Renewable Energy & Clean Technologies

Canada-UAE Business Council Sector Profile Report

Although still a fairly young industry, renewable energy and clean technologies are gaining rapid momentum around the world due to the growing urgency surrounding climate change. Since the Paris Agreement in 2015, 174 states have been increasing their investment in, and use of, renewable energy and clean technologies to fulfill international targets. In this race to become more environmentally conscious, both Canada and the UAE have made a point to standout amongst the crowd.

Canada and the UAE are endowed with a great supply of oil and gas resources, but both countries have recognized the importance of renewable energy and clean technologies in powering the future of their economies. They have both pushed for policy reform that focuses on greater adoption of renewable energy as well as committed major investments that help fuel the research and development in making clean technologies more efficient and cheaper.

With renewable energy and clean technologies being a priority industry for both countries, there is great potential for growth in the exchange of goods, services, and knowledge related to the industry.

Canada Sector Stats

Canada ranked 6th in the world in renewable energy capacity in 2017 and 4th in the world in renewable energy generation in 2016.

17.4% of Canada's energy came from renewable sources in 2016.

The GDP of Canada's renewable energy activities was C$24.9 billion in 2016, representing 1.3% of Canada's total GDP.

C$22.2 billion was invested into Canadian renewable energy industry between 2013 and 2017.

Over 61,000 workers are part of Canada's renewable energy labour force.

There are 90 renewable energy and clean technology companies listed on the TSX and TSX-Venture – 77 of which are headquartered in Canada.

UAE Sector Stats

The UAE ranked 117th in the world in renewable energy capacity in 2017 and 140th in the world in renewable energy generation in 2016.

In 2017 the UAE was the second-largest investor in renewable energy in the MENA region, investing a total of C$2.9 billion, a growth of 2,815.0% over the previous year.

Over 2,000 workers are part of the UAE's renewable energy labour force.

Nuclear power will produce 1/4th of the UAE's energy by 2020.

The Mohammed bin Rashid Al Maktoum Solar Park is soon to be the world's largest solar park in a single site – spanning nearly 4,000 acres.

THE CANADA-UAE SECTOR RELATIONSHIP

There are a few instances of collaboration between Canada and the UAE in renewable energy and clean technologies. With the ever growing relevance of the sector, it is likely new opportunities for partnership will continue to develop between the two countries.

In June 2017, Canadian Solar, one of the world's largest solar power companies, was selected as the sole module supplier to provide more than 800,000 double-glass Dymond modules (equivalent to 268MW) for the third phase of the 800MW Mohammed bin Rashid Al Maktoum Solar Park in Dubai.

In January 2019, Manitoba Hydro International signed a collaboration agreement with Khalifa University of Science and Technology and the Abu Dhabi Transmission and Dispatch company (TRANSCO) to build an industrial-level software to monitor, predict, and interact with network operators in real time and enable renewable energy integration with the UAE power system. The software aims to help the integration and reliable operation of existing power systems with large scale renewable energy sources. The project also aims to develop the knowledge and capability of future engineers to cope with systems employing large penetration of renewable technology.

RENEWABLE ENERGY & CLEAN TECHNOLOGIES IN CANADA

When it comes to renewable energy, Canada is a world leader in its production and use – ranking 6th in the world for renewable energy capacity and 4th in the world for renewable energy generation. Of course, this is only the beginning, as Canada continues to invest in an array of renewable energy projects and innovations.

As a water-rich country, it is no surprise that hydroelectricity is the most important renewable energy source in Canada. In fact, Canada is the 2nd largest producer of hydroelectricity in the world, after China. This energy source accounts for 58.8 per cent of Canada's total electricity generation, with a capacity of 80,859MW, as of 2016.

