A large, dynamic splash of water in shades of blue, forming a circular shape that frames the central text. The water is captured in mid-air, with many small droplets and bubbles visible, creating a sense of movement and freshness. The background is a solid, deep blue gradient.

**SUFFOLK COUNTY
COMPREHENSIVE
WATER RESOURCES
MANAGEMENT PLAN**

**Section 1
VALUING WATER**

Section 1

Valuing Water

The Value Proposition

“Price is what you pay. Value is what you get.” – Warren Buffett

“Value is expressed and measured in the eye of the beholder.” – IBM Wiki

“From California’s historic drought to Toledo’s pollution crisis, the country’s water challenges have captured the national spotlight.” – Brookings

1.1 The Value Proposition

It’s Our Planet’s Most Valuable Resource Cities Are Powered by It...People Fight over It...Life Depends on It...

“Whiskey is for drinking and water is for fighting.” -old saying in the West

William Mulholland, the Robert Moses of Los Angeles’ water infrastructure, oversaw construction of the 233-mile Los Angeles Aqueduct that made the L.A. of today possible. Completed less than a year before the Panama Canal, diversion of water from the once fertile Owens Valley into the parched San Fernando Valley ignited the notorious California water wars with farmers dynamiting the aqueduct siphoning their water to L.A., as shown on **Figure 1-1**. *“There it is. Take it,”* Mulholland declared upon completion. *“If you don’t get the water, you won’t need it.”*

In the Chinatown film dramatization of events, a former L.A. mayor lays out the case for water infrastructure in front of a map of the PROPOSED ALTO VALLEJO DAM AND RESERVOIR:

“Gentlemen, today you can walk out that door, turn right, hop on a streetcar and in twenty-five minutes end up smack in the Pacific Ocean. Now you can swim in it, you can fish in it, you can sail in it but you can’t drink it, you can’t water your lawns with it, you can’t irrigate an orange grove with it. Remember we live next door to the ocean but we also live on the edge of the desert. Los Angeles is a desert community. Beneath this building, beneath every street there’s a desert. Without water the dust will rise up and cover us as though we’d never existed!”

SECTION 1 VALUING WATER



Figure 1-1 L.A. Aqueduct Dynamited in Response to Being SOLD Out in the Owens Valley
(Source: <http://www.moviestillsdb.com/movies/chinatown-i71315/16a828>
<http://green.blogs.nytimes.com/2012/04/25/the-water-fight-that-inspired-chinatown/?r=0>)

Though both are situated on oceans, Long Island, unlike Los Angeles, is naturally lush, sitting atop a sole source aquifer producing seemingly boundless freshwater. But surface waters surrounding us are impaired and groundwater quality is trending in the wrong direction. We pay a negligible amount for our potable water and the majority of Suffolk County expends nothing to treat it once it is used. Assigning no real value to water, we take it for granted. Much of the rest of world is not so fortunate. What, then, is the **value proposition** of water quality for Long Islanders?

Suffolk Water = 1/6 of a penny per gallon

The Suffolk County Water Authority (SCWA) distributes over 80% of the county's groundwater. SCWA is a public benefit corporation operating pursuant to New York State Public Authorities Law, Article 5, Title 4. SCWA is the largest provider of groundwater in the nation, pumping and delivering approximately 70 billion gallons of potable water each year through nearly 6,000 miles of pipe from 581 active wells and 234 pump stations. In its May 31, 2014 financial report, SCWA showed water service operating revenues of \$138.45M and assessed its net capital (water plant) assets at \$1,077.32M.

SECTION 1 VALUING WATER

*“Nothing is more useful than water, but it will purchase scarce anything”
– Adam Smith, “Wealth of Nations”*



In Suffolk County it costs \$66.80 to fill this 40,000 gallon pool

Note that, unlike SCWA which levies no fee for wastewater treatment, Fairfax County Water Authority (FCWA) in Virginia charges a multiple of 1.7:1 for ‘sewer usage’ versus ‘water usage.’ If a sewerage usage charge were incorporated into SCWA’s billing comparable to that in Fairfax, approximately \$236M would be generated per annum to address wastewater treatment. As a point of comparative business performance, FCWA more than doubles SCWA’s operating income to sales ratio, 0.37:0.15, and the FCWA’s debt-to-asset ratio is $\frac{2}{3}$ of SCWA at 0.36:0.56 (Water Utility Privatization: A Comparison of Commercially-Owned and Government-Owned Utilities, Maryland Tax Education Foundation, 2008).

SCWA charges \$1.67 for 1,000 gallons of potable water or about what one might pay for a pint of Poland Springs. Put another way, bottled water costs 8,000 times as much as SCWA water. It is just about the cheapest water in the nation, one-third the average cost. Unlike the majority of systems that integrate water delivery and treatment, SCWA assigns no charge for wastewater treatment. Residents in the nearly 30% of the County that is seweraged pay annually for advanced wastewater treatment; the balance of the County is free of such responsibility. Given the extremely low unit cost for water, water bills go largely unnoticed. As a result, there is, effectively, no cost pressure to conserve and discourage excessive use. Consumers are accustomed to low water rates and frequently protest rate hikes (Apple Valley News 2014).

SECTION 1 VALUING WATER

This graphic, from the SCWA web-site, makes a point of price comparison between water that is “vital to life,” and perfume. “Most of us in the U.S. don’t even realize how inexpensive the water we get from our tap is.” Note that the price of SCWA water is nearly one-third the U.S. average. And SCWA assigns nary a penny to treating the water that is largely contaminated upon delivery and filters untreated back into the aquifer.

Product	Average Price \$USD/Gallon
Tap water	\$0.0048
Coca-Cola	\$3.00
Gasoline	\$4.00
Tide laundry detergent	\$8.50
Imported beer	\$12.00
Evian bottled water	\$25.00
Starbucks latte	\$22.00
Pepto-Bismol	\$65.00
Vicks Formula 44D cough syrup	\$100.00
American whiskey	\$150.00
Visine eye drops	\$750.00
Revlon nail enamel	\$1,000.00
Good French wine	\$1,000.00
Chanel No. 5 perfume	\$45,000.00

Water bills in the U.S. amount to 0.6-0.9% of national household income (Congressional Budget Office, “Future Investment in Drinking Water and Wastewater Infrastructure,” Nov, 2002). France is estimated at 2.2%, UK at 2.2% and Hungary at 6.2%. Rate increases for this under-valued commodity nevertheless can be expected to meet resistance, as observed recently in Ireland. A newly imposed charge for water in the Emerald Isle’s water-soaked climate has gotten their Irish up, as illustrated by **Figure 1-2**.



Figure 1-2 Government Says It Needs Money for Infrastructure, But Some Citizens Say They Are Willing to Go to Prison for Refusing to Pay

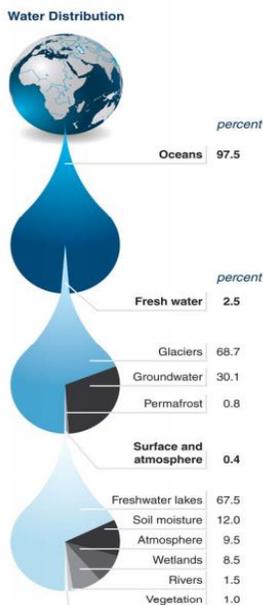
“A household of five will pay €584 (\$730). The government notes it was one of the last nations in the western world to bring in water charges, and says it needs the imposition to invest in infrastructure, and promote conservation, the latter because of EU directives on water and the environment (The Guardian, 10/31/14).” From 11/22/14: Irish Prime Minister’s party suffers dip in popularity after water charge protests/ Opinion poll shows only 22% would vote for Enda Kenny’s centre-right Fine Gael party. <https://www.facebook.com/pages/Protest-against-water-charges-in-the-republic-of-Ireland/213410058694008>.

SECTION 1 VALUING WATER

The Irish Times editorialized: “This claim to EU ownership of a God-given resource...includes the water that falls from the sky, that flows in rivers, springs and underground, water that fills our wells, lines our coasts and stretches out to sea and presumably the water that makes up 60 per cent of our bodies.”

There is a yawning chasm between the demands on water systems and an acceptance of responsibility for meeting those demands. “The price of water going into Americans’ homes often does not even cover the cost of delivering it, let alone the depreciation of utilities’ infrastructure or their Research & Development (New York Times, ‘The Risks of Cheap Water,’ 10/14/14).” Absent rate reform, many utilities will remain financially incapable of evaluating, testing, and adopting new technologies. As for willingness to pay (WTP), evidence shows that hypothetical mean WTP exceeds actual mean WTP by an average ratio of 1:4. With WTP and valuation of ecosystems, economists are merely taking stabs to divine some monetary measure of what increased well-being is worth to people (D. MacMillan, “Actual and Hypothetical Willingness to Pay for Environmental Outputs: Why Are They Different? University of Aberdeen, 2004).

With fifteen years of drought across the Southwest, conflict has morphed into crisis with unprecedented declines in reservoir storage and groundwater reserves. “Californians as a whole have failed to conserve water during the worst drought in a generation.” (*California Adopts \$500 Criminal Penalty for Water Waste*, Sacramento Bee, 7/15/14).



(Source: *Global Water Security – Intelligence Community Assessment*, February 2012, page 4 <http://www.fas.org/irp/nic/water.pdf>)

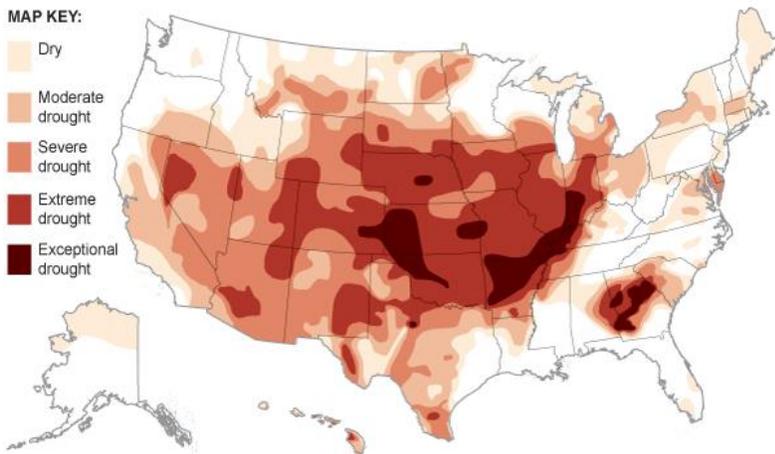
SECTION 1 VALUING WATER

The Current Disaster

National drought conditions as of last week. About 52 percent of the United States was in moderate drought, or worse; 20 percent was in extreme or exceptional drought.

