

CORPORATE PLAN

2021-2022

MID-YEAR UPDATE

PROJECTS & PROGRAMS

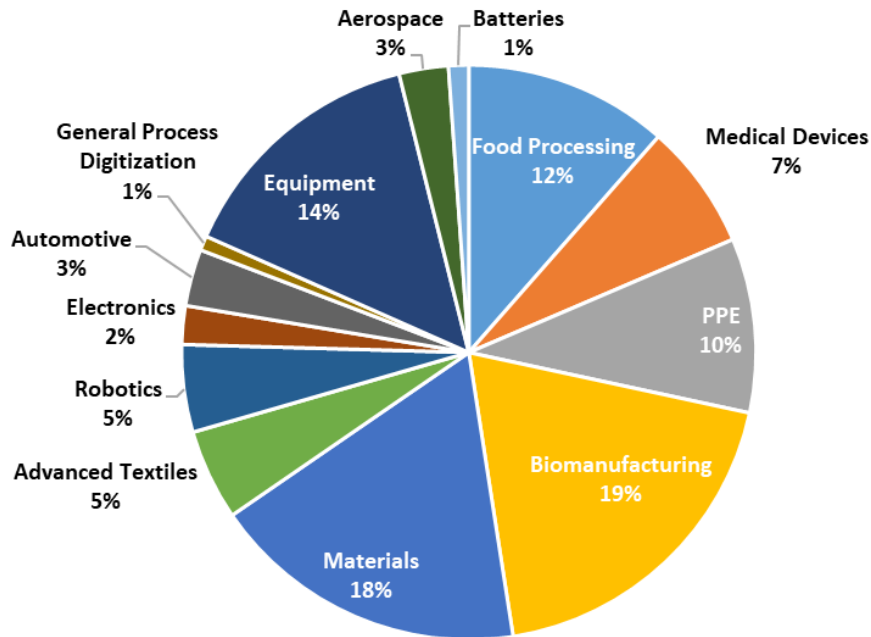
NGen has been conditionally approved for \$20 million (of the \$60 million) earmarked for the Innovation Superclusters Initiative in “Budget 2021: A recovery focused on jobs, growth and resilience” to ensure that superclusters that have made emergency investments in supporting Canada’s response to COVID-19, as well as other investments, can continue to support innovative Canadian projects. NGen is working with ISED to amend our Contribution Agreement to take this additional funding into account; with \$12 million allocated in 2021-22 and the remaining \$8 million in 2022-23. The additional funding is intended to support the most promising projects in NGen’s current pipeline, an Automotive Zero-Emissions Challenge, and a Circular Food Economy Challenge. The finalization of the additional contribution will include a formal amendment to NGen’s Contribution Agreement.

PROJECT PORTFOLIO UPDATED TO JUNE 30, 2021

Status	Number of Projects	Number of Partners	Number of SMEs	NGen Investment	Total Project Amount	Funding Leverage
Completed	29	52	50	\$42.1 million	\$60.2 million	43%
Contracted and Underway	55	133	120	\$105.7 million	\$271.0 million	156%
Approved not yet Contracted	21	57	45	\$33.4 million	\$106.2 million	218%
TOTAL APPROVED	105	242	215	\$181.2 million	\$437.4 million	141%
Open Source Main Stream	32	104	83	\$104.5 million	\$301.3 million	188%
Open Source Capacity Building	40	74	70	\$5.4 million	\$12.8 million	137%
COVID Rapid Response	16	23	22	\$38.9 million	\$52.5 million	35%
Disinfecting Robots	5	7	7	\$5.0 million	\$10.5 million	110%
Made Smarter Challenge	12	34	33	\$27.3 million	\$60.2 million	121%
Projects in Pipeline	70	137	75	\$139.2 million	\$327.9 million	136%

By the end of June 2021, NGen had approved investments of \$181.2 million in 105 projects involving total project expenses of \$437.4 million - representing funding leverage of 141%. NGen had 70 projects with a total funding request of \$139.2 million in its project pipeline.

Approved Projects by Sector of Application



Project Participation

- 242 Industry Partners
- 215 SMEs
- 11 Clusters
- 1,750 Cluster Members
- 56 Academic & Research Partners
- 39 Public Sector Partners

Project Impacts to Date

- \$962 million in new orders
- \$32 million in new R&D investments by industry
- 63 new products in development
- 39 products to fight Covid-19
- 91 new manufacturing processes under development
- 177 new IP assets created
- 4 patents licensed to other NGen members
- 15 new companies created
- 865 new jobs created to date
- 18,411 new jobs projected over 10 years



DEVELOPING A CLUSTER ECOSYSTEM

NGen has invested in the development of eleven advanced manufacturing clusters across Canada. This cluster network represents more than 1,750 companies and organizations with \$52 billion in sales from coast to coast.

CLUSTER CONCIERGE

NGen will continue to provide customized support for the clusters in its network, including:

- Raising International Awareness
- Supporting the development of Canada's advanced manufacturing workforce
- Supporting Cluster Members with Domestic and International Growth Opportunities
- Enabling the success and growth of new Clusters
- Providing new tools, infrastructure, and test beds
- Growing Membership by attracting new cluster members through NGen's Member network.

COMPETITIVE EDGE WORKSHOPS

In partnership with BDO, NGen has developed a Competitive Edge workshop series available to Cluster members. The workshop series empowers Cluster Members to create competitive advantages and build sustainable business plans by offering support for Business Planning, Technology Adoption and Access to Funding. NGen will organize at least three cluster workshops by the end of March 2022.

WORKFORCE & MANAGEMENT DEVELOPMENT

ACCELERATING MANUFACTURING PERFORMANCE UPSKILLING PROGRAM - AMPUP

AMPUP is NGen's open-source platform for advanced manufacturing executive education and training. With partner organizations providing discounts for training, NGen pays 50% of the balance, significantly reducing costs for Members. Since launch, NGen has reached agreements with over 20 education and training partners from across Canada. To date, 35 companies have enrolled over 200 employees in training under AMPUP. NGen has committed \$120,852 in funding with a total impact of over \$400,000 in training at retail value. NGen aims to enroll 500 employees in AMPUP by the end of March 2022.

VIRTUAL ROBOTICS TRAINING ACADEMY

VRTA is a cloud-based Learning Platform (LMS) providing students and employees easy access to industry-relevant STEM-based simulation programs. With funding support from NGen for the development of the LMS, the platform launched on July 5th and now provides Coding (Python, Java, R), four robotics, and eight Cisco Network Simulator packages with an additional 90 challenges scheduled for release on August 31, 2021. NGen will continue to identify opportunities for companies to participate in the form of:



- Sponsoring student seats on the platform
- Supporting girls and BIPOC students gain coding and simulation skills
- Developing their own simulations for students or employee training
- Assessing skills of current or prospective employees

CAREERS OF THE FUTURE

NGen's Advanced Manufacturing Youth Campaign is a multi-media initiative that aims to promote awareness about the importance of advanced manufacturing in Canada and attract young people into careers in the sector. It educates students about advanced manufacturing and showcases young role models in the sector, what they do, and what inspires them about advanced manufacturing. It also provides students with guidance about the types of careers available in manufacturing, the academic qualifications required to pursue advanced manufacturing employment, and how to get engaged in extracurricular activities related to advanced manufacturing like youth-oriented robotics programs and maker spaces.

The campaign was launched in May 2021. By the end of June, it had attracted over 75,000 engaged visits by students and parents alike to its website at www.CareersoftheFuture.ca. The first phase of the campaign will run until September. NGen will aim to recruit over 100,000 engaged visitors by that time. We will also engage other companies and industry groups in a second phase of the campaign after September.

MANUFACTURING ENTREPRENEURSHIP EDUCATION FOR INDIGENOUS YOUTH

In July 2021, NGen and the Martin Family Initiative (MFI) announced a partnership to develop a manufacturing component in MFI's high school and adult Indigenous education programs that are being offered on and off reserves across Canada. NGen support will also allow MFI to expand its entrepreneurship and financial literacy courses into primary schools and set up a summer employment program for Indigenous youth. The program will be available for Indigenous students by the end of March 2022. Our aim is to raise awareness among Indigenous students about modern manufacturing in Canada and the type of jobs that exist in the sector and prepare them with many of the skills and some of the practical experience required to take advantage of future post-secondary and career opportunities.

TRANSFORMATION LEADERSHIP PROGRAM

NGen's Transformation Leadership Program offers SME managers step-by-step advice, proven methodologies, and practical tools they can use to assess and improve performance along the path to successful implementation of advanced manufacturing strategies. The program draws on best international management practices. It provides a modular approach to online executive education that will help business leaders and senior managers identify how they can best contribute to customer value, improve critical processes, and understand their business and skills requirements for successful advanced manufacturing transformations. NGen has piloted the TLP program with several of its members and will scale up delivery over the course of the coming year, with the target of delivering it to at least 50 companies by the end of March 2022.

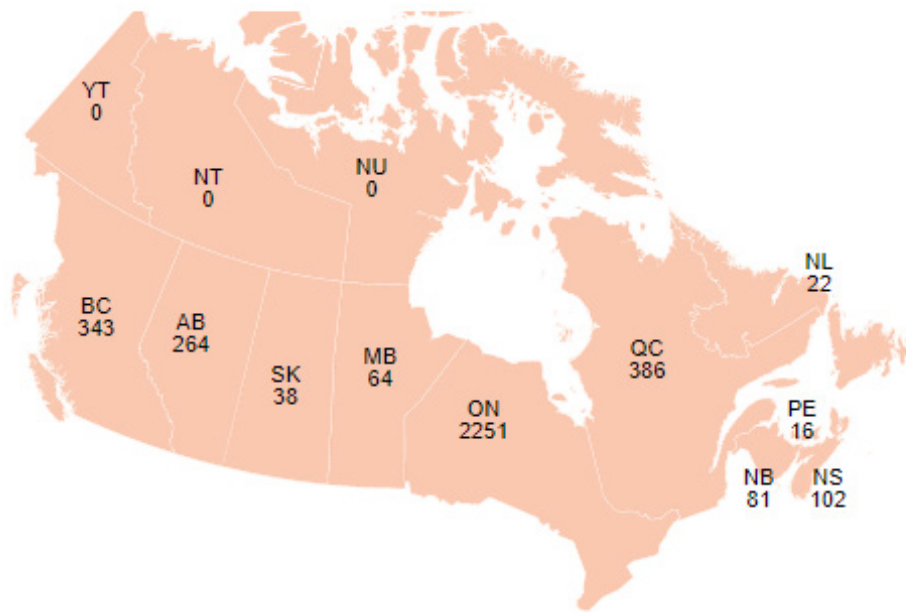


SUPERCLUSTER MEMBERSHIP

NGen aims to increase its membership to 4,000 companies, supporting organizations, and individuals by the end of March 2022, and to reach a 5,000 membership target by the end of March 2023. It will place particular emphasis on expanding membership participation from outside Ontario.

