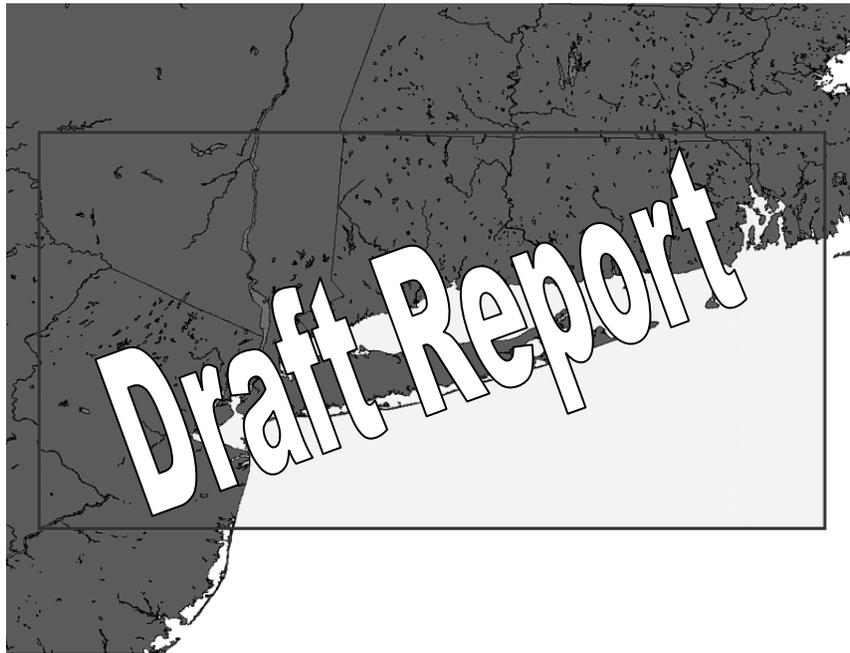


*A Global Warming
Action Plan
For Long Island*



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A Global Warming Action Plan for Long Island

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A Global Warming Action Plan for Long Island Goals

- 1. Create a Regional Energy Commission comprised of key public officials, regional stakeholders, and scientists.**
 - a. Create a regional energy plan in 2006
 - b. Produce annual progress reports
 - c. Advocate for a regional bond fund for capital projects
 - d. Advocate for tax and legislative reforms

- 2. Adopt Kyoto-style goals to reduce total greenhouse gas emissions in Nassau-Suffolk to 7% below 1990 levels by 2015.**

- 3. Create a regional education campaign on global warming partnering with Newsday, News 12, and regional educators.**
 - a. Develop education curriculum
 - b. Implement community projects
 - c. Develop news shows

A Global Warming Action Plan for Long Island **Examine Cost-Benefits of Large Scale Investments**

\$2 Billion, 10-Year, Public-Private Capital Campaign

- **\$600 million investment in transportation services**
 - Implement Nassau Hub transportation improvements
 - Implement East End Transit System
 - Expand Ride Sharing Programs
 - Improve public transit reliability
 - Purchase Hybrid Buses
 - Develop Biodiesel Program
 - Develop a regional plan to reduce gasoline consumption

Benefits

 - Improve air quality
 - Reduce GHG emissions
 - Improve Transit Services
 - Reduce single-occupancy vehicles

- **\$500 million investment in energy efficiency improvements**

Benefits

 - Improve air quality
 - Reduce GHG emissions
 - Reduce business/household energy consumption
 - Lower utility bills

- **\$300 million investment in solar photovoltaics**

- **\$300 million in tax credits for green buildings/smart growth designs**

- **\$200 million investment in upgraded electric power generation**

Benefits

 - Improve air quality
 - Reduce GHG emissions

- **\$100 million to promote healthier diets**

A Global Warming Action Plan for Long Island

Year	Conceptualizing an Implementation Schedule
2006	<ul style="list-style-type: none">• Campaign for a regional commission on global warming.
2007	<ul style="list-style-type: none">• Create and implement a Long Island commission on global warming
2008	<ul style="list-style-type: none">• Develop a baseline report on regional energy consumption.• Implement energy education programs.• Implement pilot food and health diet programs
2009	<ul style="list-style-type: none">• Complete a regional model that analyzes the relative cost effectiveness of alternative emission reduction and trading policies.• Approve county bonds to finance regional projects.• Expand pilot food programs.• Expand solar PV installations through energy service contracts.• Target energy efficiency programs for lower-income households.
2010	<ul style="list-style-type: none">• Initiate tax code changes.• Large-scale investments in regional transit systems.• Large-scale investments in smart growth projects.

A Global Warming Action Plan for Long Island **Regional Facts**

- 1. 2001 Personal Income: \$113 billion¹**
- 2. 2003 Electric Consumption: 18,815,722 MWH²**
- 3. 2002 Consumption of Natural Gas: 182 bil. cu. ft.³**
- 4. Annual Consumption of Heating Oil: <unknown>**
- 5. 2003 Consumption of Gasoline: 1,250,000 gal/year⁴**
- 6. Annual Consumption of Jet Fuel: <unknown>**
- 7. Annual Consumption of Propane: <unknown>**
- 8. Greenhouse Gas emissions per capita: 3 metric tons⁵**

¹ Nelson A. Rockefeller Institute of Government,
http://www.rockinst.org/publications/NYS_Statistical_Yearbook.html. Long Island is 17% of NYS totals.

² LIPA Energy Plan, 2004-2013, <http://www.lipower.org/projects/energyplan04.html>

³ Estimated from NYSERDA, Patterns and Trends' Energy Fast Facts (see ref 4) and Census data on household Income. Estimated at 17% of NYS total consumption.

⁴ NYSERDA, Patterns and Trends: NY State Energy Profiles 1989 – 2003.

http://www.nyserda.org/Energy_Information/trends.pdf

⁵ NYS average from NYSERDA (ref 4).

A Global Warming Action Plan for Long Island Goals

If Long Island is to get serious about global warming, it needs a regional commission to set and coordinate policy goals. This body should consist of both elected and appointed officials. The commission should develop a comprehensive and cost effective plan to reduce regional greenhouse gas emissions.

This month, December 2005, the UN concluded its first annual meeting under the Kyoto Protocol in Montreal. While the United States is not a signatory to this agreement, many cities and localities across the United States have declared their intentions to move forward with greenhouse gas reduction plans. On Long Island, Suffolk County and Huntington Town are members of the ICLEI's Cities for Climate Protection program.⁶ LIPA's offshore wind farm is another notable program. Many regional efforts are creative and essential first steps towards reducing Long Island's reliance on fossil fuels.

Now, Long Island needs to set comprehensive regional goals for reducing greenhouse gas emissions. Seattle, for example, has set a Kyoto-style goal of cutting greenhouse gas (GHG) emissions 7% below 1990 levels by 2012.⁷

Viewed from either a national or global perspective, Long Islanders impose a heavy burden on the planet with our large consumption of fossil fuels. The resulting GHG emissions will profoundly affect weather patterns, disease, vegetation, energy costs, and many other factors.

