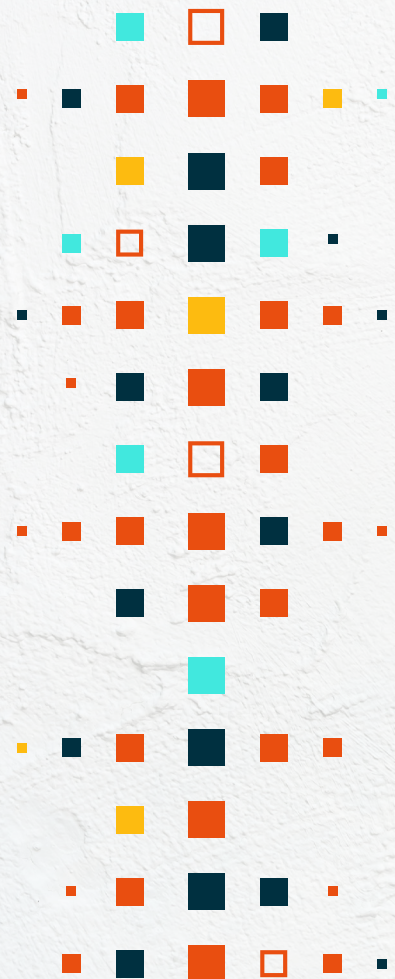




# Five-Year Strategic Plan



April 2023

[www.ngen.ca](http://www.ngen.ca)





# Table of Contents

Our Mission	4
Why Advanced Manufacturing?	4
Transformation and Growth	4
Realizing the Potential of Transformative Change	5
Our Strategic Vision	6
NGen’s Five-Year Strategy	7
Our Values	9
Our Value Proposition	9
Ambitious Targets that Build on Our Success	9
Strategic Objectives	10
Strategic Initiatives	11
Technology Investment Priorities	13
Project Development and Commercialization Strategy	14
Ecosystem Development Strategy	15
International Strategy	18
Ecosystem Collaboration Strategy	19
Equity, Diversity, & Inclusion Strategy	19
Intellectual Property Strategy	20
Data Strategy	22
Financial Plan 2023-2028	22
Performance Measurement Framework	26
Governance	29
Operations	31
References	32



# Next Generation Manufacturing Canada

## OUR MISSION

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

We aim to strengthen the competitiveness and growth potential of Canada’s critical advanced manufacturing sector and deliver step-change improvements in greenhouse gas (GHG) emission reductions, environmental sustainability, health and safety, food and water security, and supply chain resilience for Canadians and the world.

We work to fulfil our mission by:

- Identifying strategic innovation and business opportunities for Canada’s advanced manufacturing sector.
- Connecting manufacturers, technology providers, and researchers, strengthening collaboration, and providing access to resources across Canada’s advanced manufacturing ecosystem.
- Funding and supporting collaborative industry-led Technology Leadership projects to accelerate the development, scale-up, adoption, and commercialization of transformative solutions for manufacturing.
- Supporting the development and attraction of a highly skilled, diverse, and inclusive advanced manufacturing workforce in Canada, placing special emphasis on attracting youth and equity-seeking groups into advanced manufacturing careers.
- Helping companies improve the management of advanced manufacturing processes and implement net-zero emission facilities.
- Promoting Canada’s advanced manufacturing capabilities across the country and around the world.

## WHY ADVANCED MANUFACTURING?

If manufacturing is the business of making things, advanced manufacturing involves the use of leading-edge technologies and techniques to grow that business, by solving problems and making things – often new things – for customers, in significantly better ways.

The economic prosperity of all Canadians depends on sustaining and growing a globally competitive advanced manufacturing sector. Manufacturing directly accounts for 10% of Canada’s GDP and employs close to 1.8 million or 9% of Canadian workers in high quality jobs. The sector generates over 60% of Canada’s merchandise exports. When suppliers in other business sectors are also considered, the overall economic contribution of Canada’s manufacturing sector exceeds 32% of our country’s GDP.

The past several years have shown how important it is to make things in Canada – especially those products and components that are critical to sustaining supply chains, ensuring the health and safety of Canadians, reducing greenhouse gas (GHG) emissions, improving environmental sustainability, and ensuring food security.

What companies make is important; so too is how they make them. Manufacturers need to offer their customers a unique value proposition to compete and grow in today’s fast-paced and highly competitive business environment. They need to offer a solution – a product or service – that their customers can manage, at a level of quality and convenience their customers expect, at the time their customers want, at a price point their customers can afford, and to do all that better than anyone else.

Innovation is key. Manufacturers around the world are in a rush to create new and better solutions, new ways of adding value through the products and services they offer, and new ways of generating revenue. They are gaining greater agility and flexibility to respond rapidly to changing customer demands, mitigate market and supply chain risks, and pivot into new product lines to take advantage of emerging business opportunities. They are being required to meet more exacting regulations, industry standards, stakeholder and investor expectations. Meanwhile, they still need to be cost competitive to sustain their business and generate the cash required to invest in future growth.

## TRANSFORMATION AND GROWTH

In Canada and around the world, the business of manufacturing is rapidly changing in response to

five interrelated transformations that are creating new and unprecedented business challenges, opening new commercial opportunities, and leading to new ways of doing business:

1. Market conditions are rapidly changing as competition intensifies and customers, stakeholders, investors, and governments alike are demanding more customized products and services, immediate response, and more stringent compliance with responsible environmental, social, and governance practices.
2. Supply chain disruptions are elevating the risks of global sourcing, forcing companies to restructure their supply base, while at the same time creating new business opportunities for companies agile and innovative enough to offer new solutions to new customers.
3. The need to cut emissions, eliminate harmful products, and address global challenges related to environmental sustainability is not only forcing manufacturers to adopt new technologies to reduce their carbon footprint and resource requirements, but also creating new business and supply chain models based on environmentally friendly products, circular economies, supplier traceability, and full life-cycle product management.
4. Manufacturers are also facing significant demographic challenges leading to growing labour and skills shortages. A quarter of Canada’s manufacturing workforce will retire by 2030 while fewer workers are entering the job market.
5. The rapid development and deployment of advanced digital, materials, and production technologies are helping manufacturers make significant improvements in productivity by increasing operating efficiencies, enhancing production flexibilities and employee capabilities, speeding up new product design, testing, and engineering, and strengthening supply chain collaboration by connecting customers and suppliers more effectively. They are enabling the creation of new products and new lines of business. At the same time, they are threatening the long-term viability of manufacturers whose businesses are being disrupted by new and improved products and services.

Canada has deep research capabilities, leading-edge engineering and technical expertise, and a wide variety of technology solution providers –

both start-ups and established companies, large, medium, and small – that can play a critical role in creating the solutions needed to address the challenges and take advantage of the opportunities arising from the transformations facing manufacturers in Canada and around the world.

Technologies like sensors, Internet of Things networks, operational software, virtual design and modeling, data analytics, artificial intelligence (AI) and machine learning (ML), quantum and other advanced computing capabilities, augmented and virtual reality (AR/VR), photonics and lasers, robotics and automation, additive manufacturing, machining, moulding, shaping and other production technologies, nano- and other advanced materials, biotechnologies, and cleantech are enabling those solutions today and will play an even more prominent role in the future.

## REALIZING THE POTENTIAL OF TRANSFORMATIVE CHANGE

Opportunities abound for technology scale-up and manufacturing growth. Canada’s technology sector already accounts for 9% of our GDP and employs 7% of Canadian workers. Global market growth projections for advanced manufacturing technologies are much higher than for the world economy as a whole. Real demand for industrial automation systems is forecast to expand at a compound annual growth rate of 7.4% by 2030, Industrial Internet of Things (IIoT) by 23%, AI/ML solutions by 38%, AR/VR by 39%, industrial lasers by 10%, additive manufacturing by 21%, nanotechnology by 35%, biomanufacturing by 12% to 16%, and industrial cleantech solutions by 5%.<sup>1</sup>

But Canada has been slow off the mark. The pace of technology adoption by Canadian manufacturers lags that of our major competitors. Likewise, the ability of Canadian technology companies to commercialize solutions, scale up, and grow into globally competitive enterprises has long been recognized as a weakness in converting Canada’s stellar record in research and development and our world-leading start-up ecosystems into real economic benefit for Canadians.

NGen’s role is to help bridge those gaps. We measure success based on the value that our technology leadership and ecosystem initiatives create by developing, scaling up, and commercializing ground-breaking advanced manufacturing solutions and by supporting their adoption in Canadian industry.