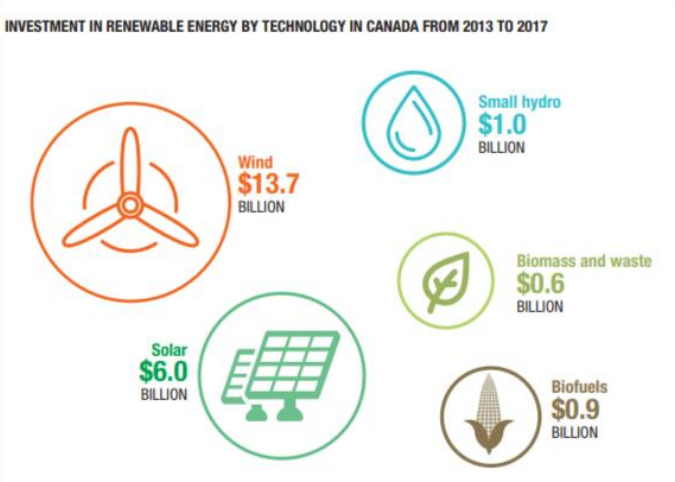
Opportunities for UAE Companies in Canada:

Building Renewable Energy and Energy Efficient Infrastructure

Investing in Major Renewable Energy Projects

Investing in Clean Tech Start-Ups

Canada's other key sources for renewable energy include nuclear and biomass. Canada is the world's 2nd largest producer and exporter of uranium and is also home to the largest operating nuclear power plant in the world. Nuclear energy contributes 14.6 per cent to Canada's total electricity generation, with a capacity of 14,071MW as of 2016. Biomass energy comes primarily in the form of wood derived material in Canada. Although it only contributes 2.0 per cent to total electricity generation, it is a key source for renewable heat and transportation fuel in the county.



Canada has now set its sites on increasing both wind and solar power capacity, with the two energy sources seeing the highest levels of renewable energy investment (public and private) in the country between 2013 and 2017. Another area of growing interest in renewables is tidal energy. Canada's Atlantic coast is home to the world's highest tides, creating significant potential to test and generate energy from the ocean.

In terms of clean technologies, Canada has some of the best and brightest minds in the field, whether they are

working as academics or building their own innovative technology companies. In 2017, Canada ranked 4th place among global clean technology innovators in the Global Cleantech 100 List. Focus areas for Canadian cleantech academics and firms include air and water quality improvement, environmental monitoring and remediation, waste and recycling, transportation, agriculture, and the creation of advanced materials.

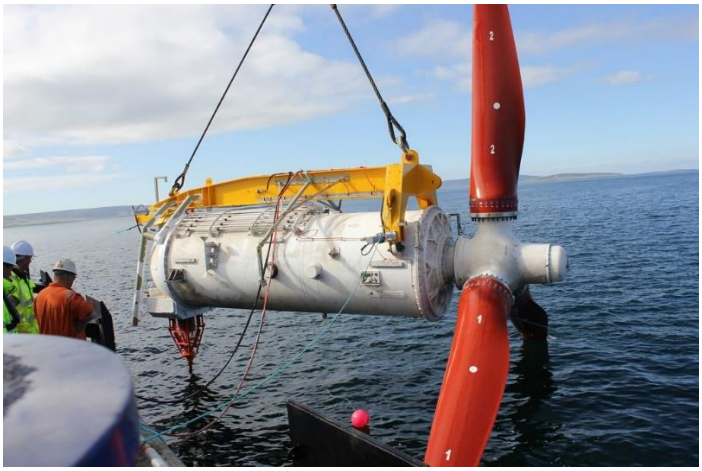
Since 2016, the Government of Canada has been putting policies and plans in place to accelerate Canada's adoption, and the business opportunity, in this space. This includes the creation of the Pan-Canadian Framework on Clean Growth and Climate Change as well as the creation of major federal programs – with strong financial support – to grow the clean technology in the country. These programs include: financing for clean technology firms; investing in research and development for renewable energy and transportation infrastructure; tax deductions for businesses investing in renewable energy generation or energy efficiency equipment; international business development for clean technology firms; establishing a clean technology economic strategy table between industry and government (as part of the Innovation and Skills Plan); establishing the Clean Technology Data Strategy and Clean Growth Hub; and the creation of the Low Carbon Economy Leadership Fund, which makes C$1.4 billion available to the provinces and territories for projects that promote clean growth and reduce greenhouse gas emissions.

