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Canada

AMT
CLEAN TECHNOLOGY
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TRADE COMMISSIONER SERVICE

European innovation partnerships guide for Canadian small and medium enterprises

TRADE COMMISSIONER SERVICE (TCS)

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Foreword

Europe is a world leader in innovation.[1] The European Union's (EU) vow to remain at the forefront of technological advancement is evident in its commitment to fostering innovation both within its borders and beyond. This commitment to research and innovation is demonstrated in the funding opportunities available for both EU and non-EU countries. Yet, non-EU companies are often unaware of the opportunities afforded them or are unsure of how to navigate the complexity of funding available at the local, national and EU levels.

This guide reflects the questions, comments and concerns gathered from a survey of Canadian small and medium enterprises (SMEs) working across a wide range of sectors. It provides the information Canadian exporters require to find and engage in innovation partnering opportunities in Europe.

Why seek funding abroad

Canada and Europe share a reputation for innovation. Not only does Europe at the EU and national levels offer some of the largest research and innovation funding opportunities in the world, it also ensures financial support for demonstrators of technology. The European focus on research and innovation offers unparalleled support for emerging technologies and initiatives, all of which translates to opportunities for Canadian exporters.

The vast majority (three out of four) of developing products fall short of making it onto the market at the final hurdle, which is the demonstration stage. The EU and European national governments are committed to supporting innovation and technology demonstration makes the European market increasingly attractive, offering unique opportunities for European and non-EU SMEs alike.

The EU also supports a number of under-invested sectors, including key enabling technologies (KETs), to facilitating clusters and joint technology initiatives (JTIs). This guide provides links to many of these platforms.

The Comprehensive Economic and Trade Agreement (CETA) between Canada and the EU that came into force provisionally in September 2017 facilitates opportunities for innovative SMEs.

CETA

- » offers Canada better access to the EU's procurement market than any other G20 country, nearly the same access that EU member states provide each other
- » facilitates the free movement of goods and people, making it even easier for Canadian SMEs to find innovation partnerships on European soil
- » enables SMEs to form international consortia

Since the start of Horizon 2020, Canadian organizations have been involved in 58 EU-funded projects involving research and innovation. *(CORDIS, 2018)*

Initiatives such as CETA, coupled with the EU's preference for funding research and innovation consortia that cross European boundaries, mean the EU can offer a platform for Canadian SMES to engage in innovation partnerships to pursue commercialization and market access opportunities across Europe.

About this guide

This guide offers Canadian exporters a window into the complex European economic environment. Relevant information is presented at the EU, country and regional levels. Each chapter features several countries that are market leaders or have forward-looking innovation initiatives. Please note that the list of countries featured in each chapter is not exhaustive. Users of this guide are encouraged conduct their own research on innovation partnering in Europe and validate their findings with the assistance of the Canadian Trade Commissioner.

[1] The guide covers finding innovation partnerships in Europe and is therefore not limited to the EU and its 28 member states. As such, relevant content from non-EU European countries will be included.

CANADIAN TRADE COMMISSIONER SERVICE

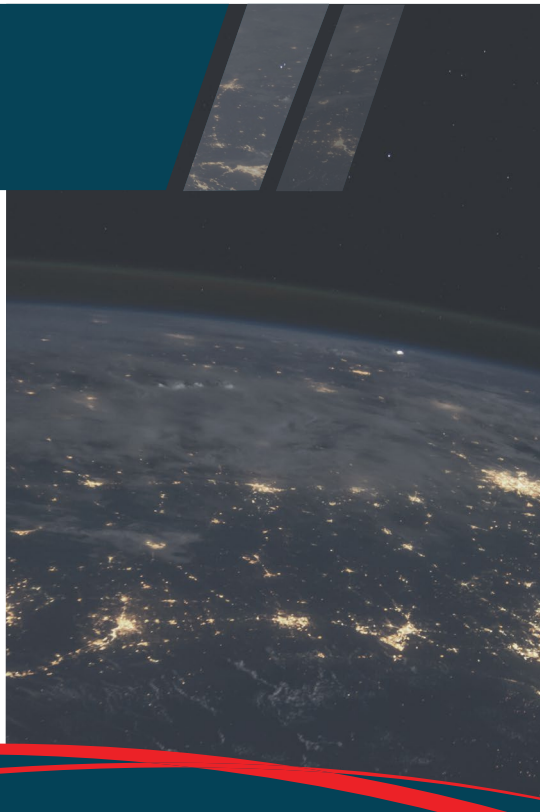
For more than 120 years, the Canadian Trade Commissioner Service (TCS) has helped companies navigate international markets. Canadian trade commissioners are located in more than 160 cities worldwide and can provide key business insights and access to an unbeatable network of international contacts.

GET HELP EXPORTING AND INNOVATING INTERNATIONALLY

- Funding and support programs for doing international business
- Trade missions and events
- Quiz - Are you ready to export?

KNOW YOUR MARKETS

- Canada's trade agreements
- Country and sector information
- Tariffs, sanctions and export controls



CANADIAN SUCCESS STORIES

Canadian organizations have been involved in 31 EU-funded research consortia, working on projects ranging from agriculture and food, communications technologies, clean technology and life sciences. *(European Commission, 2018)*

EU overview

The EU's funding for research and innovation is distributed between several interlinked programs. Horizon 2020[3] is the largest of these for research and innovation and supports SMEs across various fields, including clean technologies, life sciences, transportation, food and agriculture, and communication technology. Horizon 2020 is not limited to the EU but is designed to enhance international research and cooperation in any sector anywhere in the world. Various parts of the program benefit from international cooperation and encourage participating consortia to include non-EU partners. Funding opportunities for all fields are managed by the European Commission Directorate-General for Research and Innovation (DG RTD), and includes joint funding opportunities with large European industrial companies through public private partnerships.

> **Only 8% of Canadian businesses surveyed are aware of the EU's enormous research and innovation funding opportunities.**
>
> *(European Commission, 2017)*

Canada-EU relationship

Canada has entered into bilateral agreements with many European countries, including members of the EU and individual non-EU countries. Such agreements facilitate international collaboration between Canadian SMEs and their European counterparts. Generally, the European Commission is the main entity responsible for research at the European level, but member states are also involved in decision making whether or not they have their own bilateral agreements with Canada as a whole or with its individual provinces and territories.

Priorities for collaboration between **Canada and the EU are set out by the Canada-EU Joint Committee on Scientific and Technological Cooperation Committee (JSTCC)**, which meets every 18 months.

The JSTCC provides a regular opportunity for members to

- » exchange views on some of the most important science and technology happenings
- » coordinate joint research and innovation efforts

Since the committee was established in 1996, certain sectors have boomed, for example, advanced manufacturing, information technology and life science.

Some member states stand out as having particularly close relationships with Canada at both the federal and provincial levels. These include France, Germany, Spain, Italy and the United Kingdom.

Quebec has nine agreements with France, part of a strong strategic partnership in the fields of industrial and bio-technologies.

The Canada-EU bilateral relationship entered a new era with the Strategic Partnership Agreement (SPA) and the Comprehensive Economic and Trade Agreement (CETA).

EU funding programs

Horizon 2020

Horizon 2020, the current EU Research and Development Framework program, is the largest funding program for research and innovation in the world, offering nearly €80 billion of funding between 2014 and 2020. Horizon 2020 is open to participants from anywhere in the world, including SMEs. Some calls for tenders specifically require inclusion of international partners. After 2021, the program will be renewed as Horizon Europe until 2027.

The majority of Horizon 2020 projects are collaborative, comprising a minimum of three organizations from different EU member states or associated countries, such as Norway or Switzerland. Any organization from anywhere in the world can join the consortium for some projects provided that three EU organizations are involved in the project. In most cases, Horizon 2020 participants from Canada and other industrialized countries must finance their own project contributions. Some Canadian funding agencies offer support to Canadian Horizon 2020 participants.

[3] Horizon 2020 runs from 2014-2020 with a multi-annual budget of €80 billion

See

- Partner Search Funding and Tender Opportunities - Horizon 2020 to find partners by keywords, geographical area and funding type that are involved in ongoing projects or are seeking partners
- Funding and Tender Opportunities - Horizon 2020 to search for partners according to keywords/geographical area/funding type
- Horizon 2020 National Contact Points (NCPs) to receive guidance, practical information and assistance on all aspects of participation in Horizon 2020. NCPs are also established in many non-EU and non-associated countries, including Canada.

Horizon 2020 Public Private Partnerships (PPPs)

Through PPPs, which are also known as Joint Technology Initiatives, Joint Undertakings or Contractual PPPs, the European Commission partners with private sector industrial partners to fund market-driven innovation in strategic sectors. PPPs have multi-billion Euro budgets over several years to finance collaborative research and innovation projects involving large industry leaders, applied academic researchers ad SMEs and through calls for proposals.

PPP projects are open to Canadian participants and follow Horizon 2020 rules (i.e. Canadians can only be funded by EU on an exceptional, case-by-case basis). Beyond funding, participation in PPPs offers Canadian SMEs opportunities to build strategic partnership with the future European value-chain leaders for an emerging innovative technology.

See

- Horizon 2020 - Canada Country Page *[only available in English]*
- Horizon 2020 topics that target international cooperation

Contractual PPPs with European Industry	Joint Technology Initiatives (Joint Uundertakings)
Factories of the future	Bio-Based Indutries
Energy-efficient Buildings	Innovative Medicines Initiative (IMI)
European Green Vehicles Initiative	Aeronautics and Air Transport (Clean Sky)
Sustainable Process Industry	Fuel Cells and Hydrogen (FCH)
Photonics	Shift2Rail
Robotics	Electronic Components and Systems for European Leadership (ECSEL)
Cybersecurity	
Big Data Value	
Advanced 5G networks for the Future Internet	
High Perfomance Computing	

The Horizon 2020 SME Instrument

The SME Instrument, which is part of the Horizon 2020, has €1.6 billion in funding for the duration of the current program Horizon 2020 to improve SME access to research and innovation opportunities. This funding is only available to SMEs. Canadian SMEs are eligible, providing they operate their research and development centres in Europe.

The instrument is divided into two funding opportunities:

- Feasibility assessment projects for exploring the technical feasibility of a breakthrough innovation, and
- Innovation projects underpinned by a sound and strategic business plan.

Enterprise Europe Network

The Enterprise Europe Network (EEN) is a network of European business agencies, associations and service providers that help businesses find international partners for business, trade and innovation opportunities. Canadians can use EEN for free to identify local service providers who can help them find business partners in their target European markets.

EUREKA

EUREKA is a European-based platform for international research and development cooperation that supports innovation collaboration between SMEs. EUREKA follows a bottom-up approach, accepting projects accepted from any technological area with a civilian purpose. The network has 41 full member countries including Israel, as well as two associated countries - South Korea and Canada.

EUREKA provides a fast and flexible way for Canadian SMEs to build innovation projects with one or more international partners to commercialize quickly for new markets. EUREKA projects fall under one of three types – Individual, Cluster (larger projects with multiple partners in a specific industrial application) or Eurostars (receives funding support from the EU) The National Research Council (NRC) is the point of contact for Canadians interested in developing a EUREKA project with international partners.

See

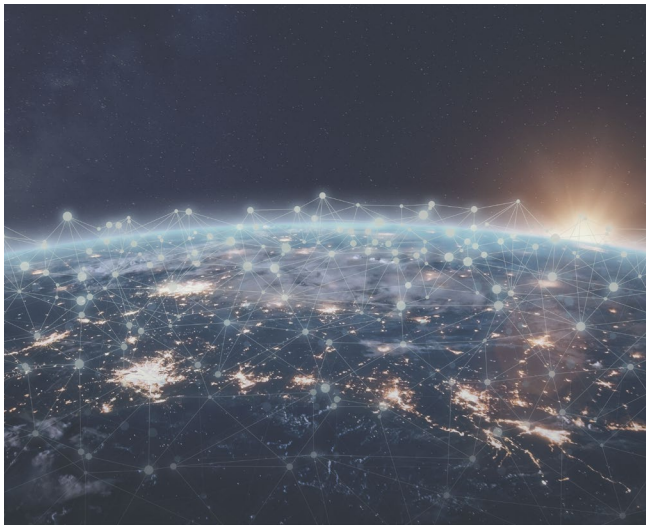
- National Research Council Canada - EUREKA

The Belmont Forum

The forum is composed of members from around the world that support research into global environmental changes, such as climate change. National funding agencies and the European Commission contribute to this initiative. Canada also participates through the Natural Sciences and Engineering Research Council of Canada.

EBN Innovation Network

EBN is an international network of organizations and innovation centres that connects and coaches SMEs. EBN has members in 40 countries. It welcomed its first Canadian members in 2017.