MAP KEY:

-  Dry
-  Moderate drought
-  Severe drought
-  Extreme drought
-  Exceptional drought



August 21, 2012

1.2 Global Water Security & Scarcity

“Energy Security” fed “Energy Independence” which became a driver for the “drill, baby, drill” promoters (U.S. now neck and neck with Russia and Saudi Arabia as the world’s top oil producers) as well as the drive for renewable energy. While climate has been the principal concern fueling renewable alternatives, the U.S. military embraced renewables for remote operating locales and theaters of combat, particularly forward operating bases where the logistics of delivering fossil fuels is costly, daunting and produces unacceptable fatalities (<http://www.defenseindustrydaily.com/commanders-in-iraq-urgently-request-renewable-power-options-02548/>). As oil reserves make realms like Iraq of strategic interest to the U.S. leading to military presence, so too will regional conflicts over water.



As the world’s premier power, the U.S. military is obliged to factor issues of climate and overtaxed resources. The following summarizes the assessment that was prepared under the auspices of the Director of the Strategic Futures Group and drafted by the Defense Intelligence Agency (October 2011). A significant

SECTION 1 VALUING WATER

portion of this report focuses on the opportunities, particularly in terms of agricultural water use which constitutes an estimated 70% of the global total. Suffolk County should take particular heed from the standpoint of economic development. The spirit of Long Island's aerospace industry past could mesh with its water resource industry future to evolve into a water management mecca akin to the Netherlands of today. (http://www.dni.gov/files/documents/Special%20Report_ICA%20Global%20Water%20Security.pdf)

Bottom Line: During the next 10 years, many countries of import to the United States will experience water problems—shortages, poor water quality, or flood. As a result they will risk instability and state failure, increased regional tensions, and distract them from working with the United States on important U.S. policy objectives. Between now and 2040, fresh water availability will not keep up with demand absent more effective management of water resources. Water problems will hinder the ability of key countries to produce food and generate energy, posing a risk to global food markets and hobbling economic growth. The ISIS takeover of the Haditha Dam on the Euphrates, among others, demonstrates both threat and strategic advantage of water assets:

ISIS Push for Iraq's Dams Draws American Airstrikes



CBS/AP September 7, 2014, “U.S. officials have expressed concerns that militants could flood Baghdad and other large swaths of the country if they control the dams. It also would give the group control over electricity, which they could use to strengthen their control over residents. Water is a precious commodity in Iraq, a largely desert country of 32.5 million people. The decline of water levels in the Euphrates over recent years has led to electricity shortages in towns south of Baghdad, where steam-powered generators depend entirely on water levels.”

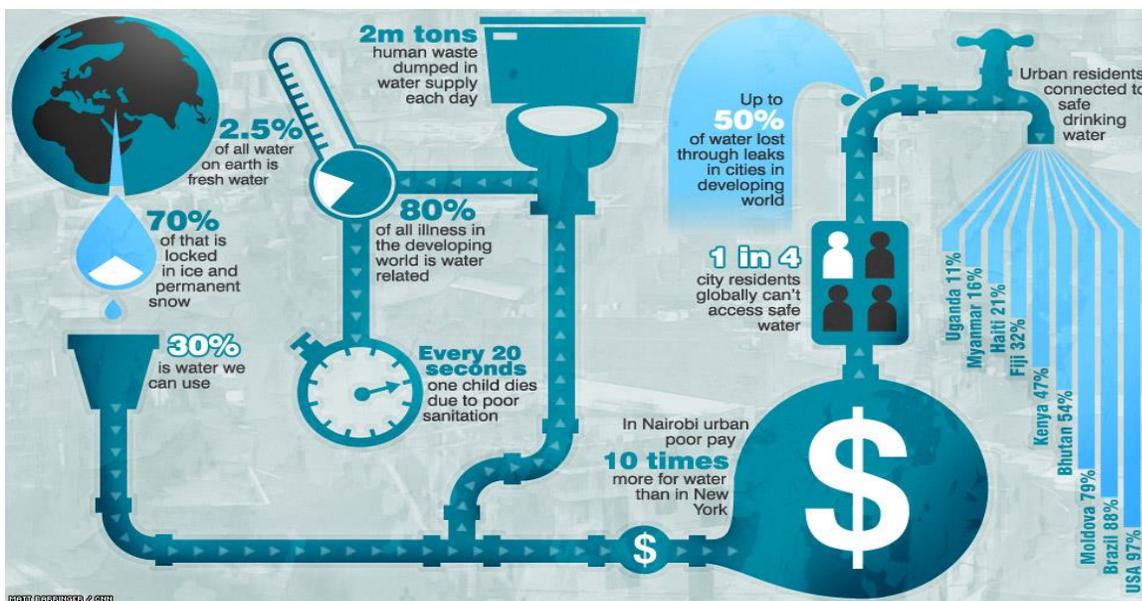
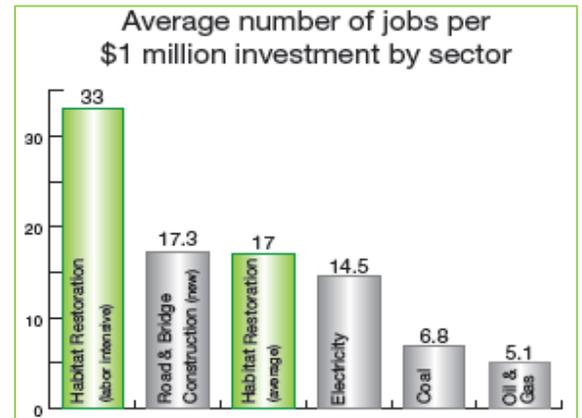
“From now through 2040, improved water management (e.g., pricing, allocations, and “virtual water” trade) and investments in water-related sectors (e.g., agriculture, power, and water treatment) will afford the best solutions for water problems. Because agriculture uses approximately 70 percent of the global fresh water supply, the greatest potential for relief from water scarcity will be through technology that reduces the amount of water needed for agriculture.”

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Opportunity: States with water problems will require integrated water, land use, and economic data which the U.S. is positioned to provide via satellite, other remote sensing data and hydrological modeling tools. The U.S. will realize increased demand for agricultural exports as water scarcity increases in various regions of the world.

Unlike other economic sectors, restoration jobs can't be outsourced to far-off places. According to the Oregon Ecotrust study, an average of \$0.80 of every \$1.00 spent on a restoration project stays in the county where the project is located, and \$0.90 stays in the state. (file:///F:/Resilience/Restoration%20jobs-NOAA_2012.pdf).

Water technology will evolve to address expected changes in salt-tolerant crops and point-of-use applications for safe



(Source: <http://www.cnn.com/SPECIALS/road-to-rio/secret-life-drinking-water/>)

consumption of untreated water in areas not served by community supply. Membrane and other nanotechnology applications dominating current desalination and water-purification industries are likely to be the most productive. Desalination, economically feasible for household and industrial water, is not currently feasible for agriculture and faces challenges.

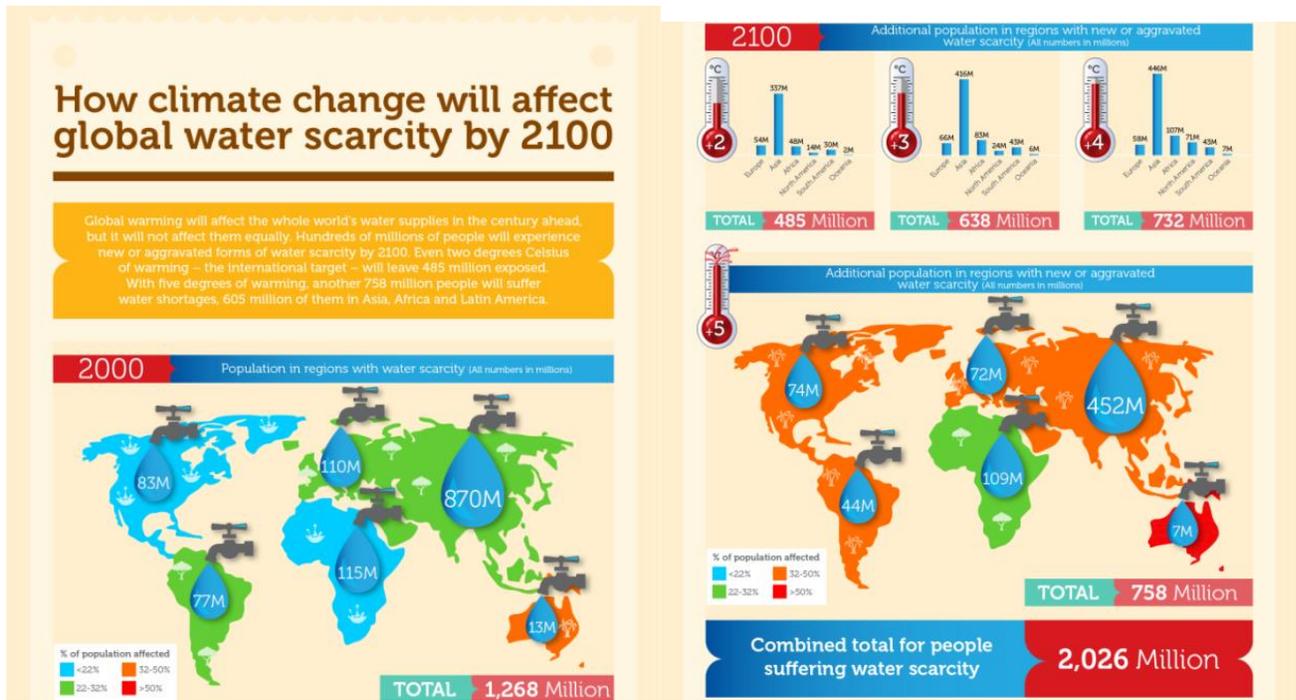
- As desalination processes produce a saline concentrate, the environmental impact of using or disposing this concentrate poses a hurdle.

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- Given the low price of water charged in most regions of the world, users are less motivated to adopt technologies such as desalination and drip-irrigation systems. For industry and households, water prices in developed countries range from \$0.60/cubic meter (\$2.27/1000 gallons) to more than \$3/cubic meter (\$11.36/1000 gallons). Recent data indicate that desalination processes produce water at much higher costs: \$0.61/cubic meter for reverse osmosis, and \$0.72/cubic meter to \$0.89/cubic meter for thermal processes compared to prevailing rate of \$0.10/cubic meter (\$0.39/gallon) for agriculture use.
- Advances in large-scale drip-irrigation systems are the most likely approach to address water shortages for agriculture.
- During the next three decades, selected crops could be developed that require half the water used by current crops, but drought resistance in crops remains problematic.
- Contamination of coastal aquifers and contraction of freshwater lenses on small islands—due to saltwater intrusion as sea level rises, coupled with contamination by more extensive storm surge incursions is expected. “Reality is already setting in among low-lying island nations, like the Marshall Islands, where rising seas are soaking coastal soil, killing crops and contaminating fresh water supplies. “The groundwater that supports our food crops is becoming inundated with salt,” said Tony A. deBrum, foreign minister of the Marshall Islands. “The green is becoming brown.” (New York Times, Optimism Faces Grave Realities at Climate Talks, 11/30/14)”

Limited experiments are being conducted to develop food plants that can tolerate salt or wastewater (see: <http://www.desertcorp.com/>). The advances in biotechnology may result in new plants or genetically altered strains that can grow in saltwater from the ocean or large saltwater aquifers. Point-of-use water-purification technology relies upon portable, self-contained systems favored by recreational enthusiasts and military personnel, and will be spread in the developing world where drinking water is drawn from untreated sources (e.g., rivers, lakes).