Global warming is a very serious problem but relatively simple to understand. Energy from the sun radiates down to earth. Normally a lot of the energy is reflected back out into space, and the earth's climate is relatively unaffected. However, with the buildup of greenhouse gases in the atmosphere, the heat and energy reflected is trapped in the earth's atmosphere. This creates a "greenhouse effect;" average global temperatures rise, though some regions could experience cooler climates.

Greenhouse gases in the atmosphere include carbon dioxide, methane, and nitrous oxide. Since the beginning of the industrial revolution, methane concentrations have more than doubled, and carbon dioxide and nitrous concentrations have risen significantly. As a result, the earth's temperature has risen about one degree Fahrenheit in the past decade.

To address these issues over the next decade, we have chosen to focus on three basic goals:

⁶ <http://www.iclei.org/index.php?id=1121>

⁷ National Public Radio, November 28, 2005. "Seattle Tackles Greenhouse gases"
<http://www.npr.org/templates/story/story.php?storyId=5028946>

1) Create a regional Energy Commission comprised of key public officials, regional stakeholders, and scientists.

a) Over the next two years this commission should begin outlining a plan for reducing energy consumption on Long Island. Trained professionals should look at GHG emission levels and evaluate cost-effective reduction strategies. The commission should model regional energy consumption and define preferred strategies for improving regional economic performance and reducing energy consumption.

b) Produce annual progress reports. It is important for this commission to meet on a regular basis and produce and evaluate annual progress reports. These progress reports should be released to the public and be a tool for public dialogue.

c) Develop a regional fund for capital projects. Funds can be used for a wide range of projects including regional transportation and improving the energy efficiency of government buildings, schools, businesses and homes. LIPA could pay the upfront costs of installing solar PV units on homes and recoup these costs through their utility bill. A revolving fund financed with bonds could be an effective strategy for financing these projects.

d) Advocate for tax and legislative reforms. While a bond fund will help many projects come to fruition, we must also ensure that taxes are properly spent. Through tax and legislative reforms, we can change regional spending practices and energy consumption.

2) Adopt Kyoto-style goals to reduce total GHG emissions in Nassau-Suffolk to 7% below 1990 levels by 2015.

Long Island must take sensible measures today to reduce GHG emissions. Hurricane Katrina caused an estimated \$40 billion worth of damage to the state of Louisiana. Many scientists believe that global warming causes more intense storms. We must do our part to reduce the risks of future violent storms such as Katrina. If such a storm were to hit Long Island, it would cause billions of dollars worth of damage.

Scientists like Stephen Leatherman have been tracking hurricanes and urging Long Islanders to pay more attention to the devastation these storms can inflict on our region. Other scientists like Scott Mandia have posted maps depicting the impacts of hurricanes on our coastlines⁸.

The Census bureau posted the population of Long Island as 2.78 million people in 2000 in Nassau and Suffolk counties. A category 3 hurricane could cause sea level to rise 15 feet or more thereby destroying marshes and many bird habitats.⁹

⁸ http://www2.sunysuffolk.edu/mandias/38hurricane/storm_surge_maps.html and http://www.southamptonvillage.org/pdf_files/BeachBasics.pdf

⁹ http://www.nhc.noaa.gov/HAW2/english/surge/long_island_printer.shtml

Dan Fagin, a staff writer for *Newsday*, wrote an article entitled “The Birth of Long Island.” Fagin stated, “The one-foot-per-century rise in sea level, and the pounding storm waves, are gradually shrinking the Island by pushing back the North Shore cliffs and cutting into the South Shore beaches. They also are gradually propelling the barrier islands inland.”¹⁰

3) Create a regional educational campaign on Global Warming partnering Newsday, News 12, and regional educators.

It is imperative that we raise public awareness of this issue so that each of us understands our role in this process. The quicker the public is awakened to the local and regional consequences of global climate change, the quicker we can all work together to stop the harm caused by GHG emissions. For these reasons, we need to:

a) Implement existing and develop new educational programs. Students of all ages must be more knowledgeable of the environment that they live in and the effects that they have on it. They are entitled to an extensive curriculum in Science, Social Studies/History, Human and Physical Geography, Technology, and Environmental Studies to broaden their awareness of the ecosystem around them.

It should be mandatory that students become more familiar with the geography of the area in which they live. Students need to be able to analyze local, regional, and global climate change in relation to spatial scales and long-term temperature trends to see the effects that recent social movements have had on our withering environment.

b) Implement Community Projects. Responding to global warming requires changes that many people are going to be resistant to make. We need to learn and work together. Here on Long Island we have learned to enjoy the benefits of consuming resources that contribute to global warming like large homes and cars. Only by working together to reverse these cultural practices can we succeed in reducing our regional impacts.

c) Develop news programs. The news has always been the most popular selection for marshalling community into action, and it is also an effective choice for spreading awareness rapidly. If global warming issues become a regular portion of the news each week, more people will gain a better understanding of the various effects of climate change. They will also become more interested in changing their own behaviors at home and at work to reduce global warming’s effects.

¹⁰ <http://www.newsday.com/community/guide/lihistory/ny-history-hs101a,0,4995000.story?coll=ny-lihistory-navigation>

A Global Warming Action Plan for Long Island Transportation

The Long Island railroad is one of the nation's most important and intensively used commuter rail services in the nation. The MTA reports that the "MTA Long Island Rail Road is the busiest commuter railroad in North America, carrying an average of 274,000 customers each weekday on 730 daily trains."¹¹

While 12% of Nassau County residents use the LIRR for their commutes, 68% drive alone. In Suffolk County, 78% drive alone.¹² With Long Island's sprawling land use patterns, driving alone is certainly the most convenient option for most families. It is however both expensive and the most polluting form of transportation.

There are no easy answers for transforming these well established patterns. Efforts to promote carpooling and ridesharing are complicated by the fact that cars are used for many errands during the day and not simply for driving to and from work.

Nevertheless, the time has come to reevaluate Long Islanders' reliance upon single occupancy vehicles. Many strategies need to be explored, including eliminating free parking, creating toll roads, increasing gasoline taxes, increasing public transit subsidies and services, and making long term changes to land use maps to reduce sprawl and encourage higher density settlements. Long Island's five east end towns have had some success in examining these kinds of issues through their Sustainable East End Development Strategies (SEEDS) program.¹³ These kinds of conversations and planning programs need to expand across Long Island.