By mid July 2021, NGen membership had grown to 3,810, including 2,489 companies and organizations and 1079 individual experts. Among member companies and organizations, 2,097 or 92% were SMEs.

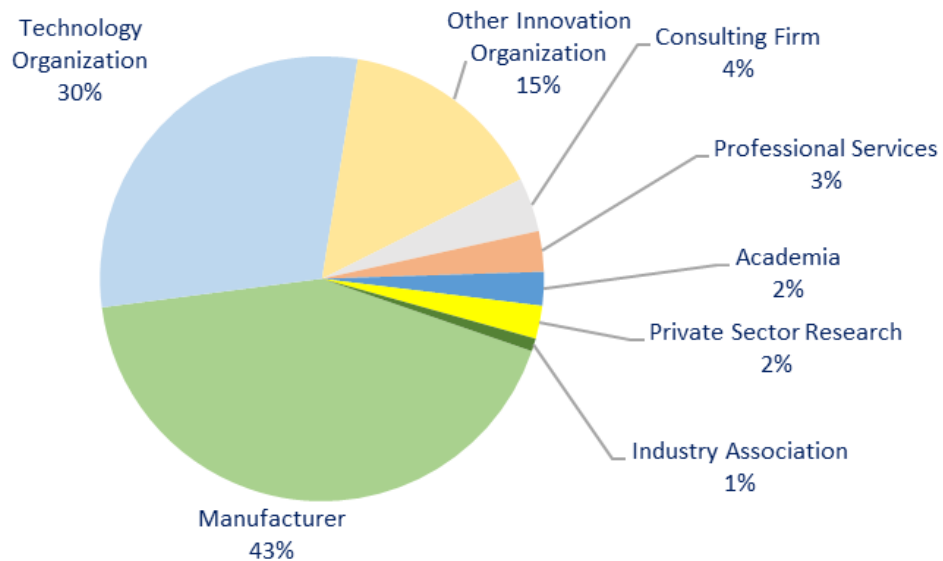
NGen’s membership is drawn from every province across Canada. While membership is concentrated in southern Ontario, 37% of NGen members are located outside the province. NGen also has 100 members that are based outside Canada.



The organizations within NGen’s membership include manufacturers, technology companies, colleges and universities, research centres, industry clusters and business networks, start-up accelerators and innovation centres, engineering and consulting services, private-sector investors and financial institutions, economic development organizations, as well as federal and provincial government agencies.



Members by Type of Organization



NGen’s membership offers a valuable source of information about the structure and capabilities of Canada’s advanced manufacturing ecosystem, a pool of potential partners for innovation projects, an extensive population to survey in order to identify business priorities and constraints, and an effective platform for communicating with and engaging supercluster members in NGen-led initiatives.

FINANCIAL UPDATE

Audited Financial Statements for the year ended March 31, 2021 will be published in NGen’s Annual Report for 2020-2021 and will be available on the NGen website in early August.

With the increase in contribution from Budget 2021, ISI funding has been reprofiled.

Prior							
Supercluster	2018-19	2019-20	2020-21	2021-22	2022-23	Total per Supercluster	Lapse 2020-21
NGen	\$1,754,122	\$35,126,941	\$66,546,454	\$100,695,908	\$45,641,702	\$249,765,127	\$1,917,918
	Actuals			Forecast			
Reforecast as at July 1, 2021	1,754,122	35,126,941	64,628,536	73,695,908	74,559,620	249,765,127	



UPDATED FORECASTED STATEMENT OF OPERATIONS 2021-2022

In \$ 000's	With Industry Contribution	
	Latest Forecast 2022	5-Year Forecast 2023
REVENUES		
Federal Contributions		
OPEX	12,304	31,732
Project & Programs	81,771	218,033
In-Kind Contributions	100	441
Industry Project & Other Contributions	<u>116,816</u>	<u>255,232</u>
	210,991	505,438
Administration Fees	4,916	10,160
Sponsorship, Fees, & Other Income	<u>80</u>	<u>514</u>
TOTAL REVENUES	<u>215,987</u>	<u>516,113</u>
EXPENSES		
Project Expenditures	78,829	206,032
Program Expenditures	2,942	12,000
Industry project & other expenditures	<u>116,816</u>	<u>255,232</u>
	198,586	473,264
Salaries & Benefits	5,359	19,080
Advanced manufacturing ecosystem initiatives	6,882	11,177
Outsourced Services	1,496	5,346
Administration & Governance	566	2,551
Communications & Events	120	765
Amortization of Capital Assets	<u>730</u>	<u>1,724</u>
	<u>15,153</u>	<u>40,633</u>
TOTAL EXPENSES	<u>213,740</u>	<u>513,898</u>
EXCESS / (SHORTFALL) OF REVENUE OVER EXPENSES	2,247	2,215
NET ASSETS (DEFICIENCY) - Beginning	3,106	(1,025)
NET ASSETS (DEFICIENCY) - ENDING	5,353	1,190
Contracted Estimates:		
	Total	Total
COVID	-	120,109
Projects	178,063	330,890
Programs	<u>18,578</u>	<u>24,000</u>
	196,641	475,000

UPDATED FORECASTED CASHFLOW 2021-2022

	Annual	5 Year
In 000's	Forecast 2022	Forecast 2023
OPENING CASH BALANCE	15,591	0
CASH INFLOWS		
Funding from ISED		
OPEX	11,754	31,732
Projects & Programs	61,946	218,033
	73,700	249,765
Administration Fees	4,916	10,160
Sponsorships, Fees & Other Income	80	514
TOTAL INFLOWS	78,696	260,440
CASH OUTFLOWS		
Project Expenditures	76,394	206,033
Program Expenditures	2,942	12,000
	79,336	218,032
Salary & Benefits	5,359	19,080
Advanced manufacturing ecosystem initiatives	5,001	11,177
Outsourced Services	578	5,346
Administration & Governance	469	2,551
Communications & Events	83	754
	11,491	38,909
TOTAL OUTFLOWS	90,826	256,942
NET OPERATING INFLOWS / (OUTFLOWS)	(12,130)	3,498
BALANCE SHEET MOVEMENTS	2,339	(1,498)
ISED ADVANCES / (REPAYMENTS)	0	0
	2,339	(1,498)
NET MOVEMENT	(9,791)	2,000
CLOSING CASH BALANCE	5,800	2,000



NGen Next Generation
Manufacturing Canada

CORPORATE PLAN

2021-2022

MANUFACTURING. REVOLUTIONIZED.

Next Generation Manufacturing Canada leads Canada's Advanced Manufacturing Supercluster.

NGen is dedicated to building world-leading advanced manufacturing capabilities in Canada, for the benefit of Canadians.

We aim to strengthen the Canadian economy and create high value jobs for Canadians while contributing solutions that address some of the world's most pressing challenges in areas like health care, energy and resource management, and environmental sustainability.

NGen works to achieve these objectives by leveraging the technology and industrial strengths of Canada's advanced manufacturing ecosystem.

We create new opportunities by supporting, connecting, and strengthening collaboration among manufacturers, engineering and technology companies, service providers, academia, researchers, innovation centres, business networks, funding agencies and investors, and our high-quality workforce, to enhance the competitiveness and growth potential of Canada's advanced manufacturing sector.

Catch up with what's happening in Canada's Advanced Manufacturing Supercluster at www.ngen.ca.

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NGEN'S FIVE-YEAR SUPERCLUSTER STRATEGY

MISSION

NGen supports, connects, and strengthens collaboration across Canada's advanced manufacturing ecosystem to build world-leading advanced manufacturing capabilities in Canada, for the benefit of Canadians.

OBJECTIVES

NGen aims to strengthen the competitiveness and growth potential of Canada's advanced manufacturing sector, boosting GDP by \$13.5 billion and creating 13,500 well-paying jobs by 2030 while contributing solutions that address some of the world's most pressing challenges in areas like health care, energy and environmental sustainability, and food security.

STRATEGIC INITIATIVES

NGen works to achieve these objectives by leveraging Canada's technology and industrial strengths, workforce skills, and supporting innovation infrastructure to accelerate the development, scale-up, and productive deployment of advanced technologies in Canadian manufacturing and their commercialization in global markets. Specifically, NGen undertakes initiatives that:

- Promote Canada's advanced manufacturing capabilities, both within Canada and internationally;
- Build connections, identify partnership opportunities, and strengthen collaboration across Canada's advanced manufacturing sector;
- Facilitate and co-invest in collaborative, industry-led projects that will lead to the development, adoption, and scale-up of world leading capabilities in advanced manufacturing and contribute to Canada's advanced manufacturing ecosystem; and,
- Build capacity by strengthening advanced manufacturing workforce capabilities, de-risking technology deployment and scale-up on the part of smaller firms, and enhancing Canada's advanced manufacturing ecosystem.

All of NGen's initiatives are designed to be:

- Transformative - building world-leading advanced manufacturing capabilities;
- Applied - developing advanced manufacturing solutions that have significant commercial potential;
- Collaborative - enabling capabilities that no individual company or organization can achieve on its own; and,
- Enduring - contributing know-how and resources in support of Canada's advanced manufacturing ecosystem.



POWERING THE ECOSYSTEM

All of NGen's initiatives, including the industry-led projects in which it co-invests, are intended to contribute to and strengthen Canada's advanced manufacturing ecosystem.

NGen has a unique role to play in this regard by focusing the attention of ecosystem partners on advanced manufacturing, identifying and supporting industry-led innovation priorities, and building connections and collaboration across an extensive network of companies, organizations, and individual experts that are all part of NGen's membership.

Canada is the home of many technology leaders in advanced manufacturing, world-renown research in the field, and manufacturing companies already active in global supply chains and export markets. But, many of the country's advanced manufacturing assets and capabilities are not widely known. Linkages between technology companies and manufacturers, whether in the form of technology adoption or scale-up for manufacturability, are underdeveloped. Our objective is to build Canada's advanced manufacturing supercluster by expanding NGen's membership and by networking, supporting, and developing collaborative opportunities for members across the ecosystem.

Over 95% of members expect NGen to promote Canada's advanced manufacturing capabilities across the country and around the world. A majority of members also expect NGen to inform public- and private-sector innovation policies about the capabilities, opportunities, and constraints affecting the growth potential of the sector. NGen's promotional initiatives are designed to achieve both of these objectives.