VentureEU

VentureEU is the European Union's venture capital fund, providing cornerstone investments of €410 million in independently managed venture capital funds-of-funds, including €200 million directly derived from Horizon 2020.

See

- EasySpeak
- European Networks and Tools
- European Commission Partner Search Tool
- Partner Search platforms
- European Research Area (ERA)
- Call Topics for International Cooperation in Horizon 2020, EU and Canada
- Overview of Research and Innovation in Canada

CHAPTER 1

ADVANCED MANUFACTURING AND INFORMATION TECHNOLOGY

The advanced manufacturing and information technology (AMT) sector includes activities that foster efficient and intelligent production and consumption throughout the manufacturing industry. This involves factors such as processing speeds, productivity enhancements, energy use, materials consumption and pollution management. AMT is involved in most economic sectors.

Canada and Europe: AMT partners

Canada's AMT industry is world-class, with leading capabilities in research clusters, bio-manufacturing and industry-academic research collaboration. [4] These industry strengths make Canadian partnerships an attractive option for European SMEs looking for international collaboration. European companies are also at the forefront of many important technological developments and are considered by international players to be key innovation partners in advanced manufacturing, nanotechnology, biotechnology, micro- and macro-electronics, photonics and advanced materials. The AMT industry employs more than 30 million people in the EU and provides an estimated one quarter of all private sector jobs.

Canada uses its strength in industry-academic collaboration to forge overseas partnerships. The Canadian government fosters partnerships between Canadian universities and their European counterparts.[5] With the provisional entry into force in 2017 of the **Comprehensive Economic and Trade Agreement** (CETA) and support by **Export Development Canada** (EDC), additional innovation partnership opportunities are available for manufacturing SMEs to grow their businesses abroad, both at the national and EU level.

Innovation hotspots in Europe's AMT industry

According to the European Commission, countries in middle and western Europe are the go-to regions for the European AMT sector. The Netherlands, Germany, Italy and Austria are the AMT hotspots, based on their overall levels of production, trade and technology.[6]

The European Commission's **KETs tools**, which compare the distribution among countries of patents for key enabling technologies (KETs), shows these countries are leaders in the number of products that have been awarded distributed patents. The Netherlands remains the European leader in AMT due to its dominance in trade and production. Germany and Italy are leaders in the technology, production and trade aspects of AMT.

The EU is the world's largest exporter of manufactured goods and services, which accounted for 83% of its total exports between 2008 and 2016.
(European Parliamentary Research Service, 2017)

Some central European countries are also developing leadership in specific AMT sectors. The Czech Republic, for example, is fast becoming the technology hub of central Europe, and for this reason has been included in this guide.

[4] Government of Canada, Innovation, Science and Economic Development Canada, Interim Report

[5] McMaster University's collaboration with universities in the Netherlands, for example, focuses on research and innovation in certain fields of advanced manufacturing and is leading the way for future academic-industry collaborations.

[6] European Commission, Composite Indicator 2013

The Netherlands

The Netherlands is a global hub for R&D innovation. The AMT industry in the Netherlands, commonly referred to as the high-tech systems and materials (HTSM) industry, contributes the most revenue to the economy of the Netherlands. The HTSM industry is also the largest spender on R&D, accounting for 57.3% of the total spending of the top sectors and 51.9% of all industry spending in the Netherlands.[7]

Given the scope of HTSM in the Netherlands, the Dutch government formed **Holland High Tech** to create more public-private partnerships (PPPs) and encourage the involvement of more companies within the industry. Any company in the HTSM industry can approach the organization for research opportunities. Holland High Tech provides specific information on funding and research opportunities and key developments in particular industries.

Canadian SMEs can also search for opportunities in AMT among Dutch clusters and partner platforms. Although some of these clusters are formed exclusively of Dutch enterprises, they offer an overview of the key players in the sector, as well as regional hotspots, which may help SMEs identify potential partnerships.

See

- **High Tech NL: the gateway to innovation with the Dutch industry**
- **FME**
- **Smart Industry NL**

The **Netherlands Foreign Investment Agency (NFIA)** helps companies establish or expand their operations in the Netherlands.

The NFIA performs the following services without charge:

- organizes fact-finding missions
- arranges meetings with relevant partners
- provides confidential, personalized guidance and counsel on tax, government and permit procedures

Netherlands-Canada Chamber of Commerce

- promotes investment and industry cooperation between Canada and the Netherlands
- includes SMEs as members
- provides useful insights about the Dutch market that have benefited Canadian SMEs

The Netherlands is home to more than 1,700 firms involved in materials-related research and development.

DID YOU KNOW...

- The Canada-Netherlands **Cyber and Securities Technologies Soft Landing Platform** in The Hague gives Canadian and Dutch SMEs a unique opportunity to soft land fora trial period in the Netherlands, home of the largest security technology cluster in Europe.
- Dutch firms such as Airbus and Van Halteren Metaal BV are exploring Canadian expertise in aerospace and other AMT-associated industries.[8]
- An estimated 70% of innovation in the Netherlands is IT-related.[9]
- Amsterdam is home to a third of all European data centres and the world's second-largest Internet exchange, AMS-IX.[10]
- Canada is one of only three countries whose citizens are eligible to be granted working holiday visas in the Netherlands.
- Canada's special relationship with the Netherlands dates back to WWII when Canadian troops helped to liberate the country.

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in The Hague

See

Canadian Netherlands Business and Professional Association in Toronto

Holland International Distribution Council (HIDC)

[7] U.S. Commercial Service, **Advanced Manufacturing Market Resource Guide**

[8] **Alberta Economic Trade and Development**

[9] **Alberta Economic Trade and Development**

[10] **Doing Business in the Netherlands 2018**

Germany

The AMT industry in Germany is known as Industrie 4.0, which refers to the digitalization of the manufacturing process. It is the industrial equivalent of the Internet of Things.

The German government is heavily involved in Industrie 4.0 and through the German Ministry for Economic Affairs and Energy is providing €100 million for two programs to foster AMT research and innovation:

- Autonomics for Industrie 4.0
- Smart Service World

Canadian SMEs can explore clusters and partner platforms to learn about potential partners and opportunities for collaboration in Germany.

it's OWL is among the numerous cluster organizations that support Industrie 4.0. Based in North Rhine-Westphalia, it's OWL is a regional organization that works closely with international organizations in the AMT industry. **it's OWL Clustermanagement GmbH** manages strategy development, project implementation and networking between cluster partners.

See

- **Plattform Industrie 4.0**
- **Mittelstand 4.0**
- **Smart Service World**
- **Autonomics for Industrie 4.0**
- **it's OWL**
- **Allianz Industrie 4.0**

Canada and Germany already cooperate in the field of AMT. In 2018, they announced their first **Call for Proposals for "2+2" R&D Projects**, focusing on the development of Industrie 4.0-enabling technologies that involve SMEs. The 2+2 in the title indicates that each consortium must include at least one SME from Canada and one from Germany, and at least one Canadian academic partner and one German academic or research institute partner.

In 2018, the National Research Council of Canada invited Canadian SMEs to submit expressions of interest to join an Industrie 4.0 mission to Berlin, with the aim of exploring collaborative applied research and development opportunities between Canadian and German companies and their academic partners. The mission included an AMT partnering event and site visits to German companies, demonstration facilities and clusters.

The German-Canadian Centre for Innovation and Research gives Canadian SMEs access to a matchmaking tool and joint funds they can use to explore opportunities with European partners.

Canadian SMES may not join all national clusters, but can use these helpful tools to analyze local and industry regional players and identify potential innovation partners.

DID YOU KNOW...

- Canada and Germany have been cooperating for almost 50 years: the two countries **signed an intergovernmental agreement** on scientific and technological cooperation in 1971.
- Canada's McMaster University and Germany's Fraunhofer Institute for Cell Therapy and Immunology partnered to open BEAM, a **$33-million laboratory and advanced manufacturing facility**—the second Fraunhofer project centre in Canada.

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Contact a trade commissioner in Berlin

Italy

The Italian government is the most active stakeholder in the advanced manufacturing industry in Italy, where AMT is called Industria 4.0. Industria 4.0 focuses on the Internet of Things, which covers subsectors such as cloud computing, robots and advanced machine tools, digital industry, 3-D printing and cyber security.

This activity is bolstered by Piano Nazionale Industria 4.0, launched in September 2016 to encourage private investment.

Funding worth €23.9 billion is available from 2017 to 2020:

- €13 billion in tax breaks for investments during 2017
- €10 billion in additional resources by 2020

Italy's plan for Industria 4.0 includes bolstering its educational component by strengthening partnerships with companies and universities in North America.

Given Canada's strength in academia-industry research collaboration, Italy has already turned to Canada in this field:

- In 2012, the Natural Sciences and Engineering Research Council of Canada and the Italian Consiglio Nazionale delle Ricerche [National Research Council] signed a memorandum of understanding.
- The two countries have since published **Calls for joint research projects** in manufacturing focussing on academia-industry collaborative research and development.
- In 2014, the Government of Québec and the Lombardy Region signed a **5-year bilateral agreement** *[link in French]* on research and innovation. This agreement provides for collaboration in advanced manufacturing and has led to joint research projects and facilitated greater mobility for Canadian and Italian researchers.
- The Embassy of Canada to Italy sponsors an annual **Canada-Italy Innovation Award**, which provides funding for Italian innovation experts, researchers, scientists and representatives of start-up companies to travel to Canada to develop collaborative projects.

Explore clusters and partner platforms to find potential opportunities in Italy:

- **Italian National Technology Cluster Fabbrica Intelligente**
- **Internet 4 things and Industria 4.0**
- **Associazione Fabbrica Intelligente Lombardia**

DID YOU KNOW...

- Manufacturing accounts for **23.6 %** of Italy's GDP. In 2015, Italy's **$63.2-billion**
- Manufacturing trade surplus was the **fifth highest in the world.**

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Contact a trade commissioner in Rome

Austria

The Austrian government's dedicated funding programs and SME support measures drive Industrie 4.0 Österreich, the national AMTindustry.

> The government is injecting approximately €120 million in direct funding for digitization in science and industry.

Support is available for enabler technologies such as cyber-physical production systems, assistance systems at the human-machine interface, big data analysis, cloud technologies, additive manufacturing processes such as 3-D printing processes, robotics, intelligent materials and encryption technologies.

Plattform Industrie 4.0 is a membership-based platform open to leaders across the AMT industry from academic and research institutions to SMEs and NGOs. Founded by Austria's federal ministry for transport, innovation and technology, the platform aims to develop joint strategies on Industrie 4.0 and to launch initiatives for international activities.

Production of the Future, Silicon Austria and ICT for the Future are three such initiatives that involve experts from research and industry.

Within the past three years, the ministry funded, and Austrian Research Promotion Agency (FFG)[11] managed, more than 600 projects related to manufacturing. Infineon Technologies, the worlds twelfth-largest producer of microchips, is currently investing €1.6 billion in a new factory in southern Austria that will become operational in 2021.

> Austria's AMT industry comprises 29,000 companies employing some 640,000 people.

Explore clusters and partner platforms to find potential opportunities in Austria:

- Plattform Industrie 4.0
- Silicon Alps
- Zukunftsakademie Mostviertel
- Business Upper Austria
- Kärnten Digital – Industrie 4.0
- The Austrian Federal Association of Commercial Agents
- Advantage Austria Business Directory Advantage Austria:
- offers business development services for Austrian companies and their international business counterparts
- hosts events on cooperation in AMT research and development between Austria, the United States and Canada
- provides online search tools to help SMEs locate potential business opportunities in Austria

Austria is an EU leader in green building technology.

DID YOU KNOW...

- Each year, some **50 companies from Canada** seek innovation partnerships with Austrian stakeholders in the field of high-rise wood buildings, cross laminated timber passive and net zero houses.
- The Wirth Institute for Austrian and Central European Studies at the University of Alberta was founded by Austria's ministries of science and of foreign affairs.
- Austria will be the **first European country** to test a new system enabling vehicles to transmit safety-relevant information to each other in real-time. This is part of a trans-European cooperative intelligent transport system initiative.

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Vienna

[11] https://www.ffg.at/en

BALTIC STATES

Since the emergence of Industry 4.0 across Europe, Estonia, Latvia and Lithuania have recently become key players in the ATM industry, in particular in the field of ICT, cybersecurity and cryptocurrency.

Together, these three Baltic States have spawned a wave of tech entrepreneurs and SMEs that have transformed the European ICT landscape.

In 2018, Estonia and Canada signed a memorandum of understanding on digital cooperation aimed at joint projects.

Estonia

Estonia is one of the world's most developed digital societies. Estonia's innovation policy is based on digitalization and places great emphasis on promoting entrepreneurship:

- The Estonian economy is supported by a large number of SMEs and has an above-average founder ratio.