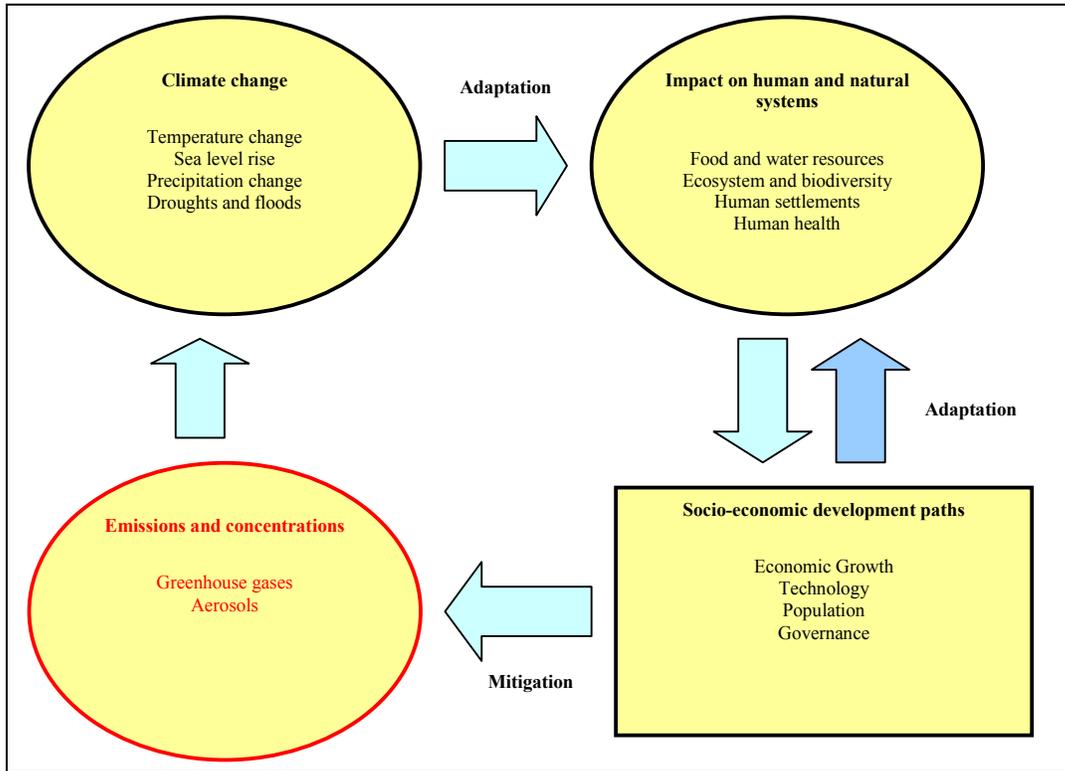
The past five years have seen at least five major transportation initiatives: the upgrading of LIRR cars, the creation of the HOV lane on the Long Island Expressway, the development of the LITP 2000 report by the NYS Department of Transportation, the Nassau County Hub report, and the SEEDS project on Eastern Long Island. While most people despair that there is not much that can be done about transportation congestion and pollution, the reality is that a fair amount of work has already been done to conceptualize system-wide transportation improvements that can potentially reduce single occupancy trips and reduce GHG emissions.

The numbers of automobiles on Long Island roads continues to rise year after year, and their negative impacts on area quality of life are well understood by all Long Islanders. Therefore, we are still a long way from actually realizing reductions in GHG emissions associated with transportation.

¹¹ <http://www.mta.nyc.ny.us/lirr/pubs/aboutlirr.htm>

¹² http://www.litp2000.com/download/LI_Facts_Figures.doc

¹³ <http://www.seedsproject.com>

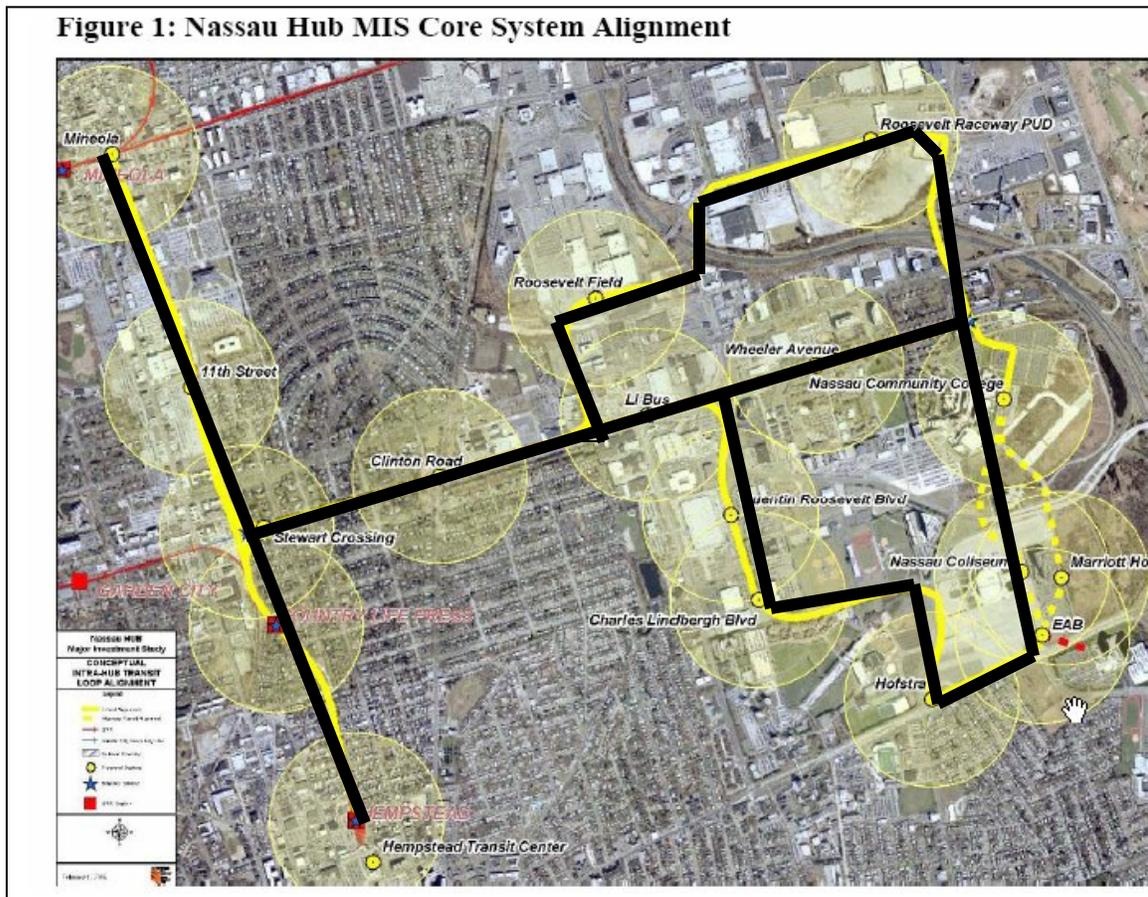


Atmospheric concentration of carbon dioxide (CO₂) has increased from 280 parts per million (ppm) to the current level of 360 ppm. CO₂ levels are expected to increase to 450 ppm by 2025 and 550 ppm by 2050. The current level of CO₂ in the atmosphere has not been exceeded in the past 420,000 years and not likely in the past 20 million years. This current rate of increase is faster than any in the past 20,000 years. The expected rate of temperature variations during the next century will equal those that occurred in the most recent Ice Age during a 10,000-year period. Actions taken or not taken today have long-lasting consequences to the climate and the earth's systems.

