

LWVDE ENERGY/GREENHOUSE GAS BACKGROUND INFORMATION SUMMARY

INTRODUCTION

This article was prepared by the Energy/Greenhouse Gas Subcommittee to provide background information for League members to read prior to consensus meetings in New Castle County on March 7 and in Sussex and Kent Counties on March 9, 2011. Members of the subcommittee were: John Austin, Chris Bason, Sumner Crosby, Mary Anne Edwards, Steve Hegedus, Peggy Schultz and Chad Tolman. More detailed supplementary information for each of the eight sections below, including figures, tables and references, are posted on the LWVDE web site (<http://de.lwv.org/>).

1. LWVUS and LWVDE Key Statements on GHGs and Climate Change

The LWVUS called for prompt and aggressive action to cut U.S. greenhouse gas (GHG) emissions and cited detailed objectives to guide the development of comprehensive climate legislation. In a letter to the U.S. House of Representatives in January 2009, Mary G. Wilson LWVUS President, wrote:

“The League of Women Voters strongly urges you to take quick and strong action against global climate change. Based on the best available science, we urge you to support a cap on greenhouse gas emissions for the year 2020 that is at least 20 percent below 1990 levels, without loopholes that will undermine the cap. We also ask that you support a cap for the year 2050 that is 80-100 percent below 1990 emissions.”

Delaware’s League of Women Voters exercised strong leadership on this subject. In a Letter to the Editor, December 11, 2009, published in both the Cape Gazette and Vol. 16, No. 4 of the LWWNCCo Voter, Delaware League President Sandy Spence wrote:

“The League of Women Voters of Delaware believes that global climate change is one of the most serious threats to the environment, health, economy and security of our nation and the world. League members throughout the country call on the United States and world political leaders to cap emissions at 25% below 1990 levels by 2020. We also join many other civic and social organizations in urging providing critical adaptation and associated assistance to countries most in need. Delaware itself is especially vulnerable to sea level rise, as it has the lowest average elevation of any state in the country....”

2. The Basic Science of Climate Change and the Role of Greenhouse Gases, Especially CO₂

Although Earth’s climate has changed a lot over its long history, ranging from very hot to ice cold, it has been remarkably stable for the past 10,000 years. That began to change with the coming of the Industrial Revolution, when the population began to grow more rapidly and started burning fossil fuels - coal, oil, and natural gas - to power modern industrial societies.

The global average temperature had been relatively stable because the energy absorbed from the sun (mostly as visible light), was balanced by the energy radiated out into space (as infrared). Human activities are causing the emission of several greenhouse gases – especially carbon dioxide (CO₂), but also methane, nitrous oxide and fluorochemicals – that accumulate in the atmosphere and reduce the outgoing radiation. The resulting build up of heat in the atmosphere, land and ocean is causing the global average temperature to rise - about 0.8°C (1.5°F) since the Industrial Revolution, but mostly during the past 30 years.

Projections for 2100 are for increases as high as 6°C (10.8°F), depending on how rapidly humans cut emissions.

Sea level rise (SLR) in Delaware is caused by sinking land, expansion of ocean water as it warms, and the addition of water from ice on land. SLR was about a foot (0.3 m) at Lewes during the past century. Projections for 2100 tend to be 0.5 to 1.5 m, but could be much higher.

3. Delaware's per Capita Energy Consumption and GHG Emissions

Delaware's per capita energy use is in the middle in a rank ordering of the states, but higher than our neighboring states of Pennsylvania, New Jersey and Maryland, and about 50% higher than the energy efficiency leaders: New York, Rhode Island, Hawaii, Massachusetts and California. In terms of per capita carbon dioxide emissions, Delaware is in the top 12 of the high emitters – about 35% higher than the 2008 U.S. average of 20.9 metric tons of CO₂ per person per year. Wyoming has the highest per capita CO₂ emissions, but burns a lot of coal to produce electricity used in other states; Vermont has the lowest because a lot of its electricity is produced by hydropower (from Quebec).