Feature Project: FORCE & Uisce Tapa at The Bay of Fundy

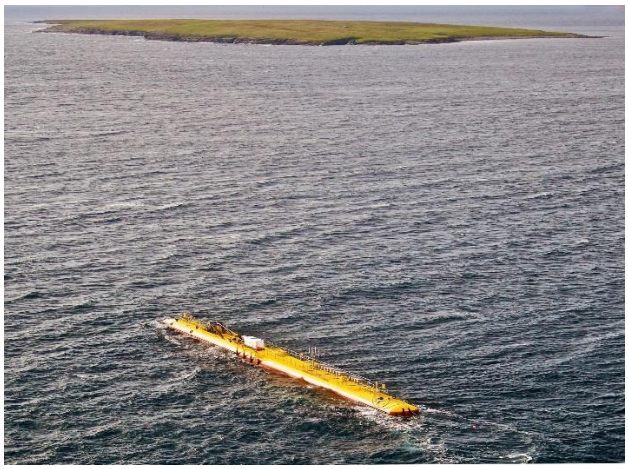
The Bay of Fundy, located in the province of Nova Scotia, has the highest tides in the world – creating opportunity to capture the immense kinetic energy produced by the ebb and flow of water.

The area's tidal testing and energy production is managed by the Fundy Ocean Research Centre for Energy (FORCE), a not for profit corporation with two objectives: to permit, construct, and operate a tidal turbine test and demonstration facility in the Bay of Fundy and, to engage in, and enable monitoring and research associated with the deployment, installation, and operation of tidal in-stream energy conversion (TISEC) devices.

Currently there are five tidal energy developers located at the FORCE facility: Atlantis Operations Canada Ltd. (AOCL); Cape Sharp Tidal, Black Rock Tidal Power, Minas Tidal – IME – Tocardo, and Halagonia Tidal Energy Ltd.



Andritz Hydro Mk1 1.5 MW Sea-Bed Mounted Turbine



Scotrenewables Tidal Power SR2-2000 Floating Turbine

In fall 2018, the Government of Canada announced C$29.8 million in grant funding towards the development of the C$117-million Uisce Tapa project at FORCE. The project is being developed by Irish-based renewable energy company DP Energy and its Canadian subsidiary, Halagonia Tidal Energy Ltd. Uisce Tapa will incorporate a system of five sea-bed mounted tidal turbines and a single floating turbine, all working together to improving overall efficiency. When complete in 2020, the system is expected to create 9MW, making it the largest tidal stream array to be deployed anywhere in the world, with the ability to produce enough energy to power 2,500 homes.

RENEWABLE ENERGY & CLEAN TECHNOLOGIES IN UAE

Over the past few years the UAE has made major commitments for their transition to renewables, aspiring to be a model in the region in terms of cleaner energy adoption.

In January 2017, the UAE launched their Energy Strategy 2050, which outlined the federation's goal to reach 44.0 per cent renewable energy by 2050 as well as its goal to reduce carbon dioxide emissions by 70.0 per cent by the same year. The UAE aims to invest US$163 billion by 2050 to meet these goals and ensure sustainable growth of the country's economy. Even though the strategy was created in 2017, the UAE has already seen major progress in that will allow a smooth transition to renewable energy – primarily in the form of solar and nuclear energy.

Opportunities for Canadian Companies in UAE:

Clean Technologies Research & Development in Masdar City

Clean Technologies Testing Market

Public Private Partnership for Major Renewable Energy Projects

Retrofitting Contracts for Energy and Water Efficiency

Solar power has been the primary focus of the UAE's renewable energy efforts to date, primarily due to resource availability (a lot of sun) and the falling cost of solar photovoltaic technology. The nation has already had success with two ambitious solar projects – Shams 1 in Abu Dhabi (the largest concentrated solar power plant in the Middle East) and the Mohammed bin Rashid Al Maktoum Solar Park in Dubai (one of the largest single-site solar parks in the world). The UAE has also explored innovative technologies in solar development, such as the Solar Impulse 2 – the first aircraft to fly around the globe powered only by the sun.

