

This article comes from the October 2014 newsletter of the LWV Greater Capital Area. It is a follow-up to the presentation given by LWNH co-president Sally Davis to the group in September, composed by board member Peg Fargo.

## Understanding Energy

Last month's overview of the New Hampshire's 10 year Energy Plan was interesting but far too complex for some of us. Energy use and its relationship to climate change will continue to be a priority for New Hampshire - and the world. For the next couple of months I will submit an article to help our members understand this complex, ever changing issue. As a good league member, I am starting with the league position that will guide our work in this area.

LWVUS has several positions that tangentially deal with energy starting with the overall position on Natural Resources. League members became concerned about the depletion and conservation of natural resources during the 1920s and 30s and that interest has manifested itself in a continuing priority for league work.

The League strives to promote an environment beneficial to life through the protection and wise management of natural resources in the public interest. A broad national league program has focused on protecting and managing the interrelated aspects of air, water, land use, pollution control, nuclear issues, energy and waste management.

## Energy

The league supports:

- Energy goals and policies that acknowledge the United States as a responsible member of the world community;
- Reduction of energy growth rates;
- Use of a variety of energy sources, with emphasis on conserving energy and using energy-efficient technologies;
- The environmentally sound use of energy resources, with consideration of the entire cycle of energy production;
- Predominant reliance on renewable resources;
- Policies that limit reliance on nuclear fission action by appropriate levels of government to encourage the use of renewable resources and energy conservation through funding for research and development, financial incentives, rate setting policies and mandatory standards;
- Mandatory energy-conservation measure, including thermal standards for building efficiency, new appliance standards, and standards for new automobiles with no relaxation of auto-emission control requirements;
- Policies to reduce energy demand and minimize the need for new generating capacity through techniques such as marginal cost or peak-load pricing or demand-management programs;
- Maintaining deregulation of oil and natural gas prices; and,
- Assistance for low-income individuals when energy policies bear unduly on the poor.

So, Why Does That Light Switch Work?

Electricity seems magically delivered to our home and we take it for granted that the light switch will work, the stove will heat and the computer keeps running. When it stops due to a power outage, our whole way of life changes in an instant.

Electricity is created in power plants which use various forms of energy. In the United States, most electricity is created by burning fossil fuels (coal, natural gas, oil) and then converting the thermal energy into electricity. However, fossil fuels are not good for the environment. Coal emits mercury, sulfur dioxide, and carbon dioxide which are harmful to both human health and the health of our planet. Nuclear power is another source of electricity generation which is controversial on its benefits and challenges. Other sources of energy that can be converted into electricity are more sustainable and environmentally friendly. These include wind, solar, hydro, geothermal and biomass.

Most power plants use magnetic conduction to produce electricity. The potential energy of fuel sources is converted into mechanical or thermal energy, which turns the blades inside a turbine. The blades are attached to a shaft that turns when the blades begin to move. When the shaft turns, wires are spin around a magnetic field inside a generator. This causes electrons to flow. And that's what electricity is - the flow of electrons.

The produced electricity goes to a switchyard where the voltage of electricity is raised and is sent to a grid which sends it along transmission lines on a prescribed basis. Prior to reaching your home, the voltage is readjusted at substations and again at those transformers you see on electric poles all along the highway.

Since electricity cannot easily be stored in quantities large enough to meet demands on a national scale, at all times exactly as much must be produced as is required. This requires electricity utilities to make careful predictions of their electrical loads, and maintain constant coordination with their power stations. A certain amount of generation must always be held in reserve to cushion an electrical grid against inevitable disturbances and losses.

Demand for electricity grows with great rapidity as a nation modernizes and its economy develops. The United States showed a 12% increase in demand during each year of the first three decades of the twentieth century, a rate of growth that is now being experienced by emerging economies such as those of India or China. Historically, the growth rate for electricity demand has outstripped that for other forms of energy.

Environmental concerns with electricity generation have led to an increased focus on generation from renewable sources, in particular from wind and hydropower.