As the above diagram illustrates, climate changes are likely to affect a wide range of natural and human systems including food and water resources, biodiversity and ecosystem services, as well as human health. Transportation is one of the most important sectors of society that is contributing to GHG emissions yet it is receiving only limited national and regional attention. At the national level, Long Islanders must undertake a more effective and coordinated effort to increase mandatory fuel efficiency by increasing federal Corporate Average Fuel Economy (CAFE) standards. This report focuses more on regional efforts that should be made a high priority.

Rail service is probably the region's biggest asset and merits significant increases in capital expenditures over the next decade. The recently opened Airtrain to Kennedy Airport promises to cut journey time in half with its light rail air-train. The light rail system can reduce the traffic on the streets. Long Island needs to develop new light rail services to areas like the Nassau Hub and the East End.

Nassau County is currently investigating transportation alternatives for the Nassau Hub. The MIS (Major Investment Study) is considering two alternatives: Bus Rapid Transit (BRT), Light Rail Transit (LRT). The core system of BRT would cost \$560 million and LRT would cost \$560 million. The Full system of BRT would cost \$1.9 billion and LRT would cost \$2.1 billion. Annual operating costs range from \$10 to \$55 million¹⁴.



LRT is a relatively inexpensive fixed guideway system. It generally uses larger, higher capacity vehicles compared to buses and can be coupled into trains for greater capacity and productivity. It usually operates on a narrow right of way and can use a protected single track; therefore, it is safer than buses. It has shown to offer a more reliable service with fewer breakdowns than buses.

BRT combines the speed, reliability, and amenities of rail-based rapid transit systems with the flexibility of buses. BRT can be designed to meet specific needs and characteristics of a region. BRT systems typically incorporate components appropriate to the environment. Components include stations, bus ways, service plans, vehicles, intelligent transportation system applications, system identity, and image.

Rather than spending \$5 billion on widening highways and adding HOV lanes as proposed in LITP2000 where only 4% of congestion is solved, with the use of either

¹⁴ Data provided by Neighborhood Network, <http://longislandnn.org/hub/hubmis.htm>

alternative (BRT or LRT), highways will not need to be widened, and there is no need for extra HOV lanes¹⁵.

Expenditures totalling billions of dollars certainly impose long delays in project implementation, but these kinds of projects are also very appropriate for state and federal funding, so that local taxpayers will only need to pay for a portion of these capital costs.

On the East End, SEEDS (www.seedsproject.com) and Five Town Rural Transit (<http://www.eastendshuttle.org>) are following a parallel examination of capital projects for transportation. Five Town Rural Transit recently estimated that developing an east end shuttle service would cost approximately \$150 million¹⁶.



In addition to these capital projects, Long Island needs to do more to encourage ride sharing, invest in new (hybrid) buses, provide more frequent bus and train service, and develop alternative fuels for transportation. Only with major investments will the number of vehicles and GHG emissions decline. Ridership will only increase if investments are made to improve the frequency and quality of service to and from LIRR stations, schools, hospitals, villages, government and shopping centers, and other transit hubs.

Finally, we propose that more attention be given to alternative fuels. For example, all individuals who have registered cars which run on vegetable oil could be given an initial \$500 benefit, followed by subsequent \$100 benefits annually for as long as they own the car. Fast food establishments, diners and other large consumers of vegetable oils should be given a tax credit for donating their used oil to motorists who drive vegetable oil powered automobiles.

Long Island can learn a lot from other regions and their efforts to reduce GHG emissions in the transportation sector. For example, Climate Change Connection developed the following table for reducing GHG emissions.¹⁷

¹⁵ Based on data provided in <http://www.antonnews.com/syossetjerichotribune/2001/07/20/opinion/scharyltr.html>

¹⁶ <http://www.eastendshuttle.org/EEShuttlePressRel.pdf>

¹⁷ <http://www.climatechangeconnection.org/pages/barriers.html>

Key Transportation Policies for Reducing GHG Emissions by Private Vehicles				
Measure	Level of Government	Tonnes of GHGs reduced by 2010	Cost per tonne of GHG reduced	Feasibility of Implementation
A. Passenger Travel				
A1 Tax-exempt transit passes	Fed	0.2	-\$941	Most Promising
A2 Telecommuting	Fed/Prov	0.4	-\$99	"
A3 Driver Education	Prov	1.2	-\$78	"
A4 Car Sharing	Prov	0.3	\$3	"
A5 Transit Pricing	Mun.	5.7	\$16	Promising
A6 Transit Service Improvements	Prov/Mun	1.9	\$46	"
A7 Transit Infrastructure	F/P/M	1.7	\$115	"
A8 Pedestrian and bicycles	Mun	0.3	\$147	"
A9 Voluntary ride sharing	Prov/Mun	??	??	"
A10 Parking Pricing	Prov/Mun	7.7	\$89	Least Promising
A11 Road Pricing in urban areas	Prov	1.4	\$120	"
A12 Mandatory ride sharing	Mun	2.4	\$144	"
A13 Distance-based vehicle charges	Prov	0.4	\$146-\$190	Unlikely
B. Road Infrastructure				
B1 Enforce speed Limits	Prov/Mun	4.2	\$10	Most Promising
B2 high-occupancy Vehicle lanes	Mun	0.9	-\$1000	Promising
B3 Reduce speed limits to 90km/hr	Prov	8.3	\$31	Least Promising
B4 Road pricing of inter-city areas	Prov	2.8	\$68	Least Promising
C. Road Vehicles and Fuels				
C1 Ethanol-blending incentives	Pro	2.0	\$36-\$59	Least Promising
C2 Increase fuel efficiency	Fed	5.2	\$74	Promising
C3 Feebates	Prov	2.3	\$100-\$116	Least Promising
D. Fuel Taxes				
D1 National fuel tax	Fed	54.0	Not applicable	Unlikely
D2 Urban fuel tax	Prov	0.4 1.4	N/a	Promising
D3 Road gas and diesel tax	Fed/Prov	7.5 14.0	N/a	Promising

A Global Warming Action Plan for Long Island

Energy Efficiency

There are many energy efficiency improvements that can be made that are cost effective and therefore should be subsidized to encourage these investments. There are many organizations, including LIPA, that provide extensive information on energy efficiency. For this initial proposal, we have focused on a random sample of the many rationales for making these kinds of investments.

1. Reduce Household/business energy consumption:

1. We waste useful energy by using antiquated and highly inefficient end-use technologies and by engaging in wasteful habits.
2. We waste at least 17%, and up to 75%, of our electricity through inefficient lighting, appliances, and buildings.
3. Simple energy conservation efforts, such as setting air conditioner controls to slightly higher temperature settings, setting pool-pump timers to run at night, and turning off lights and appliances when not in use could reduce the demand for additional fossil fuel burning power plants significantly.
4. Long-term investments in efficiency measures that reduce our fossil fuel consumption would save the U.S. millions of dollars
5. Long Island has experienced an extraordinary boom in residential and commercial construction in recent years, most being very energy inefficient.
6. The adoption and implementation of Green Building standards as set forth by the Leadership in Environmental and Energy Design (LEED) Pilot Program should become the benchmark for all new and retrofit residential and commercial buildings on Long Island.