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Euractiv.com - Infographic

On average, a child dies from a water-related disease every 15 seconds, according to a 2006 United Nations Human Development Report. Unsafe drinking water and poor sanitation are leading causes of death in the developing world for children under age 5. Close to half of all people living in developing nations are suffering from a health problem related to water and sanitation deficits.

Drawing attention through school communities to the plight of other children via a charitable drive may be a means by which to indirectly uplift appreciation for the Value of Water.

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**Suffolk is blessed with abundant potable water
– not so the rest of the world
Can You Help?**

- **1 out of 6 in the world do not have access to safe drinking water.**
- Waterborne diseases are caused by drinking contaminated or dirty water. Which can cause many types of diarrheal diseases, including Cholera, Guinea worm disease, Typhoid, and Dysentery. Water related diseases cause 3.4 million deaths each year.
- **LifeStraw®** water filters remove the bacteria and pathogens that contaminate water to decrease the incidence of waterborne diseases.



Purchase of LifeStraw® filter funds distribution of LifeStraw Community institutional water purifiers to schools in Africa & South America.

Long Island
STEM Hub

Harnessing water resources was pivotal in the development of the United States. Water infrastructure investments helped overcome regional divisions and brought prosperity. The Pacific Northwest transformed from indigence in the 1930s to one of the most economically successful regions in the world. The change was even more dramatic in the south with the introduction of the Tennessee Valley Authority (TVA). There is contention over water in the West and Southeast, but mechanisms are in place to redress, ostensibly. Globally, the U.S. is a leading exporter of “virtual water” (absorbed in manufacturing or growth). Given the abundance of inexpensive water, that is a distinct strategic advantage for Suffolk County both in terms of export but also from the standpoint of attracting water dependent businesses.

Virtual water: the water used (or consumed) in the development or production of a good or commodity, typically agricultural products. In general, livestock products have a higher virtual water content than crop products. For example, the global average virtual water content of maize, wheat, and rice (husked) is 900, 1,300 and 3,000 cubic meters per ton (m³/ton) respectively, whereas the virtual water contents of chicken meat, pork, and beef are 3,900, 4,900 and 15,500 m³/ton respectively. The biomass needed to produce one liter of biofuel (under currently available conversion techniques) consumes between 1,000 and 3,500 liters of water, on a global average. **Figure 1-3** that posts the water consumption of production of a cotton versus polyester shirt at 7:1 is but one so-called ‘footprint.’ Energy use in millijoules per kilogram (MJ/KG) of fiber organic cotton is 14, for conventional cotton 55, and for polyester 125. KG of CO₂ emissions per ton of spun fiber for crop cultivation is 4.2 and fiber production is 1.7 for a total of 5.9 KG CO₂/ton (Stockholm Environment Institute). Polyester’s fiber production spews 9.52 (Dev, Vivek, “Carbon Footprint of Textiles”, April 3, 2009, http://www.domain-b.com/environment/20090403_carbon_footprint.html).

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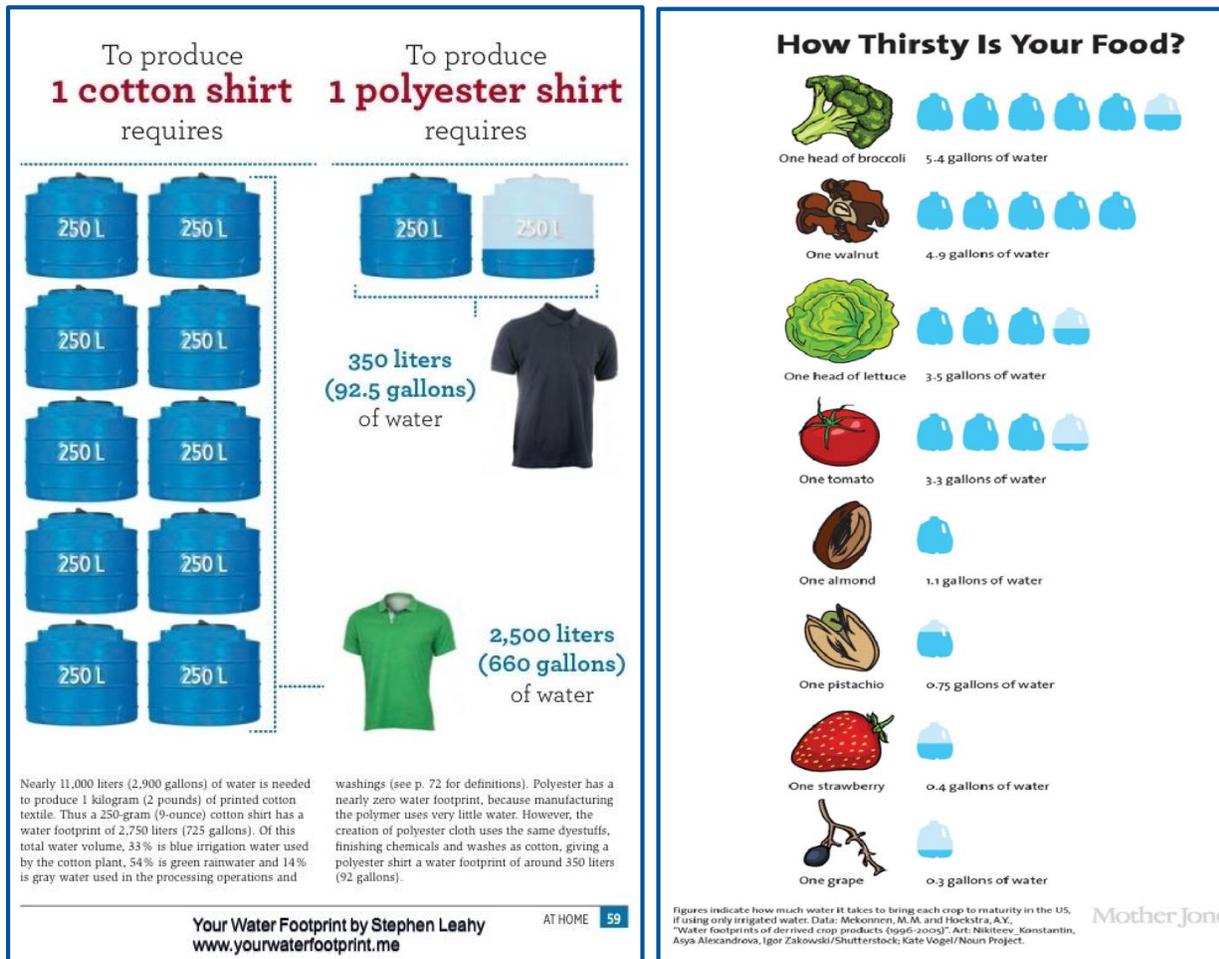


Figure 1-3 Water Required to Produce Clothing and Food

Prediction: Resource valuation, capturing associated cost/benefit 'externalities' will go beyond academic speculation and slowly become more 'internalized' in market pricing.

1.3 Public Opinion/Outreach



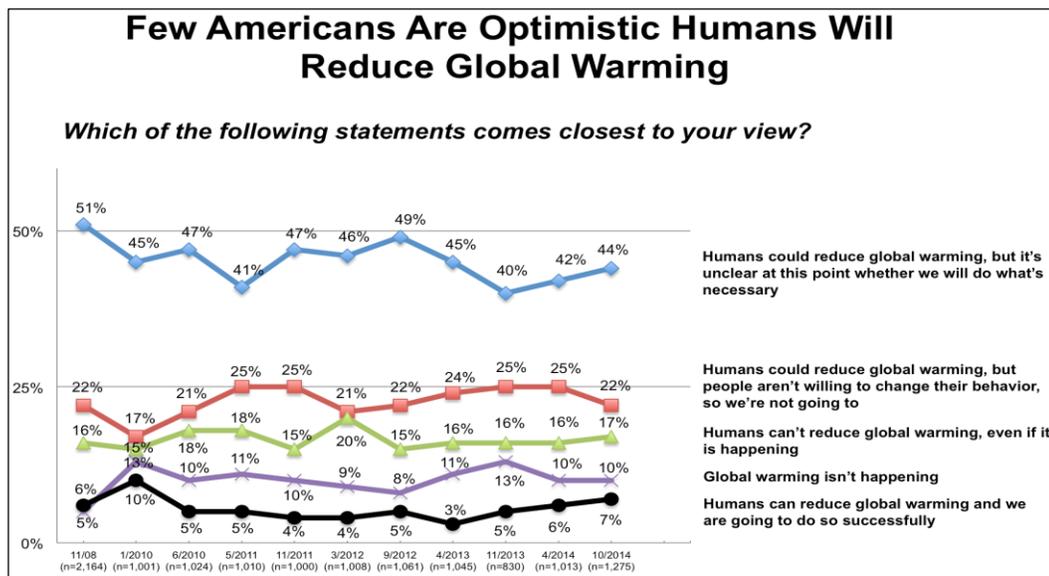
Public opinion is a moving target; polls are snap shots in time whose queries are often ambiguous. They fail to capture resonant neural images that are more revealing of the brain's limbic-centered decision-making process. In a Gallup snap shot earlier this year, (<http://www.gallup.com/poll/168236/americans-show-low-levels-concern-global-warming.aspx>) concern for polluted water polled at nearly double the rate of global warming (60% v 34%), showing that people care about their environment not the environment. In talking about concerns and challenges, make it personal. "Reclaim Our Waters" is about "your" well-being.

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Major agents of change, such as Henry Ford with automobiles and Steve Jobs with personal computers declared, in no uncertain terms, that they have led the charge in making new markets, absent demand or consumer surveys. “If I had asked people what they wanted,” said Ford, “they would have said faster horses.” And Jobs said, “People don’t know what they want until you show it to them.” Market makers are leaders who envision possibilities, marry them to needs and desires and make them accessible. Maslow has said, “If you don’t know where you are going any road will take you there.” If public opinion is ambiguous, at best, *is it a driver, passenger or going through driver’s education?*

Issues of climate change, sea-level rise and coastal resiliency have been largely depoliticized on Long Island. Just as the saying goes, there are no atheists in the foxhole, climate denial is far less prevalent on Long Island than elsewhere. Living on the frontlines of sea-level rise and vulnerability to extreme storm events, concern is bipartisan. To paraphrase Samuel Johnson, there is nothing like a storm the magnitude of Sandy to focus the mind. “As an island that juts out into the Atlantic, we are as vulnerable to climate change as any place in the world... This is not an academic exercise for Long Island... This is an existential challenge we are facing.” -Steve Bellone https://www.youtube.com/v=erqyq_23oNs&sns=em.