An ecosystem approach is vital in order to solve the technical and manufacturing problems facing Canadian industry and tackling many of the bigger economic, social, and environmental challenges confronting Canadians, now and in the future. Advanced manufacturing is powering many of the solutions that we need. But it takes an ecosystem to achieve success, and to ensure that the opportunities and value of innovation are captured in Canada.

Collaboration is at the heart of NGen's strategy. World-leading capabilities in advanced manufacturing cannot be built one company or one organization at a time. The pace of technological change, business disruption, and emerging market opportunities is simply too fast for any one entity to take all the risks or command all the resources needed to succeed on its own.

Unique manufacturing solutions depend on integrating knowledge and tools from a variety of advanced digital, materials, and production technologies and techniques. Deployment, scale-up, and commercialization of those solutions depend on maximizing the potential of shared intellectual property and rely on supporting innovation, business services, public sector, and investment infrastructures for their success. Business knowledge and best practices shared across organizations, sectors, and regions are instrumental in enhancing the leadership and management capabilities required to develop and execute new business strategies effectively. Everyone in Canada's advanced manufacturing ecosystem has a stake in developing and gaining



access to a highly qualified workforce.

Supercluster funding also provides an important incentive for building collaboration and for strengthening Canada’s advanced manufacturing ecosystem. All of NGen’s technology-related projects must demonstrate that they will make a significant contribution in the form of intellectual property, education and workforce development opportunities, and/or tools and testbeds that can be shared with other members of the supercluster. NGen also co-invests in industry-led ecosystem development projects that aim to enhance ecosystem capacity, providing direct support for the development of local innovation clusters, scale-up initiatives for start-ups and small and medium-sized companies (SMEs), and advanced manufacturing technology training or test centres.

NGen is uniquely positioned to work on behalf of its members by building collaborative approaches to programming, funding, and policy making that supersede organizational and jurisdictional boundaries. NGen invests in strategic initiatives that address critical gaps in Canada’s advanced manufacturing ecosystem funded from its own operating budget. In 2019-2020, NGen conducted a series of discussions with its Board as well with other industry and ecosystem leaders across Canada to identify critical gaps and opportunities for strengthening support the advanced manufacturing sector. Priorities identified for NGen initiatives in ecosystem development were summarized in NGen’s Consensus Report published in May 2020. They include:

- Identification of innovation partnership and business opportunities within Canada and internationally;
- Curated access to thought leadership on advanced manufacturing trends and best management practices around the world;
- A campaign to attract young people into advanced manufacturing careers;
- Initiatives that address current and future skills shortages in advanced manufacturing;
- Initiatives that enhance diversity and inclusion in Canada’s advanced manufacturing workforce;
- Programs that enhance advanced manufacturing leadership and management capabilities;
- Cluster development in new fields of advanced manufacturing- like digital twinning and simulation, biologics and medical technologies, cybersecurity, quantum computing, and artificial intelligence;
- The development of online platforms for diagnostics, training, partnering, IP commercialization, and data sharing that would provide SMEs capabilities they would not otherwise be able to achieve on their own;
- Facilitated access to public- and private-sector funding and procurement; and,
- Empirically based advice to governments with respect to strategic opportunities in advanced manufacturing for Canada and regulatory constraints on innovation and growth.

These priorities are informing the direct investments that NGen is making in ecosystem development in each of its program funding streams.



PROGRESS TO DATE

PROGRAM FUNDING STREAMS

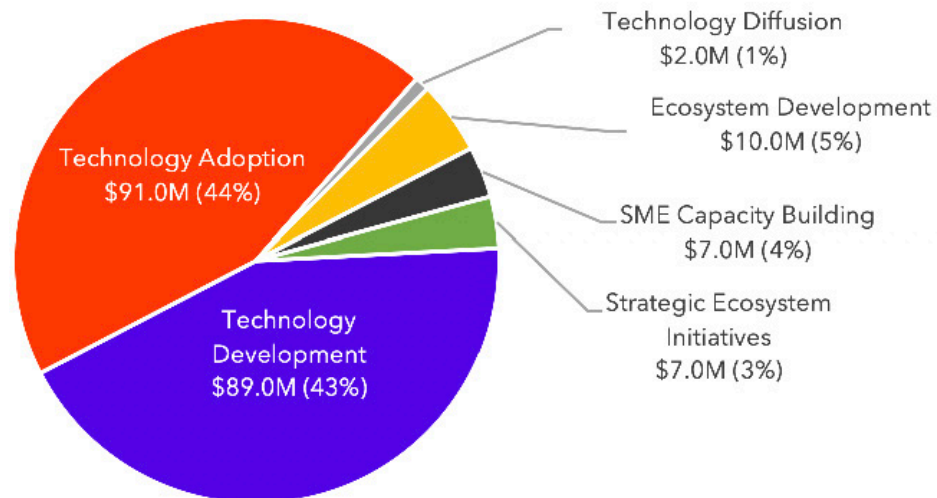
In 2018, NGen was allocated \$229.8 million as part of the Government of Canada’s Innovation Supercluster Initiative to fund programming in support of its objectives.

NGen has supported six program funding streams from the Government’s contribution:

1. High Potential Technology Development projects that develop and scale new manufacturing processes giving Canadian manufacturers a significant competitive advantage in world markets;
2. Ground-Breaking Process Transformation projects that involve the adoption of advanced technologies to transform existing manufacturing processes in critical sectors of Canadian manufacturing;
3. Technology Diffusion projects that aim to expand the manufacturing user base for new and unique technologies developed in Canada;
4. Ecosystem Development projects that enhance education and training, research and testbed infrastructure, and scale-up supports for Canada’s advanced manufacturing ecosystem, and particularly for SMEs;
5. SME Capacity Building projects that involve smaller-scale pilots, technology and commercialization feasibility studies, and cluster-building activities; and,
6. Strategic Ecosystem Initiatives that address critical gaps in Canada’s advanced manufacturing ecosystem that are funded directly from NGen’s own operating budget.

By the end of its 2020-2021 financial year, NGen will have allocated \$199 million of Supercluster funding to these six program streams. This represents 97.5% of its \$204 million project budget.

Allocations to NGen Program Funding Streams (March 31, 2021)



ECOSYSTEM DEVELOPMENT

NGen will have contributed \$61 million to advanced manufacturing ecosystem development activities by the end of March 2021, either in the form of direct investments in strategic ecosystem initiatives or from the ecosystem supports provided by NGen approved projects.

Ecosystem Development	Investment
Technology and Capacity Building Projects (Estimate)	\$33M
Ecosystem Development Projects	\$20M
Cluster Building	\$1.0M
Strategic Ecosystem Initiatives	\$7.0M
Total Allocated to March 31, 2021	\$61.0M

All of NGen's industry-led projects are expected to make a contribution to Canada's advanced manufacturing ecosystem beyond the benefits accruing to participating project partners themselves. Based on approved project plans, approximately 9% of NGen's technology-related and capacity building project budget - \$33 million in total - will have been allocated to activities that contribute to ecosystem development by the end of March 2021. These contributions include developing education and training programs for students and workers, enabling access for smaller companies to technology testing and scale-up facilities, and sharing best practices and industry knowledge. They do not take into account the future benefits that can be expected by sharing IP generated as a result of those projects.

Another \$10 million of NGen investments will be approved by the end of March 2021, leveraging total spending of approximately \$20 million, in industry-led ecosystem development projects specifically intended to support SME scale-ups in fields like autonomous robotics, bio-manufacturing, electronics, smart materials, cleantech, and medical devices. NGen will also have approved investments of \$525,000 (leveraging total spending of more than \$1 million) in cluster-building projects that are aimed at developing or supporting smaller, regionally based advanced manufacturing clusters across Canada.

NGen invested \$150,000 in two cluster-building initiatives in 2020. The clusters are led by Ontario's Bluewater Wood Alliance (BWA) and the Saskatchewan Industrial and Mining Suppliers' Association (SIMSA). Together their membership includes 345 SMEs. NGen's support enabled BWA to host 16 online leadership workshops and training events for its members, with 255 participants covering topics like manufacturing operational improvements, advanced technology applications in the wood products sector, export readiness, sourcing talent, and health and safety preparedness. SIMSA conducted 15 virtual events with NGen support in 2020,

including a virtual mining supply chain tradeshow involving 481 Canadian suppliers and 316 potential buyers from around the world and highlighting more than US\$4 billion in potential procurement opportunities. Other events included a virtual mining supply trade mission to Chile and workshops on topics like virtual tradeshow training, virtual negotiations, virtual selling, modular reactor development, carbon reduction, women in supply chain leadership, and indigenous supplier development. SIMSA's virtual events in 2020 involved more than one thousand companies and 1,700 individual participants. It plans to organize six more virtual events in the first quarter of 2021 including a virtual trade mission to Peru and Brazil.

In addition to providing support to industry-led projects, NGen invested \$7 million of its own operating budget in a number of strategic ecosystem development initiatives. In 2020-2021 NGen:

- Published its Consensus Report on advanced manufacturing ecosystem priorities summarizing the outcome of cross-country discussions with ecosystem leaders and surveys of NGen members conducted in 2019-2020;
- Published an analysis of its membership, a review of Canadian business school programs in support of advanced manufacturing, as well as a strategic analysis of advanced manufacturing opportunities for Canada;
- Launched a multi-media campaign to attract young people into advanced manufacturing careers including a portal providing guidance with respect to academic and extracurricular programs for students interested in pursuing advanced manufacturing activities;
- Signed up to the Government's 50/30 Challenge to enhance diversity and inclusion in senior leadership positions within the organization and encouraged its members to do the same - 81 of the 470 organizations that enlisted in the Challenge when it was officially announced in December 2020 are NGen members;
- Supported educational initiatives related to advanced manufacturing for aboriginal and black youth;
- Launched its AmpUp and Transformative Leadership programs designed to provide advanced manufacturing skills and management development training for SMEs; and,
- Launched its on-line collaboration platform and IP Registry for NGen members.