The UAE government also envisions nuclear power to become a main source of non-hydrocarbon-based energy for the nation, with a goal of it producing 25.0 per cent of total electricity by 2020. To see this goal through, the UAE invested US$20.0 billion in 2012 to build four commercial nuclear power reactors as part of the Barakah Nuclear Energy Plant. The plant is expected to be fully completed by 2020.

In addition to its renewable energy goals, the UAE aims to be a clean technology and sustainability innovation hub. A key example of this is Masdar City, a 600-hectare zero-carbon and zero-waste community developed by Abu Dhabi's renewable energy company, Masdar. Masdar City is a freezone location for clean-tech firms from around the world, a research hub for academics working on clean technology solutions, and also an eco-friendly residential development equipped with retail, restaurants, and public spaces. It houses the Masdar Institute of Science and Technology, the Emirates College of Technology, the Siemens Middle East Headquarters, and the International Renewable Energy Agency (IRENA) Headquarters, to name a few. Not only is Masdar City a massive experiment in how cities can be designed and built more sustainably, but it is also a functioning centre for clean tech development.

Barakah Nuclear Energy Plant

Masdar City

With the UAE moving rapidly in the adoption of renewable energy and clean technology, the opportunities for Canadian firms are endless. The UAE has prioritized public private partnerships, through the independent power producer models, with many of their most recent renewable energy projects – creating opportunity for companies that can design and build renewable energy infrastructure. The UAE also has opportunities in retrofitting old buildings to be more energy efficient. In this regard, they have need for energy services companies to conduct audits for energy and water saving opportunities; design energy and water saving plans; and provide installation and maintenance services. In terms of clean technology and innovation, the UAE provides companies an opportunity to locate and operate at Masdar City, whether for the purposes of research and development or to build out a test market for cleantech products.

Feature Project: Mohammed bin Rashid Al Maktoum Solar Park

Taking advantage of their high sun exposure rates, the UAE has focused on multiple ambitious solar projects, including the Mohammed bin Rashid Al Maktoum Solar Park. The project was first announced in 2012 and is made up of multiple phases with an overall completion date of 2030.

The first two phases of the Solar Park are fully operational at a combined output of 213MW. Phase three, which is currently being built and expected to be commissioned by 2020, will add an additional 800MW. Future phases aim to bring the total production capacity up to 5,000MW by 2030. Each phase of the project, except the first, has been in partnership with different consortiums of independent power producers from around the world.

In addition to solar energy production, the park will also become an area for furthering renewable energy and clean technology solutions through the creation of an innovation centre and a research and development centre.


Mohammed bin Rashid Al Maktoum Solar Park

The project is being managed and implemented by the Dubai Electricity and Water Authority. Overall the total investment for the Solar Park is expected to be US$13.0 billion.

GOVERNMENT RESOURCES

Natural Resources Canada: https://www.nrcan.gc.ca/
Innovation, Science, and Economic Development Canada: http://www.ic.gc.ca/
Clean Technology in Canada: https://www.canada.ca/en/services/science/innovation/clean-technology.html

UAE Ministry of Energy and Industry: https://www.moei.gov.ae/
Masdar: https://masdar.ae/

Canadian Trade Commissioner Service in the United Arab Emirates: The Canadian Trade Commissioner Service has been helping Canadian companies navigate international markets for more than 120 years. Canadian trade commissioners are located in more than 160 cities worldwide, including Abu Dhabi and Dubai. Canadian trade commissioners in the UAE are each responsible for one or more key sectors. Their offices are at the Embassy of Canada to the United Arab Emirates (located in Abu Dhabi) and the Consulate General of Canada in Dubai.

Website: https://www.tradecommissioner.gc.ca/united-arab-emirates-emirats-arabes-unis/
E-mail: uae-eau.infocentre@international.gc.ca

Consulate General of the United Arab Emirates in Toronto: The Consulate General of the UAE in Toronto has a business development team that can point you in the right direction in Canada. The Consulate General of the UAE and the Embassy of the United Arab Emirates in Ottawa work together with key partners to support UAE companies interested in the Canadian market.

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