Survey participants are conflicted on environmental issues or, rather, lack clarity on cause, effect and remedy. A Yale poll (“Climate Change in the American Mind,” Yale Project on Climate Change Communication, Leiserowitz, A., et al, Oct, 2014) on climate change reveals that only 10% know that well over 90% of climate scientists say that global warming is largely man-made (with fewer than half believing a majority do). Over half of Americans (56%) say they are at least “somewhat worried” about global warming, but only 11% say they are “very worried” about it. About one in five Americans (22%) say they are currently part of – or would “definitely” or “probably” be willing to join – a campaign to convince elected officials to take action to reduce global warming.



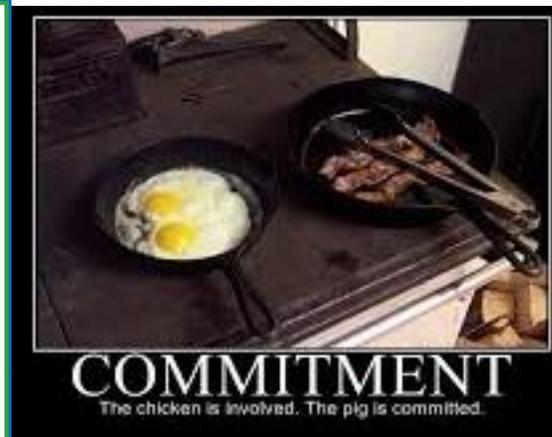
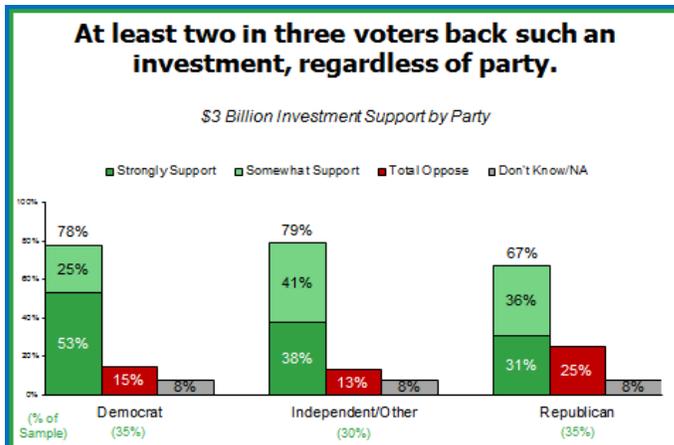
Over the past two decades, the environment has been distinctly politicized. Twenty-five years ago a Republican representative sponsored H.R. 1078 (101st): Global Warming Prevention Act of 1989; today that

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scenario would have a snowball's chance on an overheated planet. There are now “two Americas” when it comes to global warming perceptions. America was largely on the same page back in 1992, according to Pew Research, when an overwhelming majority in both parties favored stricter laws and regulation; the gap is now a gaping 39%.

Some have proposed bridging the divide, by reframing the issue as a sociocultural appeal. Welcoming the latest EPA pronouncement on carbon pollution, the CEO of the Evangelical Environmental Network said, “From acid rain to mercury to carbon, the coal utility industry has never acted as a good neighbor and cleaned up their mess on their own. Instead of acting for the benefit of our children’s lives, they’ve internalized their profits while our kids (have) borne the cost in their brains, lungs and lives (Washington Post, 12/2/14).” Here, too, however, the divide has been cleaved to further extremes by fundamentalist heavyweights like Focus on the Family: “one of the greatest threats to society and the church today is the multifaceted environmentalist movement (<http://www.resistingthegreendragon.com/>).”

Local polling, sponsored by The Nature Conservancy and conducted by FM3 and Public Opinion Strategies, indicate the one consensus issue at the national level – water quality – draws even greater support from Long Islanders augmented by a willingness to actually invest to that end. The big challenge is moving the dial from a pledge to a contribution to total commitment; or, the differing investment made in a bacon & egg breakfast by the diner, chicken and pig.



Yale Project on Climate Change Communication

County Executive Bellone launched the **Reclaim Our Waters** initiative at the turn of the year by introducing the revised Executive Summary of the 2015 Suffolk County Comprehensive Water Resources Management Plan. He sounded the alarm over “devastating impacts on our surface water, declines in the quality of our drinking water and enhanced risks for future storms. For the health of our region today and for the sake of future generations, we must reverse these trends.” Six weeks later, following his State of the County address, the County Executive hosted a town hall teleconference that drew nearly ten thousand participants, leading to other widely publicized events, identified on **Figure 1-4**.

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Figure 1-4 Reclaim Our Waters Initiatives Completed in 2014

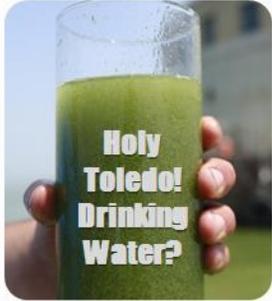
John Bargh, professor of psychology at Yale, says “We’re finding that we have these unconscious behavioral guidance systems that are continually furnishing suggestions through the day about what to do next, and the brain is considering and acting on those, all before conscious awareness (<http://www.nytimes.com/2007/07/31/health/psychology/31sub1.html?pagewanted=all>).” Cognitive scientist Alex Pouget writes in the journal *Neuron* of the good news: “Once we started looking at the decisions our brains make without our knowledge, we found that they almost always reach the right decision, given the information they had to work on” (<http://www.rochester.edu/news/show.php?id=3295>).

As a counterpoint, neuroscientists Amos Tversky and Daniel Kahneman were awarded the 2002 Nobel Prize in Economic Sciences for research that posited that people customarily don’t make rational decisions (“The Framing of Decisions and the Psychology of Choice,” *Science*, New Series, Vol. 211, No. 4481, Jan. 30, 1981, pp. 453-458). In “Predictably Irrational” and “The Upside of Irrationality,” Duke behavioral economist, Dan Ariely, makes lemonade out of this existential lemon, something akin to meditating on paradoxical koans. Dependence on reason must be abandoned in order to force-flash insight: ‘what is the sound of one hand clapping?’ To paraphrase Dante, ‘Abandon all reason, ye who enter here.’

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1.4 Messaging: Scare and/or Care

**Nitrogen Bombs in Our Bays –
Public Water Enemy #1**



**Holy Toledo!
Drinking Water?**



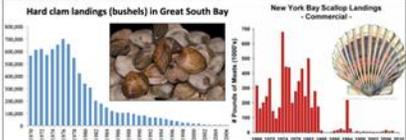
**No, this is not Lake Erie.
It's Lake Ronkonkoma!**

Is this Long Island's Future?

Remember How It Used to be?




LET'S GO CLAMMING!



Hard clam landings (bushels) in Great South Bay

New York Bay Scallop Landings - Commercial

Canaries in a Coal Mine



Distressed Dolphin – Gilgo Beach



**Fish Kill – Morning House Creek,
Peconic Bay**

Visions of the Island that Beckoned Us Here



Shooting the barrel at Gilgo Beach



Catching dinner and the sunset on Fire Island

**Restoring Suffolk's Second Line of Coastal Defense...
Its Wetlands**



Mitigating Property Damage



Reclaim Our Waters

"We are a county that will no longer allow our water quality crisis to go unaddressed, but will come together to Reclaim Our Water."

SUFFOLK COUNTY EXECUTIVE STEVE BELLONE
2014 State of the County



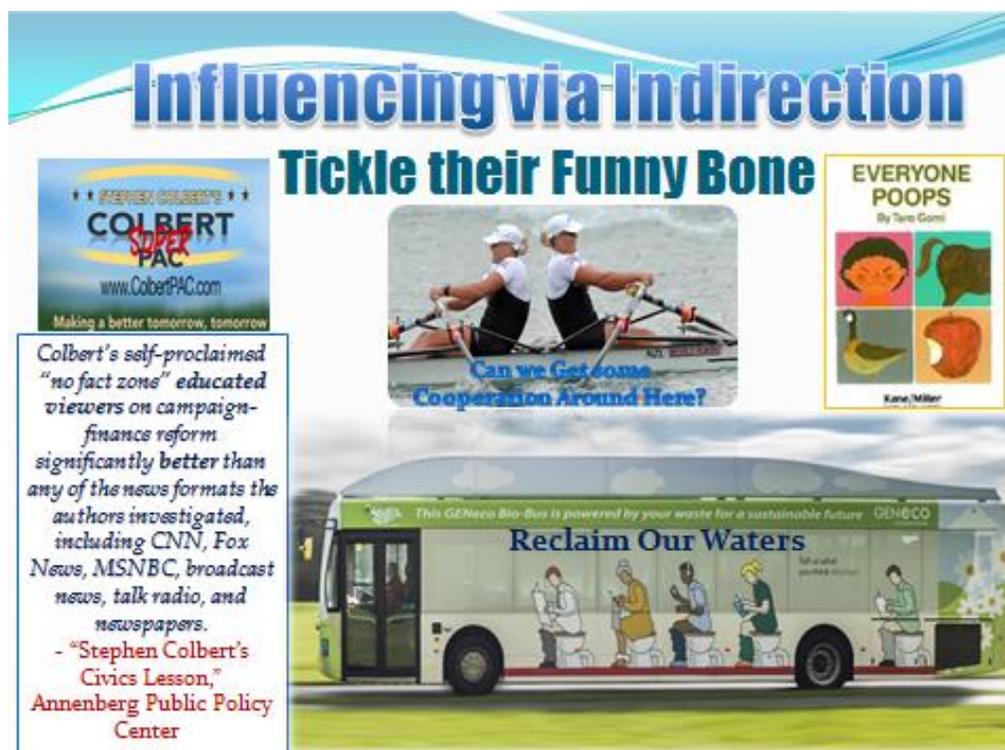
Dubbed the Manipulative Prince, no one has more effectively framed contemporary debate than 'Word Doctor' Frank Luntz, substituting "Death Tax" for the estate tax and "Exploring for Energy" for drilling for oil. With the frame "Climate Change," Luntz bumped "Global Warming" to the back-burner and defined the

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debate on his clients' terms. "It's not what you say," Luntz reminds would-be shape-shifters, "it's what people hear." Plus what they pay attention to and sub-cognitive influences they absorb.

Robert Kenner's 2015 documentary, "Merchants of Doubt," based upon a 2010 book of the same title by historians of science, Naomi Oreskes and Erik M. Conway, makes a primal observation about the so-called climate debate: "Why don't people change their minds when new data comes in about climate? Because it isn't about the data. It's about me being a consistent tribal member and showing my fellow tribal group members that you can count on me."

It's the messenger who gives meaning to the message. More often than not, people hear what they want to hear. "You get at a man through his own religion and not through yours," notes George Bernard Shaw. No one, despite the risks he faced, donned that Shavian clothing more masterfully than Nelson Mandela when he asserted himself as the #1 fan of the Springboks, a symbol of apartheid South Africa (<https://www.youtube.com/watch?v=qV5SIFBmfAM>).