Estonia offers e-residency, which is available to foreign companies seeking start-up opportunities in the country.

The Global Entrepreneurship Monitor (GEM 2017) acknowledges Estonia's dynamic environment that promotes innovation:

- Around a quarter of Estonia's total industrial research budget flows into the IT sector.
- Recent Estonian innovation policy includes two medium-term (2014–2020) strategies: the Estonian research and development and innovation strategy and the Estonian entrepreneurship growth strategy.
- The Estonian government has set up Arengufond, a fund to promote the development of information technology and digitalization in application sectors.
- Despite its small size, Estonia has an internationally renowned research sector, especially in the area of information technology.

Estonia has three state-run universities, located in Tartu and Tallinn, and two competence centres:

- ELIKO
- Software Technology and Applications Competence Centre (STACC)

The Estonian government is driving Estonia's competitiveness by improving ICT infrastructure through Digital Agenda 2020.

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Contact a trade commissioner in Tallinn

Latvia

Latvia is in the top ten countries in Europe for investment and revenue in the telecom industry, and ICT services account for approximately 4.6% of Latvian GDP and employing over 30,000 people in 5,000 companies. The ICT industry in Latvia has experienced significant growth over the past few years, offering many opportunities for Canadian SMEs to find business partners in Latvia. The availability of stable, highly productive and well-trained IT specialists with modest salary requirements, in comparison to the average EU salary levels, makes the Baltic States an attractive environment for the development of AMT projects.

Canadian SMEs interested in potential partnerships should explore the following:

- Riga-based **CryptoBaltic** is paving the way for ICT innovation in the Baltic States, with the aim of creating a platform that connects ICT innovation in cryptocurrency and blockchain technology.
- The **Latvian IT cluster** represents the ICT Industry and is a platform for further development of innovative solutions and products.
- The **Latvian Information and Communications Technology Associations** represents over 70 ICT products and services providers and educational institutions.
- **The Investment and Development Agency of Latvia** promotes business development by facilitating more foreign investment, in turn increasing the competitiveness of Latvian entrepreneurs in both domestic and foreign markets.

The ICT sector in Latvia comprises more than 1,000 companies, employs over 30,000 people and accounts for approximately 4.6% of Latvia's GDP.

DID YOU KNOW...

- In February 2017, Latvia became the **first EU member state to ratify the Canada-EU Comprehensive Economic and Trade Agreement (CETA) and the Strategic Partnership Agreement.** CETA is expected to generate new economic opportunities for both Canada and Latvia.

- Latvian Information Technologies & Telecommunications Association
- Internet Association of Latvia
- Latvian Association of Computer Technologies
- Ministry of Transport of Latvia
- Baltic Business Technology Fair and Conference

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Riga

Lithuania

Lithuania is home to the largest ICT industry in the Baltic States[12] and number one globally for fulfilling ICT needs.[13]

> Lithuania, dubbed Europe's crypto capital, has emerged as a hub for cryptocurrencies because of its open markets and compliant policies that attract cryptocurrency entrepreneurs from around the world.

Vilnius is home to **Blockchain Centre (BC) Vilnius**, the first blockchain centre connecting key players in Asia, Australia, and Europe. Although it doesn't yet cover North America, the centre's presence demonstrates Lithuania's position in the global ICT landscape. Barclays recently opened **Rise Vilnius**, a financial technology (fintech) hub for start-up and scale-up companies.

Pramone 4.0, Lithuania's national industry digitalization platform, was established in 2016 making Lithuania the first Baltic State to have such a platform. The national industrial competitiveness (Promone 4.0) commission works with thematic groups to promote the use of digital manufacturing services and cybersecurity.

The Pramone 4.0 commission includes several potential partners for Canadian companies:

- Lithuanian Confederation of Industrialists (LPK)
- LINPRA
- INFOBALT
- Lithuanian Innovation Center (LIC)
- Lithuanian Business Confederation

13 of the 20 largest IT companies in the Baltic States are based in Lithuania.

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Contact a trade commissioner in Vilnius

[12] https://www.verslilietuva.lt/en/business-sectors/ict/

[13] http://www.govilnius.lt/business/key-business-sectors-vilnius/ict/

Czech Republic

The P4.0 [Průmysl 4.0] is the Czech Republic's version of Industry 4.0. Coordinated by the Czech ministry of industry and trade, P4.0 was approved by the Czech government in 2016 as the national AMT strategy. The long-term goal of P4.0 is the promotion and funding of industrial development and research and education in order to enhance the competitiveness of the Czech Republic in AMT.

In 2017, the government formed

- Society 4.0, an educational action plan to deal with the re-skilling needed for advanced manufacturing processes
- Alliance Society 4.0, a platform for cooperation among government, economic and social partners and academia

In March 2019, PM Andrej Babiš approved new key document "**Innovation Strategy of the Czech Republic 2019–2030**", prepared by R&D Council in cooperation with a team of entrepreneurs, scientists, academics and representatives of the public administration. The strategy sets out new priorities, which, if achieved, should put the Czech Republic among the most innovative countries in Europe by 2030 – "The Country for the Future" The long-term goal of P4.0 is the promotion and funding of industrial development and research and education in order to enhance the competitiveness of the Czech Republic in AMT.

Canada and the Czech Republic are already engaged in joint initiatives and collaborations.

CzechInvest's **Artificial Intelligence (AI) technology diplomatic mission** to Canada will aim to explore partnership opportunities for Czech and Canadian research institutions, businesses and start-ups.

In September 2017, the Government of Ontario signed a Memorandum of Cooperation with the Czech technology agency TACR [(Technologická agentura České republiky], which distributes state funds for research and innovation.

Ontario-based companies may now apply for, and may soon be able to participate in, P4.0 projects funded by the Czech government, including:

- **DELTA:** supports collaboration in applied research and experimental development projects through joint projects involving enterprises and research organizations supported by TACR and major foreign technological and innovation agencies. Canadian businesses will be eligible to apply for funding as of June 2019 in **DELTA 2** (for the period 2020 – 2025)
- **Inter-excellence program:** supports the participation of Czech companies in projects of European cooperation and bilateral cooperation with countries outside the European Union. This program is managed by the Czech **ministry of education, youth and sports.**

Explore the following Czech-only clusters to identify key AMT players:

- CzechInvest
- VUTS Liberec
- National Cluster Association
- Prague AI Superhub
- NETME
- IndustryCluster 4.0
- CZLO Czech Liaison Office for Research, Development and Innovation
- National Centre for Industry 4.0
- RICAIP- Research and Innovation Centre on Advanced Industrial Production
- Czech Institute of Informatics, Robotics and Cybernetics

DID YOU KNOW...

- According to the World Economic Forum, the Czech Republic is an Industry **4.0 pioneer.**
- The Czech Republic has a **digital tax index of 7.48%**, which is more favourable than those in effect in Germany, Spain or France.[14]

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Prague

See

Industry 4.0 – the initiative for the Czech Republic

Industry 4.0 in the Czech Republic

Analysis of National Initiatives for Digitising Industry: Czech Republic

Digital Transformation Monitor, Czech Republic: "Průmysl 4.0"

[14] European Commission, 2017

AMT at the EU level

At the EU level, AMT is incorporated into programs and funding opportunities available for key enabling technologies (KETs). SMEs are key drivers of KETs. KETs comprise six technologies that form the base for innovation across all industrial sectors.

KETs has a significant impact on the EU economy:

In 2013, KETs- enabled products were valued at 53.5 billion euro, which is equivalent to 19.2% of the total value of manufacturing across the EU-28.[15]

The KETs Observatory monitors the deployment of KETs within and outside of the European Union and converts the results into useful information. The tool helps users identify key challenges and market opportunities in the AMT industry.

See

- Funding Opportunities for KETs in Horizon 2020

Horizon 2020 - Leadership in Enabling and Industrial Technologies (LEIT)

Horizon 2020 supports AMT through the leadership in the enabling and industrial technologies (LEIT) section, which includes ICT, advanced manufacturing and space technologies.

LEIT

- enhances the industrial deployment of enabling technologies
- includes in its mandate nanotechnologies, advanced materials, advanced manufacturing and processing, and biotechnology
- leverages private sector investment
- supports the involvement of SMEs

Horizon 2020 funding opportunities related to AMT will be published under the following work programs:

See

- LEIT work program for ICT
- LEIT work program for Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing, and Biotechnology
- LEIT work program for Space

[15] European Commission

Horizon 2020 Public Private Partnerships

The following PPPs are particularly relevant for Canadian SMEs seeking partnerships in AMT, given the prominent support they receive from the European Commission and European industry.

See

Joint Technology Initiatives (JTIs)

- Aeronautics and Air Transport (Clean Sky)
- Bio-Based Industries
- Fuel Cells and Hydrogen (FCH)
- Shift2Rail
- Electronic Components and Systems for European Leadership (ECSEL)

Contractual PPPs

- Factories of the Future
- Sustainable Process Industry
- Photonics
- Robotics
- Advanced 5G networks for the Future Internet
- High Performance Computing

Canadian helicopters are featured in Cleansky2, Canada's first participation in a Horizon 2020 PPP-JTI.

EUREKA CLUSTERS

> EUREKA Clusters are long-term, industry-driven strategic initiatives that develop technologies of key importance for European competitiveness, but are open to participants from other EUREKA countries, including Canada.

Cluster projects bring together large and small companies to work on near to the market and pre-competitive R&D projects in their respective sectors.

The following EUREKA clusters may be of interest to Canadian SMEs seeking innovation partnerships in AMT:

- CELTIC-NEXT - next generation telecommunications
- EURIPIDES2- smart electronic systems
- ITEA3 - software intensive systems and services
- Metallurgy Europe - industrial metallurgy and advanced manufacturing
- PENTA - micro and nanoelectronics systems and applications
- SMART - advanced manufacturing technologies

See

- National Research Council Canada - EUREKA

Other EU Resources for AMT

Explore key international clusters and partner platforms to learn about AMT opportunities in the EU:

See

- Report on KETs
- SME Internationalisation support
- ICT Innovation for Manufacturing SMEs
- Smart Anything Everywhere
- Vanguard Initiative on Smart Specialization of EU regions
- 14MS (ICT Innovation for Manufacturing SMEs)
- Country innovation profiles on smart regional specialization in the EU

CHAPTER 2:

CLEAN TECHNOLOGY

Overview

The global clean technology industry is undergoing rapid change and growth. The focus in recent years on finding greener solutions to traditional services has led to more funding opportunities and increased international and cross-sector collaboration. Canada is one of the nations leading the way to cleaner and greener initiatives, exemplified by its numerous funding opportunities and strategies in the sector. Most recently, Canada unveiled its **International Business Development Strategy for Clean Technology.** The strategy, led by Global Affairs Canada, positions 15 new trade commissioners in key global hubs to enhance clean technology resources abroad. In addition, Canada's Clean Growth Program (CGP) supports a $155-million investment in clean technology research and development and demonstration projects in three Canadian sectors: energy, mining and forestry.

CETA simplifies and accelerates the process to allow European workers with technical expertise and certain independent professionals to work in Canada for extended periods of time and vice versa. This is an important prerequisite for the free flow of knowledge and ideas that drives innovation in the energy and environmental sectors.

The provisional entry into force of the Comprehensive Economic and Trade Agreement (CETA)—the free-trade agreement between Canada and the EU—in 2017 also helps the internationalization of the clean technology industry. CETA will dramatically streamline business operations, leading to an increased exchange of knowledge, professionals, technologies and innovation in the fields of green and renewable energy. In addition, the elimination of tariffs under CETA will lead to improved labour mobility.

CETA will also ensure a greater access to public procurement markets in areas related to the EU's and Canada's initiatives related to reduce carbon emissions, a better management of waste water treatment and use of energy and better control of air pollution.

When looking for innovation partners in cleantech, one European region stands out in particular. The Nordic region is the European, and the global, hotbed for cleantech innovation. According to the **Global Cleantech Innovation Index 2017**, Denmark and Finland were identified as the top two countries with the greatest potential for increased cleantech innovation over the next decade. This was based on two main pillars of research: current inputs and innovation outputs in the green-tech sphere.

The United Kingdom is the leading European country in cleantech innovation after the Nordic countries, spurred on by the private capital provided by domestic investors and funds and its high number of successful cleantech startups.[16] Belgium has also received large venture capital investment in energy efficiency, with the ninth-highest venture capital investment in energy efficiency.

[16] Global Cleantech Innovation Index 2017

Continue reading for country-specific information on the clean technology industry.