2. Lower utility bills:

1. About 35% of all the electricity in US is used in the home. Of that: 60% is for air conditioning and heat, 16% for water heaters, 12% for refrigerators, 7% for lights, and 5% for computers and electronics.
2. The average utility bill (gas) per Long Island household is \$438, well above the average for New York State.¹⁸
3. On Long Island, an aggressive long-term program of investments in cost effective energy efficiency measures could reduce energy demand by 9.5% to 12.5% of forecasted energy requirements by 2010.
4. Simple energy conservation efforts, such as setting air conditioner controls to slightly higher temperature settings, setting pool-pump timers to run at night and turning off lights and appliances when not in use could reduce the demand for additional fossil fuel burning power plants significantly.
5. 60% of home electricity use is from heat and air-conditioning. Simple steps can be taken without high costs. These include but are certainly not limited to: close your draperies, windows and doors on the sunny side of your home on hot, sunny days to reduce solar heat buildup. Consider using window fans, particularly in the

¹⁸ <http://www.askpsc.com/publications/?view=default&action=viewPublication&id=1147>

evening and early morning to draw cooler air into the house. Plant trees that lose their leaves in the winter (also known as deciduous) along the south and west side of your home. This provides shade in the summer and lets the sun shine through in the winter.

6. Other issues to note: 5% of home electricity use is from home electronics. Home electronic products use energy when they are off to power features like clock displays and remote controls. Those that have earned the Energy Star use as much as 50% less energy to perform these functions, while providing the same performance at the same price as less efficient models. Consider using a power strip on household electronics where you don't require the stand-by features to turn them off completely. Also, 7% of home electricity use is from lighting. Compact fluorescent bulbs use 75% less energy than a standard incandescent bulb and last up to 10 times longer.

3. Improved air quality

1. Emissions from power plants cause 30,000 deaths each year in the US.¹⁹
2. Percentage of moderate air quality index days has averaged 28% over the past 6 years, while there has been an average of 5 days that have been bad for unhealthy and sensitive people, according to the US EPA.²⁰
3. Potential public health impacts include abnormally high occurrences of cardiopulmonary disease, asthma, and cancer which have been related to the cumulative effect of exposure time to these emissions, despite the fact that the levels of pollutants emitted often fall below state and federal government legal limits.²¹
4. Particulate emissions from the Northport and Port Jefferson power plant facilities have led to 12 premature deaths, 16 new cases of chronic bronchitis, 113 cases of acute bronchitis, 1,315 asthma attacks, 93 emergency room visits, and 5 hospitalizations for respiratory problems in 1999.²²
5. Influence on economy: respiratory illnesses contribute to lost work time and increased medical costs; dependence on other regions for fossil fuels leads to an export of local dollars and loss of regional wealth.

4. By reducing GHG emissions, we help mitigate the following problems:

1. A federally funded regional study estimates a 0.75' to 3.5' sea level rise for the Metro NY seaboard by 2100. A summary of the report notes, "the barrier islands of Long Island, including Jones Beach, Fire Island, and Westhampton Beach, could narrow and fragment into small islets, while highly productive salt marshes could shrink permanently due to higher sea levels."²³
2. Global warming may be responsible for the increase in severity and frequency of intense weather events, loss of wetlands, and infiltration of salt water into our wells.

¹⁹ www.epa.gov/globalwarming

²⁰ <http://www.epa.gov/air/data/repsco.html?co~36059~Nassau%20Co%2C%20New%20York>

²¹ A. Myrick Freeman III, <http://seali.org/CEPExecutiveSummary.pdf>

²² IBID 21

²³ <http://www.climatehotmap.org/impacts/metroeastcoast.html>

3. Greater than 93% of LI's energy came from fossil fuels in 2002, 4% from nuclear power, 3% from biomass, and 0.04% from wind and solar.²⁴
4. Between 1995 and 2000, the Greenhouse Gas CO2 increased by 42%, NOx increased by 64%, and sulfur dioxide increased by 91%.²⁵

²⁴ www.LIPower.org

²⁵ www.epa.gov/airmarkets/emissions

A Global Warming Action Plan for Long Island Solar Photovoltaics and Green Buildings

In the 1990s the United States Department of Energy (DOE) initiated its million solar roofs program. As a part of that program, Long Island committed to installing solar systems on 10,000 homes this decade. To date, 500 have been installed. So we still have a long way to go to meet our own goals over the next five years.

Long Island, with its high electric rates and above average sunshine, is an ideal location for capturing solar energy. New York's recently enacted Solar Choice Act offers residential customers "net metering" and state income tax credits for installing PV systems. These new incentives pay 25% of a PV system — up to \$3,750 — taken right off the top of your state taxes. In addition, the new regulations mean that homeowners producing PV power can, in effect, feed electricity back to the Long Island Power Authority (LIPA) at full retail price.

A photovoltaic (PV) system is a series of panels that are mounted to a roof of a home which converts sunlight directly into electricity. Solar cells, called photovoltaics, absorb sunlight and convert it directly to electricity. When sunlight hits the cell, electrons are released. These electrons then flow into wires and form a direct current, which is the same type of current that flows from a regular battery. There are two types of photovoltaic systems: (1) stand-alone systems and (2) systems that are connected to the electric power lines of an utility grid.

Most people who purchase a solar system will want to choose a utility-connected one. LIPA offers homeowners special rebates on PV systems and will also pay for energy that is not used as part of their net metering program. When the solar cells produce more than enough electricity for the building's users, the additional power is fed back into the utility grid and the building's electric meter runs backwards, recording the "sale" of the electricity to the utility. In the Northeast, net metering is supported by legislation in all New England states, Maryland, New York, and Pennsylvania.

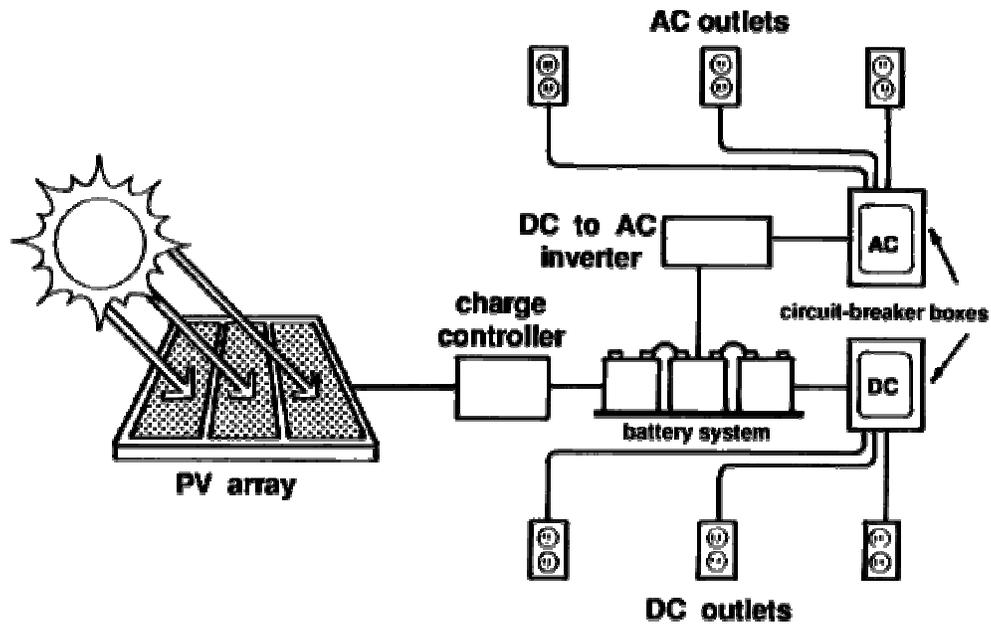
The photovoltaic industry has achieved great improvements in solar cell efficiencies and significant cost reductions. Most photovoltaic cells today achieve efficiencies between 12 and 20 percent, well above what they were just 15 years ago. The price of photovoltaic panels has declined from \$100/watt in the 1970s to the current price of approximately \$6.00/watt. LIPA's web site offers "direct incentives of \$3.75 per watt, saving you approximately 50% on system costs."²⁶ Also, solar cells have the smallest negative environmental impacts. Electricity produced from photovoltaic cells does not result in air or water pollution, deplete natural resources, or endanger animal or human health.