In response to COVID-19, NGen facilitated and funded projects that supported the production of critical products to fight the pandemic and protect the health and safety of Canadians. It also undertook a number of ecosystem development initiatives aimed at enhancing connections and collaboration in support of federal, provincial, and the private sector's pandemic response. Specifically, NGen has:

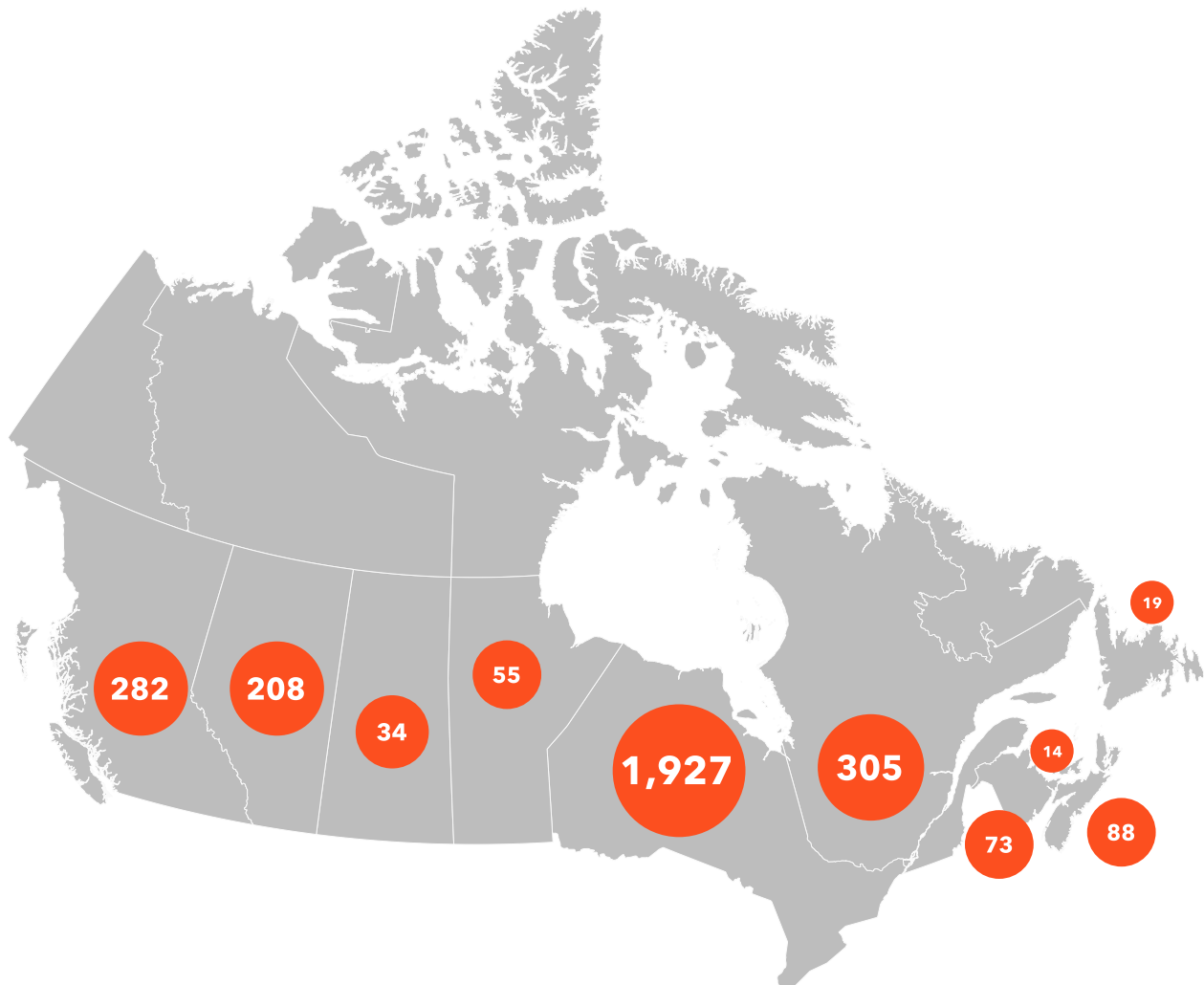
- Collaborated closely with Health Canada, the Public Health Agency of Canada, ISED, the National Research Council, and Public Services and Procurement Canada to ensure that NGen's COVID-19 related investments and initiatives are aligned to the Government of Canada's priorities for pandemic response;
- Partnered with federal and provincial funding agencies to invest in the development of critical products to fight the pandemic;



- Advised federal and provincial governments with respect to Canadian manufacturing capabilities;
- Facilitated access for Canadian suppliers of PPE, medical devices, and therapeutic products to public sector procurement channels, as well as to international procurement opportunities through Canada’s Trade Commissioner Service;
- Funded upgrades in Canada’s Rapid Response Platform that have improved quality control and visibility on that online marketplace for Canadian suppliers to meet demand across Canada for personal protective equipment; and,
- Partnered with Health Canada, NRC-IRAP, and the Canadian Standards Association to undertake a study of Canada’s standards testing, certification, and quality control capabilities related to PPE and other critical health care products.

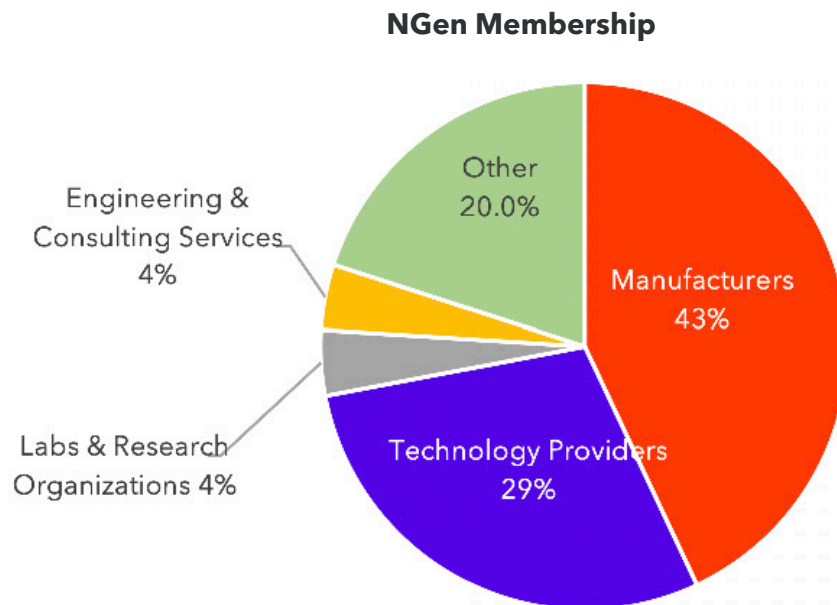
MEMBERSHIP

NGen set a target to expand its membership to 3,000 companies, organizations, and individual experts, all contributing to advanced manufacturing in Canada, by the end of March 2021. That target was surpassed in November 2020. By the end of December, NGen membership had grown to 3,105, including 2,212 companies and organizations and 893 individual experts. Among member companies and organizations, 2,027 or 92% were SMEs.



NGen's membership is drawn from every province across Canada. While membership is concentrated in southern Ontario, 38% of NGen members are located outside the province. NGen also has 100 members that are based outside the country.

The organizations within NGen's membership include manufacturers, technology companies, colleges and universities, research centres, industry clusters and business networks, start-up accelerators and innovation centres, engineering and consulting services, private-sector investors and financial institutions, economic development organizations, as well as federal and provincial government agencies.



NGen's membership base offers a valuable source of information about the structure and capabilities of Canada's advanced manufacturing ecosystem, an extensive population to survey in order to identify business priorities and constraints, and an effective platform for communicating with and engaging supercluster members in NGen-led initiatives.

NGen has used data collected from its members to identify priorities for ecosystem investments. The report was published in May 2020. NGen also published other empirical studies based on membership input in 2020-2021 that will help to inform future initiatives, including analyses of:

- Strategic opportunities for Canada's advanced manufacturing sector;
- The structure and capabilities of Canada's advanced manufacturing supercluster;
- Advanced manufacturing programs in Canadian business schools;
- The structure, capabilities, and priorities of Canada's additive manufacturing and automation sectors;
- The competitiveness of Canada's advanced manufacturing supply chains;
- Advanced manufacturing capabilities in Ontario (in conjunction with the Innovation Economy Council); and,
- Manufacturers' digital investment intentions for 2021-2022 (in conjunction with Plant Magazine and Annex media).



PROMOTION

NGen has undertaken a number of initiatives to promote the capabilities of its members and Canada's advanced manufacturing ecosystem as a whole. By the end of 2020, NGen had made 229 presentations about Canada's advanced manufacturing supercluster at in-person and virtual industry events across Canada. NGen has used its website along with other media to showcase the world-leading projects that are being supported by Supercluster funding. In partnership with RBC, NGen has also launched a series of online plant tours to showcase best practices in advanced manufacturing.

On the international stage, NGen is represented on the advisory committee of the World Manufacturing Forum which has also offered a global platform for NGen members to speak about their leadership initiatives. In 2019 NGen convened an innovation cluster summit where a formal agreement on Canada-EU cluster collaboration was signed. Since then, NGen has actively participated in identifying priorities for Canadian participation in Eureka! and other European cluster programs. NGen has also participated in a number of international in-person and online venues to promote Canada's advanced manufacturing capabilities - in the United States, Japan, UK, Germany, France, Italy, Belgium, and South Korea.

CONNECTIONS & COLLABORATION

By the end of December 2020, 1,631 supercluster members had participated in NGen collaboration events, webinars, and project workshops. NGen had also connected 328 member companies and organizations looking for project partners or other potential business opportunities.

NGen launched its online collaboration platform in early 2021. The AI-enabled platform enables NGen members to identify innovation partnership opportunities, including opportunities to license or otherwise share intellectual property arising from NGen funded projects.

As an important part of its efforts to fight COVID-19, NGen also invested in Canada's Rapid Response Platform (RRP). NGen's investment enabled that online marketplace for personal protective equipment and other critical health care products to provide services in both official languages, upgrade quality assurance, and highlight Canadian suppliers and products manufactured in Canada. As a result, RRP now offers Canadian manufacturers five online regulatory approval pathways for eleven categories of PPE regulated by Health Canada (including thermometers and respirators). Since RRP's re-launch, 6,124 new users have been added to the platform. Users have spent an average of 14 minutes and 32 seconds on the website. By the end of December 2020, RRP was managing 271 PPE product listings with 99 of those product listings manufactured in Canada by suppliers from every province across the country. It has made over 40,000 automated matches supplying requests for PPE from businesses as well as public agencies and health care authorities, with more than 45 million units sourced on the platform to date.

NGen has also partnered with 18 federal and provincial funding agencies to help develop and co-invest in supercluster projects. Public sector funding partners include ISED, the National Research Council and NRC-IRAP, NRCAN, NSERC, FedDev, WED, ACOA, BDC, EDC, Sustainable Development Technologies



Canada, ENCQOR, MITACS, Ontario's Ministry of Economic Development, Job Creation and Trade, Centre de recherche industrielle du Québec/Investissement Québec, BC's Ministry of Jobs, Trade, and Technology, Alberta Innovates, and InnoTech Alberta.