Denmark

Denmark is the global leader in cleantech innovation, supported by its commitment to specific cleantech innovation drivers and the vast size of its commercialized cleantech. Denmark scored top marks for the number of public cleantech companies and cleantech imports and exports. It must be noted that Denmark cut its R&D budget by 50% in 2017, the effects of which were not accounted for in the report. However, the Danish government's recent pledge to double the average public funding to the Danish Energy Technology Development and Demonstration Program (EUDP) to $90 million by 2020 will provide further R&D opportunities.

The **Energy Technology Development and Demonstration Program (EUDP)** is managed by the Danish Energy Agency and supports the development and demonstration of energy technologies, as well as research if it is part of a development and demonstration project. Private companies and universities and foreign participants can receive funding through the EUDP, provided that the main applicant of the project is a Danish-registered company or university. In fact, the new EUDP strategy seeks to take on an increased global perspective, with the aim of investing in areas where there is a strong match between global demand for new energy technology and business potential for the Danish industry. Under this new strategy, the EUDP seeks to promote international collaboration, providing that results of international consortia are anchored in Denmark.

Programs that support this international collaboration include

- the International Energy Agency's (IEA's) Technology Collaboration Program (TCP), which focuses on network building and the promotion of international projects
- the global Mission Innovation, which aims to strengthen research and development in cleantech. Canada is a founding member of the IEA

In 2017, Canada and Denmark, alongside Finland, Iceland, Norway, Russia, Sweden and the United States, signed an **Agreement on Enhancing International Arctic Scientific Cooperation**. Within the agreement is the acknowledgement of the need for increased actions to mitigate and adapt to climate change and the importance of international scientific cooperation to achieve this goal.

Explore the Danish clean technology industry by taking a look at the following clusters and partner platforms. Although some of these clusters include only Danish enterprises, they offer an overview of the key players in the sector, as well as regional hotspots:

- Medicon Valley
- Copenhagen Capacity
- Ministry of Foreign Affairs
- State of Green
- Scale-Up Denmark
- Clean Cluster Denmark
- BioPeople
- Energy Technology Development and Demonstration Program

More than 600 cleantech companies operate in Copenhagen Capital Region, and just over half have increased their R&D budgets.

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Copenhagen

Finland

*Finland is often dubbed the **greenest country in the world.** Indeed, per capita, Finland is the world's leading researcher in energy and environment.*

Like its Nordic neighbour Denmark, Finland scored highly in terms of cleantech-specific drivers, particularly for its cleantech R&D budget and amount of cleantech funds and clusters.

Finland's high scores in these areas can partly be attributed to the government's commitment to cleantech R&D: more than 40% of public R&D funding goes into the energy and environment sector, and more than a third of these investments are made in cleantech. Some 38% of Finnish energy is currently produced from renewable sources. This share is substantially higher than the global share of 13%.

Indeed, cleantech is one of four pillars of the Finnish government, and there is no indication of this changing. The goal for energy produced from renewable sources is 38% by 2020 and 50% by 2030. This target cannot be achieved alone, and huge efforts are being made to boost the internationalization of Finnish cleantech companies, through the joint initiative **Cleantech Finland**. Cleantech Finland is a network of cleantech experts and solutions and offers international partnering and investment opportunities across all cleantech industries. Cleantech Finland aims to increase the country's reputation as a leading cleantech country and to internationalize it by joining its cleantech network with global markets. Foreign entities can join Cleantech Finland, provided they have operations in Finland, such as R&D activities.

Finland is also a global forerunner in the transitioning to a circular economy model. In 2017, Finland unveiled its **Circular economy roadmap for 2016-2025**, which is a joint initiative involving the Finnish Innovation Fund Sitra, the relevant ministries and other stakeholders to accelerate the country's transition to a competitive circular economy. Finland will host the third **World Circular Economy Forum** (WCEF) in Helsinki from June 3 to 5, 2019, and will bring together business leaders, policymakers and experts to present the world's best circular economy solutions to businesses looking to find new opportunities and gain a competitive advantage through the circular economy.

DID YOU KNOW...

- Finland has the ***largest energy cluster among the Nordic countries.***
- Located in the city of Vaasa, the cluster generates an annual turnover of ***4.4 billion euros.***
- SMEs and micro companies make up ***70% of the total 1,600 cleantech companies in Finland.***

Explore clusters and partner platforms to learn about Finnish SMEs that could be potential collaborators or partners.

- **Cleantech Finland**
- **GreenNet Finland**

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Contact a trade commissioner in Helsinki

The United Kingdom

In 2017, the U.K. government published its **Clean Growth Strategy**, which sets out the key actions the government will take to accelerate growth in the cleantech sector in the United Kingdom. The strategy focuses on low carbon emissions, and the government's £2.5-billion investment in low carbon innovation represents the biggest increase in spending in science and innovation in almost 40 years.[17] The goal is to decarbonize all sectors of the U.K. economy throughout the coming decade.[18]

Among the policies are proposals to

- » further develop green finance capabilities
- » accelerate the move to low carbon transport
- » deliver clean power

The U.K. government launched the **Green Finance Initiative** in 2016 to promote the United Kingdom as a global hub for green finance. In 2018, the Green Finance Institute was launched to create new business opportunities and enhance international engagement in the financial sector.

London is the leading cleantech city hub in the United Kingdom and in Europe, and it will likely retain its leadership with the launch of other cleantech initiatives that support the national Clean Growth Strategy.

In 2017, the Mayor of London announced the launch of cleantech incubator **Better Futures**, aimed at further accelerating the growth of London's cleantech sector.

Better Futures will support 100 small businesses that work toward reducing negative impacts on the environment, through services such as R&D support, intellectual property support and co-working space.

Canada and the United Kingdom share a history of working together across sectors and industries, including in clean tech.

Example

In 2018, the two countries launched **the Power Forward Challenge**, a 30-month transatlantic competition on smart energy systems.

Almost 90% of U.K. cleantech companies are based in London.
(Cleantech Industry in London, s.d.)

The U.K. cleantech sector is worth £50 billion annually or 3% of GDP.

Explore partner platforms and clusters in the U.K. clean-tech industry to learn about the sector and find potential partners:

- » Cambridge CleanTech
- » Future Cities Catapult
- » London Cleantech cluster
- » Clean Capital
- » Cleantech East
- » Sustainable Bridges
- » Better Futures
- » Imperial College London's Centre for Cleantech Innovation

Brexit

On December 11, 2018, the U.K. government published technical notes regarding the participation of the United Kingdom in Horizon 2020 following the proposed departure of the United Kingdom from the EU.

In the notes, the U.K. government stated that it was preparing for every eventuality and that close collaboration between the United Kingdom's and the EU's researchers will continue after the exit.

At present, the U.K. government has committed to underwriting all U.K. Horizon 2020 project proposals that are submitted before the exit, for the lifetime of the projects, even if the U.K. project proponents are notified of their success after the exit date.

In the event of a no-deal scenario, the United Kingdom will fund the participation of British researchers and companies in Horizon 2020 calls for projects open to third country participants. This means that Canadian SMEs would still be able to partner with their U.K. counterparts and apply for funding together.

See

Brexit Fact Sheet - United Kingdom Research Office (UKRO)

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in London

[17] https://www.techuk.org/insights/news/item/11518-clean-growth strategy launched

[18] https://www.gov.uk/government/publications/clean-growth-strategy

Belgium

The Belgian region of Flanders holds considerable opportunities for engaging in cleantech innovation partnerships. In recent years, Belgium has made great strides in the industry due to its R&D budget, which, when weighted by GDP, is larger than that of neighbouring Germany, France and the Netherlands. In 2018, Antwerp hosted the annual Clean Tech Forum, a nod to the country's emerging cleantech industry.

In 2017, the Flanders Cleantech Association and Flanders Investment & Trade (FIT), the region's agency for international enterprise, signed an agreement to work together to internationalize Flanders-based businesses.

This goal will be achieved primarily by setting up international B2B matchmaking in Cleantech and by setting up international mentorship projects, in which large companies guide SMEs in setting up a framework for international ventures. Sixteen additional organizations signed agreements with FIT to support their international efforts, including clusters and partnership platforms.

See

- Clean Tech Flanders (Flanders Cleantech Association)
- Finindus
- Waterstofnet
- Flanders Investment and Trade Site
- Flux50
- Catalisti
- TWEED (Technology of Wallonia Energy, Environment and sustainable Development)
- GreenWin
- Greentech. brussels

Flanders is part of the Silicon Valley of Western Europe

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Contact a trade commissioner in Brussels

Cleantech at the EU level

Horizon 2020 funding

The final Horizon 2020 work program for its **Secure, Clean and Efficient Energy** program spans from 2018 to 2020, with a total budget of €212 million. Calls for proposal for this program support projects that will demonstrate innovation through research into more energy-efficient technologies and solutions in the following domains:

- consumers
- buildings
- public authorities
- industry, products and services
- heating and cooling
- innovative financing

Examples

- **Competitive Low Carbon Energy:** total budget of €225 million currently available to clean energy projects
- **Smart Cities & Communities:** sustainable and green solutions in urban areas
- **Climate action, environment, resource efficiency and raw materials:** under the executive agency for small and medium-sized enterprises (EASME)

In 2019, calls include

- building a low-carbon, climate resilient future: climate action in support of the Paris Agreement
- greening the economy in line with the Sustainable Development Goals

Horizon 2020 Public Private Partnerships

The following PPPs are particularly relevant for Canadian SMEs seeking partnerships in cleantech, given the prominent support they receive from the European Commission and European industry.

See

Joint Technology Initiatives (JTIs)

- Aeronautics and Air Transport (Clean Sky)
- Bio-Based Industries
- Fuel Cells and Hydrogen (FCH)

Contractual PPPs

- Energy-efficient Buildings – Key projects:
  - European Construction Technology Platform
- European Green Vehicles Initiative - Key projects:
  - European Green Cars Initiative (EGVI)
  - The European Road Transport Research Advisory Council (ERTRAC)

Stillwater Canada is part of the PACIFIC consortium and receives Horizon 2020 funding under EASME for developing new solutions for the sustainable production of raw materials.

Funding opportunities outside Horizon 2020

Breakthrough Energy Europe (BEE) is a joint investment fund to help innovative European companies develop and bring new clean energy technologies to market. With a capitalization of €100 million, the fund will focus on reducing greenhouse gas emissions and promoting energy efficiency in key areas: electricity, transport, agriculture, manufacturing, and buildings. *The €100 million BEE fund combines €50 million of public funding from the EU and €50 million in long-term risk capital from Breakthrough Energy Ventures, the Bill Gates fund for energy startups.*

LIFE *provides for the participation of third countries as associated beneficiaries, provided that*

- the coordinating beneficiary is based in the EU
- evidence is provided that concrete activities to be conducted outside the EU are necessary to achieve EU objectives and to ensure the effectiveness of project interventions in the territory of the member states

EUREKA Clusters

EUREKA Clusters are long-term, industry-driven strategic initiatives that develop technologies of key importance for European competitiveness, but are open to participants from other EUREKA countries, including Canada. Cluster projects bring together large and small companies to work on near to the market and pre-competitive R&D projects in their respective sectors.

The following EUREKA clusters may be of interest to Canadian SMEs seeking innovation partnerships in cleantech:

- EUROGIA2020 - low carbon energy technologies
- ITEA3 - software intensive systems and services, with a focus on smart cities

See

- National Research Council Canada - EUREKA

VENTURE CAPITAL FUNDS

A considerable amount of private equity is available for cleantech:

- ABB Technology Ventures
- Aster
- Chrysalix
- ipcleantech
- Demeter
- Doen Foundation
- Ecapital
- Ecomachines Ventures

Emerald Technology Ventures (Europe, United States and Canada)

- Energie Baden-Württemberg AG (EnBW)
- EON Strategic Co-investments
- ETF Partners
- Greencoat Capital
- High-Tech Gründerfonds
- InnoEnergy
- International Cleantech Network
- Global Clean Tech

Leading conferences in cleantech provide opportunities to network and meet potential European partners:

- Annual Clean Tech Forum
- Building Green
- Clean Tech Forum
- EU Green Week
- Green Build Europe
- CleantechInnovate
- Better Futures Events (London)

CHAPTER 3:

LIFE SCIENCE

The arrival of digital technologies has had a profound effect on the life science sector. This is due to the fact that life science, which encompasses biotechnology, medical technology and pharmaceutical technology, is based on the use of biology and information technology to improve health outcomes.

Overview

Canada's life science industry is renowned for its focus on research and innovation, delivering cutting-edge treatments to patients across the world, and Europe is home to some of the world's leading nations in life science. As a result, many initiatives have emerged connecting Canadian and European life science expertise.