Home ownership, its rewards and gratifications, has been the leading draw for the half-million+ families living in Suffolk County. Moreover, owning a home in Suffolk is enriched by all variety of natural bounties and recreational options, enhanced by what Nancy Rauch Douzinas describes as Long Island's "legendary range of attractions - a stunning suburban environment in close proximity to the business capital of the world; one of the most storied vacation areas in the world (president of the Rauch Foundation, Huffington

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Post, 12/2/14).” For most, their house is their primary asset. Maintenance and enrichment of that asset is welcome; factors devaluing that asset present critical concern to homeowners.

THE LONG ISLAND WATER QUALITY INDEX

NEWS 12 **Weather**

by The Gobler Laboratory at Stony Brook University
 The Long Island Water Quality Index is provided weekly by The Gobler Laboratory at Stony Brook University to inform about the quality of the water around Long Island. Click on the dots on the map below to obtain more information on the specific reading for that area. www.information.brook

<http://longislandnews12.com/weather/the-long-island-water-quality-index-1.8574957>

Feature	Good	Fair	Poor	Sources for ranking
Chlorophyll a (µg/L)	<6	6-20	>20	USEPA, NOAA, NYSDOH
Dissolved oxygen (mg/L)	>6	3-6	<3	NYSDEC, USEPA
Water clarity	>2m	1-2m	<1m	USEPA, NYSDOH
Fecal coliform (colonies per 100m)	<14	14-2,000	>2,000	NYSDEC, NYSDOH
Harmful algal blooms	None, low	Minor Impact	Major Impact	NOAA, Scientific literature
Temperature (°C)	<26	26-28	>28	Scientific literature
Score	3	2	1	

The onslaught of Superstorm Sandy exposed various water-borne vulnerabilities. Long Islanders now know, with certainty, that the surrounding waters which are such an attraction can also wreak havoc. In the wake of the storm, a report from New York State’s Department of Environmental Conservation (NYSDEC) indicted the nitrogen pollution carried by the untreated wastewater from 74% of Suffolk houses. Nitrogen is deemed the leading culprit in the breakdown of the County’s second line of defense – our wetlands. Nitrogen was previously held liable in the decimation of the hugely productive shellfish industry and regular outbreaks of harmful algal blooms. This bleak scenario provides the frame for alarm: **Nitrogen Is Public Water Enemy #1**. We are not discussing the environment; we’re talking about **our environment**.

Reclaim Our Waters is the caring counter frame to the nitrogen nemesis.

- By reclaiming our waters, we will be restoring the level of water quality that is now but a distant memory for Suffolk residents.
- Cleansing God-given resources that haven’t been suitably shepherded will be redemptive.
- Reclamation of our waters asserts pride of joint ownership and the common good from which we all benefit.
- The quality of the drinking water drawn from beneath our feet, the condition of surrounding waters in which we disport, these are vital to our well-being and, yes, the value of our primary asset.

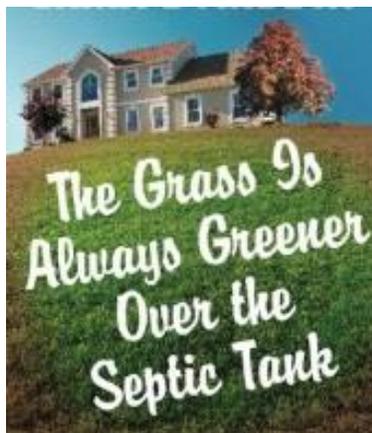
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1.5 The Value Proposition of Home Improvement

“Connection or social bonding is central to the product's **value proposition**.... When introducing a radically new product, it is necessary to understand how consumers currently frame their experience of the problem addressed by the new offering. That is, no matter how radical a new product is, it will always be perceived initially in terms of some frame of reference. It is essential that this frame be understood (Zaltman, op. cit. <http://hbswk.hbs.edu/item/3246.html>).”

Market mission: Projecting and packaging advanced wastewater treatment as a must-have home improvement for 360,000 homeowners, the vast majority of whom already see water quality as their #1 environmental concern - a problem that is now presenting a solution.

How, then, to make a home-improvement mass market for state-of-the-art wastewater treatment, given its position, hidden beneath that suburban icon – the lush, green lawn? Conceivably that very factor holds a key. Could innovative/alternative septic system come to be considered buried treasure for an ever greener garden?



A leading challenge in the home improvement market is exemplified by the classic marble countertop counter to energy efficiency. Why would a homeowner go with insulation blown into an attic and walls no one sees rather than a kitchen makeover they can show off? This was one of several barriers the Town of Babylon faced when devising the pioneering retrofit program called Long Island Green Homes. Rather than making it a zero-sum, either/or choice between a nifty new kitchen or energy efficiency, Green Homes made it so the homeowner could have both. With the energy efficiency retrofit assigned as a benefit assessment, it paid for itself from utility bill savings, and wasn't financed with conventional debt. The homeowner could do the kitchen or install solar panels, whichever they

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preferred.

But where carbon has been ‘internalized’ as a direct saving to the homeowner on their utility bill, nitrogen cannot be comparably monetized, at present. The existing cost of periodic pump-outs might work for some with high groundwater, but not nearly enough to offset current carrying costs for most. The enhanced property valuation for being connected to sewers or advanced wastewater treatment has yet to be definitively established, so it remains a data point that could clearly be a driver. Integrating the septic drain field in a way that provides natural fertilization could diminish or eliminate the estimated \$320/year (www.healthylawns.suffolkcounny.gov) that the average Suffolk homeowner spends to fertilize their lawns.

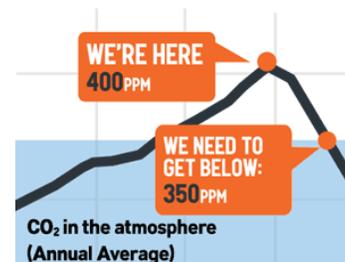
Simultaneous with piloting septic upgrades, Suffolk will set up a responsible management entity (RME) in concert with a county-wide wastewater management district. Then, as with sewers, the obligation can be assessed to the property and charged in reasonable yearly amounts over the system’s useful lifetime, defrayed by associated tax advantages. With low-interest financing through the Clean Water State Revolving Loan Fund comparable to Rhode Island’s program, the obligation would be on par with what homeowners pay to be connected in the Southwest Sewer District.

The 360,000 cesspools and septics in Suffolk represent an attractive market by itself. But there are also many more septics spread throughout the Northeast, 2.7 million in Florida and 60 million nationwide. In the course of meeting market needs, system performance will likely improve in step with shrinking cost. Early adopters and opportunists with failed systems will lead the market which will evolve at an evolutionary, not revolutionary pace. It took five years for Green Homes to reach a yearly adoption rate of 1% of its eligible housing stock. The Rhode Island program, which is the leader at this point, has not attained that level of uptake. And, as a cash-neutral investment that provided a 12% ROI, Green Homes is certainly more marketable than septic upgrades. But who could have foreseen a couple of decades back when yearly phone bills were in three-figures, that families would be expending four figures for connectivity?

1.6 Confluence of Ecoinfluencers?

In “Disruptive Ideas: Public Intellectuals and their Arguments for Action on Climate Change,” Prof Matthew Nisbet of Northeastern stakes out three different schools of ecoinfluencers who are vying to move the dial on environmental policy. This report identifies them as ecoactivists, coreformers, and ecopragmatists. Do these distinct approaches to environmental challenges send mixed messages and muddy the waters? Or is it all good - different strokes for different folks? Can cross-purposes cross-pollinate? (Nisbet, M.C. (2014). *Disruptive Ideas: Public Intellectuals and their Arguments for Action on Climate Change*. Wiley *Interdisciplinary Reviews Climate Change*).

1. Ecoactivists, like Bill McKibbens of 350.org with his divestment campaign envision a new consciousness disseminated via grassroots organizing and social protest to dramatically transform society and prevent ‘ecocide’. “Capitalism, consumerism has exceeded the carrying capacity of the planet, risking catastrophe, or certain collapse. Call for strong regulation of industry, rationing of energy



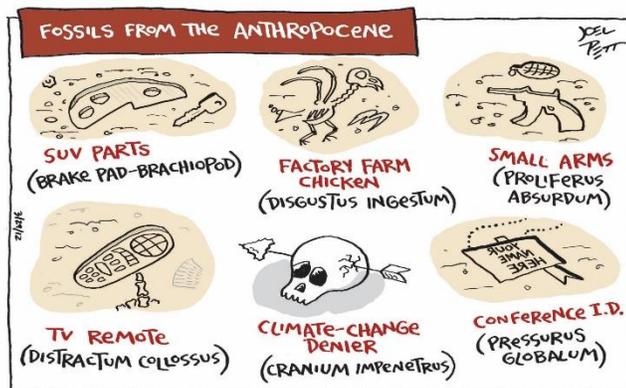
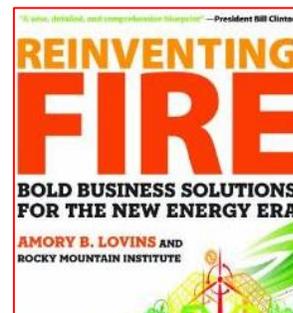
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use, localization of economies, food systems, governance.” Ecoactivists have taken the baton from neo-Malthusians like Paul Erlich and trace their inspiration back to Thoreau and Emerson. 350.org was founded in 2008 when the concentration of mid-tropospheric carbon dioxide in parts per million (ppm) had already reached 385 on its way to 400 in November, 2014 (J. Hansen, Target atmospheric CO₂: Where should humanity aim? *Open Atmos. Sci. J.* (2008), vol. 2, pp. 217-231). The ecopragmatist warns of 'noble cause corruption.

- In *Natural Capitalism*, ecoreformer Amory Lovins sees a “menu of climate-protecting opportunities... so large that over time, they can overtake and even surpass the pace of economic growth.” In his scope, *Smart Growth* conforms within environmental limits driven by the right market-based mechanisms. “Climate change is ultimate market failure, corrected by putting price on carbon and with a new ‘mindfulness’ overcoming ‘deniers.’ Put out calls for binding international agreements, national carbon pricing, and government investment in innovation.” The model of social change advocated by *Smart Growth Reformers* tends to be strongly technocratic, reflecting a strong faith in the ability of science, engineering, and economics to identify solutions and persuade others via grassroots mobilization à la civil rights movement.

