

ENERGY CONSERVATION AND GREENHOUSE GAS REDUCTION

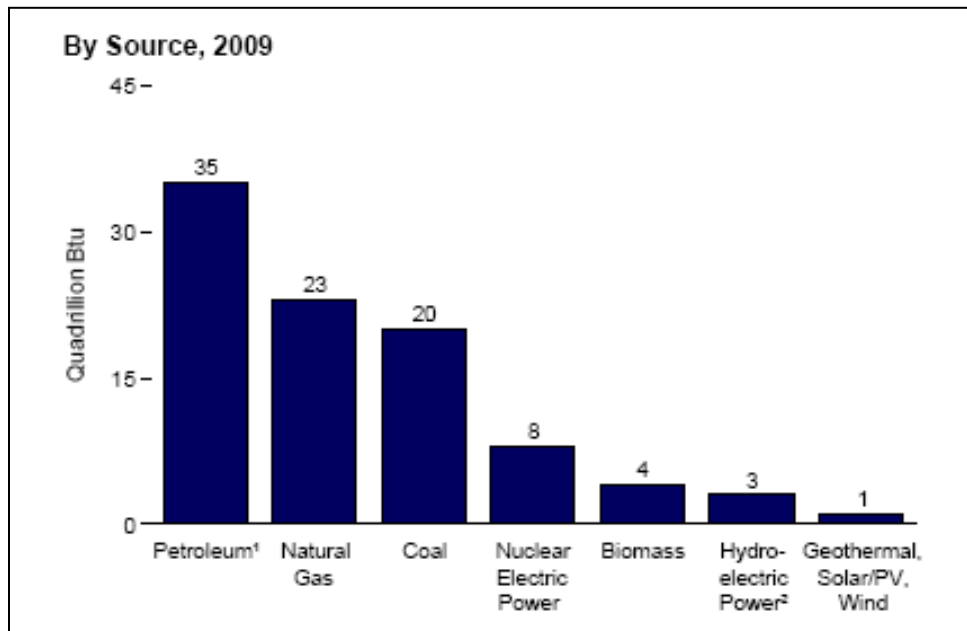
(Taken from Appendix F of the Tualatin Soil and Water Conservation District's Long Range Business Plan for 2011-2015)

Description of Resource Concern

Our daily lives depend on the use of energy. We rely on energy for heating, transportation, lighting, manufacturing, communication, and food production. While there are both renewable and nonrenewable sources of energy used to generate electricity for these activities, almost 72% of electricity in the United States is generated from nonrenewable sources¹. Figure 1 shows energy use in the United States by source in 2009.

Nonrenewable sources, which are primarily fossil fuels, contribute greatly to air and water pollution. Fossil fuels (petroleum, natural gas, coal) release greenhouse gases (carbon dioxide, nitrous oxide, and methane) into the atmosphere, contributing to the greenhouse effect. The "greenhouse effect" simply means that average global air temperatures will increase by several degrees as a result of the buildup of carbon dioxide and other "greenhouse" gases in the atmosphere.

An increase in greenhouse gas pollution from human activities is a serious threat to humans and natural resources. This increase can lead to water shortages, crop failures and loss of wildlife habitat. All of these threats can negatively impact the economy.



¹Petroleum products supplied, including natural gas plant liquids and crude oil burned as fuel. Does not include biofuels that have been blended with petroleum - biofuels are included in "Biomass."

²Conventional hydroelectric power.

Figure 1. 2009 United States Energy Use by Source (U.S. Energy Information Administration. Annual Energy Review. 2009)

¹ U.S. Environmental Protection Agency, Energy Conservation, Pollution Prevention Education Toolbox, EPA-905-F-97-011, August 1997

Carbon dioxide is released in a number of ways. It is released naturally through the carbon cycle and through human activities like the burning of fossil fuels (coal, oil, natural gas).

The majority of nitrous oxide comes from an increased use of fertilizers for agriculture purposes². Other human-related sources include animal manure management, sewage treatment, and burning of fossil fuels.

Methane in the atmosphere comes from increased food production, fossil fuel use, and forest clearing. As plant material decomposes, methane is released. Ruminant³ animals produce huge amounts of methane as a byproduct. Another important source is the anaerobic (without oxygen) decomposition of the organic matter in garbage in landfills.

Additional greenhouse gases that can contribute to the greenhouse effect are chlorofluorocarbons (CFCs). These come from the insulation in freezers, refrigerators, and air conditioners.

The upward trend in atmospheric concentrations of greenhouse gases for the past century has been well documented for decades. More recently, scientists have documented a clear trend toward increased temperatures on Earth and the resulting impact on natural resources. Due to population growth and increasing standards of living, greenhouse gas concentrations are expected to increase in coming years.