Canadian and European institutions have a long history of collaboration in this industry: 2016 marked the twentieth anniversary of the Canada-EU Science and Technology Agreement, a pact driven by the promotion of cross-border collaboration. Initiatives such as these greatly facilitate collaboration between European and Canadian SMEs, propelling transatlantic partnerships in the life science industry, a situation that is unlikely to change in the near future. In 2018, the Canadian Institutes of Health Research (CIHR) **announced** a commitment of $15 million to support ten joint transnational calls for proposals in 2018 under the EU's Horizon 2020. This is a testament to the close relationship between Canada and Europe in this field and shows renewed commitment to work collaboratively.

The provisional application of CETA that came into effect in 2017 also helps SMEs in the life science sector collaborate across borders. Not only does CETA facilitate freedom of movement, it helps SMEs identify partnership opportunities, health-care providers and academics,[19] and facilitates the development of sound market access strategies that are relevant to life sciences.

The leading hotspots for life science overlap those in advanced manufacturing: many of Europe's life science hotspots such as Switzerland, Germany and France are clustered in western Europe. As with the AMT industry, the strength of a country's life science industry can be determined by its share of patents, the number of life science firms and annual global reports. Germany is second to the United States in terms of patents. Spain, and the Catalonia region in particular, is home to a vibrant life science ecosystem which can offer partnerships and opportunities for Canadian SMEs.

[19] https://cdn.ymaws.com/echalliance.com/resource/resmgr/docs/CETA2018_Event_Prospectus_Ju.pdf

Germany

Given Germany's leading position in the AMT industry, it is not surprising that it is also the European leader in life science and the largest European market for life science products. Indeed, its strength in life science comes from its use of cutting-edge technology: Industrie 4.0 has propelled Germany in hi-tech fields such as medical devices, biomaterials and (bio)-pharmaceuticals.[20] Canada and Germany have a history of cooperation in science and technology.

The Canada-German Bilateral Agreement on Scientific-Technological Cooperation was established in 1971 to formalize cooperation between the two countries.

In 2001, the German federal minister of education and research and the Canadian minister of science, research and development signed a joint declaration to mark the 30th anniversary of this agreement and established future priorities for bilateral cooperation, including green biotechnology. As a result of this agreement, the **Helmholtz Association** and the National Research Council (NRC) have worked closely on joint projects in life science.

Canada and Germany are also engaged in specific life science initiatives, with a focus on research institutions and industry-academic collaboration, including the Helmholtz Association and the **Max Planck Society**.

Some Canadian provinces have also entered into agreements with German states.

Examples

- Alberta with Saxony
- British Columbia with Rhineland-Palatinate
- Ontario with Baden-Württemberg
- Quebec with Bavaria, Saxony and Brandenburg

DID YOU KNOW...

- In 2015, Germany was in third place, after Switzerland, with **$270 million** in venture funding in Europe.[21]

Explore clusters and partner platforms to identify possible partnership opportunities among Germany's SMEs:

- BioM
- BioRN
- Health Axis Europe
- EMBLEM
- IZB

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Berlin

See

GTAI German Trade & Investment

For information and support related to the Canada-Germany Bilateral Science and Technology Agreement:

Innovation, Science & Technology Division Global Affairs Canada

International Bureau German federal ministry of education and research

[20] Germany ade & Invest

[21] **EuropaBio**

France

France's position in the European life science industry is driven by its strength in biotechnology:

- in terms of the number of biotech firms, the country ranks third after the United Kingdom and Germany
- in terms of the number of biotech products in development, it ranks second[22]

In terms of scientific collaboration and technology partnerships, France is among Canada's priority countries. In 2013, the two countries signed the **Joint Official Statement on Innovation Cooperation 2016-2018.** The agreement identifies biotechnology and medical technology, green technologies, aerospace and advanced materials as priority sectors and facilitates cross-sector and cross-border partnerships.

Agreements also exist on the provincial level, such as the cooperation between Quebec and France on scientific and academic ventures, through joint laboratories, integrated courses and scientific events.[23]

The French Alliance for Research and Innovation in Health Industries (ARIIS) demonstrates the leading position of France in the life science sector. ARIIS facilitates the setting up of public-private partnerships and brings together scientists and researchers from the health care industry through the organization of the annual International **R&D Dating Day**, among others events.

In 2004, France introduced a new industrial policy that emphasized innovation. This resulted in the establishment of competitiveness clusters working within joint projects to improve outcomes. France has seven of these specialized competitiveness clusters dedicated to life science:

- Atlanpôle Biothérapies
- Alsace BioValley
- Cancer Bio-Santé
- Eurobiomed
- LyonBiopôle
- Medicen Paris Region
- Nutrition, Health, Longevity (NHL) cluster

Other French clusters and platforms in the life science sector include:

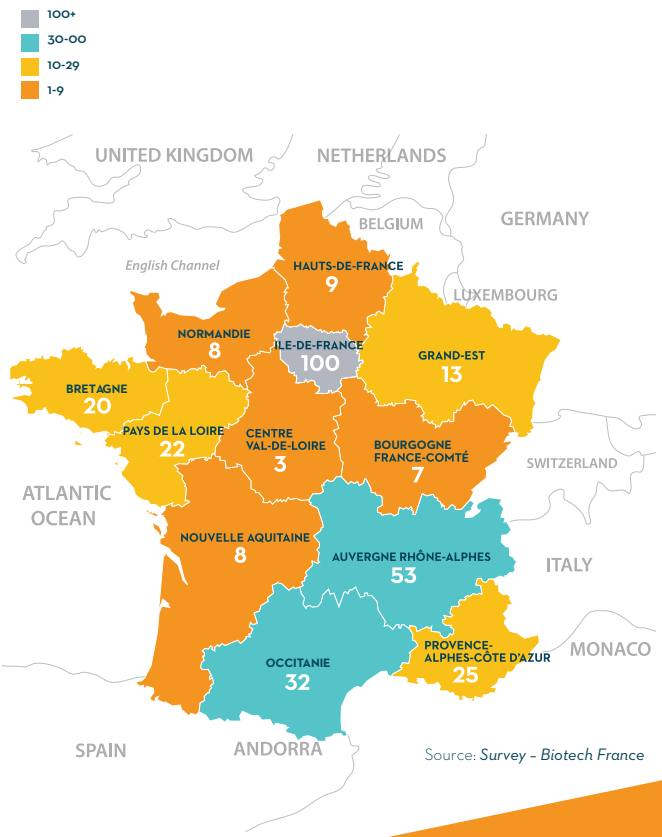
- Genopole
- France Biotech

France is also home to many of the world's largest life science venture capital funds. These include

- Truffle Capital
- Edmond de Rothschild, Investment Partners
- CMC-CIC
- Auriga Partners
- Sofinnova

France and Canada are engaged in many high-quality partnerships in biotechnology.

Map of companies in the life sciences sector



Source: *Survey – Biotech France*

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Paris

See

Panorama France Health Tech 2017

[22] France Biotech

[23] France and Québec, France Diplomatie

Switzerland

Switzerland is a global leader in the life science industry and has ranked first as the world's most innovative country for eight consecutive years. The country is home to a number of leading universities and research institutes dedicated to life sciences as well as many corporate headquarters and provides generous funding for fundamental and applied research.

- In 2017, the 24 pharmaceutical corporations that are members of the Interpharma association invested 7 billion Swiss francs in R&D in Switzerland.[24]
- The Swiss National Science Foundation (SNSF) fosters international cooperation and enables cross-border collaboration on fundamental research through project and career funding.
- The institution Innosuisse provides funding for innovation projects between academic and industrial partners. Innosuisse's international outreach is mostly channeled through EUREKA. The leading region for life sciences is the Basel Area.
- The city of Zurich, where many of Switzerland's top universities and research institutes are based, has become the Swiss hotspot for life sciences. The Zurich hotspot also houses innovation parks, technology transfers and incubators, as well as financing networks and public sector associations. The hotspot has spawned many local clusters and business networks over the past few years, including Life Science Zurich Business Network and Bio-Technopark Schlieren-Zurich.

Leading universities in life sciences:

- Uni Basel
- ETH Zurich
- Uni Zurich
- EPFL
- Unil

On a national level, efforts are also being made to promote international and cross-sector collaboration.

Example

The Swiss National Science Foundation (SNSF) offers international cooperation programs for research groups in order to foster cross-border collaboration.

Like Canada, Switzerland places great emphasis on collaboration between industry and academia; the two countries work together to foster cross-border collaboration.

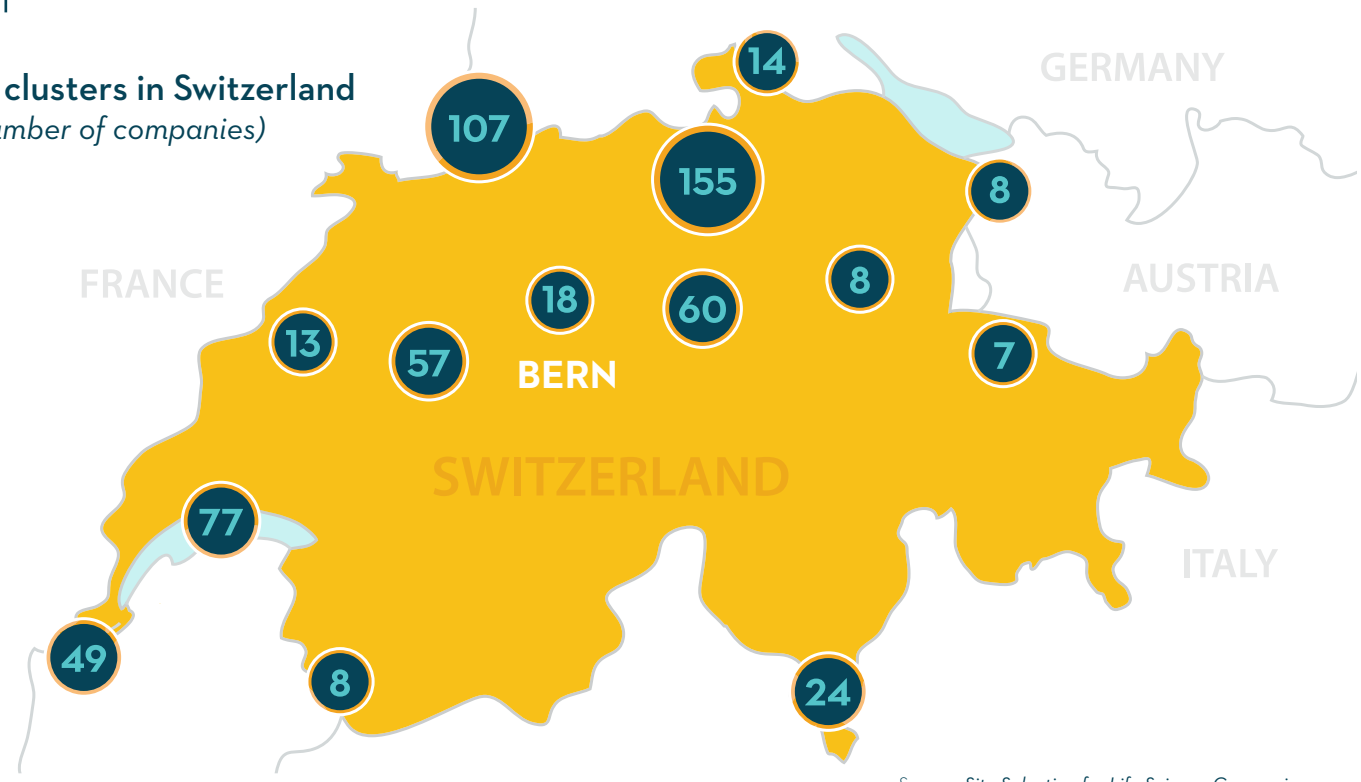
Among the most recent agreements between Canada and Switzerland is the 2018 Joint Statement on Science, Technology and Innovation that promotes cooperation between the two countries in life sciences, cleantech and advanced manufacturing.

DID YOU KNOW...

- The Swiss National Science Foundation provides an estimated **$1.3 billion** in annual competitive funding for fundamental research.
- Innosuisse provides an estimated **$300 million** of annual matching funding for innovation projects between academia and industry.

[24] EuropaBio

LS clusters in Switzerland
(Number of companies)



Source: *Site Selection for Life Science Companies in Europe, pp 64-65, KPMG (2015)*

Explore clusters and partner platforms to learn about potential partnership opportunities with Swiss SMEs:

- Medtech & Pharma Platforma
- Swiss Life Sciences Database: A database to identify potential partners in the Swiss Biotech, Pharma and Medtech industry, part of the global lead sourcing platform Biotechgate.
- Basel Area; local investment promotion agency with excellent connections into life science
- BAK Basel
- Technnopark Basel
- Greater Geneva Bern Area
- Campus Biotech
- Biovalley
- Innosuisse
- Enterprise Europe Network, Switzerland
- Swiss National Science Foundation
- Science Industries Switzerland
- Euresearch
- Enterprise Europe Network Switzerland
- Swiss Biotech
- Inartis Foundation/Health Valley

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Bern

The hub forms part of the Twins International MultiHelix agreement, an international partnership agreement with four other science parks and clusters: LifeTechValley in Belgium; Sherbrooke Innopole in Canada; Medicon Village in Sweden; and the Life Sciences Hub in Wales.