PROJECTS

NGen set four types of advanced manufacturing project challenges in 2020-2021, including an open call for project applications as well as more direct calls in response to the COVID-19 pandemic. It undertook:

1. An open call for technology-related and ecosystem development projects;
2. A COVID-19 Rapid Response Challenge issued in March 2020 to support the manufacturing of critical products for use by front-line workers in the fight against the pandemic;
3. A Disinfecting Robot Challenge issued in May 2020 to develop and manufacture new autonomous systems for disinfecting workspaces; and,
4. A Made Smarter Strategic Challenge issued in August 2020 to support the deployment of advanced technologies that will ensure sustainable globally competitive manufacturing and supply chains related to critical products required to fight the pandemic.

NGen set several targets in its Corporate Plan for 2020-2021 for its investments in collaborative industry-led advanced manufacturing projects. It aimed to:

- Approve projects with a total value of \$275 million;
- Contract projects involving a total value of \$190 million;
- Involve 150 industry partners in its projects; and,
- Encourage the participation of at least 20% of project partners from outside Ontario.

NGen surpassed all of these goals by the end of December 2020. By then NGen had approved investments of \$148.3 million in 68 projects that are expected to leverage \$210.3 million in additional industry investment and generate a total of \$358.7 million in total innovation spending. Twelve projects were completed by the end of 2020, most of which were already delivering critical health care products to front-line workers.

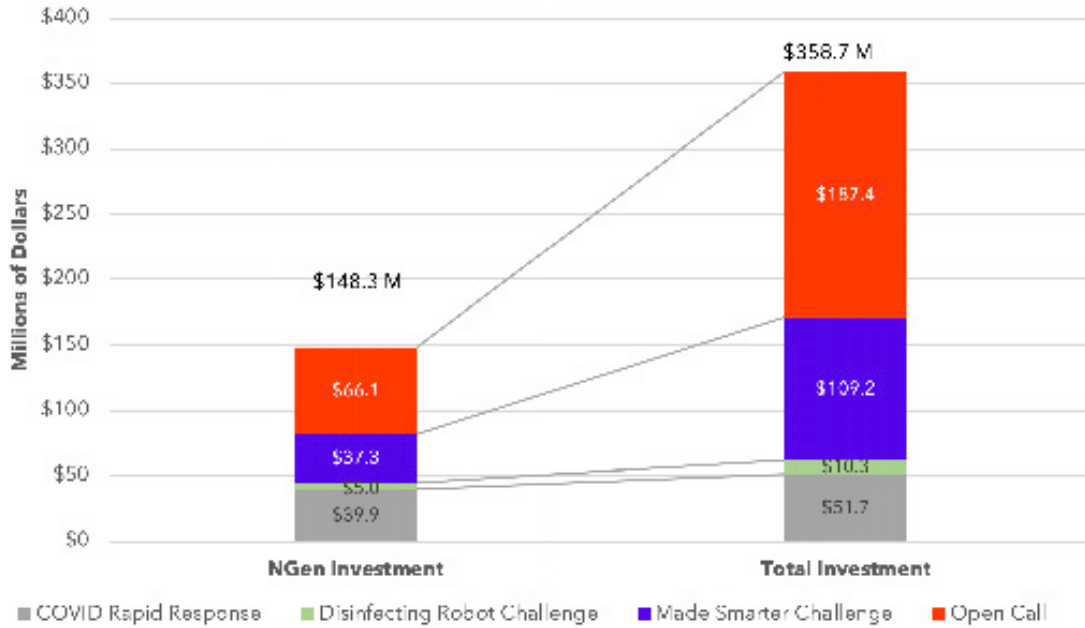
Approved NGen Projects - December 31st, 2020					
Project Status	Number of Projects	Number of Project Partners	Numbers of SMEs	NGen Investment	Total Project Spending
Completed	12	37	29	\$38.2M	\$121.4M
Contracted & Underway	48	106	95	\$102.5M	\$221.0M
Approved - not yet contracted	8	15	14	\$7.6M	\$16.2M
Total Portfolio	68	158	138	\$148.3M	\$358.7M



NGen will be able to leverage \$1.42 in additional investments by industry and other funding partners for every dollar it invests in these projects.

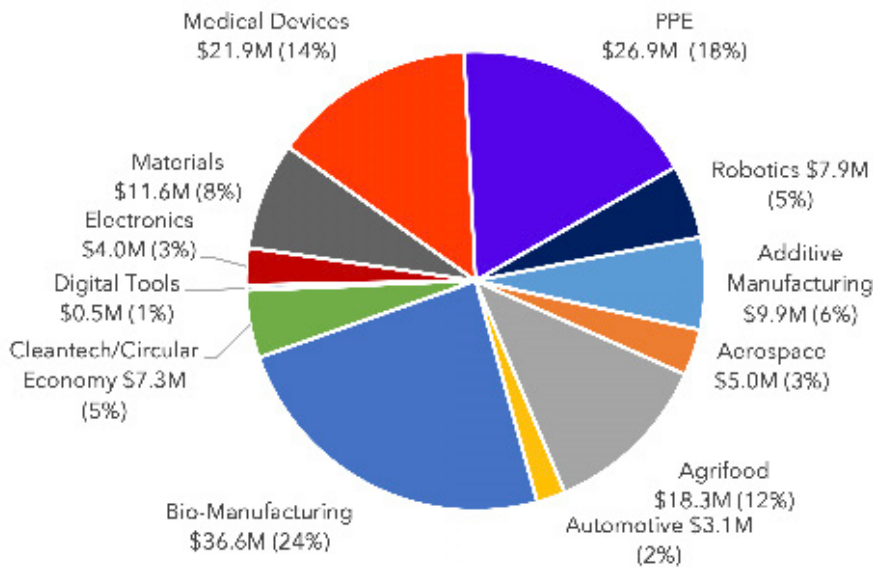
NGen’s projects involve 158 industrial partners – 138 or 87% of them SMEs – as well as 65 supporting research and academic partners from across Canada. One-third of NGen project partners are based outside of Ontario.

NGen Project Investment Leverage



The projects that NGen approved for funding by the end of 2020 will lead to the development of unique advanced manufacturing solutions for a variety of industry sectors.

NGen Investment in Approved Projects by Type of Industry Application



The investments that NGen had approved by the end of 2020 were directly supporting 1,600 jobs involved in project work. Based on their commercialization projections, they will generate an estimated \$14 billion in economic value and create 11,200 new jobs over the next five to ten years.

They are also delivering other economic impacts in line with NGen's supercluster objectives. To date:

- \$747 million in new purchase orders have been concluded by partners in completed projects;
- 51 new product lines are being established;
- 64 new manufacturing processes are being developed;
- 6 new companies have been created; and,
- 239 instances of background and foreground IP being shared among project partners and NGen members have been recorded.

While these economic impacts are impressive, NGen's projects are also delivering benefits to Canadians in the form of cleaner energy, more sustainable industrial processes, more secure and resilient supply of food and medical products, improvements in health care, and in the case of COVID-19 related projects, actually saving lives.

NGen was able to leverage the scope of its ecosystem network and the strength and efficiency of its project development and approval processes to move rapidly in support of industry and government initiatives to combat COVID-19. NGen set a target to support the manufacturing of at least 25 new products to fight the pandemic. By the end of December 2020, \$82.2 million in NGen funding had been approved for 35 COVID-related projects. Total innovation spending slated for these projects stands at \$171.2 million. Thirty-six new product lines will be established as a result of these projects including ventilators and other medical equipment along with their components, respirators and face shields, gowns, sanitizers, as well as other PPE and associated materials, disinfecting robots, test kits, vaccines, and peripheral devices.

There were 68 applications in NGen's project pipeline at the end of December 2020 representing a funding ask of \$197.3 million with total potential innovation spending estimated at \$499.0 million. NGen is aiming to approve additional project investments of \$51 million by the end of March 2021. At that point, NGen will have allocated \$199 million of its \$204 million project budget.

NGen has earmarked \$4.0 million from its project budget for the first quarter of 2021 for investments in SME capacity-building projects including pilot projects, feasibility studies, and \$375,000 for cluster-building initiatives. The remaining \$47 million in NGen funding will be made available to support larger industry-led advanced manufacturing projects. Project applications nearest to completion at the end of December were in the fields of bio-manufacturing, advanced materials, process automation, autonomous vehicles, cleantech, and battery technologies.



PROMOTION

NGen launched six new initiatives in 2019-2020 designed to enhance Canada's advanced manufacturing workforce and strengthen the capacity of SMEs to manage the successful deployment and scale-up of advanced technologies for manufacturing.

1. NGen's Advanced Manufacturing Youth Campaign is a multi-media initiative that aims to promote awareness about the importance of advanced manufacturing in Canada and attract young people into careers in the sector. It also provides students with guidance about the types of careers available in manufacturing, the academic qualifications required to pursue advanced manufacturing employment, and how to get engaged in extracurricular activities related to advanced manufacturing like youth-oriented robotics programs and maker spaces.

2. NGen's Diversity and Inclusion Initiatives aim to identify best practices related to the management of diversity and inclusion in advanced manufacturing companies in order to provide guidance for its members and assist them in connecting with initiatives being undertaken by other organizations across Canada to enhance the participation and capabilities of women, people with disabilities, and BIPOC employees in Canada's advanced manufacturing workforce. These initiatives will also inform how NGen will work to achieve its own commitments under the 50/30 Challenge. In 2020-2021, NGen helped to connect and provided in-kind support for university Women in Science and Engineering programs and well as other Women in Manufacturing and Women in Technology initiatives. It developed a strategic partnership with the Black North initiative led by the Canadian Council of Business Leaders Against Anti-Black Systemic Racism. NGen also initiated discussions with First Nations leaders to identify opportunities to include an advanced manufacturing component in aboriginal entrepreneurship education programs.

3. What's Next? is a series of webinars and follow-up discussions intended to engage NGen members by sharing insights with industry leaders and other experts about strategic issues affecting their business. In 2020-2021, the program covered issues like managing workplace health and safety during the pandemic, Canada's economic outlook, building world-class supply chains through operational excellence, using AI to drive manufacturing success, the circular economy, managing IP strategies, cybersecurity in advanced manufacturing, export opportunities in a post-COVID world, and innovation funding initiatives in Europe.