Manufacturing is the ultimate integrator of technology. Technologies are the modern tools that manufacturers use to generate value for

their customers, improve operating efficiencies, and connect with customers and suppliers. But technologies by themselves are not sufficient to achieve desired business outcomes. Their commercial potential in manufacturing can only be realized when they are applied and integrated in manageable, cost-effective solutions that can be demonstrated to work at full-scale levels of production.

It takes strategic leadership to determine business objectives and to navigate the challenges and pursue the new opportunities arising in a dynamic economic environment. Specialized management skills are needed to implement technology solutions, continuously improve business and production processes to maximize operating efficiencies, and enable the value chain collaboration required for rapid innovation. Most importantly, people need to be employed who can work together with the skill sets necessary to use technologies productively, sustain process excellence, and achieve desired business results.

That is why NGen focuses on facilitating collaborative Technology Leadership Projects that develop, scale up, and commercialize ground-breaking made-in-Canada solutions for manufacturing as well as strategic Ecosystem Development initiatives that strengthen business leadership, management, and workforce capabilities in advanced manufacturing.

The economic potential that NGen aims to unleash comes from the enhanced productivity and growth potential of Canadian manufacturers adopting advanced technologies to transform their operations and improve business performance; production scale-up by Canadian technology firms that manufacture innovative materials, devices, and equipment; and business growth on the part of Canadian technology providers that are able to commercialize their solutions for manufacturing customers in Canada and around the world.

OUR STRATEGIC VISION

- Respond knowledgeably and rapidly to industry needs, identifying strategic opportunities and working collaboratively to support the development, adoption, scale-up, & commercialization of leading-edge manufacturing solutions.
- Support an ecosystem that is a magnet for talent & investment by providing strategic leadership, deepening connections and collaboration across value chains, amplifying and promoting ecosystem capabilities, and undertaking strategic initiatives that address ecosystem gaps to enable

transformation in advanced manufacturing.

- Excel as an organization creating positive change by engaging expert, entrepreneurial, and motivated professionals pursuing their career objectives in a respectful, equitable, diverse, and inclusive work environment.
- Become a financially sustainable business outperforming expectations through compliant and responsible stewardship of investments in high-impact projects and ecosystem development initiatives.

NGEN’S FIVE YEAR STRATEGY

NGen builds world leading advanced manufacturing capabilities in Canada for the benefit of Canadians.

Business Strategy			
A National Force - A Driver of Growth - A Creator of Networks - A Catalyst for Skills Development			
NGen leverages Canadian research, technology, manufacturing, and ecosystem strengths to support the development, adoption, scale-up, and commercialization of leading-edge solutions that will strengthen the competitiveness and growth potential of Canada’s advanced manufacturing sector and help position Canada as a leading green supplier to the world.			
Unique Value Proposition			
Industry-Led - Strategic Foresight - Connections - Collaboration - Focus on Scale-Up for Manufacturing Focus on initiatives that are strategic, transformative, collaborative, applied, enduring, with significant commercial potential			
Values & Leadership Behaviours			
Respect - Trust - Commitment - Innovation - Collaboration - Accountability			
Stakeholders			
Industry Manufacturers & Tech Providers	Ecosystem Partners	Employees	Funders
Vision & Structural Strategies			
Leading Enabler of Transformation in Advanced Manufacturing	Collaborative Ecosystem A Magnet for Talent & Investment	Team of Rock Stars Creating Positive Change	Financially Sustainable Business Outperforming Expectations
Achieve a track record of advanced manufacturing initiatives that create strategic advantage for Canadian companies and significant environmental, health, and employment benefits for Canadians	Develop a cross-Canada ecosystem that is connected, aligned in addressing the challenges and strategic opportunities facing Canada’s advanced manufacturing sector, and globally recognized as a magnet for international talent and investment in advanced manufacturing	Sustain a highly cohesive and motivated team recognized as leading experts and change activists for advanced manufacturing in Canada	Become a financially sustainable organization leveraging funding from a variety of public and private sources
Strategies & Targets to 2028			
- Strategic Foresight - Promote Canadian capabilities - Connections and collaboration - Project support - Access to funding - IP strategies - Workforce development - Transformation management	- Domestic and international scope - Strategic gap analysis - Promote ecosystem capabilities - Ecosystem concierge - Connections and collaboration - Access to ecosystem services - Fill in ecosystem gaps	- Engage expert, entrepreneurial, and motivated professionals pursuing their career objectives in a respectful, equitable, diverse, and inclusive work environment - Continuous improvement and lean management that enhances stakeholder value	- Compliant and responsible stewardship of investments in high-impact projects and ecosystem development initiatives - Leverage funding partnerships - Ensure best-in-class governance, operating, and financial management practices
- \$1.3 billion in total innovation investments - \$15 billion in new sales and IP licensing revenues - 15,000 new jobs - 5,000 companies registered in NGen workforce development and management support services	- 45 advanced manufacturing clusters working together and supported by NGen - 50 public and private sector partners working with NGen to support Technology Leadership projects and Ecosystem Development Initiatives - Recognition as leading ecosystem connector for MNEs	- 90% employee engagement rating - 90% retention level - Recognition for staff professionalism	- NGen funding matched 1.7X by industry investments - \$11.4 million annual revenue for operating expense - \$70 million raised in additional funding with \$13.1 million for operating expenses - Recognition of top-grade governance, financial management, and compliance assurance practices







OUR VALUES

Respect, trust, commitment, innovation, collaboration, and accountability are the core values that motivate the NGen team and that are integral to realizing our vision and meeting our strategic goals.

All NGen’s initiatives are designed to be:

- **Transformative** – enabling world-leading solutions that address strategic innovation challenges in advanced manufacturing.
- **Applied** – developing, scaling up, and demonstrating advanced manufacturing solutions that have significant strategic commercial potential.
- **Collaborative** – enabling capabilities that no individual company or organization can achieve on its own.
- **Enduring** – contributing know-how and resources in support of Canada’s advanced manufacturing ecosystem.

OUR VALUES PROPOSITION

NGen plays a unique but integral role as part of Canada’s support system for innovation in advanced manufacturing. Our value proposition is based on:

- Our focus on industry’s innovation priorities, which enables NGen to identify strategic opportunities for Canada’s advanced manufacturing sector, target gaps in ecosystem support, and solicit the engagement of industry and public sector partners across Canada.
- Our collaborative approach to developing and supporting technology projects and ecosystem initiatives, which provides project and ecosystem partners opportunities for growth they would not

have on their own.

- Our role in helping to construct and provide non-dilutive funding for scaling up and readying advanced manufacturing solutions for application in full-scale production, which addresses an important gap in financing late-stage innovation.
- The industry knowledge and experience the NGen team offers in facilitating innovation projects and developing customized IP commercialization strategies for NGen members and project partners.
- NGen’s 5,500+ strong membership network of technology providers, manufacturers, academic and research organizations, industry clusters, innovation centres, business and financial services companies, and individual experts across Canada that we consult, connect as project partners, engage as customers, and mobilize as ecosystem partners.
- The working relationships we have established with other federal, provincial, and regional public sector funding agencies and private sector investors to strengthen support for advanced manufacturing and amplify economic impacts and other benefits for Canadians.

AMBITIOUS TARGETS THAT BUILD ON OUR SUCCESS

NGen aims to build on the strong track record of success we have achieved since 2018, during Phase I of the Global Innovation Cluster program, to meet even more ambitious investment, economic growth, and job creation targets over the next five to ten years.

Our goal is to invest at least \$260 million in additional funding in Technology Leadership projects and Ecosystem Development initiatives over the next

Economic Impact	Result by: Mar. 31st, 2023	Cumulative Target March 31st, 2028	Cumulative Target March 31st, 2033
Industry Investment Match for Projects*	1.68**	1.7	1.7
Approved NGen Investments in Projects	\$218 million	\$480 million	\$1 billion
Total Innovation Investments in Projects	\$585 million	\$1.3 billion	\$3 billion
Revenue Generated (Total Direct & Indirect GDP)	\$2.6 billion	\$15 billion	\$30 billion
Jobs Created (Direct & Indirect)	5,668	15,000	25,000

\*For Technology Leadership projects and Ecosystem initiatives where an industry match is required.  
\*\* Excluding COVID Rapid Response projects where no industry match was expected.



five years, leveraging 1.7X that amount in industry contributions, to generate a cumulative total of \$1.3 billion in innovation investments between 2018 and 2028. We aim to create 15,000 jobs and generate \$15 billion in GDP over that ten-year period.