See

- Report on Higher Education and Research in Switzerland
- Report on Research and Innovation in Switzerland
- Zurich Life Science Hotspot

Spain

Spain's reputation in the life science sector is impressive.

Spain ranked fifth among 28 EU member states in the number of grants it received from the European Research Council (ERC) in 2018.[25] ERC awards grants to scientists and researchers who have shown outstanding performance in the quality of their research. All scientific fields are considered.

Spain is also home to the many leading biotech companies, in particular in the human health domain. This position is the result of a decade-long public campaign to stimulate the establishment of a dynamic ecosystem.

Under the auspices of the Spanish Bioindustry Association, Spain hosts Biospain, the largest biotech event organized by a national bioindustry association in Europe and one of the largest in the world. The event provides opportunities for Canadian SMEs to meet representatives from leading biotech and pharmaceutical companies and potential partners from all over the world. **Biospain 2018** attracted more than 1,500 participants and representatives of 770 companies, including a delegation from Canada.

Catalonia

Catalonia's bioregion is home to one of the most dynamic life science ecosystems in Europe, considered by many as the leading region for pharmaceuticals, biomedicine and medical devices in Spain and praised for the quality of its innovative research. It is no coincidence that Barcelona was picked to host the 2019 edition of Bio€quity, one of the biggest biotechnology investor conferences in Europe, that will showcase leading European life science, pharma and biotech companies and flag direct opportunities for foreign investments.

ACCIÓ, the Catalan government's agency for foreign investment and business competitiveness, is to a large extent responsible for Catalonia's success in life science. On top of promoting funding to Catalan companies in order to facilitate their internationalization, the agency offers specialized services to international investors aimed at attracting foreign direct investment to the bioregion.

In 2006, the Catalan government oversaw the creation of **Biocat**, a public-private foundation bringing together universities, research centres and companies specialized in the biotechnology and biomedicine sector. Biocat also acts as a networking facilitator for national and international networks and projects to promote healthcare and the life science sector in the bioregion of Catalonia.

Contact the Biocat team for more information on upcoming projects.

See

- » biocat strategic projects
- » Spanish Biotech Database
- » Invest in Spain
- » CataloniaBio & HealthTech

Contact **Trade and Investment Service** for practical and tailored sectoral information from the Catalan government on investing in Catalonia.

The life science sector represents about 7% of the Catalan GDP.

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in **Madrid** or **Barcelona**

[25] https://ec.europa.eu/info/sites/info/files/srip-report-chap-1-4_2018_en.pdf

Life science at the EU level

Horizon 2020

The Horizon 2020 funding framework provides many funding opportunities in life science. In addition, the Canadian Institutes of Health Research (CIHR) has partnered with the European Commission and EU member states to offer coordinated funding to Canadian researchers seeking collaborations with Horizon 2020 life science projects.

See

» CIHR international collaborations with the European Union

Canadian participation in EU member state health research networks

The following three joint research programs involve Canadian funding collaboration with EU member states in life science:

» European and Developing Countries Clinical Trials Partnership 2 (EDCTP2) New treatments for poverty-related diseases. SMEs from outside the EU can participate in an application for EDCTP2, but are not eligible to receive funds.

» The European Metrology Programme for Research and Innovation (EMPIR) New measurement technologies. SMEs from outside the EU can participate in an application for EDCTP2, but are not eligible to receive funds.

» Active and Assisted Living Research and Development Programme Technologies empowering the elderly and disabled to live safely in their own homes. Canada is a partner country, so Canadian SMEs can participate.

Through Horizon 2020, CIHR has participated in 28 Joint Transnational Calls, funded the Canadian component of 89 multinational teams and invested $27 million.

Horizon 2020 Public Private Partnerships

Under Horizon 2020, most life science funding goes toward Joint Technology Initiatives (JTIs) with European industry.

JTIs that focus on life sciences and operate under Horizon 2020 rules:

- **Innovative Medicines 2 (IMI2)** Aimed at developing next generation vaccines, medicines and treatments, such as new antibiotics. Information about calls, funding eligibility, and applying are published with each call. Canadian SMEs may participate in some of these projects, depending on the call criteria.
- **Bio-based Industries (BBI)** Aimed at supporting the use of renewable natural resources and innovative technologies for greener everyday products.

EUREKA Clusters

EUREKA Clusters are long-term, industry-driven strategic initiatives that develop technologies of key importance for European competitiveness, but are open to participants from other EUREKA countries, including Canada. Cluster projects bring together large and small companies to work on near to the market and pre-competitive R&D projects in their respective sectors. The following EUREKA cluster may be of interest to Canadian SMEs seeking innovation partnerships in life sciences:

- ITEA3 - software intensive systems and services, with a focus on e-health

See

- National Research Council Canada - EUREKA

European-level life science clusters and industry organizations

- Council of European BioRegions Has cluster partners across the world.
- bioXclusters plus Aims to support the internationalization of European SMEs and to act as a single entry point to Europe for international healthcare players. Its gateway network enables collaboration between European life science clusters and overseas markets. Canada is a gateway country.
- Europa Bio Hub of key developments in the European life science industry.
- Medicon Valley Based in Denmark, but is transnational.

> In 2015, European biotechnology financing reached $9.9 billion, an all-time high for Europe.

Venture Capital Funds

Private equity is also available for life sciences projects:

- **TVM Capital:** comprises independent investment advisories and fund managers for venture capital funds, investing in innovative biotech, pharmaceutical, and medtech companies in Europe, Canada, the United States and Asia, with teams based in Munich and Montréal.
- **Forbion:** Dutch-based fund focuses on companies developing drugs, medical devices and diagnostics; has members in Canada, Europe and the United States.
- **Sofinnova Partners:** invests in start-ups, early-stage companies in the life science industry. In 2018, closed its Industrial Biotech I fund at €125 million, making it the world's largest fund dedicated to green biotech. Between 60% and 70% of the funds will go to companies in Europe and the remainder to Canada and the United States.
- **Capricorn:** independent European manager of venture capital and equity funds.
- **Advent Life Sciences:** a leading trans-Atlantic venture, with investors focused on building innovative life science businesses in the United Kingdom, Europe and the United States.

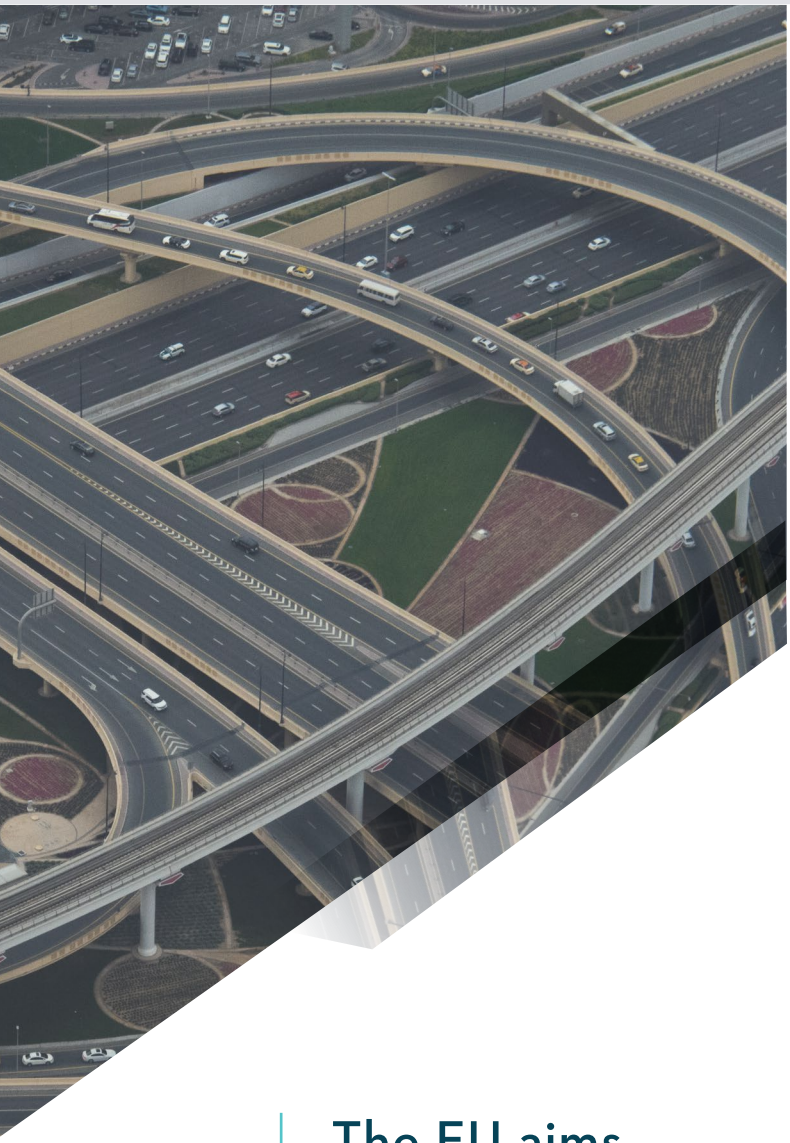
> *Corporate venture capital investment in U.K .biotech has increased sixfold in five years.*

Conferences:

- **Bio-Europe Conference:** Europe's largest life science partnering conference. Hosted by **EBD Group** every fall. North American companies may participate.
- **BioFIT 2018:** Europe's leading partnering event for academia-industry collaborations held every fall. Canadian companies have participated in past conferences.
- **European Biotech Partnering:** hosted by EBDC Group; has a **partnering tool** to help participants find partners and set up meetings.
- **International Conference on Industrial Biotechnology and Bioprocessing:** initiates collaboration within and across disciplines to advance biotechnology.
- **BIOSPAIN 2018:** largest biotech event organized by a national bio-industry association in Europe. Canadian companies have participated in past conferences.
- **Nordic Life Science Days:** largest Nordic partnering conference for the life science industry, held every year from September 10 to 12. Canadian companies have participated in past conferences.
- **Life Sciences Baltics:** only international forum in the Baltics for life sciences.
- **Swiss Nordic Bio:** high-level event where investors and potential partners in the field of biotechnology and pharmaceuticals can meet.

CHAPTER 4:

TRANSPORT



Overview

Canada's strength in the transport sector is reflected by rail and aviation champions such as Bombardier, which is an important global player. The focus of the Canadian government in recent years has been on green transport through initiatives such as **SmartWay**. Natural Resources Canada, the lead, provides the benchmarking tools that help its partners understand the fuel efficiency and emissions associated with public transportation.

Europe, as a global leader in transport innovation, has traditionally set the standards for the transport sector. The focus on green transport is shared by European countries and Canada and is reflected in various agreements and international collaborations in the sector.

Example

The **Canada-EU Air Transport Agreement** came into force in 2009 to strengthen international cooperation to reduce the effects of aviation on global climate change. It is the most ambitious agreement between EU member states and a major partner country.

Making cities and inter-city mobility smarter and more sustainable is a priority for the EU. The decarbonization of the transport sector includes numerous innovation initiatives at the EU level through increased funding opportunities for smarter cities and transport. At the national level, countries have introduced transport policies to drive their communities toward a more sustainable transport system.

Spain, France, Germany and Italy are among Europe's most innovative and research-driven and are home to large transportation industries. These countries are also leaders in AMT.

See Also

- **Advanced Manufacturing**
- **Clean Technology**

The EU aims to have 300 smart cities by the end of 2019.
European Commission, 2018

Spain

Transport is currently the largest source of greenhouse gas emissions in Spain, but like Canada, Spain is updating its transport standards to make them more environmentally friendly.[26] In 2015, the European Commission adopted an operational program (2014-2020) to support green transport.

Spain is one of the five leading European players in civil and military aeronautics and participates actively in the main European aeronautics initiatives. Spain's aerospace industry is currently ranked fifth in Europe in terms of turnover and eighth in the world. Spain's aerospace sector continues to grow and shows great potential due to increased competition in the Spanish air transport market and to a demand for new technology.

The close bilateral relationship between Canada and Spain is rooted in innovation, academic and technological collaboration.

- Under the EU's **Eureka Network**, Canada's **National Research Council** and Spain's center for industrial technological development [CDTI] have cooperated to submit joint projects and calls for proposals across all thematic areas. Previous calls have focused on industrial manufacturing and transport and AI applied to mobility.
- Canada and Spain collaborate in a **Youth Mobility Program**, which allows up to 1,000 Canadian youth to travel to Spain to gain work experience related to their area of expertise.