In association with solar photovoltaic systems, green or sustainable building is the practice of creating healthier and more resource-efficient models of construction, renovation, operation, maintenance, and demolition. Research and experience

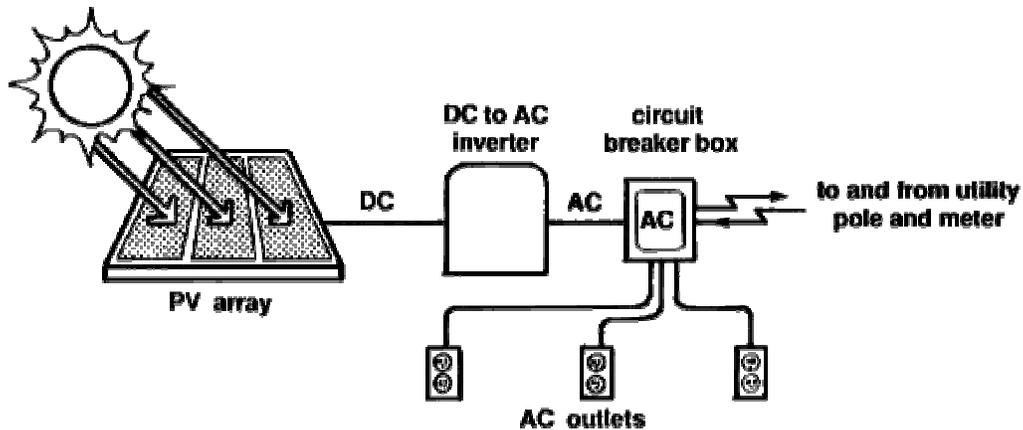
²⁶ <http://www.lipower.org/cei/solar.incentives.html>

increasingly demonstrate that when buildings are designed and operated with their lifecycle impacts in mind, they can provide great environmental, economic, and social benefits. By adopting green building strategies, people can maximize both economic and environmental performance. Green construction methods can be integrated into buildings at any stage, from design and construction, to renovation and deconstruction.

Stand Alone Photovoltaic System



Utility-Intertied Photovoltaic System



Implementing the principles of green buildings idea into schools would also be a highly beneficial idea. More than 53 million children and almost 3 million adults spend a significant portion of their days in public and private school buildings that often contain

environmental conditions that inhibit learning and pose increased risks to the health of children and staff. Green buildings would help to stop the dangerous conditions that today's schools offer.²⁷

Solar PhotoVoltaic Benefits

There are many benefits to having a solar photovoltaic (PV) system. Solar PV systems reduce consumer energy bills. PV systems can run for thirty years with minimal maintenance. Solar PV can increase the value of a home, and there is no additional property tax on a PV system. According to the Sacramento Municipal Utility District (SMUD), a solar PV system ends up being “virtually free energy after 8-15 year payback period” and also helps keep energy bills “in lower tiers so homeowners don't pay peak rates”.

Solar PV does not emit any fumes, emissions, air pollution, acid rain related gases, or water pollution. **According to Enviro-Energy Technologies Inc. “a typical PV system on a house roof could prevent over thirty-four tons of greenhouse gas emissions during its lifetime”.**²⁸

Another benefit is that PV systems are modular. You can start small and add on later. For example a residential system (2 kW) designed to meet about half of a typical homeowner's electric needs costs approximately \$17,000. Such a system could be installed incrementally over time – for example, as two 1 kW installations.

Green Buildings

Integrating “green” building practices into the construction of state buildings as well as private housing is a solid financial investment. For example, adding green features to a \$5 million construction project may add an additional \$100,000 to the project, but would result in a savings of at least \$1 million over the life of the building²⁹.

The financial benefits of green buildings include lower energy, waste disposal, and water costs; lower environmental and emissions costs; lower operations and maintenance costs; and savings from increased productivity and health. Energy and water savings can be predicted with reasonable precision because they can be measured and monitored over time. While productivity and health gains can be harder to predict with accuracy, a growing body of literature suggests that these effects are significant. For example, one study found that Lockheed saw a 15% drop in absenteeism, West Bend Mutual Insurance a 16% increase in claim processing productivity, and Pennsylvania Power and Light a 13% gain in productivity and a 25% drop in absenteeism following building redesigns.³⁰

The precise savings depend on how much of the building is “green”. For example if green building concepts are used at every step in the design and construction, then the

²⁷ <http://www.epa.gov/opptintr/greenbuilding/pubs/buildingtypes.htm>

²⁸ <http://www.enviro-energytech.com/FAQ.htm#faq%202>

²⁹ To be added.

³⁰ Rocky Mountain Institute, Productivity Through Energy-Efficient Design: Greening the Building and the Bottom Line (1998).

benefits will be maximized. If the building has only a few characteristics of green buildings, then the gains will be more modest.

Example of PV Solar System from Start to Finish

- If the average monthly electric bill is \$125 the recommended size solar unit would be a 6KW solar system for a total cost of \$51,000. However, some companies such as “ABC Real Goods Solar” will collect \$24,000 of that directly from the LIPA rebate program, so the upfront cost to the consumer is only \$27,000. For purchasing the system, the consumer may also receive a state income tax credit of \$3,750, reducing the total cost to \$23,250. This new solar system will generate \$78 of electric savings each month or \$936 per year. New York State allows for “Tradable Renewable Certificates” or Green Tags that allow you to purchase renewable energy from other developers. So, along with your other savings you could receive another \$207 as payment for your Green Tags for an annual benefit of \$1,143. As electric prices and the market for Green Tags rise the savings and income will increase.³¹

Pre-Solar Electric Bill	Rec. Solar System	Electric Bill w/ Solar (% Saved)	Net Monthly Loan Cost*	Total Monthly Benefit**	Calculate your new Electric Bill ³²				30-Year Pre-Tax Benefits***
					Annual Benefits	Greenhouse Gas Emissions Reduced (LBS)	Barrels of Oil Offset	Equiv. Trees Planted	
\$35	2 KW	\$9.13 (74%)	\$25.05	\$6.57	\$379	2.42	1.34	3,449	\$15,843
\$50	3 KW	\$11.20 (78%)	\$37.58	\$9.84	\$569	3.64	2	5,174	\$25,606
\$75	4.5 KW	\$16.79 (77%)	\$61.24	\$9.89	\$854	5.5	3	7,761	\$40,250
\$125	6 KW	\$47.39 (77%)	\$86.29	\$8.57	\$1,138	7.28	4	10,348	\$54,894
\$175	8 KW	\$71.52 (69%)	\$119.70	\$6.78	\$1,518	9.7	5.4	13,797	\$74,420
\$225	10 KW	\$95.65 (65%)	\$153.10	\$4.99	\$1,897	12.13	6.74	17,246	\$93,945

* 30-year equity loan at 5.15%, interest deductions at 42% Loan costs are only applicable if you borrow money to finance your share of the system costs.