For Delaware to significantly reduce its energy consumption and greenhouse gas emissions it will need to greatly improve energy efficiency and replace the burning of fossil fuels – especially coal – by renewable energy sources – especially offshore wind and solar power. In 2006, nearly 70% of the electricity generated in Delaware was from burning coal. That share should decrease by retrofitting Calpine's Edge Moor power plant to burn natural gas instead of coal and by retiring the three older coal units at NRG's Indian River Generating Facility. The proposed Bluewater Wind offshore wind farm should begin generating pollution-free power in 2014. Installed solar PV is rapidly growing. Major reductions in emissions can also come from more energy efficient buildings and transportation.

4. Impacts of Climate Change on Delaware

Delaware's temperatures have been steadily rising since 1895, with this past decade the hottest decade on record. And higher temperatures lead to longer growing seasons. That could be good for Delaware, especially since our number one industry is agriculture. However, insects and diseases will also have longer growing seasons, and coupled with more droughts and intense storms, increased temperatures and weeds migrating from the south, agriculture is likely to suffer, if it cannot adapt.

With storm surges on top of sea level rise, many coastal communities don't stand much of a chance. During the Mothers Day storm of 2008, Kitts Hummock residents climbed from their porches into rescue boats; the Bay had breached the impoundments and surrounded their homes. If New Castle's four dikes were to be breached, 25% of the city would be under water.

Sea level rise brings with it salt water intrusion. At a recent meeting in Dover a farmer told listeners how hard it was to look over a seventy-acre piece of his farm; in some places the ground was white with salt. He said it wasn't storms but tidewater that had come in. Given that 70-90% of the state's commercial fish and shellfish use estuaries as nurseries, increased salt in our rivers and bays could put a lot of fishermen out of work.

5. Steps Delaware has Taken to Reduce GHG Emissions and Adapt to Climate Change

Several programs to reduce emissions and promote energy efficiency and clean energy have been put in place. Legislation passed in 2008 authorized Delaware's participation in the Regional Greenhouse Gas Initiative (RGGI), the nation's first market-based, cap-and-trade program to reduce greenhouse gas

(GHG) emissions from power plants. Proceeds from Delaware's sale of CO₂ emission allowances fund emission reduction projects through grants, provide aid to low-income families, and fund the Sustainable Energy Utility (SEU), created to promote energy efficiency and renewable energy.

The General Assembly has also passed a Renewable Portfolio Standard (RPS), requiring that 1% of total electricity sold in 2007 come from renewable energy sources. The percentage increases gradually each year to reach 25% (of which 3.5% is to be solar PV) by 2025.

Efforts are also underway to reduce GHG emissions by replacing coal with natural gas and by developing renewable energy sources. Calpine and Invista are converting from coal-fired boilers to natural gas; NRG's Indian River Power Plant is in the process of retiring its three oldest coal-fired units - reducing CO₂ emissions by 1.7 million tons, based on 2008 emissions. Since Delaware imports about 38% of its power, these closures may reduce Delaware's CO₂ emissions, but not total emissions within the PJM grid until more renewable generation comes on line.

Delmarva Power has agreed to buy 200 MW wind power from NRG's Bluewater Wind project, which will be one of the first offshore wind farm in the United States. It will provide a supply of clean, stably priced energy, as well as providing other economic and health benefits.

6. Based on Past Delaware Energy and Climate Change Studies, What Near- and Long-Term Actions Do We Recommend the League Support?

In the past decade there have been three major Delaware energy/climate change plans: **The Delaware Climate Change Action Plan** in 2000, **Bright Ideas for Delaware's Energy Future** in 2003, and the **Delaware Energy Plan 2009-2014**. The emphasis of the first was on reducing greenhouse gas emissions, with most of the reductions to come from improvements in energy efficiency. The report said: "A well-conceived public education and outreach program will be critical to efforts to implement the Climate Change Action Plan." The 2003 **Bright Ideas** report also gave top priority to improving energy efficiency and conservation, but encouraged renewable electricity – especially distributed (small scale) generation. It also encouraged clean energy technologies to locate their business operations in Delaware.

