Foresight

Smart Policy Series

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INCENTIVIZING LOW CARBON PATHWAYS FOR ROBOTICS

INCENTIVIZING LOW-CARBON PATHWAYS FOR ROBOTICS TECHNOLOGY

Progressive robotic technology will have a positive impact across sectors making them more energy efficient, less wasteful and highly productive. Since the 1970's, stationary robotics played a key role in the automotive industry, often to be found in a manufacturing line. With advancement in technology such as software, sensors, 3D printing and satellites, robotic technology is becoming more adaptive and responsive.

Although we regularly focus on policy and markets, for this piece we will highlight where advanced robotics are changing the landscape in different sectors globally with positive environmental impact.

WHERE CAN WE SEE ADVANCED ROBOTICS TODAY?

In manufacturing we see new and innovative robotic products increasing efficiency in assembly, loading/unloading, plastic injection, packing/unpacking, painting and dispensing, ultimately having an impact on production processes, logistics and transportation.

For example, Universal Robots[1], from Denmark, specializes in co-bots (short for collaborative robots). In the past, robots were kept behind barriers and a person behind operated the machine. Co-bots are different as this is a smaller robot with built in software and works alongside their human colleagues, used for repetitive and precise tasks.

Quebec company Omnirobotic[2], are creating autonomous industrial robots to complete different functions, such as painting, with their OmniPaint product.

Over in Finland, ZenRobotics[3], is a leading supplier of intelligent sorting robots for the waste industry. The robots divert different types of waste including plastics, solid waste, construction waste, scrap metal and packaging ultimately preventing waste from entering the landfill. They work with large recycling facilities across Europe.

More related to energy, UK-based Q-Bot[4] has developed a suite of technologies for the built environment to maximize energy efficiency. Their robotic products survey, map and apply insulation in variety of building types and a robotic device insulates suspended timber floors without disruption and expense. In the agriculture sector, EcoRobtix[5], an autonomous solar powered machine is a means to ecologically and economically weed rows of crops, meadows and intercropping cultures. This technology reduces the need for herbicide by up to 90%, overall reducing environmental impact on the land.

BC based company company, Advanced Intelligent Systems[6] is demonstrating uses of Unmanned Ground Vehicle (UGV) technology in Canada. Their current innovation, called BigTop, is a mobile intelligent UGV that autonomously handles plant containers in greenhouse nurseries ensuring that the greenhouse works at optimum level, maximizing plant growth.

Although not cleantech, in the health sector, a new product called OMNIBotic is used in surgery. It's a patented[7] bone morphing technology that quickly builds a 3D model of the patient's knee during surgery. In this example, it's important to note the precision involved with advanced robotics technology and potential future applications.

An additional area of significant growth is drones otherwise known as unmanned aerial vehicles (UAVs), essentially flying robots, that are used to aid exploration, inspections and surveying in extreme environments in air, on land and in the sea that would otherwise be very difficult to do.

Remotely operated underwater vehicles (ROVs) are an underwater example of drones. These underwater robots are controlled by a person from a vessel. Cables connect the ROV to the vessel, sending electrical signals back and forth. Typically, ROVs are used for sea-based industry such as aquaculture farms, conservation research,offshore oil and gas in drilling, offshore wind turbine inspections and subsea exploration. Deep Trekker[8] based in Ontario work with various industries to apply their robotic innovations underwater.

There are a number of instances where drones (UAVs) are applied to land and air-based scenarios. Vancouver based company Avestec[9] works with the oil and gas industry to perform site inspections without sending people to dangerous heights and hazardous areas. By using robotics for tank inspection, it completely removes the possibility of injury while simultaneously decreasing cost and significantly decreasing the downtime resulting from manual inspection. Their skyron tethered drone uses visual inspection and ultrasonic thickness measurement for hazardous and confined spaces and meets the American Petroleum Institute's standards.

Across Canada, Skaha Remote Sensing[10] is using UAVs to scan soil moisture on cropland and this data is then used to inform precise irrigation management ensuring a better crop yield.

Elsewhere in the world, there are interesting cases of where drones are used to solve sustainability challenges. The Plastic Tide project[11] in the UK use drones to survey coastal areas from the air and uses machine learning technology to remotely detect plastic build-up. This is an open-source project highlighting where plastic waste is accumulating. To support reforestation projects, BioCarbon Engineering are using drones to scan topography to create 3D maps to inform an efficient planting pattern. This is followed by a second drone that spreads seed on the ground, with potentially for planting up to 100,000 trees per day.[12]

Of course, permits are required before drones are used for research or commercial applications, most governments including Canada have regulations in place.[13]

WHAT'S NEXT?

This quick snapshot of innovation shows that robotics can be classified as clean technology and is applicable to a number of sectors ranging from manufacturing, energy, forestry, built environment to waste. Robotics is one of the 12 specialist sectors that Foresight specializes in. Through our programmes, we are looking to support companies in early or late stages with robotic cleantech applications.

Endnotes

[1] universal-robots.com

[2] omnirobotic.com

[3] zenrobotics.com

[4] q-bot.co/robots.html

[5] ecorobotix.com/en/autonomous-robot-weeder/

[6] ai-systems.ca/#greenugv

[7] omnils.com/healthcare-professionals/OMNIBotics.cfm

[8] deeptrekker.com

[9] avestec.com

[10] skahasensing.ca/soil-moisture-mapping

[11] weforum.org/agenda/2018/06/this-ai-is-learning-to-recognize-ocean-plastic-using-drone-photos

[12] weforum.org/agenda/2017/06/drones-plant-100000-trees-a-day/

[13] tc.gc.ca/en/services/aviation/drone-safety/flying-drone-safely-legally.html