** Electric Savings + Green Tags Revenue - Loan Costs

³¹ To be added.

³² To be added.

A Global Warming Action Plan for Long Island **Improving Diets, Reducing GHG Emissions**

Over 90% of Americans rely on 30%-50% or more of their daily calorie intake from an animal source. The following statistics show that animal husbandry degrades resource potential, contributes to greenhouse emissions, and consumes an exponentially higher amount of fossil fuels than a plant based diet. (As noted in *Diet for a New America*)

Cause of global warming: greenhouse effect

Fossil fuels needed to produce meat-centered diet vs. a meat-free diet: **3 times more**

Percentage of U.S. topsoil loss directly related to raising livestock: **85%**

Years known oil reserves would last if every human ate a meat-centered diet: **13 years**

Years they would last if human beings no longer ate meat: **260 years**

Calories of fossil fuel expended to get 1 calorie of protein from beef: **78 calories**

To get 1 calorie of protein from soybeans: **2 calories**

Raw materials (farming, forestry, mining, energy) used for U.S. livestock: **33%**

Raw materials consumed by the U.S. to produce a complete vegetarian diet: **2%**

Other Statistics

People who could be fed if Americans reduced their intake of meat by 10%: **100 million**

Percentage of corn grown in the U.S. eaten by livestock: **80%**

Percentage of oats grown in the U.S. eaten by livestock: **95%**

Percentage of protein wasted by cycling grain through livestock: **90%**

How frequently a child dies as a result of malnutrition: **every 2.3 seconds**

Pounds of potatoes that can be grown on an acre: **40,000 lbs**

Pounds of beef produced on an acre: **250 lbs**

Percentage of U.S. farmland devoted to beef production: **56%**

Grain and soybeans needed to produce 1 lb of edible flesh from feedlot beef: **16 lbs**

Acres of U.S. forest cleared for cropland to produce meat-centered diet: **260 million**

Meat imported to U.S. annually from Central and South America: **300,000,000 pounds**

Central American children under the age of five who are undernourished: **75%**

User of more than half of all water used in the U.S.: **livestock production**

Gallons of water needed to produce a pound of wheat: **25 gal**

Gallons of water needed to produce a pound of California beef: **5,000 gal**

The environmental community recognizes global warming as one of the most serious threats to the planet. Although most of the focus is put on carbon dioxide as one of the most detrimental greenhouse gases, data has shown that there are other main gases which are behind the warming. Methane, produced when bacteria decomposes organic matter, is the second leading contributor to global warming, after CO₂. Roughly one quarter of global methane emissions from human activities comes from livestock and the decomposition of animal manure. "Methane is twenty-one times more powerful a greenhouse gas than CO₂."³³ Although methane production has many sources, the number one source is animal agriculture. "Animal agriculture produces more than 100 million tons of methane a year."³⁴ While the amount of methane produced by a single cow is relatively small, the problem becomes enormous when there are hundreds of thousands of livestock animals.

³³ <http://www.earthsave.org/globalwarming.htm>

³⁴ <http://www.earthsave.org/globalwarming>

A number of studies have shown that Americans consume about a quarter of all of the beef produced in the world. An easy way to reduce global warming is to reduce our dependency on animal products. By emphasizing a vegetarian diet, we can eliminate one of the major sources of global warming. A more vegetarian diet avoids costly structural changes, like wind farms and transportation systems, and is therefore relatively easy to implement. Restaurants, supermarkets, schools, and government buildings would be ideal places to begin this campaign. This is a relatively easy way to quickly reduce our GHG emissions.

Implementing Policies to Encourage Environmentally Sound Food Policy and Allocations for Food Policy from Proposed \$2 Billion Grant

We propose that \$100 million of the \$2 billion grant be allocated to addressing Nassau and Suffolk Counties' food consumption patterns in an effort to make it more environmentally friendly. \$20 million (\$2 million per year over ten years) should be dedicated to a print, radio and television advertisement campaign touting the health, social and environmental benefits of eating a vegetarian diet. It should be prominently displayed in public transport systems. Such a program can become a national model.

To encourage greater consumption of vegetarian diets (and lower-impact livestock) the county should consider an environmental impact tax on all food sold in the county. The least harmful foods to produce (organic produce) will be subsidized at the marketplace, reducing their price, while high-impact foods such as beef will be taxed more heavily in order to factor environmental externalities more honestly into their price. Not only will this sliding tax pay for the low-impact subsidies, it will also encourage healthier eating patterns because the lower-impact foods are often healthier to consume.

Such a large socio-behavioral change will not happen overnight and should be slowly phased in over the coming decade. Furthermore, we must leave our children with a society that respects and values the environment; the environment is a living system that we depend upon. Yet our economic system treats these natural systems as nothing more than dead matter available for our willful manipulation.

A campaign of presentations, advertisements, and literature and food subsidies and taxes will cost each county no more than \$5 million per year. Not only will this significantly reduce GHG impacts that LI imposes on the nation and world, it will also create a much healthier local population. We believe a careful cost benefit analysis will prove that the health benefits alone from this plan will significantly outweigh its costs. The region can expect to improve average longevity, reduce cancers, reduce obesity, and provide many other health benefits that will improve worker's productivity, reduce health care costs, and increase tax rolls.

A Global Warming Action Plan for Long Island **Contributors**

This report is a product of GGR 11/ERS 11, The Conservation of Natural Environmental Resources, a C.W. Post course taught by Prof. Scott Carlin in fall 2005.

