

DURHAM COLLEGE: TRAINING TOMORROW'S ENERGY INDUSTRY LEADERS.

In most classrooms, sustainable energy is simply a theoretical concept. But at Durham College's Whitby campus, relying on sustainable energy is already a reality.

On December 15, 2009, Phase 1 of the campus expansion was officially opened. The \$9 million second-storey addition contains many of the things you'd expect of a college expansion, including state-of-the-art classrooms and labs. Students are now learning and conducting research into many different alternative energy sources like solar water heating, solar cell systems, wind turbines and geothermal technology systems.

"It's about the new wave in energy," said John Milloy, Minister of Training, Colleges and Universities and Minister of Research and Innovation at the grand opening.

Phase 1 of the project added 20,000 square feet to the campus, but there is more to come in the following two phases. In all, the project will add 64,000 square feet to the Whitby campus.

"One of Durham Region's Most Energy-Neutral Buildings..."

What makes this project really unique are not the new renewable energy programs Durham College now offers, but that the new space is one of Durham's most energy-neutral, sustainable buildings in itself. In other words, Durham College is walking the walk, not just talking the talk.

With three main power focuses – solar, wind and geothermal energy – students are reaping the benefits of the advanced facility. More than 350 solar panels are located on the roof, representing an installed combined capacity of 78 kilowatts (kW) of electricity. These solar photovoltaic (PV) cells are providing efficient solar energy to the entire facility.

Also installed on the roof along the south wall are six vertical wind turbines. The Darrieus turbine derivatives are different than the more common horizontal propeller-type wind turbines and start spinning at minimum wind speeds of 16.2 kilometres per hour (km/h). They are capable of producing up to 3.5 kW

of electrical power each (21 kW total) at speeds of approximately 52.2 km/h.

In addition, a white roof reflects sunlight rather than absorbing it, which means the building needs less air conditioning in the summer and is more cost-efficient. A new ground source heat pump (GSHP) system provides adequate and energy-efficient heating and cooling to the expansion. The GSHP system uses 60 tons of refrigeration cooling-load pumped through 35 U-shaped pipes installed approximately 350 feet underground. Depending on the season, the system circulates to transfer hot or cool air back into the building.

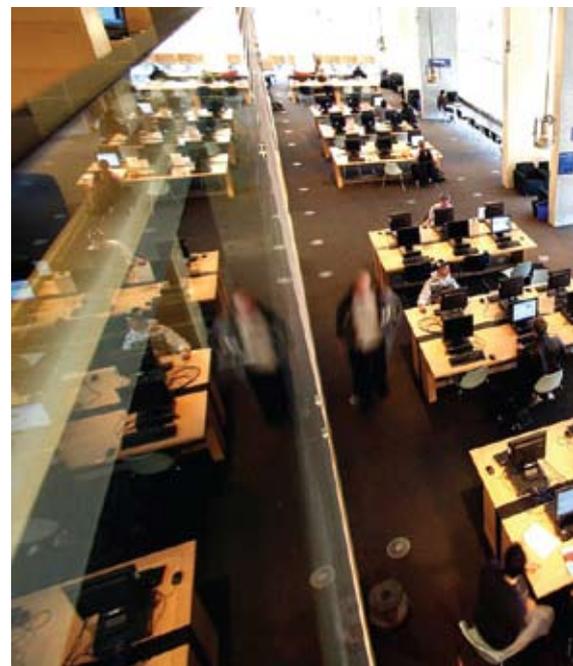
The installed capacity of the solar and wind energy systems (99 kW) provides sufficient energy to operate the entire expansion including the GSHP system. Any electrical energy excess is sent back to the grid, capturing the premium rates offered by Ontario Power Authority's new Feed-in Tariff (FIT) program. FIT was designed to help the province phase out coal-fired electricity generation by 2014; boost economic activity and the development of renewable energy technologies; and create new green industries and jobs.

New Programs Meeting the Needs of the Energy Sector

These technologies, combined with the innovative expansion, will enable Durham College to train more students than ever before in new and growing areas of the economy, and in particular, the rapidly growing energy sector.

For example, the energy sector employed close to 200,000 people in Canada in 2007. That figure is anticipated to reach 400,000 by 2020. Green jobs are growing more than twice as fast as other jobs in Canada at a rate of 9.1 per





cent over the last decade and there are approximately 2.3 million people worldwide currently working in the renewable energy sector.

Durham College's biggest contribution will likely be in providing a skilled workforce to the alternative energy sector. Durham College President Don Lovisa said that Phase 1 is an investment in Durham Region, the Greater Toronto Area and Ontario as well as the students.

"We are proud to be answering the region and province's need for highly skilled graduates in the area of sustainable energy," said Lovisa. "This will have a significant impact on the local prosperity of Durham Region and the prosperity of the province and country through the development of a well-educated workforce."

