents an emotion people seek to avoid, happiness represents an emotion we gravitate toward; both emotions have their role in energy conservation.

The Role of Happiness

"Happiness has three separate aspects: a person's judgment about how life is going overall, the presence of positive feelings like joy and the absence of negative feelings like sadness or depression."⁴⁷ These dynamic aspects coincide with a person's overall satisfaction with life. Consumption correlates with producing an immediate "experience of pleasure or eliminating discomfort."⁴⁸

Neither material consumption nor production is central to happiness.

On the whole, the most pleasurable experiences do not derive from work—people get the most satisfaction from social activities, even though having a job may be important for their self-esteem. Interestingly, the happiest people tend not to be super-achievers; apparently, whatever drives people to the highest levels of achievement does not sit well with personal satisfaction. In general, materialism is not conducive to well-being. Thus, most of what determines happiness is noneconomic. This helps explain the weak, inconsistent evidence linking income and consumption, because some activities that promote happiness may not be readily affected by wealth, and others may compete for personal time and energy with wealth-seeking activities. In short, according to the research, neither production nor consumption has an intrinsic connection with personal satisfaction.⁴⁹

A point worthy of attention is that "all measures of social connection are significantly correlated with life satisfaction."⁵⁰ This observation has relevance in approaching how to develop programs which seek to affect consumer behavior, as more particularly described below. This observation suggests the benefits of community events as teaching tools, opportunities for achieving a shared goal through collaboration and opportunities to share successes and seek

support when intermittent failure occurs along the road to developing energy efficient habits.

As indicated earlier, consumption is typically centered around immediate gratification or the elimination of negative feelings. The good news is that most energy conservation measures have a short payback period. Examples of this include shifting consumer purchases such as meat and dairy to foods using less water and fuel to produce and which cost less on the grocery bill; and from incandescent bulbs to LED lighting, which may cost more at the check-out counter but result in measurable savings in utility bills. Reducing the thermostat in a well-insulated home and doing laundry with cold water can result in a lower utility bill. Carpooling and increased walking can result in saving a tank of gas each one to two months; at \$60 a tank, this can add up to saving \$720 annually in fuel.⁵¹

Methods Toward Change

Communities typically have a culture or groups of cultures which define them and make them distinctive from communities situated elsewhere. A local focus using community-based social marketing can address and resolve barriers to energy conservation at a group level. Applying methodologies of social innovation, with its entrepreneurial yet collaborative approach to a given goal, may prove successful to harness change by putting the individual in control of selecting among comparably beneficial energy conservation choices.

Community-Based Social Marketing

Community-based social marketing (CBSM) uses social marketing techniques to make change at a group or community level. According to a white paper published by the American Council for an Energy-Efficient Economy, entitled *Reaching the "High-Hanging Fruit" through Behavioral Change: How Community-Based Social Marketing Puts Energy Savings within Reach*, behavioral changes in sustainable behavior can be targeted at the community level by "[i]dentifying barriers and benefits, using local research when possible; developing strategies, drawing from social science tools to address barriers; piloting the strategies, ensuring the effectiveness of strategies; broad scale implementation and evaluation, utilizing direct and observational measurement when possible"⁵² Dr. Douglas McKenzie published *Promoting a Sustainable Future: An Introduction to Community-Based Social Marketing*, which first introduced CBSM in 1996 as a methodology to lower barriers to sustainable behavior.⁵³ According to its authors, CBSM is especially useful when implementing energy efficiency measures has a high financial cost and non-financial barriers, such as complex decisions-making and coordination of multiple stakeholders learning how to program new devices,⁵⁴ adopting new habits and making the long-term investment itself.⁵⁵