We are confident that we can achieve and surpass those targets based on NGen's accomplishments to date. By the end of March 2023, we had approved investments of \$218 million in 165 Technology Leadership projects with total investments in excess of \$585 million. Those projects involve 372 industry partners – 90% of which are SMEs – and 252 academic and other research partners. By January 2023, completed projects had generated \$2.6 billion in revenue, about 30X the amount that NGen had invested in them. They are delivering the federal government an estimated return in tax revenues of \$4.50 per dollar of NGen funding.

We are also committed to building on the success of our Ecosystem Development initiatives which have to date:

- Supported and strengthened collaboration among 22 advanced manufacturing clusters and technology groups across Canada.
- Offered transformation management and skills development support to more than 300 manufacturers across the country.
- Provided manufacturing entrepreneurship and financial literacy education to 567 Indigenous students in 10 elementary and secondary schools in northern Canada.
- Engaged more than 470,000 young Canadians in investigating future careers in advanced manufacturing and provided \$100,000 in financial support to secondary students entering advanced manufacturing programs in Canadian colleges and universities.
- Promoted NGen and Canada's advanced manufacturing ecosystem at more than 200 international trade shows, conferences, and investment promotion events in the United States, Europe, and Asia.

More detail about NGen's achievements can be found in our **2021/2022 Annual Report**.

### STRATEGIC OBJECTIVES

NGen's five-year strategic objectives are aimed at achieving our longer-term growth targets. In line with the objectives of the Government of Canada's Global Innovation Cluster program, NGen will position ourselves as a:

- **National Force** – Developing ecosystems that create a global advantage for Canada by leveraging and attracting industry investment, developing a global profile, and collaborating on projects at a national scale.
- **Driver of Growth** – Accelerating the scale-up of small and medium-sized enterprises (SMEs) by fostering collaboration and integration into emerging value chains, to drive international opportunities, expand market share, and grow revenues.
- **Creator of Networks** – Strengthening connections and collaborations among private, public, and academic organizations to drive impactful commercialization outcomes and develop domestic capacity.
- **Catalyst for Skills Development** – Addressing skills gaps, acting as a magnet for global talent, collaboration, and skills and talent development, and fostering opportunities for equity-seeking groups to benefit from connections, to drive innovation and contribute to inclusive economic growth.

More specifically, over the next five years, NGen aims to:

- Achieve a track record of advanced manufacturing initiatives that create strategic advantage for Canadian companies and significant environmental, health, and employment benefits for Canadians.
- Augment our role in building Canada's advanced manufacturing ecosystem focusing especially on commercialization, scaling companies, capacity building, skills development, and talent attraction.
- Become an effective means for governments to achieve strategic policy objectives aligned to our mission.
- Implement a more systematic approach to enhancing our national and global presence.
- Support the adoption of advanced manufacturing solutions in Canadian industry and their widespread commercialization in global markets.
- Facilitate and support a syndicated funding approach to support the development, scale-up, adoption, and commercialization of leading-edge technology solutions for manufacturing and NGen-led ecosystem

development initiatives.

- Develop a cross-Canada ecosystem that is connected, aligned in addressing the challenges and strategic opportunities facing Canada's advanced manufacturing sector, and globally recognized as a magnet for international talent and investment in advanced manufacturing.
- Expand cross-Canada engagement of academic and research institutions, technology providers, manufacturers, and other ecosystem partners in NGen funded projects and ecosystem initiatives.
- Increase industry investments in advanced manufacturing initiatives funded by NGen. Our goal is to exceed \$1.50 in industry contributions for every dollar of funding received by NGen while ensuring a minimum 1:1 industry match.
- Sustain a highly cohesive and motivated team recognized as leading experts and change activists for advanced manufacturing in Canada.
- Enhance our financial sustainability by leveraging funding from a variety of public and private sources to support Technology Leadership projects and Ecosystem Development initiatives.

### STRATEGIC INITIATIVES

In pursuit of these objectives, NGen will:

- Strengthen our leadership role in developing long-term national ecosystem strategies to take advantage of emerging innovation opportunities that drive economic growth and benefits for Canadians.
  - Put special emphasis on initiatives that significantly reduce GHG emissions and improve supply chain resiliency.
  - Develop a portfolio of strategically focused Technology Leadership projects that deliver superior economic results in terms of GDP and job growth, create scale-up and accelerated growth opportunities for SMEs, and improve environmental sustainability and Canadian supply chain resiliency.
  - Focus on high-quality projects with the potential of attracting co-investment or follow-on funding from private sector investors or from public funders including provincial innovation programs, regional development agencies, and
- other federal programs that can support their further development and commercialization.
  - Facilitate access to funding in support of industry-led projects.
  - Build on significant program achievements by developing, protecting, sharing, and commercializing IP and technology solutions resulting from project activity.
  - Continue to support the commercialization of solutions and IP arising from our completed projects. We will promote project outcomes, facilitate the licensing of IP to develop new value chain opportunities, identify potential customers, help companies navigate standards and regulatory issues, and work with financial and business services providers that can also support the commercialization of project results.
  - Expand our Ecosystem Development initiatives with added emphasis on strengthening collaboration across our network of advanced manufacturing clusters; creating fully inclusive opportunities for equity-seeking groups such as women, visible minorities, Indigenous populations, and persons with disabilities; supporting the transformation management capabilities of SMEs, including their transition to net-zero processes and facilities; and addressing workforce talent gaps through skilling, upskilling, and reskilling programs.
  - Implement our international engagement strategy, including initiatives that enhance the international promotion of NGen activities and Canadian advanced manufacturing capabilities, attract advanced manufacturing talent and investment to Canada, enable international innovation partnerships, and support the commercialization of Canadian technology solutions in global markets and supply chains.
  - Strengthen collaboration with other Global Innovation Clusters, particularly in initiatives that address common missions of fighting climate change and strengthening supply chain resiliency.
  - Continuously improve our governance, operating, and program delivery processes.





## TECHNOLOGY INVESTMENT PRIORITIES

Based on funding obtained to date, NGen will target investments of \$165 million to support industry-led collaborative Technology Leadership projects in the following priority areas, including:

- \$45 million from Phase II GIC funding to build Canada's EV Value Chain, focusing on projects that address strategic innovation challenges that stand in the way of a sustainable global industry, including green processing of critical minerals, improvements in battery chemistry and performance, development of battery testing infrastructure, and the design, development, testing, and production of materials, powertrain, electronics, fuel cells, and other parts for battery and hydrogen powered vehicles.
- \$45 million from GIC Phase II funding for Industrial Decarbonization and the Circular Manufacturing of Materials, focusing on the scale-up, demonstration, testing, and application of technology solutions that will enable manufacturers to achieve net-zero emission facilities and the development and scale-up of manufacturing processes that repurpose by-products and GHGs into new production feedstocks and materials or produce bio- and recyclable materials.
- \$45 million from GIC Phase II funding for other Transformative Advanced Manufacturing solutions in fields like aerospace, electronics, advanced construction systems, biomanufacturing, medical devices, robotics, and customized automation systems.
- \$24 million from Pan-Canadian AI Strategy funding for projects that expand the adoption of AI solutions by Canadian manufacturers, help applied technology companies and research centres scale their AI solutions and user base, and develop a diverse top-tier AI talent pool specializing in advanced manufacturing applications. NGen will focus on projects that enable the implementation of AI solutions for rapid prototyping and testing of materials, products, and processes; systems optimization within manufacturing facilities and/or across supply chains; the development of autonomous vehicles, robotics, and automation equipment; and the development of new AI-enabled manufacturing services.
- \$6 million from National Quantum Strategy funding to develop, scale up, and demonstrate

Quantum solutions for manufacturing.

These priorities are based on:

- Strategic opportunities identified by NGen's Board of Directors, our Technology Working Groups, as well as through extensive consultations with our members and ecosystem partners.
- Industry and technology trend analysis undertaken by NGen or commissioned from our ecosystem partners – available at [www.ngen.ca/insights](http://www.ngen.ca/insights).
- NGen's pipeline of funding requests.