4. NGen's Transformation Leadership Program offers SME managers step-by-step advice, proven methodologies, and analytical tools required to assess and improve performance along the path to successful implementation of advanced manufacturing strategies. The program draws on best international management practices. It provides a modular approach to online executive education that will help business leaders and senior managers identify how they can best contribute to customer value, improve critical processes, and understand their business and skills requirements for successful advanced manufacturing transformations.



5. AmpUp is an open-source online education and training platform for managers and employees in advanced manufacturing. It provides access to high quality executive education and skills development programs relevant to advanced manufacturing offered by Canadian universities, colleges, and private sector training initiatives. Training partners provide NGen members with a discount on registration fees while NGen matches company contributions to employee training up to a maximum of \$15,000 per company. The program was launched in October 2020. By the end of December, it was providing access to 64 online courses offered by 16 academic and private sector partners from across Canada. Partners had discounted registration fees by \$86,000 and NGen had provided \$60,000 in matching funding to support 80 employees who were early registrants in the program.

6. NGen's Recover & Lead Supply Chain Resiliency Program engages business leaders and supply chain executives from across NGen's membership in developing a strategic roadmap for securing and strengthening the resiliency of advanced manufacturing supply chains. In 2020-2021, NGen published a report in conjunction with Deloitte on the competitiveness of Canada's manufacturing supply chains. It convened an online supply chain summit to discuss the findings of the report and identify industry priorities for enhancing supply chain competitiveness. It also formed a Supply Chain Leadership Council of senior executives with a mandate to mobilize their Canadian suppliers to improve supply chain visibility and encourage the adoption of best manufacturing practices and supporting technologies.

OBJECTIVES FOR 2021-2022

NGen has three overarching priorities for 2021-2022:

1. Raise additional funding from public sector agencies and private sector investors in order to sustain NGen's ability to support world-leading, industry-led advanced manufacturing projects and ecosystem development initiatives.
2. Focus attention on ecosystem development.
3. Monitor and facilitate the successful completion and commercialization of NGen funded projects.

PROGRAM FUNDING STREAMS

NGen plans to invest \$8 million in SME capacity-building projects and strategic ecosystem development initiatives in 2021-2022:

- \$5 million will be allocated from NGen's capacity-building fund for collaborative SME projects involving feasibility studies, pilot projects, and cluster-building activities. These investments will fully commit the funding that NGen has available from its original tranche of Supercluster funding.



- \$3 million will be allocated from NGen’s own operating budget to invest in strategic ecosystem development programs that are aligned with the priorities identified in its 2020 Consensus Report.

NGen’s budget for supporting industry-led projects from its original tranche of Supercluster funding will be fully allocated by the end of June 2021.

The importance of advanced manufacturing to Canadians has never been more apparent. NGen has also established a strong track record in facilitating consensus and collaboration across Canada’s advanced manufacturing ecosystem, assisting in the development of collaborative industry-led projects with significant commercial potential and important outcomes for Canada, partnering with federal and provincial funding agencies, and demonstrating that the value of collaborative ventures exceeds that achieved by companies when they attempt to go it alone. NGen has built efficient and effective project development, assessment, and contracting, and monitoring processes. And, it has expanded its membership to include leading advanced manufacturing organizations from across Canada.

NGen will look to leverage these advantages in order to increase funding available from public sector agencies and private sector investors. Its goal will be to sustain its ability to support world-leading, industry-led advanced manufacturing projects and ecosystem development initiatives. In order to do that NGen will aim to raise at least \$50 million from additional funding sources in 2021-2022.

ECOSYSTEM DEVELOPMENT

Ecosystem development will be the primary focus for program funding allocated from the original tranche of NGen’s Supercluster funding in 2021-2022.

NGen’s capacity-building fund supports collaborative projects involving SMEs that allow them to assess opportunities for undertaking larger projects or joint ventures and scale-ups with manufacturing partners. It also supports the development of new advanced manufacturing cluster activity.

By the end of December 2020, there were 29 proposals in NGen’s application pipeline to support cluster-building activities in fields that include bio-manufacturing, medical technologies, materials, advanced textiles, cleantech, automation, additive manufacturing, and agri-food (representing an overall funding ask of \$2.175 million). The applications were filed on behalf of 1,868 SMEs. In 2021-2022, NGen will earmark \$2 million to support cluster-building initiatives based on successfully assessed proposals from this pipeline and other applications.

NGen will also continue to work with project partners to realize the ecosystem development objectives defined in the industry-led technology adoption and diffusion, process transformation, and ecosystem development projects that it had approved by the end of March 2021.

Strategic ecosystem development programs funded from NGen’s operating budget are intended to address



gaps and opportunities in Canada's advanced manufacturing sector. NGen will continue to implement the promotional, collaboration-building, workforce development and SME capacity-building programs that it launched in 2020-2021. It will also aim to undertake a series of additional initiatives in support of ecosystem development, including:

- A study of IP commercialization strategies in advanced manufacturing based on evidence from its projects;
- An analysis of the statistics used to define advanced manufacturing and the performance of the sector;
- A review of regulations and standards with the aim of strengthening the competitiveness and growth potential of Canada's advanced manufacturing sector. NGen will work with ISED to identify opportunities for regulatory improvements related to its industry-led project activities. It will also lead a sandbox initiative to identify regulatory and standards issues related to the use of collaborative robots. Initiatives will also be undertaken with the Standards Council of Canada to develop best practices related to diversity and inclusion in advanced manufacturing, and with Health Canada to examine the substitutability of personal protective equipment and health care products used to fight COVID-19);
- Pilot projects to explore the use of digital wallets in advanced manufacturing applications, in conjunction with ISED's Canada's digital infrastructure project;
- Development of an online video repository to showcase advanced manufacturing capabilities;
- More focused international initiatives aimed at showcasing Canadian advanced manufacturing capabilities, attracting international investment, and identifying opportunities for international partnerships in advanced manufacturing projects;
- Expanding its student engagement, workforce development, and diversity and inclusion initiatives;
- Development of an online curated thought leadership library highlighting global trends in advanced manufacturing;
- SME assessment and advisory services based on NGen's Transformation Leadership Program;
- The launch of an online learning platform for virtual robotics training for students and employees; and,
- Offering online digital tools to assist SMEs improve operational and supply chain performance.

NGen will also seek additional financial support for industry-led ecosystem development projects that it will not be able to support from its original tranche of Supercluster funding.

MEMBERSHIP

NGen aims to increase its membership to 4,000 companies, supporting organizations, and individuals by the end of March 2022, and to reach a 5,000 membership target by the end of March 2023. It will place particular emphasis on expanding membership participation from outside Ontario.

An updated report on the structure, capabilities, and priorities of Canada's advanced manufacturing ecosystem, based on data collected from NGen's members and online collaboration platform, will be published by the end of March 2022. Similar reports will be published in 2022-2023.



PROMOTION

NGen will expand its promotional activities on behalf of its members over the next two years. It will continue to showcase NGen-funded projects and their impacts via its website, as well as through external and social media. It will expand its virtual plant tour program in partnership with RBC. In addition, NGen members will be invited to submit videos demonstrating their capabilities that will be posted in an online repository searchable through NGen's collaboration platform.

NGen will also work with the Trade Commissioner Service and Invest in Canada to highlight Canada's advanced manufacturing supercluster and the country's advanced manufacturing capabilities in more international events, including recruiting NGen members and enabling their participation in virtual trade missions. It will work with Invest in Canada and local economic development agencies to target prospects and support pitches to attract foreign direct investment into Canada.

CONNECTIONS & COLLABORATION

NGen will target at least 100 innovation partnership opportunities and matches on its online collaboration platform in 2021-2022. It will expand the platform to include international partnership opportunities. And, it will aim to expand the scope for collaboration on the platform by including a tool that will provide NGen members the ability to search the web rapidly for advanced manufacturing solutions to technical and business problems.

NGen will also expand and strengthen its partnerships with public and private sector organizations to assist in the identification and development of world-leading advanced manufacturing projects and raise funds to support those projects. It will aim to develop working relationships with at least 25 strategic partners by the end of March 2022, and will continue to grow its network of strategic partners in coming years as well.

PROJECTS

In 2021-2022, NGen will invest the remaining \$5 million of unallocated funding from its project budget in SME capacity-building projects including pilot projects, feasibility studies, and cluster-building initiatives (\$2 million has been earmarked for cluster-building projects alone).

Most of NGen's Supercluster project activity will switch to monitoring and reporting on the progress of projects that have been approved and contracted. NGen will also work with project partners to enhance the commercial impact of their projects by identifying opportunities to share or apply the IP arising from their initiatives in other sectors of Canadian manufacturing as well as new sales and innovation partnership opportunities within Canada and in international markets.

Timelines for project completion depend on the type of project and deadlines for delivery built into the Master Project Agreements undertaken between NGen and project partners.



Timelines for Project Completion							
Type of Projects	4Q 2020/1	1Q 2021/2	2Q 2021/2	3Q 2021/2	4Q 2021/2	4Q 2022/3	NGen Investment
COVID-19 Rapid Response							\$40M
Disinfecting Robot Challenge							\$5M
Made Smarter Challenge							\$37M
Advanced Manufacturing Open Call							\$109M
SME Capacity-Building							\$12M

Cumulative expenditures and advances on contracted projects are expected to amount to \$82.6 million by the end of NGen's 2020-2021 financial year, \$165.3 million by the end of 2021-2022, and \$203.2 million by the end of 2022-2023.