Many of Spain's transportation groups are organized into regional clusters or partner platforms, which may offer opportunities.

See

- **Canary Cluster of Transport and Logistics**
- **Infoanet**
- **Catalonia Logistics**
- **CIAC**
- **Clustermoto**

With more than 1,970 miles of high-speed rail, Spain is second to China in terms of high-speed train infrastructure.
(Export.gov, 2018)

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in **Madrid** or **Barcolona**

[26] **Transport & Environment**

France

France's focus in the transportation sector is on investing in innovative solutions to reduce greenhouse gas emissions and make transport more sustainable. The country is known for its TGV high-speed rail service, one of the more efficient yet low carbon transport systems in the world. France's efforts include reducing the use of hydrocarbons and increasing energy efficiency, and its efforts to make transportation greener are already producing successful outcomes. France's share of renewable energy in transport fuel consumption is one of the highest in the EU and growing.[27] This is partly due to France's electric vehicle industry, which in 2017 overtook Norway as the European hub of green cars.[28] The French government's commitment to green mobility is unlikely to change in the near term. Under France's **Climate Plan** published in 2017, the country will end sales of petrol and diesel vehicles by 2040 to encourage innovation by car manufacturers.

Following the announcement of their climate plan, Canada and France announced the **Canada-France Climate and Environment Partnership** to promote and implement the Paris Agreement. One priority is reducing international transport emissions by sharing best practices in electric vehicle deployment and fostering innovation in energy production to reduce emissions.

The Consortium for Aerospace Research and Innovation in Canada (CARIC) supports international projects with key European partners including France.

See

CARIC's project idea submission page

Through EMC2, the French industrial cluster dedicated to advanced manufacturing technologies, France is also closely collaborating with the Consortium for Research and Innovation in Aerospace in Québec (CARIQ). **EMC2** promotes collaborative innovation projects in different sectors, including aerospace, and has been collaborating with Canada in this area for a decade. The focus of this partnership between France and Quebec is on technical innovation and advanced manufacturing through collaborative R&D projects involving French and Canadian SMEs.

France's clusters offer foreign investors an ideal environment to form R&D partnerships with leading businesses. The **ADEME** centralizes calls for innovation and R+D programs. The European Rail Agency, headquartered in Valenciennes, France, sets standards at the EU level in the rail sector.

International clusters include:

- I-Trans
- Mov'eo
- European Railway Cluster Initiative

National clusters include:

- Logistique Seine-Normandie
- Véhicule du futur
- Advancity

See

- Study on key technologies in the transportation sector by DG des entreprises [French only]

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Paris

[27] European Commission, Transportation Scoreboard

[28] The Economist

Germany

Germany's transportation sector focuses on research and development and is propelled by both public and private investment. The German government has shown considerable commitment to initiatives in this domain.

R&D is among its highest priorities and initiatives.

See

- » High-Tech Strategy
- » Excellence Initiative

Joint Initiative for Research and Innovation

In 2006, Germany's federal government introduced a high-tech strategy, laying out five priority areas for increased investment in research and innovation. Among the five pillars is smart mobility, which means optimizing the efficiency and capability of various modes of transport.

Based on this initiative, the federal government adopted a new strategy in 2014 entitled Innovation for Germany, aimed at improving the innovation landscape in Germany.

Measures introduced to achieve this goal include

- » supporting SMEs
- » fostering industry-academia collaboration
- » helping research clusters and networks engage in international cooperation[29]

Specific programs were also introduced to tackle these goals, such as the Central Innovation Programme for SMEs [ZIM].

See

Germany's position in the global transport sector is driven by its automotive industry, which is the largest in Europe and Germany's most innovative industry.

As a global aerospace hub, Germany is home to leading players from all civil and defence aviation market segments. The country's world class R&D infrastructure combined with its powerful manufacturing base gives the sector a competitive advantage for investors.

The German government is highly involved in the aerospace industry. BMWi announced the sixth iteration of the aerospace research program—a grant program for aerospace research and technology projects—for the fall of 2018.[30] BMWi also supports Germany's aviation industry through European research framework programs such as Clean Sky, SESAR and Horizon 2020.

Numerous agreements exist between Germany and Canada at the provincial and local levels.

- » Among the most notable are the cooperation agreements between Germany's Bavaria and Canada's Quebec, dating back to 1989. Every two years, the **Bavaria-Quebec Work Group** meets to discuss cooperation projects for the following two years. In 2014, its focus shifted to electricity-driven mobility.
- » In 2017, the Consortium for Research and Innovation in Aerospace in Quebec (CRIAQ) and Bavarian-based Ludwig Bölkow Campus (Lbc) signed an agreement to increase R&D collaboration in the aerospace and security sector.
- » In 2018, the major aerospace research hubs of Hamburg and Montréal signed a **partnership agreement** that builds on existing research cooperation to focus on fields that include aircraft cabin acoustics and composite fibre materials. The projects resulting from this collaboration receive regular government and commercial funding from Germany and Canada.

From 2016 to 2018, Canada and Germany agreed on 60 projects and cooperation agreements in various fields.

[29] BMWI

[30] https://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10002/

Cooperation agreements also exist between academic and research institutes. In 2010, Ontario and Baden-Württemberg signed 59 bilateral joint-research agreements between their universities.

The German-Canadian Center for Innovation and Research offers matchmaking tools and joint-funds to help Canadian SMEs find European partners.

Cooperation between Canada and Germany is underpinned by the **German-Canadian Cooperation in Science and Technology**, which represents almost 50 years of international collaboration. The cooperation agreement has spawned numerous initiatives and agreements.

- Central innovation programme for small and medium-sized enterprises [ZIM] is Germany's funding program geared to the needs of SMEs.
- To facilitate the international projects within ZIM cooperation projects, AiF Projekt GmbH, with the financial support of BMWi, coordinates IraSME comprising several bilateral agreements and a network of ministries and funding agencies from different countries and regions.
- German companies working with foreign partners in a ZIM project receive a bonus of 10% above the regular funding rates. Alberta has bilateral agreements with ZIM. **IraSME** enables consortia of SMEs from at least two participating countries to work together in transnational projects.

See

ZIM

Exlore Germany's clusters and partner platforms in the transportation sector:

- AiF Projekt GmbH
- ClusterPlattform Germany
- Electric Mobility South-West
- LR BW
- Bayern Innovativ
- Luftfahrtcluster Metropolregion Hamburg
- German Aerospace Center

Under the Trans-European Transport Network (TEN-T) EU fund, **21 German proposals** were selected for CEF Transport. *(2016 only)*

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Berlin

Italy

Following the lead of its European neighbours, Italy is also moving toward greener policies and initiatives in its transportation sector.

> In Italy, private automobiles account for 66% of road travel.

This heavy reliance on single vehicle transportation has led to new legislation promoting green transport, including funding for sustainable urban transport. Italy's main innovation and research program, the national research programme [PNR] 2014–2020, identifies priorities for the national research policy, which include smart, green and integrated transport. This national policy is already producing results: the European Commission reports that Italy has made significant progress toward aligning itself with EU guidelines and objectives.

Canada and Italy cooperate in research and innovation.

- The Natural Sciences and Engineering Research Council of Canada (NSERC) and the Italian Consiglio Nazionale delle Ricerche [CNR] recently published Similar to the joint calls with Germany, these calls focus on collaborative research and development between academia and industry.
- In 2014, the Government of Quebec and the Lombardy Region in Italy signed a **5-year bilateral agreement relating to research and innovation.** This agreement provides for collaborations in advanced manufacturing and has led to joint research projects and greater mobility between Canadian and Italian researchers.

See

- **Next Future Mobility**
- **Research Italy**

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Rome

Transport funding at the EU level

Europe has a strong and highly competitive transportation sector. The EU's top priorities include making transport greener and more sustainable, whether by road, rail, water or air.

Horizon 2020

Horizon 2020 offers many funding opportunities for the transportation industry in its 2018-2020 work program for **Smart, green and integrated transport.**

The goal is a European transport system that is resilient, resource-efficient and climate- and environment-friendly.

Because Canada is considered a third country, Canadian SMEs cannot apply to all Horizon 2020 calls. Many calls are open to international collaboration, provided each consortium includes an EU member state. Others specify the need for third country partners.

See

- National Contact Point
- Horizon 2020 Guide for Canadians

Canada-EU relations in the aerospace sector

Canadian aerospace companies have a well-deserved reputation for quality, value, performance and reliability, including in the EU. Enhanced cooperation between the EU and Canada in the aerospace dates from 2011 with the EU-funded Canadian networking aeronautics project for Europe (CANNAPE), a consortium comprising R&D players from Canada and the EU.

The two-year project

- improved EU-Canadian collaboration and achieving ambitious goals in several areas including greener air transport, greater time efficiency and improving air transport R&D
- developed a cooperation plan to work with European partners in the future, aligning objectives with those of Horizon 2020, involving key Canadian partners and organizations, including networks and clusters from the aeronautical industry, and research organizations at both government and local levels

Key projects arising from the CANNAPE partnership include:

- AMOS: additive manufacturing optimization and simulation platform for repairing and re-manufacturing of aerospace components
- EPICEA: electromagnetic platform for lightweight integration/installation of electrical systems in composite electrical aircraft
- PHOBIC2ICE: super-icephobic surfaces to prevent ice formation on aircraft

Other aerospace initiatives between Canada and the EU

- ICARe: International Cooperation in Aviation Research is supported by the European Commission via Horizon 2020 to foster cooperation between the EU member states, and associated and third countries, including Canada, to provide the European Commission with recommendations for future international cooperation in civil aviation research and innovation. ICARe organizes regular **events and workshops**.

- **CARIC:** Consortium for Aerospace Research and Innovation in Canada is the national contact point for the co-development of aviation research projects with the EU. The consortium provides financial support for R&D-related projects in partnership with players in the aerospace industry and extends opportunities for European partners to participate in **Canadian-funded projects**.
- **The European Aerospace Cluster Partnering (EACP):** This major networking hub for European aerospace clusters provides information on the economic, political and social developments affecting the aerospace industry and supports projects focused on technological innovation that strengthens the competitiveness of the EU in the sector. Under the internationalization working group, EACP is working toward global partnerships. EACP finalized the signing of a mutual collaboration agreement in 2017 with Aéro Montréal, Quebec's aerospace cluster that will open additional cooperation agreements and programs between the EU and Canada.

Horizon 2020 Public Private Partnerships

The following PPPs are particularly relevant for Canadian SMEs seeking partnerships in transport sector, given the prominent support they receive from the European Commission and European industry.

See

Joint Technology Initiatives (JTIs)

- **Fuel Cells and Hydrogen 2** (FCH_2): accelerates introduction of clean and efficient technologies in energy and transport into the market. See **factsheet**.
- **Clean Sky 2** (CS2): develops cleaner, quieter aircraft with significantly lower carbon emissions. Private or public organizations (including SMEs) are eligible under Horizon 2020 to apply for specific open calls for proposals. See **factsheet**.
- **Shift2Rail:** develops better trains and railway infrastructure that will significantly reduce costs and improve capacity, reliability and punctuality. Bombardier's position as a founding member of this JTI could be useful for Canadian SMEs. The EU is a global leader in rail research and innovation. The rail sector in Europe is geared toward interoperability across borders and ultimately the creation of a single European railway area. These rail initiatives have produced significant technology breakthrough in fields like signaling, where the European Trail Traffic Management System standards regulate safety in the rail transport system. See **factsheet**.

Contractual PPPs

- **European Green Vehicles Initiative**

Europe-wide clusters and participant portals

- **European Railway Clusters**
- **Clusters 2.0:** consortium consists of 29 partners from 10 EU countries and Switzerland
- **Transport Research & Innovation Portal (TRIP):** for transport research at European and national levels and in EU countries, Norway and Switzerland.