Our investment priorities are also confirmed by projections in recently published market reports. By 2030, for example, EVs are expected to account for over 45% of all new light-duty vehicle sales globally, up from 4% in 2021.<sup>2</sup> At the same time, world battery demand is forecast to grow by 30% annually to 3,900 gigawatt hours.<sup>3</sup> Heavy industry accounts for 11% of Canada's GHG emissions<sup>4</sup> but about one-third of emissions around the world.

The transition to a net-zero economy globally will require investments averaging US\$3.5 trillion a year on a global basis<sup>5</sup> and in Canada between \$125 billion and \$150 billion every year to 2050.<sup>6</sup> Circular manufacturing has the potential to create up to US\$4.5 trillion in economic activity globally by 2030.<sup>7</sup> Transformative solutions in other sectors of advanced manufacturing also promise to generate significant commercial benefits. The global Industry 4.0 market size was valued at US\$114 billion in 2021 and is expected to grow on average by more than 16% annually to US\$377 billion by 2029.<sup>8</sup>

NGen will target an overall industry match of \$1.7 for every dollar of NGen project funding. This is slightly above the rate of industry investment realized during the first four years of our operations and higher than the 1:1.5 matching ratio targeted by the GIC program for all Phase II projects.

We intend to achieve this elevated match by:

- Adjusting our reimbursement rate to leverage more industry investment.
- Targeting larger more strategic projects with high potential commercial returns that will attract more extensive industry participation and higher rates of contribution.
- Position our funding as seed capital or "catalytic capital" to support technology projects and



ecosystem initiatives by helping them attract investments from other funding partners that require additional contributions from industry.

Our targeted focus on investment priorities will help grow NGen's ecosystem of engaged companies, academic and research groups, innovation clusters, and other community partners working in Canada's EV, cleantech, aerospace, automation and robotics, biomanufacturing, medical device, resource processing, and heavy manufacturing industries. Our goal is to enable more connections, develop more opportunities for collaboration, and accelerate the development, scale-up, and adoption of leading-edge solutions involving a greater cross-section of Canada's research, technology, and manufacturing sectors.

It will allow NGen to engage more with international enterprises and clusters looking to expand their value chains, find innovation partners in Canada, and potentially invest in Canada's advanced manufacturing ecosystem. It will also allow NGen to tap into international industrial investment funds that have been established by multinational enterprises looking to develop and scale novel solutions that address their innovation, supply chain, and environmental sustainability challenges.<sup>9</sup>

NGen's model for engaging academic and research support for projects, in which we directly fund industry partners, leaving it up to them to invite academic and research partners to participate in projects while allowing them to claim the training and research costs they incur, and develop co-investment opportunities with granting councils and public sector research organizations, has been successful in building innovation partnerships and aligning training and research with industry needs. Altogether, 252 academic and research groups worked with 369 industry partners in 113 out of 165 projects funded by NGen in Phase I of the GIC program. Our model enables NGen to support the scale-up of early-stage technology solutions developed in collaborative ventures between industry and universities, colleges, or other research organizations. NGen helps ready them for adoption or production in full-scale manufacturing.

### PROJECT DEVELOPMENT AND COMMERCIALIZATION STRATEGY

NGen's aims to maximize the economic and commercial benefits of our Technology Leadership projects and help Canadian companies grow by:

- Selecting projects on the basis of their strategic potential to develop solutions that will transform manufacturing processes and develop use cases across a variety of industrial applications.
- Connecting manufacturers, technology providers, and research groups as part of our project development process, allowing manufacturers to identify new innovation partners and providing technology companies with a better understanding of how their solutions could be applied in industry.
- Helping construct and fund collaborative projects that incorporate technologies developed by Canadian SMEs in integrated solutions proven to work in full-scale manufacturing applications and production processes. NGen support enables SME partners to co-create solutions with other non-competing companies with complementary capabilities, giving them access to IP and commercial opportunities they would not otherwise have on their own. By focusing on building larger projects, NGen will aim to increase the rate of SME participation and enhance the business opportunities available to SMEs through expanded collaboration.
- Providing non-dilutive funding for working capital and equipment investments which reduces pressures on SMEs to make an early exit while enabling them to leverage additional funding from other public and private investors.
- Providing Intellectual Property advisory services to help project partners identify IP assets that will be contributed to or likely to arise from projects, assist in the development of strategies to protect and commercialize that IP, identify the IP that will be made available for licensing to other NGen members through our IP Registry, and specify any conditions attached. NGen funding is contingent on project activity being carried out in Canada and IP arising from projects being commercialized in Canada. NGen approval is required for funding continuance to ensure that Foreground IP will be commercialized in Canada in the event of any change in ownership on the part of project partners.
- Supporting the creation and growth of new business ventures to commercialize solutions and jointly owned IP arising from our projects.
- Connecting SMEs with other public funding

and private sector investment opportunities during our project development process and as part of our support for post-project commercialization. To enhance opportunities for Canadian SMEs to enter new value chains, NGen will also help connect them with non-dilutive funds established by MNEs or other organizations that are looking for solutions to major innovation challenges in fields like environmental sustainability, health care, food security, supply chain resilience, and automation for low-volume and high variability.

- Supporting the commercialization of technology solutions developed by NGen project partners. We will continue to help our project partners build their business by facilitating access to additional funding and investment opportunities, providing access to business advisory and financial services, and providing assistance in developing industry standards or navigating their way through regulatory and public procurement processes. We will continue to develop business opportunities for SME technology providers in our Technology Working Groups to help commercialize their solutions in manufacturing – supported by our PCAIS Commercialization funding in the case of NGen's AI Working Group. NGen will also work with our project partners to target and attract the interest of larger multinational enterprises, which will enable Canadian SMEs to gain access to and expand their business in North American and global supply chains.

### ECOSYSTEM DEVELOPMENT STRATEGY

The objectives behind NGen's Ecosystem Development initiatives are to:

- Reinforce industry leadership in Canada's advanced manufacturing sector.
- Raise awareness about the research, technology, and manufacturing capabilities found across Canada's advanced manufacturing ecosystem.
- Promote our ecosystem as a leading supplier of green products and manufacturing solutions to the world and as a preferred destination for international talent and investment.
- Expand connections and build greater collaboration among industry clusters and ecosystem partners.

- Enhance Canada's advanced manufacturing workforce capabilities and attract more youth, women, visible minorities, and other under-represented groups into the workforce.
- Support manufacturers as they transition to new technologies, net-zero processes and facilities, and more resilient value chains.

Our target is to have 5,000 companies registered in NGen workforce development and management support programs and services by 2028.

NGen's strategy is to work with ecosystem partners, invest directly in strategic ecosystem initiatives where NGen can play a value-adding role by addressing some of the gaps in ecosystem support, and leverage further contributions from our Technology Leadership projects. (Every project is required to contribute to Canada's advanced manufacturing ecosystem by, for instance, licensing IP or sharing industry knowledge, establishing training programs, or developing new testbeds and scale-up facilities for SMEs.)

Based on funding approved to date, NGen will target investments of \$25 million over the next five years in strategic Ecosystem Development initiatives.

We will target \$3.75 million from Pan Canadian AI Strategy funding to:

- Promote Canada's manufacturing-related AI research and technology capabilities across the country and internationally.
- Support the development of a highly qualified and more diverse and inclusive talent pool with expertise in manufacturing-related AI.
- Raise general awareness among manufacturers about potential benefits, use cases, and best practices in implementing AI solutions.