In circumstances such as this, where impulse purchasing should take a back-seat to a more deliberative approach, CBSM "applies social marketing tools around researched and identified barriers and benefits as experienced by a

local and specific audience." CBSM focuses on creating programs with a measurable outcome that can be accomplished by a particular action; the program is then narrowly designed around that specific behavior to result in a targeted outcome. Tools employed in CBSM include, (i) social commitment to invite a change in self-image and therefore behavior when self-motivation is lacking; (ii) social diffusion which involves modeling behavior of trusted peers when lack of motivation is due to lack of trust or lack of trusted information; (iii) social norms demonstrating that a practice is widespread when lack of motivation is due to uncertainty about fitting in; (iv) prompts such as signage or reminders help when motivation lacks because of forgetfulness or lack of instant cues; (v) communication with a relevant message in a "vivid and personal" way when an important message needs to be conveyed to and remembered by the audience; (vi) incentives when the actual or perceived cost presents a barrier to taking action; and (vii) addressing barriers in the built environment, institutions, processes or other infrastructure to facilitate the targeted but impeded action.⁵⁶

Tools For Change is an example of a resource-based Internet website which incorporates CBSM. Using food waste as a model, *Tools For Change* lists "waste" among its categories under the *Waste Resources* banner. From there a municipal planner can scroll through and read case studies of projects and programs that address issues of personal relevance. With respect to residential waste pick-up, *Tools For Change* links to *User Pay for Residential Waste Pickup in Ontario (Research Alert)* reporting that there are now over 200 user-pay programs, with numbers continuing to grow following a 1996 public survey on the topic. According to this research alert, user-pay programs make residents more aware of the costs associated with waste management, can cover all or a portion of the waste management cost of operations and can also result in reduced amounts of waste being thrown away. "In addition to traditional 'bag tag' user-pay programs, municipalities are introducing many variations on the user-pay theme, from flat fees that cover part of the municipal waste service to the outright removal of certain services (in particular bulky goods collection) from the tax base. Bulky goods are handled for a separate fee in many jurisdictions or people are simply given a list of contractors who will remove the material for a fee."⁵⁷

Continuing on the topic of food waste, *Tools For Changes* links to the case study of a City of Portland, Oregon program called *Fork it Over!* which links food businesses in Portland, Oregon with perishable food surplus to local food banks serving the region's hungry population. To inaugurate the program, the following goals were established: "Decrease the amount of food disposed in the Metro region; Maximize the amount of nutritious, edible, perishable foods diverted to food banks and, ultimately, the hungry; Increase awareness of both hunger and waste; and Provide the tools necessary for businesses to make positive change. No quantified targets were set."⁵⁸

Studies were performed to focus on gathering information and practices in the “target audiences”, in this case, the food industry and the food rescue agencies. In addition, a so-called barrier-benefit identification study was likewise performed to identify the perceived barriers to program success from the perspective of the food industry donors and the food bank recipients. The results showed, for example, that one of the key barriers to accepting more food was the food banks’ limited equipment for recovering, transporting, storing and distributing perishable foods safely. “Safety and liability were of top concern and second was ease of implementation in a busy industry. Surprisingly the biggest benefit to food donation was not tax write-offs, savings on garbage fees or other financial benefit as assumed by both Metro and food banks; it was simply the right thing to do.”⁵⁹

Social Innovation Defined, The Role of Social Innovation

“Social Innovation focuses attention on the ideas and solutions that create social value, as well as the processes through which they are generated, not just the individuals and organizations.”⁶⁰ The following three key, interacting mechanisms drive contemporary social innovation “(i) exchanges of ideas and values; (ii) shifts in roles and relationships; and (iii) the integration of private capital with public and philanthropic support. Ultimately, the most difficult and important problems cannot be understood, let alone solved, without involving the nonprofit, public, and private sectors.”⁶¹ According to the World Economic Forum

social innovation refers to the application of innovative, practical, sustainable, market-based approaches that achieve transformative social and/or environmental change, with an emphasis on under-served populations. Social innovation is becoming a priority for decision-makers at the most senior levels. In this new age of austerity, as governments search for guidance and inspiration on scaling cost-effective solutions to social problems, social entrepreneurship has taken centre stage. Social enterprises balance a social mission with financial viability and sustainability, existing between the public sector and private markets in both the developed and developing world.⁶²

