

Sustainable Energy



Definition

Sustainable energy involves the effective and efficient production and use of energy from an array of distributed sources matched in scale and quality to the end use. It isn't just about more electricity. It is about producing and using energy in a way that meets our needs while improving the quality of life and preserving the ecological system for future generations indefinitely (Ontario Sustainable Energy Association, 2013). Sustainable energy includes various sources such as hydroelectricity, bioenergy, wind energy, solar energy, geothermal energy, ocean energy, and nuclear

energy. Several of these sources can be found within Durham Region.

Nuclear Energy

Nuclear energy supports more than 50 percent of Ontario's electricity needs at low operating costs and produces virtually no emissions that lead to smog, acid rain, or global warming (Ontario Power Generation, 2016). The production of nuclear energy requires the splitting of natural uranium in CANDU reactors to produce heat that changes water into steam. The steam powers a turbine or generator that makes electricity (Durham Region Economic Development, 2016). Canada has 19 CANDU reactors in operation with 10 of them across two locations in Durham Region.

Bioenergy Energy

Bioenergy is produced from renewable, biological sources called biomass which are biological materials in solid, liquid, or gaseous form that has stored sunlight in the form of chemical energy. An example of bioenergy and biomass commonly used by Canadians is space heating from burning wood. Canada has 70 bioenergy power plants with an installed capacity of 2,043 megawatts. Durham Region produces bioenergy at

the Durham York Energy Centre (DYEC) located in Courtice.

Geothermal Energy

Geothermal energy is produced from heat stored below the surface of the earth or from heat that has been absorbed by the atmosphere and/or oceans. The first captures energy from naturally occurring underground steam and turns it into electricity and the latter achieves heating and cooling by using temperature differences between outside air and ground or groundwater (Canada, Natural Resources, 2016). The University of Ontario Institute of Technology (UOIT) has one of the largest geothermal well fields in North America with 384 holes drilled 213 metres into the ground.

Solar Energy

Solar energy is energy generated from the sun in the form of radiated heat and light that is used to produce electricity (Canada, Natural Resources, 2016). Modern solar power technologies use solar panels that heat water or ventilation air for buildings and/or solar photovoltaic technology which uses solar cells to convert sunlight directly into electricity. Durham Region is also involved in solar energy through research at University of Ontario Institute of Technology and Durham

College. In the Clean Energy Research Laboratory (CERL) located in north Oshawa, the university conducts research on hydrogen production, heat engines and nanotechnology (Canada, Statistics, 2014).

Wind Energy

Wind energy can be converted into forms of energy by using turbines with large propellers that are erected on 'wind farms' located in strategic areas that have good wind regimes and that are in proximity to existing electrical grids (Canada, Natural Resources, 2016).

The Durham Workforce Authority considers sustainable energy a Subject Matter

Working Group because it represents a high growth sector within Durham Region with potential for additional expansion and put simply, there is a worldwide push for energy alternatives. There are opportunities in this sector to support traditional energy endeavours while transitioning focus to existing sustainable methods, as well as research and development surrounding the energy sector. This sector can also continue to grow through continuous educational support and development, in order to establish a dynamic and skilled workforce. This allows for long term development and

employment opportunities within the Region.

Canadian Business Counts – Durham Region

Data within the Canadian Business Counts table represents counts of active businesses by industry classification and employment-size categories for Canada and the provinces and territories. The counts are compiled from the Business Register, Statistics Canada's central listing of Canadian businesses. The table below represents a sampling of active businesses, as of December 2015 within the Durham Region considered to be in or related to the sustainable energy sector.

	Without employees	Total, with employees	1-4	5-9	10-19	20-49	50-99	100-199	200-499	500 +
Total	34,517	14,731	8,308	2,865	1,763	1,176	372	148	71	28
Unclassified	4509	1054	914	95	27	12	4	2	0	0
Sub-total, classified	30,008	13,677	7,394	2,770	1,736	1,164	368	146	71	28
Total – Sustainable Energy	5,721	2,332	1,776	274	121	94	46	11	5	5

Industry Overview (NAICS)

The North American Industry Classification System (NAICS) is an industry classification system developed by the statistical agencies of Canada, Mexico and the United States. Created against the background of the North American Free Trade Agreement, it is designed to provide common definitions of the industrial structure

of the three countries and a common statistical framework to facilitate the analysis of the three economies. NAICS is based on supply-side or production-oriented principles, to ensure that industrial data, classified to NAICS, are suitable for the analysis of production-related issues such as industrial performance.

NAICS is a comprehensive system encompassing all economic activities. It has a hierarchical structure and is

composed of sectors (two-digit codes), subsectors (three-digit codes), industry groups (four-digit codes), and industries (five-digit codes). At the highest level, it divides the economy into 20 sectors. At lower levels, it further distinguishes the different economic activities in which businesses are engaged. The table below represents the top three industries in the sustainable energy sector.

NAICS Code	Description	Jobs in Durham Region (POW)	Durham Region Residents Employed (POR)	Total - Class of Worker	Employee	Self-Employed #2	Self-Employed	Median Wages and Salaries (POR)	Average Wages and Salaries (POR)	Median Wages and Salaries (POW)	Average Wages and Salaries (POW)
221	Utilities	9,825	8,200	8,770	8,690	75	75	\$91,544	\$97,128	\$103,931	\$105,727
541	Professional, scientific and technical services	10,445	5,640	20,745	16,085	4,660	4,625	\$48,484	\$57,933	\$43,298	\$54,246
913	Local, municipal and regional public administration	6,600	11,445	12,430	12,405	25	20	\$67,990	\$65,945	\$66,138	\$64,959

Definition of Terms

Within this document data related to the industry is classified within two categories:

Place of Work (POW) and Place of Residence (POR).

Place of Work – is defined as individuals employed within Durham Region.

Place of Residence – is defined as Individuals who reside within Durham Region.