We will target \$22 million from Phase II GIC funding to:

- Develop strategic opportunity roadmaps for advanced manufacturing in Canada based on industry and technology trend analysis and innovation needs assessments of larger companies leading Canadian supply chains. The roadmaps will identify innovation and commercialization opportunities for Canadian advanced technology and manufacturing companies, with a priority focus on fighting climate change, improving environmental sustainability, and strengthening Canadian



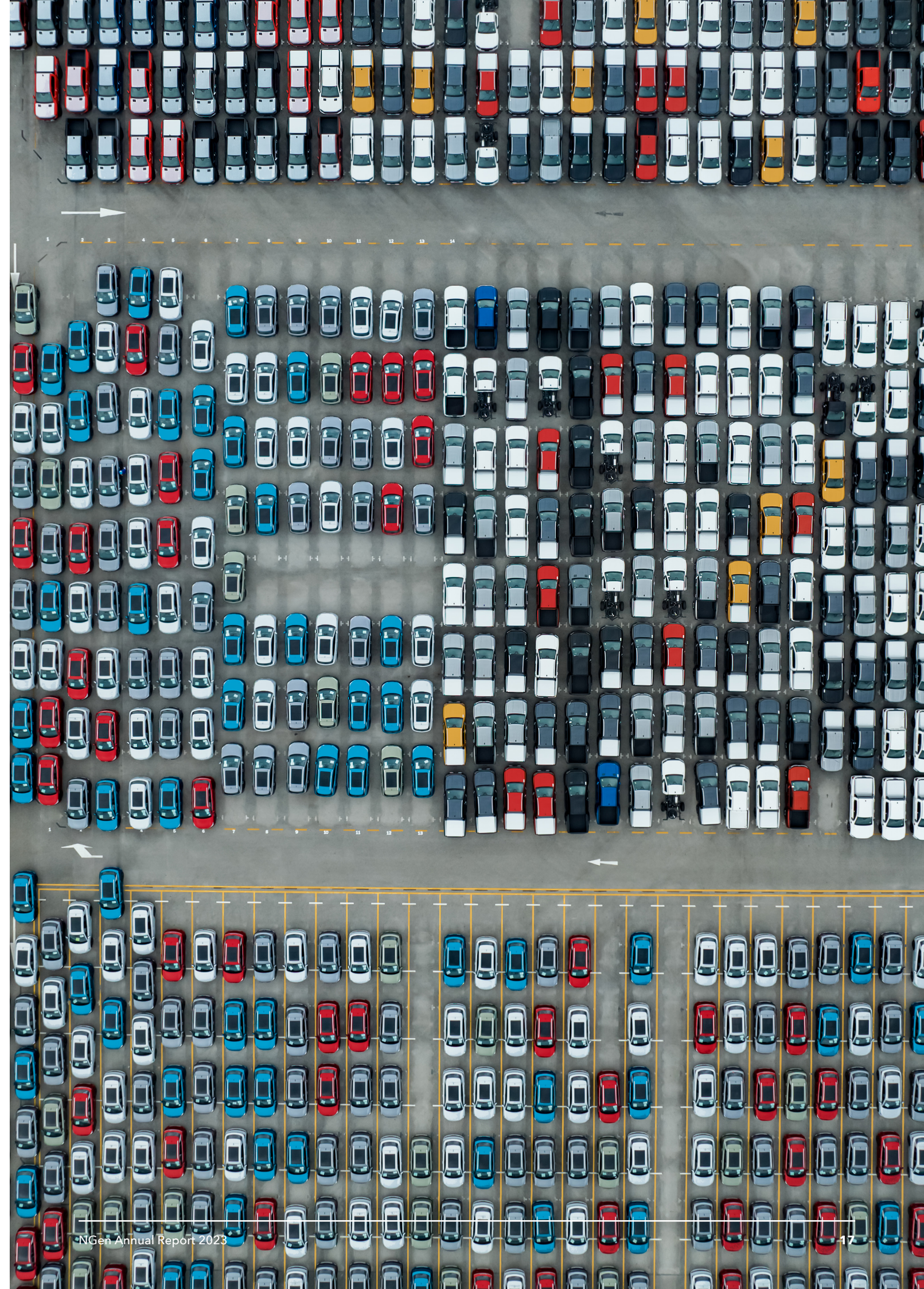
advanced manufacturing value chains and supply chain resiliency. NGen will also establish a Consultative Panel on Green Manufacturing to advise NGen and our members on strategic trends in the sector.

- Expand and deepen connections among advanced manufacturing clusters that are part of NGen's cross-Canada cluster network, providing education and tools that will help them and their members develop innovation partnerships, access, protect, and commercialize IP, find new sources of funding, promote their capabilities in international markets, attract skilled workers, share best management practices and advice, manage technology adoption and improved environmental sustainability, mitigate supply chain risks, and improve business performance. NGen supported the development and growth of 17 clusters and 5 technology working groups during Phase I of GIC funding. We aim to double the number of clusters NGen supports by 2028.
- Support transformation management on the part of SMEs looking to develop, protect, and commercialize IP, adopt advanced manufacturing technologies, or develop their technology solutions for business growth. NGen will scale up delivery of our IP advisory service, our educational workshops focusing on strategic issues, opportunities, and critical technologies for advanced manufacturing in Canada, as well as delivery of our Transformation Leadership Program (TLP). TLP is designed to help manufacturing executives manage technologies more productively, transform their business to capitalize on changing market conditions, and build more resilient supply chains. We will add TLP modules to help manufacturers transform their processes and facilities to net-zero and build more circular systems of materials re-use and recycling. NGen aims to take 300 companies through the TLP program by 2024 and grow from there.
- Help build a more equitable, diverse, inclusive, and highly-skilled advanced manufacturing workforce by further developing NGen's **Careers of the Future** initiative aimed at attracting young people from diverse backgrounds into careers in advanced manufacturing; building partnerships with educators and other organizations supporting skills development for advanced manufacturing

and workforce placements, especially those engaging under-represented groups; and developing tools that will enable manufacturers to conduct customized assessments of their skills requirements.

- Enhance NGen's existing workforce development programs. We will expand our open-source online education program (AmpUp) to include more modules on energy management, net-zero processes, circular manufacturing, advanced technologies, and digital transformation. NGen will continue to partner with universities and colleges to develop micro-credentials and training programs for advanced manufacturing processes. And we will expand our Indigenous advanced manufacturing education and skills development programs in partnership with NGen members, the Martin Family Initiative, and the Indigenous Manufacturing and Suppliers cluster that NGen helped establish in Phase I. Our goal is to engage 8,000 students by incorporating manufacturing curriculum in Indigenous entrepreneurship, financial literacy, and adult education courses in over 100 schools across Canada by 2028 and supplement those programs with courses on coding and advanced manufacturing technologies.
- Facilitate innovation partnerships and help commercialize Canadian IP and technology solutions by connecting SMEs with larger companies and global commercialization opportunities, facilitating member access to support services provided by ecosystem partners within Canada and internationally, and creating an online platform for promoting made-in-Canada advanced manufacturing solutions.
- Promote Canada's advanced manufacturing ecosystem and company capabilities on a global stage, including expanded participation in key trade events like Hannover Messe, the largest advanced manufacturing trade show in the world, and support for Canada's participation as partner country at the fair in 2025.

NGen will continue to pursue additional funding opportunities in support of our Ecosystem Development initiatives. In 2023/24, NGen will undertake two initiatives with support from other federal agencies. We will invest:





- \$400,000 from NRC-IRAP to recruit companies and technology providers in its Metal and Engineered Plastics Additive Manufacturing Industrial Demonstration Program.
- \$9.939 million from Employment and Social Development Canada (ESDC) for our Future Ready initiative allowing NGen to conduct research on critical advanced manufacturing skills development issues, develop personalized skills assessments and training programs for workers, increase the number of placements in manufacturing, and expand delivery of our AmpUp workforce upskilling, Transformation Leadership, and EDI programs. (NGen expended \$5.9 million of ESDC funding in 2022/2023).

To pursue our objective of financial sustainability over the next five years, NGen will look to expand our business development and workforce development programs and develop a subscription model for access to these services.

NGen's Technology Leadership projects will continue to contribute to ecosystem development. As a condition of funding, all projects will continue to contribute to ecosystem capabilities in the form of knowledge sharing, IP licensing, training programs, testbeds, or demonstration sites.

NGen will also support Technology Leadership projects that develop advanced manufacturing infrastructure to facilitate technology scale-ups by SMEs. Industry and academic partners came together in three projects that received Phase I GIC funding from NGen – Flex-Ion's Battery Innovation Centre in Windsor, ON, OmniaBio's Scale-Up Centre for Cell and Gene Therapies in Hamilton, ON, and the Verschuren Centre's Bio-Processing Hub at Cape Breton University, NS.

Future infrastructure initiatives may include similar initiatives that help industry access advanced manufacturing demonstration sites and scale-up centres, AI platforms, or advanced equipment available at public and private research and technology centres across Canada – particularly for applications in the EV Value Chain, decarbonization and circular manufacturing, biomanufacturing, medical devices, automation, and robotics.

### INTERNATIONAL STRATEGY

NGen's international engagement objectives are to:

1. Promote Canada as a world leader in green manufacturing and the strengths of Canada's

advanced manufacturing ecosystem globally.

2. Attract advanced manufacturing talent and investment to Canada.
3. Assist our project partners commercialize their solutions in global value chains.
4. Help our members connect with innovation partners, suppliers, and potential customers in markets at the forefront of advanced manufacturing, particularly the USA, European Union, United Kingdom, Japan, Singapore, South Korea, and Taiwan.