Andrew Revkin, (“The good, the bad, and the anthropocene (age of us),” *New York Times*, July 7, 2014,

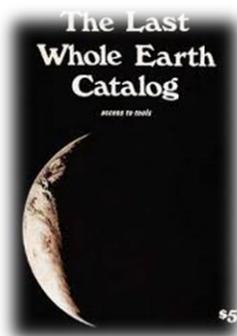
<http://dotearth.blogs.nytimes.com/2014/07/07/the-good-the-bad-and-the-anthropocene>) is an incrementalist who has recognized that, “The primacy of energy access in most of the places in the world trumps long-term concerns about what we are going to do about greenhouse gas concentrations in the atmosphere. When you have endpoints that you don’t know how to reach, chanting numbers like [four degrees, or] two degrees, or 350, or 80 by 2050, is less useful than saying, what are the traits in societies and individuals that I can work on that give us the best chance of bending curves in directions that are “good”?... No one had any idea we were going to have a natural gas revolution and, for better or worse, here it is, reshaping global energy policies. So what do you do when you know the things you don’t know are going to matter most in coming years?”



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The impact of human conduct on the Earth and its atmosphere over the previous two centuries is of such magnitude that it has, effectively, carved out an entire geological epoch that has been named the Anthropocene. “The idea of the ‘Anthropocene’ underscores the point that human activities and their impacts have global significance for the future of all living species -- ours included,” says Anik Bhaduri, Executive Officer of the Global Water System Project. “The list of human activities and their impact on the water systems of Planet Earth is long and important. We have altered the Earth's climatology and chemistry, its snow cover, permafrost, sea and glacial ice extent and ocean volume—all fundamental elements of the hydrological cycle. We have accelerated major processes like erosion, applied massive quantities of nitrogen that leaks from soil to ground and surface waters.”

3. In the wake of several international climate summits, ecopragmatists from the Breakthrough Institute critiqued “climate benefits far off in the future — benefits whose attributes, magnitude, timing, and distribution are not knowable with certainty.” Their approach “values pluralism over universalism, flexibility over rigidity, and practical results over utopian ideals.... For the United States and other nations to effectively pursue energy innovation, resilience to extreme weather, and pollution reduction, policymakers must make a clean break from the pitched and polarizing climate wars of the last twenty years and embrace a more pluralistic and pragmatic approach. Following Stewart Brand’s lead, they embrace the ‘positive Anthropocene,’ where, in theory we have the capacity to alter course and mitigate impact. Nature’s capacity for resilience is heeded and dire warnings are discarded as self-fulfilling prophecies (S. Brand, “Whole Earth Discipline: An Ecopragmatist Manifesto,” New York: Viking Adult; 2009). Too much faith is placed in carbon tax; international emissions agreements are not equipped to spur technological innovation which occur in ad hoc fashion as a portfolio of incremental ‘clumsy’ solutions (Nordhaus T, Shellenberger, et al, “Climate Pragmatism: Innovation, Resilience, and No Regrets. Oakland, CA: The Breakthrough Institute; 2011).



Unsettled Scientists - The problem engendered by so-called ecoinfluencers, as Amitai Etzioni points out, is that they reside in ‘communities of assumptions,’ and, in effect, preach only to their respective choir of activists, funders, journalists, etc. (A. Etzioni & A. Bowditch, “Public Intellectuals: An Endangered Species?” Rowman & Littlefield, 2006). These competing choirs of fellowships, professorships, research grants, conferences, books, journals, blogs, etc., produce nationwide cognitive dissonance which gets fed into the sausage factory. Prof. Mike Hulme concludes that climate change is, therefore, “a synecdoche (a figurative turn of phrase in which something stands in for something else) for something much more than simply the way humans are changing the weather (M. Hulme, “Exploring Climate Change through Science and in Society,” London: Routledge Earthscan; 2013).”

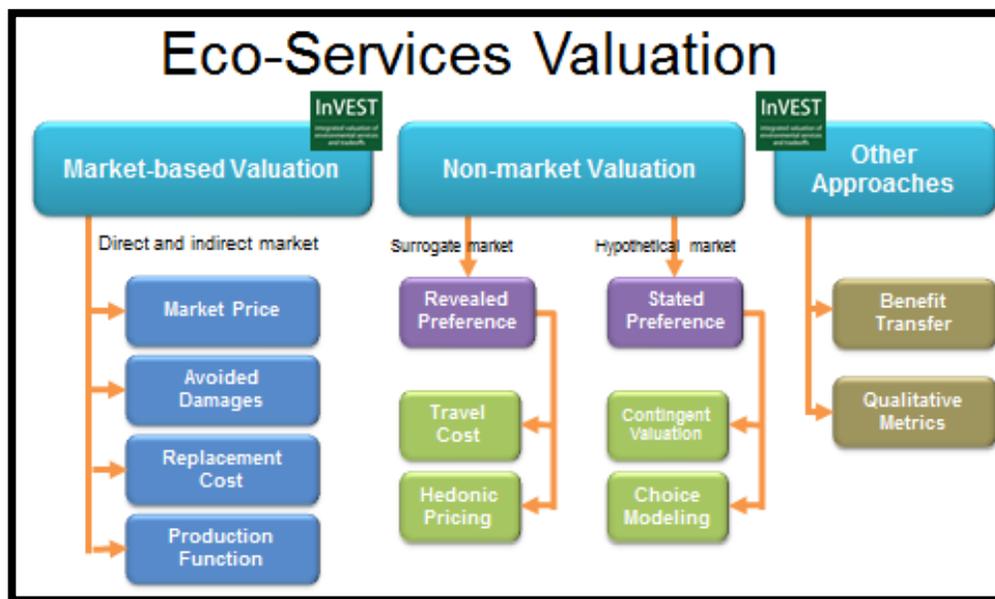
Leaving all these competing academic scores unreconciled, a return to valuing home improvements is in order.

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1.7 Ecosystem Services Valuation & Externalities

“We need to revise our economic thinking to give full value to our natural resources. This revised economics will stabilize both the theory and the practice of free-market capitalism. It will provide business and public policy with a powerful new tool for economic development, profitability, and the promotion of the public good.”

-Paul Hawken



“Give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime.”

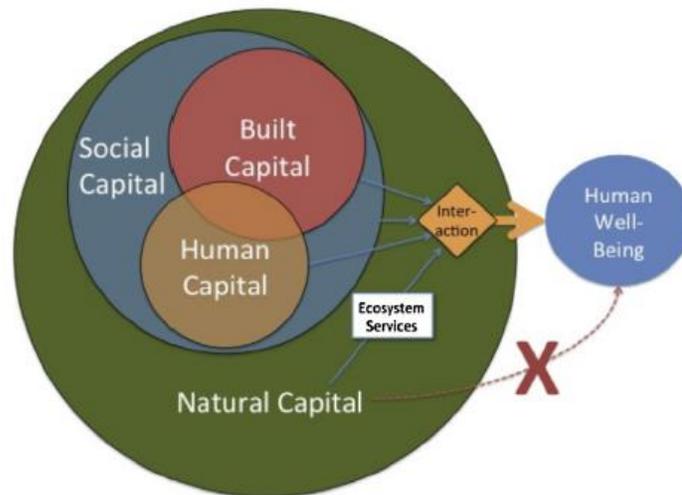
-Maimonides

‘What’s in it for you?’ That’s the issue that valuation of ecosystem services has been devised to answer, in part. Alternatively referred to as ‘natural capital,’ it quantifies the benefits to human well-being derived from functioning ecosystems. Leading ecological economist, Prof. Robert Costanza, sums it up: for benefits of ‘natural capital’ (coined by Costanza in 1992) to accrue, they are generally bundled in a complex mix along with manufactured, human and social capital (R. Costanza, et al, “Valuing ecological systems and services” Biological Reports, 3:14, 2011) Fishing boats manned by experienced fisherman from ports plying waters with thriving aquatic life. “The depletion of the natural capital base has often been counted as profits, because these external costs are miscounted as profits. Are we making bad management decisions because we’re not considering all of our capital base?” Costanza asks. In effect, the owner of a patch of redwoods makes money from cutting them down rather than letting them stand, passing along on the substantial external cost of their loss to 6 billion other people. At this point, this academic approach is more aspirational than applicable.

The Millennium Ecosystem Assessment from the U.N. in 2005 characterizes the four **ecosystem services** as follows (<http://www.maweb.org/documents/document.429.aspx.pdf>):

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1. **Provisioning services** that provide food, fiber, forest products, etc.
2. **Regulating services** that proffer the storm protection services of coastal wetlands
3. **Cultural services** offering recreational benefits of natural assets like rowing on a lake.
4. **Supporting services** that maintain habitats for animals while sequestering carbon.



Costanza's estimate for the total global ecosystem services in 2011 is \$125 trillion/year (assuming updated unit values and changes to biome areas) and \$145 trillion/year (assuming only unit values changed), both in 2007 \$US. From this we estimated the loss of eco-services from 1997 to 2011 due to land use change at \$4.3-20.2 trillion/year, depending on which unit values are used. (Costanza, 4-1-14). Deforestation and other damage we've inflicted on the natural world has wiped out \$23 trillion a year in ecosystem services. To put that loss into perspective, consider that the gross domestic product of the United States is \$16.2 trillion.

Purists recoil from reducing the intangibles of the natural world to a cost-benefit analysis and placing price tags on ecosystem services. Nature, by their reckoning is priceless; degrading ecosystems may, in fact, be deemed less valuable and further disregarded. "Mother Earth is the source of life which needs to be protected, not a resource to be exploited and commodified (sic) as 'natural capital,'" decries the Kari Oca 2 Declaration. "The Green Economy is a crime against humanity and the Earth." "Instead of expanding the scope of markets to every domain of nature," states BankTrack, "strengthen the democratic control over the worlds' ecological commons." A Natural Capital spokesperson responds: "We are not talking about 'pricing' nature but 'valuing' it. By valuing it, you are enabling better economic decisions." Add to this mix the salient factor that ecosystems also harbor costly dangers for humans. That makes for a balancing act here on Long Island between marsh management and vector control's preventative role in mosquito control.