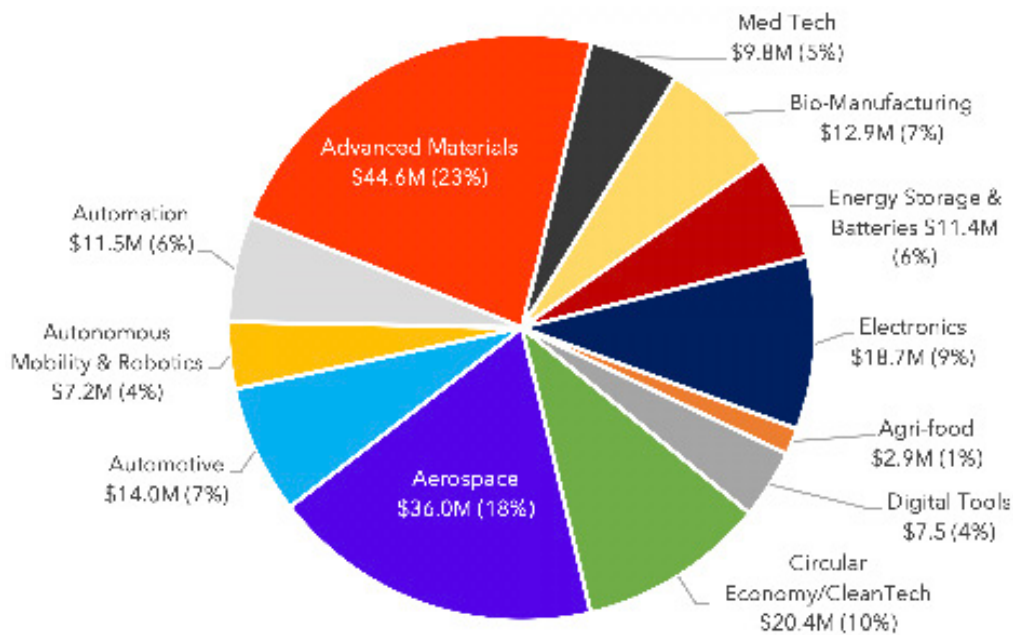
Estimated Expenditures and Advances on NGen Projects (Millions of Dollars)								
Type of Projects	Full Year 2020/1	1Q 2021/2	2Q 2021/2	3Q 2021/2	4Q 2021/2	Full Year 2021/2	Full Year 2022/3	Total Program
Advanced Manufacturing Open Call and Challenges	\$80.2	\$18.7	\$19.6	\$18.7	\$18.7	\$75.7	\$37.3	\$192.3
SME Capacity Building	\$2.4	\$1.7	\$1.8	\$1.7	\$1.7	\$6.9	\$0.9	\$12.0
Total	\$82.6	\$20.4	\$21.4	\$20.4	\$20.4	\$82.7	\$38.2	\$203.3

By the end of March 2021, NGen is likely to have \$141.7 million in industry funding requests for advanced manufacturing projects that it will not be able to support from the original tranche of Supercluster funding. NGen aims to cover at least some of this demand by raising funds from other public sector funding programs and private sector investors.

The applications that were in NGen's project pipeline at the end of December provide an excellent indication of the short- and medium-term opportunities that Canadian industry sees in areas like medical technologies and bio-manufacturing, circular economy and cleantech, energy storage and battery technologies, advanced materials, autonomous mobility and robotics, as well as in new manufacturing applications in Canada's agri-food, aerospace, automotive, and electronics sectors.



NGen’s Project Pipeline Funding Requests by Industry Application December 31st, 2020



The project proposals in NGen’s pipeline also point to the importance of collaboration, especially when it comes to taking an end-to-end life cycle approach across product value chains from resource extraction and processing through product and innovation supply chains to finished product manufacturing, in-use monitoring and maintenance, and finally to recycling or re-use of materials, components, and final products.

PROGRAMS

Over the next two years, NGen will continue to support and expand the student engagement, workforce development, and SME management support programs that it launched in 2020-2021. Specifically, NGen plans to:

- Roll out, expand, and monitor its youth campaign, engaging more role models and linking in more advanced manufacturing-related extracurricular programs and work-integrated learning opportunities into its online portal;
- Launch an Advanced Manufacturing Education Program for Aboriginal Youth that will support the inclusion of manufacturing themes, makers’ projects, and mentorships involving aboriginal business leaders in First Nations’ elementary and secondary school curricula;
- Expand its diversity and inclusion initiatives to engage more members in the 50/30 Challenge, identify best diversity and inclusion practices, and connect members to programs across the country that are working to increase the participation of women and BIPOC communities in manufacturing;
- Support the development of an online robotics simulation platform that will allow students and other users to design, build, program, and test drive robots in a virtual environment and encourage its adoption by school boards across Canada;



- Organize webinars and virtual discussions for members on strategic issues in advanced manufacturing, including subjects like the global outlook for the sector, supply chain resiliency, strategic planning, and technical topics that include machine learning, additive manufacturing, and quantum computing;
- Launch its Transformation Leadership Program online and develop assessment and advisory services based on it for SME members; and,
- Expand the curriculum, the number of education and training partners, and the number of trainees in NGen’s AmpUp program. NGen will aim to support at least 300 trainees through the program in 2021-2022.

NGen will also undertake new programming initiatives in support of Canada’s advanced manufacturing ecosystem. It will develop an online curated thought leadership library highlighting global trends in advanced manufacturing. It will also launch a program that will offer SMEs access to online digital tools to assist them improve operational and supply chain performance.

Estimated cash requirements to support NGen’s operating expenses which support both project administration as well as the delivery of strategic ecosystem programs and initiatives are estimated at \$10.8 million for 2020-2021, \$6.6 million for 2021-2022, and \$5.3 million for 2022-2023.

Estimated Operating Expenses (Millions of Dollars)								
	Full Year 2020/1	1Q 2021/2	2Q 2021/2	3Q 2021/2	4Q 2021/2	Full Year 2021/2	Full Year 2022/3	Total Program
Total Operating Expenses	\$10.8	\$2.2	\$2.2	\$2.2	\$2.2	\$8.9	\$7.1	\$32.9
Of which: ISI Contribution	\$10.8	\$1.7	\$1.7	\$1.7	\$1.7	\$6.6	\$5.3	\$26.5

DIVERSITY & INCLUSION STRATEGY

NGen was an original signatory to the Government of Canada’s 50/30 Challenge in November 2020. The organization takes seriously the need and the benefits that will arise from building organizations that are reflective of the diversity of Canadian society and provide equitable career opportunities for employees irrespective of race, gender, physical capability, or sexual orientation.

In line with its 50/30 commitment, NGen will maintain gender parity on its Board of Directors and increase the representation of female and BIPOC employees on its senior management team. NGen’s staff is already comprised of equal numbers of men and women. One-fifth of its employees are people of colour. NGen’s 50/30 commitment will inform future career development opportunities and succession planning within the organization.



NGen will also take active steps to enhance diversity and inclusion within its internal operations as well as in program activities supporting ecosystem development. To that end, NGen has initiated a review of its operations to identify and rectify cases of unconscious bias in its communications, program development and delivery, and human resource and internal management practices and procedures. NGen is also working with the Standards Council of Canada to identify and develop best diversity and inclusion practices for industry that it can apply internally in the form of a D&I policy and procedures and which will serve as a model for NGen members. NGen will ensure that the messaging, role models, and mentors involved in its youth campaign will reflect the diversity of Canada's student population. In 2021-2022, it will continue to promote member participation in the 50/30 Challenge. It will also work with academic, industry, and other ecosystem partners to support advanced manufacturing educational initiatives and employment opportunities for aboriginal, black, and other under-represented communities.

INTERNATIONAL STRATEGY

International engagement is a key aspect of NGen's efforts to promote Canada's advanced manufacturing capabilities to the world, find opportunities to build collaborative innovation partnerships in multinational supply chains, attract advanced manufacturing talent and investment to Canada, and develop international commercialization opportunities for NGen members and project partners.

NGen's strategy for international engagement prioritizes promotion, partnerships, investment and other commercial opportunities with those countries, international companies, and innovation programs that are leaders in advanced manufacturing. Country/regional targets include the European Union (particularly Germany, Italy, France, Belgium, and the Netherlands), the United Kingdom, Japan, South Korea, and the United States. Corporate targets include international technology providers, manufacturing companies, and investment firms that have indicated a potential interest in locating or investing in Canada to gain access to the country's advanced manufacturing ecosystem or high-quality talent pool. Partners include advanced manufacturing clusters, export and economic development agencies, and advanced manufacturing innovation centres, as well as the Eureka! program managed in Canada by NRC-IRAP. NGen is also targeting key events related to advanced manufacturing like the World Manufacturing Forum, Hannover Fair, and other international trade shows showcasing advanced manufacturing technologies. NGen works in partnership with Canadian partners, including Global Affairs, Export Development Canada, NRC-IRAP, Invest in Canada, as well as federal and regional economic development agencies.

To date, NGen has been active in promoting Canadian capabilities and the Supercluster initiative in international events like the World Manufacturing Forum, international technology summits like the Global Robotics Summit hosted by South Korea in 2020, and Belgium's Advanced Manufacturing Summit, the Hannover Fair in Germany, and the Eureka! Summit held in the United Kingdom in 2019. NGen has also built working relationships with international advanced manufacturing clusters in Europe (including the European Advanced Manufacturing Support Centre, Agoria and Sirris in Belgium, light-weight composite and aerospace clusters in Germany, robotics, automation, and cleantech clusters in Italy, as well as Eureka!'s SMART program), with



the aim of sharing information and best practices and identifying international partnership and investment opportunities. In early 2021, NGen organized a series of webinars with Canada's trade commissioners in Europe and European Commission officials to showcase NGen, Canadian capabilities, and shared priorities for advanced manufacturing innovation in Canada and the EU.

Over the next two years, NGen will continue to engage with its strategic partners to promote Canada's advanced manufacturing sector and identify international innovation partnership and investment opportunities. It will place particular emphasis on the strategic business opportunities that its members have identified - medtech and bio-manufacturing, cleantech and clean energy, aerospace, autonomous vehicles, machine learning and robotics. NGen's online collaboration platform will allow Canadian companies access to new partnership opportunities and allow international companies to assess Canadian capabilities. More active engagement is being planned in international events and advanced manufacturing trade shows, including recruitment for virtual trade missions hosted by Global Affairs as well as by NGen. Partnerships with Trade Commissioners and EDC will help NGen inform its members about how to take advantage of new business opportunities. NGen will also continue to work with Invest in Canada and regional economic development agencies across the country to reinforce their efforts to attract advanced manufacturing investment and talent to Canada

IP STRATEGY

NGen's Intellectual Property Strategy is critical to achieving its objectives in maximizing the commercial potential and economic impacts of NGen-funded projects, enhancing the IP management capacity of SMEs, and creating new business opportunities for NGen members.

NGen has established clear, transparent, and predictable IP ownership policies and licensing structures with respect both to the Background IP that project partners bring to their collaborative activities as well as to the Foreground IP arising from Supercluster-funded projects, including procedures for NGen members to request and negotiate licenses to use Foreground IP in future commercial applications.

Foreground IP is shared among participating members of project consortia according to the terms of project collaboration agreements developed in consultation with NGen's IP Manager. Wherever feasible, and as determined by IP owners, IP arising from projects will be shared with other NGen members. Balancing this availability will be a mechanism to enable companies to recoup their investment, through licensing/sharing agreements or user fees to be paid by members who wish to access newly developed IP. Both of these considerations are important criteria in evaluating and selecting projects for NGen funding.