Over the next five years, NGen will enhance Canada's profile internationally as home to innovative advanced manufacturing solutions and green supplier of choice to the world by organizing exhibition space and leading business delegations to key international trade shows for advanced manufacturing. We will expand our presence at Hannover Messe, the largest manufacturing trade show in the world, and support Canada's participation as partner country at the fair in 2025.

We will coordinate our presence there with the Government of Canada and provincial delegations and work with the fair organizers to obtain preferential rates for Canadian exhibitors and attendees. NGen will participate in other international shows too where members express an interest in attending and see the value in being associated with NGen as flag bearer for Canada's advanced manufacturing ecosystem.

We will leverage our participation on the advisory board of the World Manufacturing Forum to highlight Canada's advanced manufacturing ecosystem and the unique solutions arising from our projects to a global audience. NGen will also develop media assets and provide speakers for investment attraction events in important markets for advanced manufacturing in partnership with Global Affairs and Invest in Canada.

Another part of our strategy to attract international investment into Canada's advanced manufacturing ecosystem and potential customers for advanced manufacturing solutions developed in Canada is to target and work with multinational manufacturing companies that have established investment funds and are looking to source leading-edge technologies that address innovation challenges aligned with NGen's priority areas of focus, including the EV value chain, industrial decarbonization and circular manufacturing, biomanufacturing, advanced automation and

robotics. Our objectives here are to leverage more co-investment for NGen-funded projects, source additional investment opportunities to enable SMEs to scale and gain entry into global supply chains, and support the commercialization of advanced manufacturing solutions developed in Canada, particularly from NGen projects.

To help attract international talent to Canada's advanced manufacturing ecosystem, NGen will connect our manufacturing and technology members with Canadian colleges and universities that have collaborative R&D initiatives with foreign counterparts. We will partner with colleges, universities, and interested members to develop an international recruitment campaign to attract foreign students to advanced manufacturing programs and job opportunities in Canada. As part of that campaign, NGen will promote Canadian university and college programs in advanced manufacturing at the international trade shows in which we will be participating.

We will adopt a selective approach by working with Canadian trade commissioners, NRC/IRAP, international trade offices in Canada, and advanced manufacturing clusters registered as members of Eureka!, the European Cluster Collaboration Platform, or the World Economic Forum's Global Network of Advanced Manufacturing Hubs to identify and qualify potential international innovation partners, investors, and commercialization opportunities for NGen members. We will make those opportunities available for NGen members by posting them on our online collaboration portal and offering a service for facilitating introductions.

### ECOSYSTEM COLLABORATION STRATEGY

NGen will continue to work collaboratively with ecosystem partners, including colleges, universities, research organizations, industry and innovation networks, business services, public and private sector funders, as well as federal and provincial departments across Canada, to help promote, coordinate, and support their efforts on behalf of our advanced manufacturing sector. The strategic challenges facing the sector – its response to the transformations that are reshaping the business of manufacturing in Canada and around the world – and its priorities with respect to workforce development, investment promotion, and the productive adoption and scale-up of technologies are shared across the ecosystem and require a systems approach to address them. NGen will play a pivotal leadership role in identifying those

strategic challenges and opportunities, and finding ways to work together more effectively in order to achieve common goals.

NGen will also strengthen its collaborative work with other Global Innovation Clusters by:

- Undertaking joint communications initiatives that promote the Global Innovation Clusters program and its successes, build engagement across Canada and internationally, and demonstrate collective benefits for Canadians and the world.
- Sharing project information, promoting other Clusters' calls for proposals to our members, referring members as possible project partners, inviting representatives from other Clusters to sit as observers in its project assessment meetings, and opening access to our IP Registry to other Cluster members.
- Developing joint education initiatives to strengthen workforce, EDI, and innovation management capabilities.
- Pursuing opportunities for joint calls for project proposals, particularly where aligned with the common missions of emission reductions and supply chain resiliency.

### EQUITY, DIVERSITY, & INCLUSION STRATEGY

NGen was an original signatory to the Government of Canada's 50/30 Challenge in November 2020. We take seriously 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, or sexual orientation.

In line with its 50/30 commitment, NGen will ensure that at least half of the members of Board of Directors and Executive Committee of the Board are women. We also aim to increase the representation of women and employees from minority groups on our management team. NGen's 50/30 commitment will inform future career development opportunities and succession planning within the organization.

NGen is committed to taking active steps to enhance equity, diversity, and inclusion within its internal operations as well as in program activities supporting ecosystem development. To that end, NGen undertakes annual assessments 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’s work with the Diversity Institute and Centre for Global Inclusion has allowed it to identify best equity, diversity, and inclusion practices for industry that are being applied internally in our own EDI policy and procedures and that we are also communicating to NGen members.

The engagement of women, minority groups, and LGBTQ+ students and employees is one of the assessment criteria for evaluating NGen funded projects. NGen also places a priority on EDI in its Ecosystem Development Initiatives. We work to ensure that the messaging, role models, and mentors involved in our Careers of the Future campaign reflect the diversity of Canada’s student population. We are placing a priority on Indigenous entrepreneurship, education, and cluster building. And, we lend support and engage actively with other organizations that aim to enhance education, career opportunities, and working conditions for women, minority groups, LGBTQ+, and people with disabilities within advanced manufacturing.

**INTELLECTUAL PROPERTY STRATEGY**

NGen’s IP Strategy aims to maximize the commercial value, ecosystem impact, and the economic, environmental, and social benefits for Canada of intellectual property generated by NGen investments.

For the purposes of our IP strategy, intellectual property (“IP”) refers to intangible intellectual assets contributed to (“Background IP”) or arising from (“Foreground IP”) projects and ecosystem development initiatives in which NGen invests. IP thus includes, but is not limited to, patents, trademarks, copyrights, industrial designs, software, algorithms, data, machine learning models, trade secrets, confidential information, and know-how.

NGen investments are determined according to the transformative and commercial potential of the foreground IP expected to be generated by individual projects, as well as the extent to which resulting commercial, ecosystem, economic, environmental, and other social benefits are expected to accrue within Canada. The objective of NGen investment is not the creation of IP itself, but the application of that IP to create value for Canadian business and for Canadians.

Accordingly, NGen works to:

- 1. **Raise the awareness of project partners and NGen members about the nature and value of IP, methods for protecting it, strategies for its**

**protection and its commercialization, and IP risk management by:**

- Presenting IP workshops to provide education on IP issues generally as well as those specific to manufacturing and advanced manufacturing.
- Hosting IP commercialization workshops with experts in the field.
- Meeting with all partners of a project to advise them in identifying Background and Foreground IP, methods for protecting such IP, and opportunities for commercializing Foreground IP arising in their project.
- Retain, and to the extent necessary, training a select group of IP lawyers, patent agents, and/or other IP professionals and specialists to provide expert advice to project partners and NGen members, as required.
- Exploring opportunities to contribute to courses on IP law and commercialization relevant to advanced manufacturing.
- Developing partnerships with provincial government, other federal government, and non-governmental organizations to facilitate access to resources that may benefit NGen members.

**2. Assist in enhancing the commercial value of Background IP contributed to projects by partners by:**

- Supporting projects that set out to develop pilot or scale-up technology applications for manufacturing which test and demonstrate the value of Background IP.
- Assisting project partners combine Background IP in developing, proving out, and scaling up integrated technology solutions that can be applied in manufacturing.
- Assisting project partners refine, augment, and enrich industry know-how and increase the potential value of Background IP through the application of knowledge derived from advanced manufacturing projects.

**3. Assist in enhancing the commercial value of Foreground IP arising in projects by:**

- Testing and demonstrating the value and feasibility of Foreground IP through projects that set out to develop pilot or scale-up technology applications for manufacturing.

That value may be multiplied as part of an integrated technology solution. The transformative and commercial potential of project partnerships is an important criterion for NGen project selection.

- Working with project partners to develop project specific IP Plans for the creation, protection, management, and commercialization of Foreground IP.
- Assisting project partners develop collaboration agreements that specify how they will commercialize Foreground IP either individually or jointly. NGen requires project partners to have an agreement in place prior to the project commencing.
- Working with SMEs to ensure their active participation in these negotiations and assist SMEs in accessing external legal advice where necessary.