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The Natural Capital Project (<http://www.naturalcapitalproject.org/>) is a collaboration between the Stanford Woods Institute for the Environment and The Nature Conservancy to “develop simple, use-driven approaches to valuing nature: If properly managed, Earth's lands, waters and their biodiversity yield a flow of ‘ecosystem services,’ including:

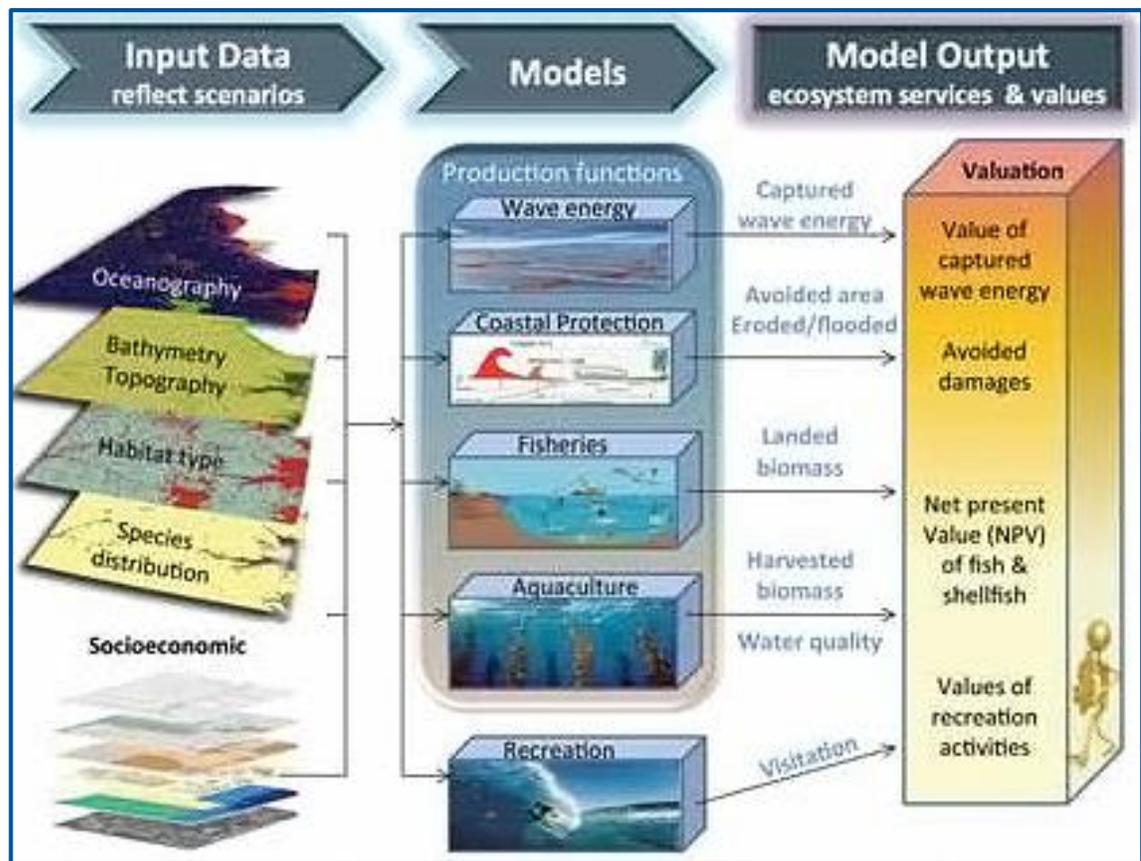
- The production of goods such as food and timber,
- Life-support processes such as water purification and coastal protection,
- Life-fulfilling benefits such as beautiful places to recreate, and
- The preservation of options, such as genetic diversity for future use.

Natural Capital offers software models for download. ‘Integrated Valuation of Environmental Services and Tradeoffs,’ InVEST, defines how ecosystems affect the flows and values of environmental services (<http://www.naturalcapitalproject.org/download.html>). ‘Resource Investment Optimization System, RIOS, provides a standardized, science-based approach to watershed management (http://naturalcapitalproject.org/rios_download.html).

At this stage, the InVEST tool operates at 30,000 feet. Last year a Natural Capital team (K. Arkema, et al, “Coastal habitats shield people and property from sea-level rise and storms,” Stanford Woods Institute, 2013) delivered a map of natural habitats indicating where conservation and restoration of reefs and vegetation have the greatest potential to protect coastal communities. “Today 16% of the U.S. coastline comprises ‘high hazard’ areas, harbouring 1.3 million people (an estimate far smaller than others such as CoreLogic’s 4.2M houses), 250,000 elderly, 30,000 families below the poverty line and U.S. \$300 billion in residential property value.” If the extensive coral, mangrove and seagrass ecosystems that line Florida at present persist in the face of development and climate change, the Natural Capital analysis predicts these habitats will reduce exposure of nearly U.S. \$4 billion worth of 2010 home property values within 1 km of the coastline by 2100, up from U.S. \$0.7 billion at present. Property now protected by coastal habitats is substantial, ranging up to more than U.S. \$20 billion in Suffolk and Kings, New York (Natural Project). Valuing ecosystems remains an academic proposition and has far to go before reaching granularity that can be internalized in market price.

“Valuing Estuarine Resource Services Using Economic and Ecological Models: The Peconic Estuary System (PES) Study,” summarized a 1999 evaluation conducted on Long Island by a team from the University of Rhode Island, “Much of what residents and visitors value in the PES—for example, the quality of the area’s natural amenities, like open space, attractive views, good beaches, high levels of water quality, and fish and shellfish resources used for recreation—are not bought and sold in markets. The value of these services, therefore, is often omitted in traditional economic impact studies.” As beauty is in the eye of the beholder, so too the valuation of that beauty. Fifteen years later, market pricing of ecosystem valuation remains elusive.

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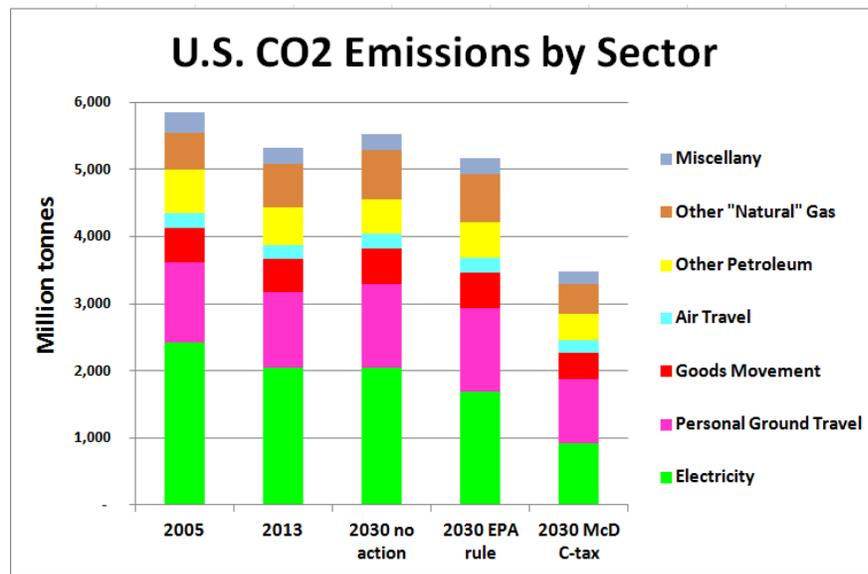


An **externality** is a (positive or negative) impact on a third party that is not reflected in market transactions. For example, when a private wetland that provides flood protection for the surrounding area is sold, the price reflects only the value of the acreage to the buyer and seller—not the additional value to nearby homes and businesses. Considerable evaluation has gone into **carbon footprints**, quantifying how much total energy is required for products and activities, in addition to what the impacts may be. The average carbon footprint per person worldwide is 6.3 tons of CO₂ (t/CO₂), while in the U.S. it is 21 t/CO₂. Markets such as the Northeast’s Regional Greenhouse Gas Initiative (RGGI), have been trading in carbon credits; the price per ton has dipped as low as \$1.86 while this June it spiked as high as \$5.02. To coin a phrase in this realm, ‘**internality**’ is where cost and savings are captured in ways that reflect direct consumer value. Energy efficiency measures exemplify the capture of ‘internalities’ in that the capital cost is offset by savings on energy expenditures, in effect, making it a cash neutral investment (more at <http://www.carbontax.org/services/where-carbon-is-taxed/>).

As early as the 1920s, British economist Nicolas Pigou advocated for taxes on activities that caused pollution and sickness, in much the same way that state governments now tax tobacco to discourage smoking. Only two examples of Pigouvian taxes, corrective or excise, have been adopted in the U.S. at the Federal level - the gas guzzler excise tax and the excise tax on ozone-depleting chemicals. Operationalizing taxes now runs

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head on into undiscerning anti-tax political opposition that precludes consideration, let alone implementation. Cost/benefits, measures of supply and demand atop conflicting regional impacts are murky. Various iterations of what and who is to be taxed how much whirl about what the policy objectives might be. Pigouvian taxes like the carbon tax have had influential proponents such as Harvard's Greg Mankiw, chairman of the Council of Economic Advisers under President George W. Bush, then economic adviser to Mitt Romney. If it happened that the carbon tax came to pass, note the projected impact over the next fifteen years:



Cap & trade (C&T), or cap and dividend, its populist variation, are trading regimens or schemes, as the Europeans call them. C&T is modeled on the successful mitigation of acid rain during the administration of Bush Senior. It is designed to be a market maker for the cost of carbon embodied in power generation and production. The Regional Greenhouse Gas Initiative (RGGI) is a C&T program that joined ten Northeastern states (now minus NJ). Beginning in 2008, carbon credits auctions have financed clean energy programs like Green Jobs/Green NY.

Storm-Prone Property Valuation is considerably closer to the bone than the quicksilver of externalities. That is because actuarial risk assessment provides an 'internality,' real-world data that a homeowner can factor into the household budget. "With the continuing surge of coastal development and about one-half the U.S. population living along coastlines,... it's more important than ever that properties are accurately assessed using tools specifically designed for the insurance industry." -CoreLogic (provider of analytics on more than 135.6 residential million properties) estimates that there are 687,412 homes at risk for potential storm surge damage in the greater New York metropolitan area whose reconstruction value would \$251 billion. Nationwide it is estimated that 4.2 million single-family homes valued at over \$1.1 trillion are exposed to some level of storm surge. CoreLogic uses GIS data layers and probability models that evaluate and score coastal risk from multiple angles to improve pricing and risk management, using web-based tools such as RiskMeter Online to more effectively assess and distribute coastal risk. Well-designed disaster insurance can play an important role in linking mitigation with financial protection. A statewide insurance

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program that incents mitigation measures through the equivalent of a systems benefit charge is an elemental starting point to move the dial on preparedness.

Availability bias: Herein a cautionary tale. There is a documented tendency to ignore rare risks until after a disaster occurs. Low-probability, high-consequence (LP-HC) events, don't, as a rule, catalyze people to make provision. Availability bias, as it is called, is strongly influenced by recent personal experience and can lead to an underestimation of low probability events (e.g., typhoons, floods, or droughts) before they occur, and their overestimation after an extreme event has occurred. The resulting availability bias can explain why individuals first purchase insurance after a disaster has occurred only to cancel several years later. An in-depth analysis of the entire portfolio of the National Flood Insurance Program revealed that the median tenure of flood insurance was between two and four years while the average length of time in a residence was seven years (Michel-Kerjan, Lemoyne de Forges, and Kunreuther 2012).

A poll of 1,100 adults living along the Atlantic and Gulf coasts undertaken by Mason-Dixon Polling and Research in May 2006 revealed that 83% of the responders had taken no steps to fortify their home, 68% had no hurricane survival kit, and 60% had no family disaster plan. A survey of nearly 800 residents in coastal counties during Hurricane Irene in 2011 revealed that less than half of storm-shutter owners in the state of New York actually installed them to protect their windows before the hurricane came. Most others did not install them because it would have “taken too long.” (E. J. Baker, J. Czajkowski, and R. Meyer, “Modeling the Real-Time Decision to Evacuate from a Hurricane,” Wharton Risk Management Center, Philadelphia, PA, 2012).