Energy Conservation on Your Own Terms

Social innovation has the potential to fill the gap between legal mandates and private enterprise where energy conservation is concerned. How the gap gets filled will depend upon the consumer profile and the goal at hand. Each person has individual strengths, weaknesses and a unique world view. Using this as a context for adapting social innovation, assume that consumption can be characterized as a discipline with a stated goal; and interim consumption benchmarks can be effectively designated over stag-

gered time periods, such as a week, a month and a year. Using this model, the citizen-consumer can relearn how to purchase, how to consume and how to eliminate waste in a way that works best for the individual. For example, the goal may be to reduce the family’s annual carbon and methane emissions by 30%. How one initiates change in activities of daily living will vary from individual to individual, and from family to family. For obvious reasons, it makes sense to begin by shifting habits which are most easily achieved. For certain individuals, walking more and driving less may be the easiest point of entry into a sustainable lifestyle; to others, shifting food consumption to reduce waste may be the easiest route, while for others, switching to LED lighting and washing laundry with cold water will represent the easiest way to begin. Much like a food diet, a crash energy diet won’t work as effectively as one that evolves over time. Success breeds success. Tracking shifts in consumption can be accomplished in journal entries which compare utility bills and grocery and gas receipts on a monthly basis. As success is achieved in one area, additional changes in habits can be incorporated into the individual or family routine. Charting progress in energy and financial savings as a family unit can be used as an opportunity to save toward a common goal. For example, money saved through eliminating consumption of fuel, food and clothing can be applied toward purchases of more impactful energy upgrades such as home weatherization, an Energy Star rated refrigerator, stove or dryer or a hybrid vehicle. One thing to avoid is the so-called “rebound effect,” where energy savings derived from consuming less in one area is spent on a good or service which results in consuming more fossil fuel (directly or indirectly) than what was saved through the initial conservation effort.

Social Innovation at the Community Level

For individuals who are not prone to initiate change involving their conservation habits, initiatives which enlist the involvement of all sectors of the community toward achieving a common goal may be a more productive approach. Just such an initiative is currently under way in the Larchmont/Mamaroneck, New York community. This is a Westchester County suburb of Manhattan situated along the Long Island Sound with a population of approximately 29,000. The local chapter of the League of Women Voters has spearheaded a year-long community conservation civics initiative aimed to engage all sectors of the community to conserve on consumption. Individual savings resulting from energy conservation strategies and 100% of the proceeds earned from League-sponsored conservation-themed events throughout the year are being donated to a tax deductible fund that will benefit energy improvements and renovations to the Town-owned ice rink. The ice rink is currently the largest Town-owned energy consumer and is also a valuable source of revenue. The League of Women Voters, which is a 92-year-old national grassroots organization devoted to transparent and effective government and citizen action, embraces a nationwide position on curbing global warming and preserving natural resources. Cognizant of

the potential limitations of government's role in energy conservation on the one hand and the role of personal liberties and human nature on the other, the civics initiative was devised to provide education about the nexus between energy consumption and sustainable solutions to encourage voluntary shifts and changes in consumer habits. The initiative aims to engage all sectors of the community: families, students, local businesses, the schools and houses of worship, in the learning and *doing* process. The initiative recognizes that citizens can and do, unilaterally, effect change. Every person makes a difference. One method involves citizen action with one's vote; another with one's pocketbook.

To launch the conservation civics initiative, energy conservation experts convened for a televised forum to educate residents about home energy audits and food waste. All sectors of the community were encouraged to audit their home and business energy consumption. In addition, through public participation in community events, the civics initiative aims to translate action into savings which simultaneously benefits the individual and the community-at-large. Inspired by the social innovation model, the League is collaborating with local environmental groups and local businesses to make this an all-inclusive process and to optimize community participation. In addition, all local clergy were requested to consider delivering a sermon on the day before Earth Day addressing whether people have a moral obligation to be "*mindful* consumers." Later the same day, residents participated in a community yard sale, silent auction and sustainability fair at which approximately 40 families and some businesses rented space in a Town parking lot to sell items they no longer need; and people donated and bid on unused gifts at the silent auction. Local musicians performed. Not-for profit organizations focused on the climate, environmental impacts on human health, conservation and food composting were on hand to educate and answer questions, as was a solar energy provider, a wind energy provider, an electric car dealer and an energy efficiency audit and weatherization company. Town officials had a table too. The combination of participants and visitors in a relaxed setting opened up dialog among the public, private and not-for-profit sectors thereby planting seeds for future shifts toward a more sustainable community.