**4. Support the commercialization and enhance ecosystem benefits of Foreground IP by:**

- Requiring project partners to agree to the terms and conditions by which Foreground IP may be shared with other NGen members.
- Encouraging project partners to contribute to its IP Registry making Foreground IP available for potential licensing to others.
- Assisting in the promotion of projects’ technological solutions and Foreground IP to potential domestic and international customers.

**5. Capture and maximize the value of IP retained and commercialized in Canada by:**

- Requiring that, to the extent possible, project activities take place in Canada so that, amongst other things, project partner Background IP will be exploited in Canada.
- Basing project selection, amongst other things, on how the value of the Foreground IP and technological solutions arising from projects will be retained, developed, scaled, and commercialized in/from Canada.
- Requiring that that ownership of Foreground IP and the benefits of its commercialization remain in Canada.

To achieve our IP objectives, NGen will maintain clear, transparent, and predictable IP ownership policies and licensing structures for the

management of Background IP applied in projects, treatment of Foreground IP arising from projects, and processes by which NGen members can request and negotiate licenses to use Foreground IP.

NGen will base project selection on the extent to which the commercialization of Foreground IP will benefit the Canadian economy. Any change of control of a project partner will require NGen’s written consent based on benefits continuing to accrue to the Canadian economy. If consent is withheld, NGen retains the right to terminate funding for the project and to recover a portion or all of the funds paid or advanced for the project.

NGen will work with all partners in a project to advise them in the development of an IP Plan that identifies and addresses: (i) Background IP and Foreground IP in their project, (ii) the ownership and/or licensing thereof, (iii) the potential value of that IP, (iv) good methods and strategies to protect it, (v) potential pathways to its commercialization, and (vi) project IP risks and potential mitigation strategies. If necessary, NGen will also assist project partners in accessing independent expertise and legal advice related to IP.

NGen will ensure that appropriate legal provisions are present in its Master Project Agreement (MPA) to ensure this IP Strategy is put into effect. NGen’s MPA will require project partners to conclude a legally binding collaboration (joint development) agreement for their project as a prerequisite for final funding approval. NGen will ensure that such project partner collaboration agreements contain certain reasonable provisions respecting IP, covering at a minimum: (i) the protection of project partner confidential information, (ii) the licensing of all project partner Background IP to any other project partner requiring access to such Background IP to carry out its project activities, (iii) ownership of project Foreground IP, (iv) the licensing of Foreground IP to any project partner requiring access to such Foreground IP to carry out its project activities, and (v) IP infringement, misappropriation risk management, and procedures for dispute resolution among the project partners.

NGen will maintain a member-accessible Registry of Foreground IP arising from projects, recording any conditions, restrictions, or exceptions to the inclusion of Foreground IP on the Registry or access by NGen members to the Registry.





NGen will design and deliver programming to enhance the capacity of SME members to manage IP in support of business growth.

NGen will employ a senior IP official responsible for implementing our IP Strategy and directing and overseeing all NGen staff and independent contractors involved in the delivery of our IP services.

**DATA STRATEGY**

NGen’s Data Strategy aims to maximize the value of the data collected by NGen for the benefit of Canada’s advanced manufacturing ecosystem and to support the financial sustainability of NGen.

The strategy determines how we acquire, store, govern, manage, use, and share data to accomplish our mission, achieve our strategic objectives, create value for our members and clients, carry out our operations, and ensure our long-term business success. Data privacy is a priority. Our privacy policy is available at [www.ngen.ca/privacy-policy](http://www.ngen.ca/privacy-policy).

Our 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. NGen has implemented robust operational, governance, and compliance processes to ensure data integrity, privacy, and security.

NGen’s Data, Information Technology, and Cybersecurity team 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. With respect to NGen’s internal management systems, all project application processes and NGen programs are administered online.

NGen continuously works to harden cybersecurity protection for the data we manage. NGen undertakes regular third-party audits of our cybersecurity systems. Cybersecurity awareness training is provided to NGen staff on a bi-weekly basis. NGen also runs regular workshops for NGen members and other industry participants 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).

NGen will continue to pursue the objectives of our data strategy over the next five years. We also intend to undertake new data initiatives including development of:

- A new online process for managing project information, including application intake, assessments, IP strategies, contracting, monitoring, and reporting that will help us consolidate data, improve project management efficiencies, and integrate project information into an enhanced CRM system.
- An online solutions centre that will provide members access to a variety of NGen and partner services on a subscription basis, track traffic through the site, and direct potential business and partner leads to interested members. Privacy rights will be respected, and data protected, as per the high standards of our existing data strategy.
- Broader cybersecurity support services for Canada’s advanced manufacturing sector.
- An expanded results reporting system to cover ecosystem initiatives as well as projects.
- An automated due diligence process for sanctions compliance.

We will continue to upgrade our website, enhance our virtual education and training programs, and provide NGen members access to online digital tools that will enable them to improve business performance. We will also focus on leveraging the data we collect from members and website traffic to identify strategic opportunities, assess the impacts of our projects and ecosystem initiatives, increase funding for our members, and generate additional revenue to sustain the organization beyond 2028.

**FINANCIAL PLAN 2023-2028**

NGen aims to attain financial sustainability over the next five years and beyond by raising additional investments from public and private sources to fund advanced manufacturing Technology Leadership projects and Ecosystem Development initiatives, as well as the operating expenses we will require to maintain leadership in these areas.

NGen’s financial plan over the next five years is based on total funding allocations of \$224,042,038 million that have been conditionally approved by April 1st, 2023, including:





- \$177,153,038 from Phase II of the Global Innovation Clusters program.
- \$29,550,000 from the Pan Canadian AI Strategy (excludes \$450,000 expended in 2022/23).
- \$7,000,000 from the National Quantum Strategy.
- \$9,939,000 from Employment and Social Development Canada (excludes \$5.9 million expended in 2022/23).
- \$400,000 from NRC-IRAP.

Our plan also takes the total amount of project and ecosystem investments expected by 2028 into account, including projected industry contributions calculated at 1.5X the total amount of NGen funding or 1.7X the amount of project funding. Funding for NGen operating expenses will come from program allocations as well as industry contributions in the form of project administration and service fees.

To sustain NGen’s operating capabilities over the next five years, we will aim to secure at least another \$70 million in additional funding to invest in Technology Development projects and Ecosystem initiatives and cover our operating expenses. We expect this to leverage an additional \$105 million in industry contributions as well as \$5.25 million in administration and service fees. It will raise the amount of innovation investments under NGen management to \$743 million by 2028.

CONSOLIDATED FIVE-YEAR FINANCIAL PLAN

Funding Source	Direct Funding	Projected Industry Contributions	Projected Total Investment
(\$ Millions)			
Funds approved by March 31st, 2023	\$224.07	\$338.41	\$562.45
Additional Funding	\$70.00	\$110.31	\$180.31
Total Revenue	\$294.07	\$448.71	\$742.77
Expenses for Projects & Ecosystem Initiatives	\$259.97	\$426.37	\$686.33
Operating Requirement	\$34.10	\$22.34	\$56.44
Total Expenses	\$294.07	\$448.71	\$742.77
Surplus/(Deficit)	\$0.00	\$0.00	\$0.00