The **Delaware Energy Plan**, published in 2009 by the Governor's Energy Advisory Council (<http://www.dnrec.delaware.gov/energy/Documents/Energy%20Plan%20Council%20report%20-%20Final.pdf>), is the most recent and most comprehensive of the three. Five Work Groups dealt with various aspects of the plan:

Reducing Delaware's Energy Use
Reducing the Environmental Footprint of the Energy Delawarean's Use
Transmission & Distribution
Reducing Transportation Energy Use
Clean Energy Businesses

Some of the recommendations* we support are:

FP- 1: Establish a greenhouse gas reduction goal to develop a detailed Climate Action Plan for Delaware.

EO- 1: Develop and implement a comprehensive Energy Education and Outreach Program.

● The acronyms (e.g., FP-1) are those used in the 2009 Delaware Energy Plan, Pages 9-12.

CE- 2: Develop and implement a Comprehensive Energy Workforce Training Strategy.

CE- 3: Fund targeted Wind and Solar industry business development initiatives.

LU- 1: Strengthen Delaware's efforts to effectively direct growth into growth zones and require Smart Growth.

EE- 1: Adopt an Energy Reduction Goal & Vision to achieve energy self- sufficiency and carbon neutrality in Delaware's built environment by 2030.

FP- 7: Reduce the carbon emissions from the State's existing coal and other power facilities.

7. What Other States Have Done

States from around the nation have developed a great variety of programs to reduce the various sources of greenhouse gas emissions in their states. The most comprehensive programs start with the development of a detailed, state-specific assessment of the vulnerabilities to climate change, as well as the state-specific mix of greenhouse gas sources. Programs are then built to address the state-specific opportunities to tackle these challenges. *There are lots of things going on out there: there are 50 states, with 50 unique programs, built around each state's particular vulnerabilities and appetites for action.* Additionally, there are several regional compacts built around regional targets for GHG remissions reductions, such as the RGGI, and of course, there are many cities and counties forging their own paths.

[The Pew Center on Global Climate Change](#) has an excellent summary of state actions, as well as a database and maps of various kinds of programs by state: [summary of state climate actions](#). Additionally, they have compiled an excellent table that shows an array of programs and the states engaged in each: [interactive table of all states' greenhouse gas reduction actions](#)

8. The Potential and Cost of Delaware's Renewable Energy Resources

Once installed, solar and wind systems generate negligible CO₂ emissions. Within 1-2 years, a solar array 'pays back' the energy required for its manufacture, while for offshore wind, it takes less than a year. Thus, for the rest of the 25-year (solar) or the 20-year (wind) lifetime, every kWh generated is emission-free energy. Thus, these are ideal technologies to prevent CO₂ and other harmful emissions.

The new RPS legislation will require Delaware to obtain 25% of its electricity from renewable sources by 2025, with a minimum of 3.5% from solar PV (photovoltaic) within the state. That will require about 350 MW of installed PV capacity. To meet this goal will require only 0.1% of our land area, which is about a quarter of the area covered by golf courses in DE. As of 2010, Delaware has about 10 MW of grid-connected PV capacity installed. But this will double with the completion in 2011 of the 10 MW Dover Solar Park project. Delaware receives plentiful sunlight; the average intensity is about 80% that of California.

When completed, the 200 MW offshore wind project will produce an average of 650,000 MWh annually, or about 5% of our annual electricity needs.

Solar PV does not require any additional transmission lines because it is a distributed energy source. In fact it reduces grid congestion on hot summer days. Wind requires additional transmission lines because it is centralized and produces more power per site.