At a separate taped and televised event focused on waste management, viewers will learn about new twists on trash, such as Paraguay's Landfill Harmonic, where teens play beautiful music using orchestral instruments created from landfill debris. State and local officials will discuss what is being done by New York government to manage and minimize waste. They will then judge "best outfits" in the Town's first *trashion* show featuring high school and middle school students modeling fashions they created out of recycled materials which would typically go to the landfill. A high school jazz band will play music using instruments it adapts from everyday items. Tips for waste management will be woven into the show for each viewer to consider and adapt into his or her daily routine.

The ice rink energy improvements and renovations are estimated to cost \$ 2.8 million. The Town rink upgrade will be funded, in part, through these community-focused events; events that introduce new approaches to daily activities which foster elimination of unwanted greenhouse gas emissions. These programs reflect the types of events which people associate with happiness; thus, the hope is for a shift in practices happening more naturally and permanently because they are associated with what people value most. If each person in the community were to save on what he or she consumes and contribute \$100 a year, or \$8.33 a month over 12 months, the initiative would raise \$2.9 million, more than the estimated cost of the energy upgrade. This translates to three Starbucks coffees a month, or 1.7 tanks of gas a year. To the extent successful, this approach would eliminate what will otherwise become a tax obligation.

The timing of the conservation civics initiative is fortuitous. Sixty percent of this community lost electricity as a result of super-storm Sandy which swept through the East Coast on October 29, 2012. The impacts of climate change were experienced first-hand by everyone who lives in the community and will not be soon forgotten. The Town government is currently engaged in a sustainability collaborative involving volunteer-professionals whose goal is to make the Town owned buildings as energy efficient as possible. In addition, the Mamaroneck School District has undergone an energy audit of all of its schools buildings which will result in more energy efficient buildings and potential tax savings to property owners. The two local villages enacted plastic bag bans which will take effect during the year. The League has co-sponsored with the not-for-profit, Save the Sound, a lecture focused on restoring the health and sustainability of the Long-Island Sound, the region's multi-billion dollar treasure. The League also plans to collaborate with Shel Drake Environmental Center to host an Eco-House tour at a fall festival where children and their parents will learn the elements of energy conservation in a simulated home environment. At Halloween, local businesses will be invited to sponsor young trick-or-treaters who create their costumes out of recycled materials. In addition, an "open house" weekend event is planned for later in the year when people who have installed energy upgrades and renewable energy alternatives (such as solar panels) will welcome others in the community to learn and see first-hand what was involved. The goal is to demystify the energy upgrade process and eliminate existing barriers to these energy-saving options. Additional community events will be developed as the year evolves and new ideas are presented. An alumni hockey game benefiting the ice rink upgrade is on the list.

Other shifts are in process, as well. The middle school cafeteria, which feeds 1,200 students, will audit its food waste and if determined to be economically beneficial and affordable, will incorporate into the cafeteria operations a food composter called the "Rocket" to reduce the cost of uneaten food which otherwise would get carted from students' plates to the county waste treatment facility. The

compost would be sold or used for a community garden or other similar energy-practical use which addresses the lessons learned from the food-water-energy nexus.

To chart the evolution of the year-long initiative itself and leave open the possibility that the initiative could provide guidance to other communities wishing to adapt this effort to suit its particular local culture, all contacts are being chronicled, and all related events are being filmed.

The success of this community conservation civics initiative has been recognized already through connecting the ongoing efforts of various sectors of the community into a collaborative effort. Social innovation in this context appears to work. The importance of face-to-face conversation in this initiative cannot be overstated. While the benefits of the Internet serve well to communicate plans once they are formulated, it is the face-to-face conversations that are causing this initiative to take hold and develop. It appears that basic lessons learned from public participation theory (and, more simply, the sandbox), namely, involving people in a dialog, favoring inclusion rather than exclusion and inviting ongoing feedback and collaboration, will make the evolutionary process toward community-wide sustainability more lasting and meaningful.

Endnotes

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