Greenhouse gas emission is a critical issue for local dry land farmers who may face yield losses due to changes in rainfall and temperature, irrigators who may experience water shortages, and specialty crop growers (e.g. nurseries and vineyards) who depend on the current climate to produce superior quality crops. In a larger sense, this issue will affect local farmers and the suburban population due both to the impacts listed above and to the legislative remedies that will address the issue.

Highlights of Accomplishments

In 2010, NRCS in Washington County, in partnership with the District, developed a greenhouse gas and energy conservation pool for the Environmental Quality Incentives Program (EQIP) to address this problem. By beginning to focus on this issue now, NRCS positions itself and its clients to be well-suited to adapt to proposed cap and trade legislation as well as demonstrating pro-active leadership in addressing this critical issue.

During the past five years, conservation plans were developed that included practices to address energy conservation and greenhouse gas reduction. Examples of practices: planting native trees, shrubs, and perennial herbaceous plants; residue management (no-till); nutrient management (applying nutrients based on soil testing), and installation of drip irrigation systems. These practices conserve energy, sequester atmospheric carbon and reduce nitrous oxide emissions.

Desired Conditions

- Increased energy efficiency
- Maximal use of waste to produce energy
- On-farm energy production
- Farm equipment emits lower levels of greenhouse gases

² U.S. Environmental Protection Agency. <http://www.epa.gov/nitrousoxide/sources.html>

³ Ruminant animals (e.g. cattle, sheep, goats) digest plant-based foods by first softening it with their first stomach, then regurgitating it, now known as cud, and chewing it again.

- Fewer days with DEQ air advisories

Goals

By end of 2015, have a demonstrated increase in:

- site-by-site energy audits,
- the number of conservation practices implemented to address energy efficiency,
- acres of afforestation,
- the number of farms adopting the conservation system guide, and
- tons of carbon dioxide sequestered.

Strategies and Actions

Table 1. Timeline of Desired Conditions and Actions for Energy Conservation and Greenhouse Gas Reduction.

Benchmark	Timeline	Actions
Develop energy/greenhouse gas conservation system guides (CSG) ⁴ for three types of farms (irrigated crops, non-irrigated cropland, hobby farms).	Dec 2011	<ul style="list-style-type: none"> • Development of the CSGs will reduce energy use, and/or sequester carbon. • Focus efforts on conservation planning and implementation on farm types with the greatest potential to conserve energy, sequester atmospheric carbon, and reduce nitrous oxide emissions⁵.
Create awareness in Washington County of the issues of energy conservation and greenhouse gas reduction.	Dec 2011	<ul style="list-style-type: none"> • Create an Energy Conservation/Greenhouse Gas Reduction fact sheet to distribute throughout Washington County. Fact sheet will include information about conservation practices that can be installed in both urban and rural areas to address the issue. Fact sheet will include contact information for partnering agencies. • Help farmers work with Rural Development to apply for energy grants.
Three farmers in the county to adopt each one of the CSGs.	Dec 2012	<ul style="list-style-type: none"> • Market the CSGs to each of the three identified farm types. • Develop three conservation plans based on the new CSGs (one for each farm type identified). • Include in the conservation plans practices to conserve energy, sequester carbon, and reduce nitrous oxide emissions.

⁴ Conservation System Guide (CSG) is a combination of conservation practices, management measures, and enhancements used to address natural resource concerns.

⁵ Conservation practices include tree/shrub establishment; perennial herbaceous plantings and no-till to sequester carbon; nutrient management to reduce nitrous oxide emissions; and drip irrigation and variable frequency drives to improve energy efficiency

Implementation of CSG.	Dec 2013-2015	<ul style="list-style-type: none"> • Three conservation plans are implemented (one for each farm type identified) • Continue to market the CSG's and develop conservation plans based on the CSGs • Complete three additional plans per year
Work with existing and future partners on this issue.	Ongoing	<ul style="list-style-type: none"> • Continue to work with NRCS on the EQIP pool and partnership with Oregon Environmental Council (OEC) and Oregon Energy Trust (OET) to complete energy projects. • Develop new partnerships.

Key partners necessary to achieve the desired conditions include:

- Natural Resources Conservation Service
- Resource Conservation and Development
- Oregon Energy Trust
- Oregon Department of Agriculture's Renewable Energy Program
- Oregon Environmental Council
- Oregon Department of Energy
- Bonneville Power Administration
- Portland General Electric
- USDA Rural Development

Measurements

- Number of site-by-site energy audits completed
- Number of conservation practices installed
- Acres of afforestation
- Number of farms adopting the Conservation System Guide