Title to any IP arising from Supercluster-funded projects is determined by the collaboration agreement undertaken among project partners. A collaboration agreement must be concluded before a final Master Project Agreement is undertaken, and funding finally approved by NGen. Each collaboration agreement includes:



- Assurance of adherence to commitments set out in NGen’s IP Strategy;
- A right for each participant in a project to access on fair, reasonable, and non-discriminatory terms and subject to relevant competitive issues all Foreground IP arising from the project, at least for research and development purposes; and,
- A commitment from each project participant to enter negotiations regarding access to Foreground IP arising from the project with other NGen members subject to any limitations placed on such access.

NGen provides direct advisory support to assist project applicants develop their IP strategies. By the end of December 2020, NGen had provided IP support for 91 project proposals. It had also delivered five workshops on IP management involving the participation of 630 NGen members. With respect to IP strategy outcomes, NGen had recorded:

- 54 IP strategies developed for NGen-funded projects;
- 292 instances of Background IP contributed to projects;
- 220 instances where Background IP were shared with project partners;
- 317 instances of Foreground IP anticipated as arising from projects;
- 19 instances where Foreground IP were shared with partners in formally closed projects; and,
- 17 IP profiles in its registry for access to other NGen members.

In 2021-2022, NGen will continue to provide advice and assistance to project participants. It will expand the number of IP profiles available on its online registry and enable broader access to the registry by integrating it into NGen’s member collaboration platform. And, it will continue to deliver workshops to enhance the ability of SME members to protect and leverage their IP in order to maximize its commercial potential in global markets.

DATA STRATEGY

NGen’s data strategy outlines how it will acquire, store, govern, manage, use, and share data to accomplish its mission, achieve its strategic objectives, create value for its clients, carry out its operations, and ensure its long-term business success.

NGen’s data strategy is based on leveraging data as a strategic asset - focusing on business results, using data as a competitive advantage for NGen and its members, and supporting NGen’s strategic objectives. Implementation requires robust operational, governance, and compliance processes to ensure data integrity, privacy, and security.

NGen’s Director of Data, Technology and Security is responsible for developing, implementing, and overseeing the policies and procedures related to the governance and management of data contained in and transferred into, out of, and between Third Party platforms and NGen’s corporate services IT stack.



In 2020-2021, NGen undertook important initiatives in the implementation of its data strategy. Analyses of advanced manufacturing capabilities and priorities were published based on data provided by NGen members. NGen launched its online collaboration platform to enable members to identify prospective partners for innovation projects. It funded upgrades to Canada's Rapid Response PPE marketplace to enable access in both official languages, enhance quality control, and increase the presence of Canadian suppliers on the platform. NGen also launched its AmpUp open-source advanced manufacturing education and training program online.

With respect to NGen's internal management systems, all project application processes and NGen programs were set up online. All project information related to application status, assessments, financial data, as well as project monitoring and outcomes was consolidated into a single platform enabling real-time performance reporting.

NGen also focused on hardening cybersecurity protection for the data it manages. It undertook a third-party audit of its cybersecurity systems in early 2021. Cybersecurity awareness training is provided to NGen staff on a bi-weekly basis. NGen also ran three virtual workshops for NGen members on cybersecurity. NGen is a member of Canada's Cybersecurity Advisory Council (CSAC) and the Cybersecurity Working Group of the Canadian Centre for Cybersecurity (CCCS). It is a participant in the Government of Canada's Data Trust Project.

In 2021-2022, NGen plans to continue to improve the security of its data systems. It will also focus on expanding its online services platform, including upgrading its website, enhancing its virtual education and training programs, developing more innovation partnership and IP sharing opportunities on its collaboration platform, and providing its SME members access to online digital tools that will enable them to improve business performance. NGen will also look for opportunities to leverage the data it collects from members and website traffic to increase funding opportunities for its members and generate revenue to offset its operating costs.

PERFORMANCE MONITORING

NGen monitors the effectiveness and efficiency of its internal operating processes as well as the progress of its projects and programs in order to ensure that risks are mitigated, operating processes are improved, and that projects meet the goals they set as part of their project application, remain compliant with funding rules, and deliver value for the funds committed to their execution.

In line with its strategic objectives, NGen monitors the impact of its projects and programs according to measurable outcomes-based metrics, including:

- Incremental industry investment in innovation;
- New domestic and international sales;
- Jobs created;



- Companies created;
- New products, processes, and services created;
- Intellectual property created and shared;
- Connections and partnerships facilitated by NGen;
- Participation in education and training programs; and,
- Impacts on the environment and health care.

NGen’s project monitoring process aims to help projects achieve the best results possible while ensuring adherence to program deliverables. NGen monitors the progress of projects in its project portfolio on a quarterly basis. Monitoring consists of meetings between project partners and NGen project staff to review key metrics such as the project’s progress and performance, risk management, financial management and forecasting; facilitate the project team’s IP, exploitation, and commercialization strategy; and report on project outcomes. Upon the completion of every project, a final report is issued describing outcomes and detailing results. Under the terms of NGen’s Master Project Agreement, funding recipients are expected to report on the impacts of their projects over a five-year period following the completion of their project.

RISK MANAGEMENT

Current and potential organizational and operational risks are identified and reviewed quarterly by NGen’s senior management team and Board of Directors. Mitigating actions are undertaken by management to reduce or eliminate risks, and their implementation is likewise reported to and monitored by the Board.

The key risks facing NGen and its ability to build world-leading advanced manufacturing capabilities in Canada relate to:

- The organization’s ability to facilitate collaborative industry-led projects capable of transforming Canadian manufacturing;
- The availability of adequate funding to support industry projects and sustain momentum in project pipeline development;
- The objectivity, effectiveness, and efficiency of NGen’s governance and operating processes;
- NGen’s ability to ensure the security of private personal and confidential business information;
- The openness and inclusivity of NGen membership and project partnerships;
- NGen’s responsible management of public and private funding; and,
- The ability to demonstrate that NGen is playing a critical role in enabling positive outcomes for Canada’s advanced manufacturing ecosystem, and more generally for Canadians as a whole.

The steps required to mitigate these risks inform the objectives of NGen programming, as well as the development, implementation, and continuous improvement of the organization’s governance and operating processes with respect to financial and administrative management, project selection, contracting, and performance monitoring.



FINANCIAL MANAGEMENT

NGen aims to ensure that by the end of March 31st, 2023 industry matching funds contributed to supporting project activity will at least equal the Supercluster funds invested in its project portfolio (excluding projects related to COVID-19 where the 50:50 matching ratio has been waived). NGen must also ensure that at least 25% of operating expenses are offset by contributions from industry or other sources apart from Supercluster funding. (This requirement has also been waived for NGen's 2021 financial year.) Contributions for operating expenses will come from administration fees charged to the partners participating in projects approved for NGen funding, as well as from sponsorships, in-kind contributions, and other user fees related to NGen activities and services.

INDUSTRY MATCHING FUNDS

In 2020-2021, industry expects to contribute \$46.7 million to NGen projects and programs. Industry contributions to projects is expected to be \$40 million. Industry is also expected to contribute \$6.7 million in administration fees, sponsorships, and in-kind contributions that will support NGen's operating expenses over the five-year duration of the Supercluster program.

In 2021-2022, industry matching funds are expected to amount to \$101.4 million, including approximately \$100 million in the form of industry contributions to projects and \$1.4 million in administration fees, sponsorships, and in-kind contributions in support of operating expenses.

REVENUE FROM OTHER SOURCES

In 2020-2021, other federal and provincial funding agencies co-invested \$2.3 million in NGen-funded projects. Over the coming year, NGen projects that \$15 million will be co-invested in its projects by other government agencies.

AMOUNTS OWING TO THE CROWN

There are no amounts owing to the Crown pursuant to legislation, NGen's Supercluster Contribution Agreement, or any other agreement.



PLANNED STATEMENT OF OPERATIONS 2021-2022

In 000's	With Industry Contribution	
	Annual Forecast 2022	5-Year Forecast 2023
REVENUES		
Federal Contributions		
OPEX	6,642	26,476
Project & Programs	101,944	203,290
In-Kind Contributions	100	358
Industry Project & Other Contributions	<u>124,342</u>	<u>220,657</u>
	233,028	450,780
Administration Fees	1,250	8,188
Sponsorship, Fees, & Other Income	<u>181</u>	<u>792</u>
TOTAL REVENUES	<u>234,459</u>	<u>459,760</u>
EXPENSES		
Project Expenditures	93,472	191,467
Program Expenditures	8,472	12,000
Industry project & other expenditures	<u>124,342</u>	<u>220,657</u>
	226,286	424,124
Salaries & Benefits	4,078	16,122
Outsourced Services	4,028	13,547
Administration & Governance	505	2,401
Communications & Events	245	865
Amortization of Capital Assets	<u>730</u>	<u>1,620</u>
	<u>9,586</u>	<u>34,555</u>
TOTAL EXPENSES	<u>235,872</u>	<u>458,680</u>
EXCESS / (SHORTFALL) OF REVENUE OVER EXPENSES	(1,413)	1,081
Contracted Estimates:		
	Total	Total
COVID	-	120,105
Projects	34,000	260,895
Programs	<u>16,000</u>	<u>24,000</u>
	50,000	405,000



PLANNED STATEMENT OF CASHFLOW 2021-2022

	Annual	5 Year
In 000's	Forecast 2022	Forecast 2023
OPENING CASH BALANCE	4,500	0
CASH INFLOWS		
Funding from ISED		
OPEX	6,642	26,476
Projects & Programs	<u>101,944</u>	<u>203,290</u>
	108,586	229,765
Administration Fees	1,250	8,188
Sponsorships, Fees & Other Income	<u>181</u>	<u>792</u>
TOTAL INFLOWS	<u>110,017</u>	<u>238,746</u>
CASH OUTFLOWS		
Project Expenditures	93,472	191,467
Program Expenditures	<u>8,472</u>	<u>12,000</u>
	101,944	203,468
Salary & Benefits	4,078	16,122
Outsourced Services	4,028	13,547
Administration & Governance	505	2,401
Communications & Events	<u>245</u>	<u>865</u>
	<u>8,856</u>	<u>32,935</u>
TOTAL OUTFLOWS	<u>110,800</u>	<u>236,403</u>
NET OPERATING INFLOWS / (OUTFLOWS)	(783)	2,343
BALANCE SHEET MOVEMENTS	100	(78)
ISED ADVANCES / (REPAYMENTS)	<u>0</u>	<u>0</u>
	<u>100</u>	<u>(78)</u>
NET MOVEMENT	(683)	2,265
CLOSING CASH BALANCE	3,817	2,265



NGen Next Generation
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