EUREKA Clusters

EUREKA Clusters are long-term, industry-driven strategic initiatives that develop technologies of key importance for European competitiveness, but are open to participants from other EUREKA countries, including Canada. Cluster projects bring together large and small companies to work on near to the market and pre-competitive R&D projects in their respective sectors. The following EUREKA cluster may be of interest to Canadian SMEs seeking innovation partnerships in transport:

- **EUROGIA2020** - low carbon energy technologies
- **ITEA3** - software intensive systems and services, with a focus on smart mobility

See

- National Research Council Canada - EUREKA

Venture Capital Funds

Private equity available for the transportation industry:

- **Edmond de Rothschild:** social and transportation infrastructure
- **InMotion Ventures:** building products and services
- **Arcus:** European telecom, transport and energy infrastructure
- **Capricorn**

See

- **European Transport Conference**
- **Global Public Transport Summit**
- **World Conference on Transport Research**
- **International Transport Forum**
- **CIVITAS FORUM**

CHAPTER 5:

FOOD AND AGRICULTURE

Overview

The cross-sectoral collaborative approach of Canada's food and agriculture sector makes Canada an attractive partner for the EU: Canada-EU bilateral agreements in the agri-food industry[31] encourage cross-border collaboration. The sector in Canada is supported by numerous programs, including:

- AgriScience
- AgriInnovate

The provisional entry into force of the Canada-European Union Comprehensive Economic and Trade Agreement (CETA) in 2017 gives Canadian agri-food companies, particularly SMEs, a major advantage over their global competitors by facilitating freedom of movement. Cooperation exists between Canada and the EU at the EU level and with individual member states.

The National Research Council of Canada Industrial Research Assistance Program (NRC IRAP) collaborated with the Netherlands' Rijksdienst voor Ondernemend Nederland [RVO] for the Canadian agri-food mission to the Netherlands held in October 2018.

> Europe's leading countries in agriculture and food are also global hubs for research and development, demonstrating the integrated nature of the industry also seen in Canada. Italy, the Netherlands, France and the United Kingdom are among the EU leaders in agri-food technology innovation.

31 Agreement between the European Community and the Government of Canada on Sanitary Measures to Protect Public and Animal Health in Respect of Trade in Live Animals and Animal Products.
Agreement between Canada and the EuropeanCommunity on Trade in Wines and Spirit Drinks

Italy

Italy is at the forefront of innovation within the agricultural sector. The country's commitment to investing in innovative solutions to modernize agricultural practices is evident in numerous public and private sector initiatives and collaborative projects.

In 2016, the Italian government invested €21 million to boost the creation of new products and fund sustainable biotechnology research, in line with the Sustainable Development Goals.[32] This involved multi-stakeholder collaboration between the council for agricultural research and agricultural economics analysis [CREA] and Italy's ministry of agriculture.

Italy's agriculture sector is also involved in collaborative ventures with the aerospace industry:

- **e-GEOS Consortium:** a joint venture between Telespazio and the Italy's space agency
- **Copernicus:** an EU and European Space Agency (ESA) initiative to provide sustainable services related to agriculture and food security issues
- Italy is among the countries that will test the new **Sentinels for Common Agricultural Policy** (Sen4CAP) project, a new approach to crop monitoring that will use live data streamed from space to support the updating of the European Common Agricultural Policy (CAP).

Initiatives such as these demonstrate Italy's strength as an innovative and research-driven country.

Cooperation between Canada and Italy in the field of agricultural research includes the following initiatives:

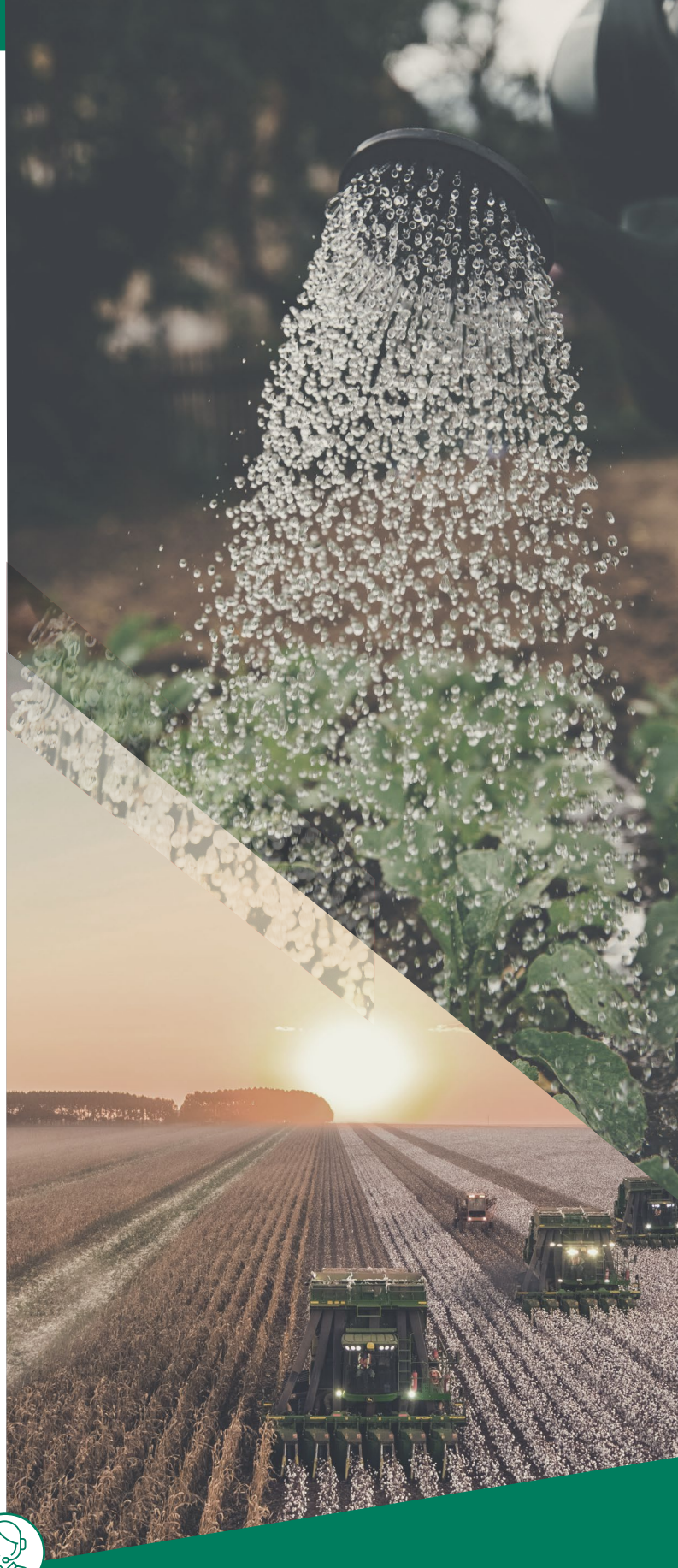
- Agriculture and Agri-Food Canada (AAFC) and Italy's national research council signed a **Memorandum of Understanding on twinning Italy-Canada activities in research and innovation in agri-food** in 2009, that spawned several Italian-Canadian innovation projects in the agri-food sector.
- Canada is involved in the Italian-led Horizon2020 MycoKey project to develop integrated and sustainable solutions to reduce mycotoxins in food and feed chains.

Through multilateral initiatives such as the Greenhouse Research Alliance, GEOGLAM and the G20 Wheat Initiative.

Explore clusters and partner platforms in the agriculture and food sector:

- **ResearchItaly**
- **FutureFood**
- **Cluster Emilia-Romagna**

[32] https://sustainabledevelopment.un.org/?menu=1300



GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Rome

The Netherlands

The Netherlands is a global leader in agricultural innovation and research, with among the world's highest private R&D budgets. Its innovative agri-food technology sector positions the Netherlands as the world's second-largest exporter of agricultural products after the United States. Of the global top 40 food and drink companies, 12 have R&D centres in the Netherlands.[33]

The Netherlands hosts some of the leading agriculture research institutes and universities, such as Wageningen University. In 2011, the university initiated a global research alliance on **Climate-Smart Agriculture.**

The **National Research Council of Canada Industrial Research Assistance Program** (NRC IRAP) collaborated with the Netherlands' **Rijksdienst voor Ondernemend Nederland [RVO]** for the Canadian Agri-food mission to the Netherlands in October 2018 aimed at future collaborative R&D projects between the two countries.

Explore clusters and partner platforms for useful information about potential partnership opportunities with Dutch SMEs:

- Startup Delta
- Greenport West Holland
- Rotterdam Food Cluster
- Food Valley
- Wageningen University
- TI Food and Nutrition

See

- Netherlands Foreign Investment Agency (NFIA)
- Netherlands-Canada Chamber of Commerce
- Canada-Netherlands Cyber and Securities Technologies Soft Landing Platform
- Canadian Netherlands Business and Professional Association in Toronto
- Canadian Chamber of Commerce in Canada
- Holland International Distribution Council (HIDC)

> **Some 80% of the world's horticultural innovations originate in the Netherlands.**
> *(Zuid-Holland, s.d.)*

[33] Holland Trade and Invest

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in The Hague

France

France's ministry of agriculture and food

- released its report **Agriculture Innovation 2025** in 2015 listing 30 innovative projects in agriculture
- announced along with the ministries for economy, research and innovation and for the environment eight calls for proposals in 2018 related to ecological and energy transition. The calls will provide financial support of 300 million euros over 2018 and 2019 for research and development projects.

France remains one of Canada's key priority countries for scientific cooperation in strategic sectors. The **Joint Official Statement on Innovation Cooperation 2016-2018** reflects the key areas identified by both parties: the biotechnology sector, with a focus on the agro-industry, technologies for precision agriculture and green technologies.

Explore national and regional partner platforms and clusters:

- Vegepolys
- Terralia
- Agri Sud-Ouest Innovation (French Only)
- Valorial (French Only)
- Vitagora
- Cirad
- La Cooperation Agricole
- Alimentation Bien-Être Naturalité
- Aquimer
- IAR
- Nutrition Health Longevity
- Plant2pro
- Qualiment
- INRA

France is a world leader in the food and agriculture industry, with support from the Government of France.

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in Paris

United Kingdom

The United Kingdom is a leader in agri-food technology innovation supported by substantial ongoing investment by the British government.

Innovate UK is the United Kingdom's innovation agency through which the British government has invested almost £90 million and created the following four centres for agricultural innovation:

- CHAP (Crop Health and Protection) Centre
- Agri-EPI (Engineering, Precision and Innovation) Centre
- CIEL (Centre for Innovation Excellence in Livestock)
- Agrimetrics

The Industrial Strategy Challenge Fund[34] (ISCF) supports innovative agri-food projects involving businesses, researchers and industry to transform food production.

See

Knowledge Transfer Network

Key partnerships already exist between the United Kingdom and Canada. Both countries have identified the agri-food sector as a pillar in their respective economies demonstrated by significant investments in agri-food research projects over the past few years. Agri-Tech was also listed as a priority under the Canada-UK STI MoU signed in Sept 2017 and a roadmap outlining collaborative opportunities across 8 thematic areas in the near, medium and longer-term has been developed.

Examples

Agriculture and Agri-Food Canada in partnership with the UK Biotechnology and Biological Sciences Research Council (BBSRC) issued a call that supports research and collaborative projects aimed at boosting global wheat productivity. The National Research Council of Canada in partnership with Innovate-UK also launched a bi-lateral research call that supports enhancing industrial productivity, and includes food production.

Explore funding opportunities.

See

- UK Research and Innovation
- UK Biological Sciences Research Council (BBSRC)

Explore clusters and partner platforms in agri-food:

- Cambridge AgriTech
- Norwich Research Park
- Quadram Institute

See

- Canada-United Kingdom Chamber of Commerce

GET HELP FROM THE CANADIAN TRADE COMMISSIONER SERVICE

Contact a trade commissioner in London

[34] https://www.ukri.org/innovation/industrial-strategy-challenge-fund/

Agri-food funding at the EU level

Initiatives that boost innovation in the agricultural sector include the European Innovation Partnership for Agricultural Productivity and Sustainability **(EIP-AGRI)**, launched in 2012 to support the Europe 2020 agenda for smart and sustainable cities through thematic networks. These include **Agri-SPIN - Space for Innovations in Agriculture**, an EU project that identifies best practices for innovation and support systems in European agriculture.

Horizon 2020

The 2018-2020 work program includes two agri-food sector-related calls for proposals: **Sustainable food security** and **Rural renaissance**.

Explore partnership opportunities:

- **European Institute of Technology (EIT):** brings together leading higher education institutions, research labs and companies to form cross-border partnerships. EIT **Food:** comprises some 50 partners across 13 countries with the common goal to make Europe a leader in innovative solutions affecting the food system.

Other EU Programmes

- **EU LIFE programme:** third countries may participate as associated beneficiaries under Article 6, provided that the coordinating beneficiary is based in the EU and that evidence is provided that concrete activities to be conducted outside the EU are necessary to achieve EU objectives.

Explore conferences and forums:

- **Global forum for innovations in agriculture**
- **Global Forum for Food and Agriculture**
- **Maamess**

The **SmartAgriHubs** project, launched in November 2018 to ***promote digital solutions in the farming sector,*** has a €20-million budget co-funded by the EU. The project has already established a large network of ***140 digital innovation hubs*** by building on its existing projects and ecosystems, such as the Internet of Food and Farm (IoF2020)