What **availability bias** underscores more than anything about Americans is that our approach to disaster is reactive rather proactive. Where Americans do post-disaster management reasonably well, the Dutch labor assiduously to avoid disaster. Someone said a clever person solves problems, a wise one avoids them. Consider how proactive the Dutch are, and how to prosper from it.

1.8 Living with Water-Learning & Earning

“The Dutch have in some ways an easy problem to solve. The entire nation is at risk if the western portion floods. So the entire country is united. It's not a question of should we do [flood protection], but how.... In the U.S., because of the way federalism works, it makes it more difficult for the U.S. to have an applied holistic approach.” –Dale Morris, American economist with the Dutch government

“For the Dutch, water management is a growth industry.” (S. Goodyear, “We're In This Together: What the Dutch Know about Flooding That We Don't,” The Atlantic CityLab, 1/9/13)

Hansje Brinker tells the tale of a little Dutch boy who finds a hole in a dike and presses his thumb inside to prevent his hometown from flooding.

There is an established connection between managing water resources and mitigating the hazards of water-born storms. Living below sea level, the Dutch have become past masters at coexisting with water, internally and externally, in concert with one another. Their defining experience was the deaths of nearly 2,000 caused by the 1953 North Sea flood, or as the Dutch call it, Watersnoodramp, the “water ordeal disaster.” Dutch engineers were retained in the wake of Hurricane Katrina to advise in the reshaping New

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Orleans and a Dutchman was appointed post-Superstorm Sandy by the Department of Housing and Urban Development to spearhead the “Rebuild by Design” initiative in the greater New York/New Jersey metropolitan area. Dutch firms pitched projects in the greater metropolitan area, stressing Netherlands’ experience with risks posed by coastline and estuaries comparable to New York’s.



Maeslantkering



The Maeslantkering, a movable storm barrier, both gates the length of the Eiffel Tower, at a cost over \$0.5B. Finished in '97, testing aside, it has been used only once - successfully.

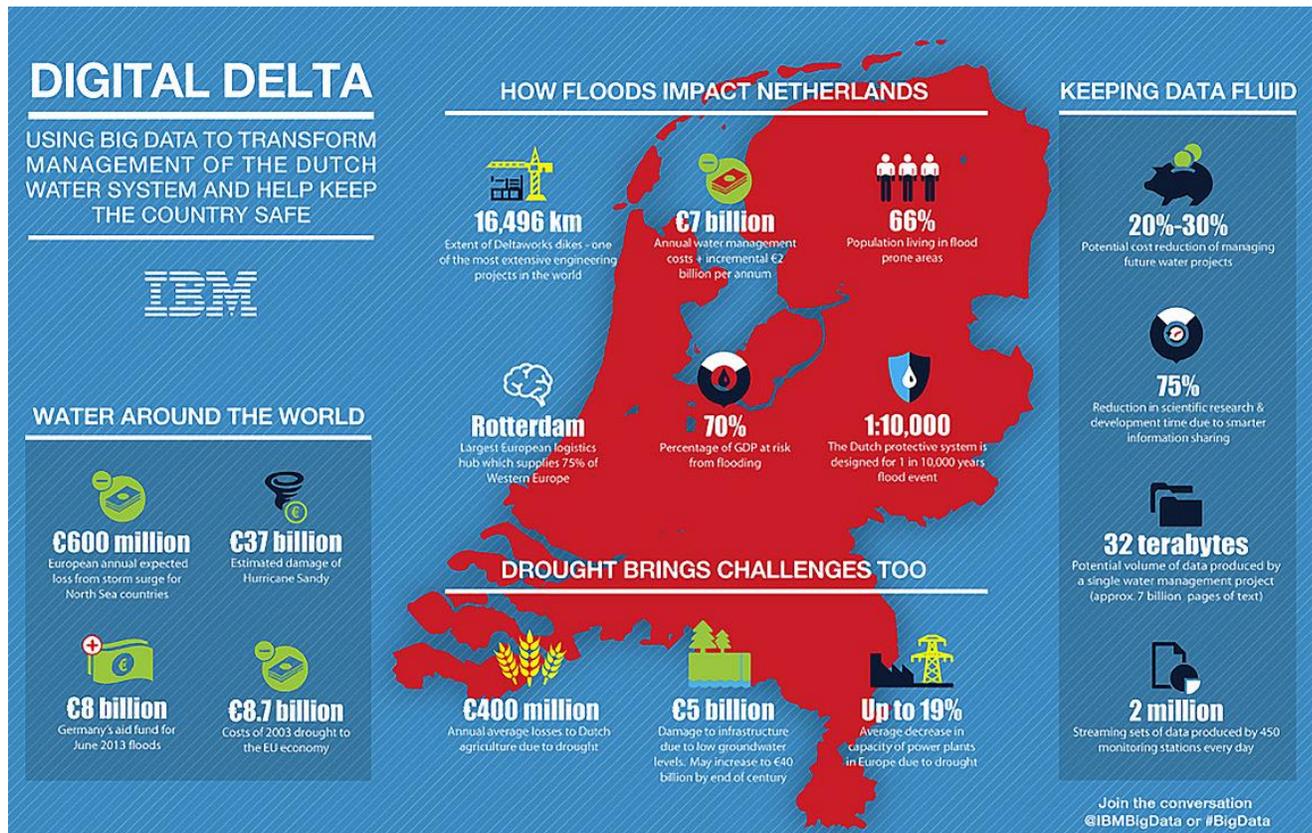
The fully integrated management of water resources in contemporary Netherlands is remarkable, but they launched their mission over sixty years ago and have followed through with skill, will, guilders and unity of purpose that may not be replicable in this country, given the temper of the times. The Dutch Association of Regional Water Authorities, known as Waterschappen (water boards in Dutch), elect local bodies that trace their roots to the 13th century and are empowered to levy taxes. The Water Management Center’s new central control unit, is stocked with computers flashing real-time data about water levels, wind strength and other potential threats to levees built to hold in check the North Sea, the Rhine River and three other major waterways that flow through the Netherlands.

Dutch thinking had shifted and now puts a priority on methods “to enlarge defenses in a natural way.” The state is investing in a plan called Room for Rivers, which aims to ease flooding by giving waterways space to move and even overflow. Last year, the country spent around \$100 million to dump 706 million cubic feet of sand off the coast north of Rotterdam to engender promote formation of protective sandbars via a littoral drift driven Sand Engine. In lieu of flood control the new philosophy in the Netherlands is controlled flooding.

Dutch are, by temperament, almost as allergic as Americans to top-down programs that impinge on personal and property rights; but water safety trumps pretty much every other priority in a country where 60% of the nation’s gross domestic product is produced below sea level. On the flip-side, Americans expend excessive energy and capital on emergency relief and recovery after the disastrous fact, and not nearly enough on anticipating and mitigating as the Dutch do. It was Einstein who said, “A clever person solves a

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problem. A wise person avoids it.” Post Sandy, in the introductory stage of ‘Rebuild By Design, Renée Jones-Bos, the Royal Dutch Ambassador to the United States most effectively delineated what her country had to offer:



“The Netherlands is famous for its flood protection systems which, until recently, ‘kept the water out’ or ‘kept the water contained.’ The climate, however, is changing, sea-levels are rising, and the world’s deltas are sinking. In the Netherlands, we see these challenges and welcome them, because they present us with **opportunities** too.... Katrina reminded us that living in deltas and in coastal areas can be dangerous. Yet most people of the world choose to live in those areas because they provide unparalleled economic, cultural, recreational opportunities....

“We have an entrepreneurial spirit. We’re penny-pinchers. World traders. Calvinist preachers, with at the same time an open-mind. Someone described our collective personality as one of “sober optimism.” We find ways “to make lemonade out of lemons,” to adapt, and even stand those disasters on their heads. It was this mentality that enabled us to rebuild, and see new opportunities, after every major flood.... Today, the Netherlands is the world’s 16th largest economy, the 7th largest trading nation, the 3rd most densely populated country in the world. We derive tremendous opportunity from being the Gateway to Europe. Not bad for a land of swampy marsh, gloomy weather, and stingy preachers!

“And how climate change is nuancing traditional cost-benefit analysis.... Since the early 1990s, the Netherlands has applied cost-benefit analysis to infrastructure and planning decisions. We know that these



SECTION 1 VALUING WATER

analyses are imperfect. And we know with certainty that politicians – even Dutch ones! -- don't always make rational decisions even if they have perfect information!...

“We ask “do the costs of increasing flood safety exceed the benefits of reduced flood damages?” On the cost side of the equation, we look at fixed and variable investment aspects of a project, and operations and maintenance. On the benefit side, we estimate the value of reduced flood damages to roads, buildings, infrastructure. We estimate the economic benefits floods might produce, for instance the additional wages and materials production needed to rebuild after a flood. These types of valuations are traditional, and pretty easy.

“Where it gets tricky, but crucial, is in the assessment of indirect flood damages. Like lower economic activity, business interruption, flood-related environmental damage, pollution. The damage to unique fauna, flora, buildings and cultural assets. Valuing the loss of life is impossible. No international consensus exists on how to precisely quantify these indirect damages. Many assumptions are made. Are assessments imperfect? Yes. But we are trying, because by capturing these values, better investment decisions can be made, better policies designed.

“If you have seen the Dutch landscape, and understand our risks, you might wonder why our dikes are not higher, our rivers not more contained, our buildings not more elevated? The primary reason: cost-benefit analysis says we can't afford it because those very actions might increase the impacts of a catastrophic event. This is a change in mentality, driven by recent events which show us that low probability, high impact disasters are still too common. And another reason? Because we don't want to live in an overly engineered landscape that has lost its aesthetic charm. We like our modern cities, but also our deep green polders, our Amsterdam canals, our low skies and distant horizons.

“That is why a new paradigm — **Living with Water** -- infuses our policy and our public investments today. Of course: we must always be on guard against floods. That cannot and will not change. The new paradigm means, however, that we can't always fight the water. Instead, we need to accommodate water, and give it room. And in the world's 3rd most-densely populated country, giving room to water means taking space from something else. It is a zero sum game. Or is it? Climate change, oddly enough, is reminding us of both the beauty and resiliency of nature, and the benefits of sustainable design. The sober optimist is again making lemonade...”*

"It's the catastrophe for which the Dutch have been planning for fifty years. Or, really, for as long as we've existed. We had cooperative water management before we had a state. The one created the other; either we pulled together as a collective or got swept away as individuals."

- Jim Shepard, "The Netherlands Lives with Water"

"We must all hang together, or assuredly we shall all hang separately." - Ben Franklin at the signing of the Declaration of Independence

*<http://dutchdialogues.com/about/>; <http://dc.the-netherlands.org/key-topics/water-management>;
<http://www.dutchwatersector.com/expertise/governance/>; <http://www.deltawerken.com/23>