It is one more indication that Durham Region is indeed Canada's energy capital – and fast becoming a world leader in alternative energy research, design and manufacturing.

Alternative Energy Programs Popular with Students

Paul Luukkonen, a first-year student in the Renewable Energy Technician program, said he was drawn to the program because of its focus on applied science; its hands-on technical nature; and its commitment to a greener future. For Luukkonen, the expansion is the icing on the cake. "The new addition provides students with state-of-the-art technologies and an exceptional student experience, allowing Durham College to

play a key role in developing the energy sector," said Luukkonen. "The return on the government's investment will be endless as graduates from this first-class facility cross over into the workforce and implement the changes required for energy-efficient buildings and renewable energy technologies in our communities."

Applications to Durham College's School of Applied Sciences, Apprenticeship, Skilled Trades & Technology were up 26 per cent in 2009; the expansion is expected to increase student enrolment even more.

On the energy side, the one-year Energy Audit Techniques certificate and two-year Renewable Energy Technician diploma programs were designed to respond to the increased demand for knowledgeable graduates who are highly trained in the areas of energy utilization and management, efficient and effective energy use, climate control, renewable energy systems, and cost control in the rapidly growing energy sector. Both programs welcomed their first classes of students in September 2009.

Development of the college's energy-focused curriculum began in Spring 2007 when several faculty members and administrative staff began engaging sector advisors in discussions regarding the employability of graduates from energy-related programs. These individuals determined that the high demand for auditors and technicians was expected to continue, creating the need for focused and

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specialized courses able to be flexible in design in order to respond to the ever-changing energy sector requirements.

The programs were approved by a program development focus group comprised of representatives from some of Ontario and Durham Region's most influential and reputable energy groups and community associations including the Durham Strategic Energy Alliance, the Region of Durham and the Ontario Sustainable Energy Association. Several Durham College professors and administrative staff were also involved.

Second Phase Underway

The second phase of the expansion, which began in December 2009, will increase the



shop area in the Skills Training Centre to create classroom and laboratory space for new programs such as power engineering technology, sustainable energy, biomass energy, building trades and technology as well as new programs focused on the skilled trades sector including precision machining, metal fabricator, carpenter, steamfitter, construction millwright, and tower crane operator.

It will also include two houses – one older home with dated technology and wiring and one newly constructed home with the latest energy efficient and environmentally friendly technology available – to give students a sense of the changes occurring in the construction and building trades and how to use them effectively. The houses will also be used as “living labs” for the Energy Audit Techniques program which, along with the Renewable Energy Technician program, was introduced in September 2009.

Phase 2 is being supported in part through \$10 million in funding from the federal and provincial governments through the Knowledge Infrastructure Program (KIP), a two-year, \$2-billion economic stimulus measure to support infrastructure enhancement at post-secondary institutions across Canada.

The third phase of the expansion will be a Food Centre that will house culinary arts programs; a food and agricultural component including hydroponic gardens where students would learn the importance of growing veg-

etables and preserving the environment; a food processing centre; and agriculture and science laboratories.

Students will have access to new areas of post-secondary education for Durham Region including cook, chef, food processing and research and hospitality and tourism management, encouraging them to remain in the region to complete their studies, helping Durham Region’s businesses to grow.

Combined, all three phases will put Durham College ahead of the curve when it comes to students considering post-secondary education. The Whitby expansion will keep learners inside the communities of Durham Region as Durham College strives to reduce its own carbon footprint and encourage a sustainable region for everyone to work, play and live in. ■

Durham College's state-of-art facility and labs meeting industry demands in the energy sector.

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Energy Audit Techniques (one-year certificate program)
2009-2010 applications: 95 (first year of program)
Available seats: 60

This course focuses on the changing world of energy utilization and management. Students attain the skills required to assess the energy performance of residential, small commercial, and industrial buildings while learning ways to improve the efficiency and effectiveness of systems related to energy use.

Graduates may find employment as energy auditors with energy and engineering consulting firms, government agencies, and mechanical contractors, among others.

Environmental Technology (three-year diploma or compressed fast-track program)
2009-2010 applications: 179 (increase of 14 per cent from 2008-2009 applications)
Available seats: 34

This dynamic program focuses on the chemical and biological sciences as they relate to environmental pollution. First-hand field and laboratory experience is emphasized in areas such as data collection, microbiology and environmental stewardship management. A work placement program is available in the third year of the program.

Students with a Bachelor of Science (BSc) degree may be eligible to enrol in the compressed, fast-track program to complete diploma requirements in two semesters. Graduates will be poised to enter the workforce in many sectors including air monitoring, conservation and chemical production and processing.