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A Global Warming Action Plan for Long Island Resources

Apollo Project, A Bold Ten Point Plan for Achieving America's Energy Independence. http://www.apolloalliance.org/docUploads/apollo_brochure_web.pdf

EarthSave
<http://www.earthsave.org/globalwarming>

LIPA Energy Plan, 2004-2013,
<http://www.lipower.org/projects/energyplan04.html>

LIPA, 53 Ways to Save Energy and Lower your Electric Bill
<http://www.lipower.org/pdfs/company/pubs/53ways.pdf>

LI Draft Citizens Energy Plan, Exec. Summary
<http://www.energymatters.org/CEPExecutiveSummary.pdf>
Full Report, <http://www.energymatters.org/CEPdraft.pdf>

LI Offshore Wind Project
http://www.fplenergy.com/projects/contents/long_island_wind.shtml
<http://www.lioffshorewindenergy.org/>

NYS Executive Order 111
http://www.gorr.state.ny.us/eo111_fulltext.htm

NYSERDA, <http://www.nyserda.org/>

NY SolarFest
<http://www.nysolarfest.org/>

Regional Greenhouse Gas Initiative
<http://www.rggi.org/index.htm>

SUNY Farmingdale 2005 Solar Conference
<http://info.lu.farmingdale.edu/depts/met/solar/solarlongisland2005.html>

US Dept of Energy, <http://www.energy.gov>
US DOE, Million Solar Roofs, <http://www.millionsolarroofs.org/>

Appendix 1

Repowering Of Existing Power Plants³⁵

Repowering is the process whereby old, highly inefficient and ‘dirty’ power plants are temporarily shut down and replaced with cleaner, state-of-the-art efficient combined-cycle generation technologies. With demand for energy growing, it is imperative that we tap into the increased efficiency and reduced emissions potential from repowering antiquated existing power plants here on Long Island.

Preliminary findings of a memorandum by CAP³⁶ as well as a study conducted by KeySpan Energy for LIPA³⁷ reveal that output and efficiency could be nearly doubled while emissions of SO_x, NO_x and CO are reduced by over 90%. In addition, a recent study³⁸ compiled by Dr. Matthew Cordaro of the Center for Management Analysis at LI University’s C.W. Post Campus shows that repowering of Long Island’s existing baseload plants is less costly than building new plants. The study also finds that repowering of these plants could add as much as 4,700 MW to our on-Island capacity.

Repowering makes sense for a variety of reasons. Land use is no longer an issue because an existing site is being reused, eliminating the need for siting new plants on vacant parcels. Transmission and distribution lines are already in place and fuel supply established. The benefits to public health and the environment are considerable as dirty, polluting power is displaced by significantly cleaner power. Increased generation capacity, tax benefits to communities with existing facilities, and fewer new plants are additional bonuses of repowering.

Public support for the repowering of the 30, 40 and 50 year old plants in our region is well established. Any comprehensive energy plan, which seeks to improve efficiency and reduce emissions, must incorporate repowering as its immediate goal and preferred course of action.

³⁵ Reprinted from the Draft Citizen’s Energy Plan for Long Island, 2002. Sustainable Energy Alliance of Long Island.

³⁶ Memorandum on Repowering prepared for the Suffolk County Legislature by Gordian Raacke (available upon request from CAP). See also Review of Fuel, Emission and Power Production Data of Long Island Power Plants 1995 to 2000, Memo from Gordian Raacke, CAP, to Suffolk County Legislature, July 26, 2002 draft. The report is available at www.energymatters.org/LIpowerplants1995to2000Report.pdf Footnote 38 in the Draft Citizens Energy Plan.

³⁷ Information obtained during a meeting on June 4, 2002 between Kathleen Whitley and others from SEA and LIPA COO Seth Hulkower. Footnote 39 in the Draft Citizens Energy Plan.

³⁸ The study is available on CAP’s website at www.energymatters.org/LIpowerplants1995to2000Report.pdf Footnote 40 in the Draft Citizens Energy Plan.

Appendix 2

Citizens Energy Plan's Highlighted Recommendations³⁹

LIPA and KeySpan

The Long Island Power Authority should:

- double its current Clean Energy Initiative (CEI) program budget from \$160 million to \$320 million for the next 5 years;
- commit to a Renewable Portfolio Standard (RPS) which would guarantee 10% of our electricity to come from renewable energy sources by the year 2010;
- deliver on its promise to install at least 10,000 solar roofs by 2010 by putting forward a concrete plan with annual targets;
- continue its efforts to site a 100 MW offshore wind project by 2005 or sooner;
- work with KeySpan to repower our old and dirty power plants prior to siting of new generation on Long Island;
- evaluate and adjust its rate structures to provide proper incentives for energy efficiency and shifting to off-peak times and disincentives for wasteful energy consumption and peak usage;
- offer a rate rebate to households that use 15% to 20% less electricity than they used in the previous year similar to California PG&E's 20/20 rebate;
- ***voluntarily adopt a carbon dioxide cap as well as firm goals and mechanisms that will reduce total emission levels of SO₂ and NO_x to below 1995 levels within five years;***
- explore opportunities to site Combined Heat & Power (CHP) systems on the Island and implement policies that will facilitate the siting of such systems, including direct financial assistance;
- give consideration to clean distributed generation when planning for upgrades to the Island's electric Transmission & Distribution (T&D) system;
- reevaluate its Load Expansion/Attraction efforts which increase LIPA's revenue but result in increased demand and consumption;
- consider the indirect costs that result from the generation of electricity with fossil fuels, such as environmental degradation, health related costs, and other societal costs not directly included in electric rates;
- work to eliminate unnecessary electric consumption, such as daytime usage of outdoor and street lighting, running air-conditioners while windows or exterior doors are open, etc.;
- structure its rates and budgets to reflect the true cost of service as well as actual fuel costs and provide for more honest customer billing by showing information such as the actual cost of electricity during peak periods, power plant emissions, etc.;
- comply with its statute and sell its 18% share in the Nine Mile Point 2 upstate nuclear reactor as all other New York State utilities with ownership in the plant have already done;
- open up its planning process to all interested parties and engage in active outreach to all of Long Island's citizens so that all stakeholders will be able to contribute to the creation of LIPA's energy plan;
- prepare a bi-annual resource plan and provide regular monitoring and reporting of performance in fulfilling the above-stated goals.

³⁹ Reprinted from the Draft Citizen's Energy Plan for Long Island, 2002. Sustainable Energy Alliance of Long Island.

New York State

New York State should:

- *establish a carbon emissions cap at 40% below 1990 levels to reduce greenhouse gases;*
- reform NYS Power Plant Siting Law (Article X) to ensure meaningful public participation, adequate environmental and health review, and mitigation of impacts of generating electricity;
- replace LIPA's appointed Board of Trustees with an elected Board;
- provide additional checks and balances for LIPA, including a Citizen Advisory and Oversight Committee to make LIPA more accountable to Long Islanders;
- establish Neighborhood Review Boards for communities most affected by power plants to ensure access to information and enable communities to monitor plant emissions and other issues;
- adopt legislation to regulate outdoor lighting.

County Government

Nassau and Suffolk County Government should:

- commit to procuring only energy efficient buildings, lighting and appliances;
- require that at least 20% of its electricity consumption come from renewable energy sources by 2010;
- establish energy committees charged with developing and implementing recommendations on local energy issues;
- provide informational resources on energy issues and available programs through county offices and other entities funded by it.

Town Government

Town Government should:

- improve and enforce local building codes with respect to energy efficiency requirements;
- require that at least 20% of its electricity consumption come from renewable energy sources by 2010;
- designate an energy Resource Conservation Manager;
- establish energy committees charged with developing and implementing recommendations on local energy issues;
- provide informational resources on energy issues and available programs through Town offices.