DETAILED FIVE-YEAR FINANCIAL PLAN

Program Stream	Direct Funding	Projected Industry Contributions	Projected Total Investment
Revenue (\$ Millions)			
GIC Phase II	\$177.15	\$259.34	\$436.49
Pan Canadian AI Strategy	\$29.58	\$52.23	\$81.81
National Quantum Strategy	\$7.00	\$9.80	\$16.80
ESDC	\$9.94		\$9.94
NRC-IRAP	\$0.40		\$0.40
Project Administration & Service Fees		\$17.03	\$17.03
Total Revenue from Approved Funding	\$224.07	\$338.40	\$562.46
Additional Funding Requirement	\$70.00	\$105.06	\$175.06
Additional Fees		\$5.25	\$5.25
Total Revenue	\$294.07	\$448.71	\$742.77
Expenditures (\$ Millions)			
Technology Leadership Projects & Ecosystem Initiatives			
GIC Phase II	\$157.22	\$259.33	\$416.56
- EV projects	\$45.07	\$76.75	\$121.82
- Decarbonization & Circular Manufacturing Projects	\$45.07	\$76.75	\$121.82
- Other Advanced Manufacturing Projects	\$45.07	\$76.75	\$121.82
- Ecosystem Development Initiatives	\$22.00	\$29.09	\$51.09
PCAIS	\$27.78	\$52.23	\$80.01
- Projects	\$24.03	\$45.22	\$69.25
- Ecosystem Initiatives	\$3.75	\$7.01	\$10.76
NQS Projects	\$6.21	\$9.80	\$16.02
Future Ready (ESDC) Initiatives	\$6.30		\$6.30
NRC-IRAP Projects	\$0.32		\$0.32
Expenditures from Approved Funding	\$197.84	\$321.37	\$519.21
Additional Projects & Initiatives	\$62.13	\$105.00	\$167.12
Total Projects & Initiatives	\$259.97	\$426.37	\$686.33
Operating & Administrative Expenditures			
- GIC Phase II	\$19.93	\$13.47	\$33.40
- PCAIS	\$1.80	\$1.20	\$3.00
- NQS	\$0.78	\$0.47	\$1.25
- ESDC	\$3.63	\$1.95	\$5.58
- NRC-IRAP	\$0.08		\$0.08
OPEX from Approved Funding	\$26.22	\$17.09	\$43.31
Additional Operating Requirement	\$7.88	\$5.25	\$13.13
Total Operating Requirement	\$34.10	\$22.34	\$56.44
Total Expenditures	\$294.07	\$448.71	\$742.77
Surplus/(Deficit)	\$0.00	\$0.00	\$0.00
Cash Contingency		\$2.00	\$2.00





PERFORMANCE MEASUREMENT FRAMEWORK

NGen measures success based on the value that our Technology Leadership projects and Ecosystem Development initiatives create by developing and commercializing unique advanced manufacturing solutions and supporting their adoption by Canadian industry.

NGen will set specific performance targets and use the following metrics that will enable us to continue to track our progress over the next five years. Our metrics build on progress achieved to date. They include core performance indicators that reflect short-, medium-, and long-term objectives of the GIC program, as well as impact measures for tracking success towards achieving NGen’s strategic objectives, including metrics for organizational effectiveness and continuous improvement of governance and operating processes.

a) Core Performance Indicators

Short-Term	Medium-Term	Long-Term	Cumulative 2028 Target
Objectives			
Private, Academic, & Public Sector Organizations Collaborate	New and innovative products, technology and services, are developed, adopted and commercialized	Supported businesses grow and contribute to economic growth	Outcomes
- Average number of partners by project/initiative		- Number of SMEs that achieve high revenue growth	
- Ratio of leveraged funding		- Actual leveraged and follow-on industry Investment	1.5X NGen funding \$848 million total
- Number of anticipated IP assets	- Average number of IP assets generated by project		
- Percentage of projects with IP Commercialization Plans	- Progress towards commercialization (Project completion rate) (Number of solutions being commercialized)	- GDP impact	\$15 billion new sales & IP licensing revenue
		- Direct & indirect jobs created	15,000 new jobs

b) Impact Measures for Tracking Success

NGen will also track progress against our strategic objectives as a national force, a driver of growth, a creator of networks, a catalyst for skills development, and an organization aiming to continuously improve our governance, operating processes, and service delivery, and achieve financial sustainability.



Strategic Objective	Metric	Cumulative 2028 Target
A National Force	- Funding disbursed by program and funding stream	\$512 million
	- Total Innovation Investment	\$1.3 billion
A National Force	- Amount and source of project and ecosystem co-investment	
	- Percentage of projects and ecosystem initiatives that deliver environmental, supply chain resilience, health and safety, productivity improvement, workforce training, EDI, and/or international business development benefits	
	- Expected GHG emission reductions	
	- Number of members and project partners by province	10,000
	- Number of multi-provincial projects	
	- International investment into Canada supported by NGen	
	- Number of presentations to international audiences	
	- Documented international recognition	
A Driver of Growth	- Revenue per dollar of NGen investment	35X
	- Federal taxes generated per dollar of NGen investment	5X
	- Number of SME project partners	
	- Revenue growth of SMEs (total, international)	
	- New companies/joint ventures created	
	- Number and value of IP licenses granted	
	- Number and value of IP licenses granted to international companies	
	- Number of SMEs participating directly in international commercialization/supply chains	





Strategic Objective	Metric	Cumulative 2028 Target
A Creator of Networks	- Number of academic and research partners in projects and ecosystem initiatives - Number and geographic scope of advanced manufacturing clusters and technology working groups supported by NGen - Number of inter-cluster collaborations - Number of connections made in NGen collaboration events and activities - Number and location of sources of co-investment and follow-on funding - Number of NGen's ecosystem partnerships (backed by formal agreements) - Number and location of international cluster partners	45
		50
A Catalyst for Skills Development	- Number of individuals receiving skills training	3,000
	- Number and percent of women & visible minorities new hires and engaged in training programs and projects	2,000
	- Number of students from minority groups enrolled in NGen supported programs	8,000
	- Number of participants in NGen's Transformation Leadership Program	2,000
	- Participation of equity-seeking groups in NGen and in all NGen projects and ecosystem initiatives	
	- Number of participants in NGen IP & cybersecurity educational workshops	
	- Number of participants in strategic education workshops	
	- Number of participants in NGen talent attraction or placement activities	



A Sustainable and Best Practices Organization	-Net promoter score for projects - Net promoter score for ecosystem initiatives - Amount of additional funding raised to support projects and ecosystem initiatives - Net promoter score for employees - Employment retention - Representation of women in NGen - Representation of Visible Minorities in NGen - Independent Board members - Compliance with legal and contractual obligations	\$70 million     90 90% 50% (Board members, Executive Committee, Management Team) 30% (Management Team) 33%  100%

GOVERNANCE

NGen is a not-for-profit corporation governed by an industry-led Board of Directors. Four Board Committees support and report to the Board in carrying out its governance responsibilities.

The Executive Committee is composed of the Chair and (if appointed) the Vice Chair of NGen, as well as the Chairs of each of the Board’s standing committees and is responsible for:

- Reviewing major issues facing the organization and making preliminary decisions with respect to those decisions that should be brought before the Board.
- Providing advice to NGen’s CEO with respect to issues affecting the governance and strategic management of the Corporation.
- Making decisions on behalf of the Board in urgent situations when a Board meeting cannot be convened in time.

The Governance and Compliance Committee is responsible for:

- Developing and reviewing NGen’s by-law and governance policies.
- Board self-assessment.
- Overseeing and advising management with respect to its relationships with legal counsel.
- Overseeing corporate compliance with the terms of any funding or legal agreements entered into by the Corporation.
- Oversight of NGen’s financial risk management framework and risk mitigation processes.
- Resolving any disputes or conflicts of interest arising among Board members according to the terms of the policies approved by the Board.

The Finance and Audit Committee is responsible for:

- Oversight of corporate financial reporting and accounting systems.
- Oversight of corporate investment decisions.
- Oversight of NGen’s financial risk management framework and risk mitigation processes.





- Selection of an independent auditor.
- Receipt of audit results.

The Human Resources and Nominating Committee is responsible for:

- Hiring and overseeing the performance of NGen’s CEO.
- Approving NGen’s compensation and Human Resources policies;
- Recruiting new members of the Board.
- Nominating members of the Board.
- Nominating the Chair of the Board and the Chairs of Board Committees.
- Nominating members of Board Committees after consultation with individual Board members and Committee Chairs.
- Board education and orientation for new members.
- Board succession planning.

NGen’s Board operates according to the requirements of Canada’s Not for Profit Corporations Act, the Competition Commissioner’s Guidelines for Global Innovation Clusters, the provisions of NGen’s Contribution Agreement with the Global Innovation Cluster program, and a set of Governance Policies approved by the Board itself. These policies cover:

- A Code of Conduct for Board members as well as NGen employees and contractors.
- Expectations of individual Directors.
- Roles and responsibilities of Board members.
- Confidentiality.
- Conflict of Interest.
- Financial management.
- Investment.
- Whistleblowing.

NGen’s governance policies are reviewed annually by the Board. Statements of compliance are received from the CEO at each Board meeting, and by the Director General of the GIC program and NGen’s legal counsel at our spring Board meeting.

Board and Committee meetings are scheduled quarterly according to a workplan approved by the Board at the beginning of each calendar year. Meeting dates for the coming year are agreed at the Board’s fall meeting. The Corporate Plan for the coming fiscal year is approved in January. NGen’s performance is reviewed in the spring. Our Annual Report, Financial Statements, and any revisions of the Corporate Plan are approved in July. The Board reviews and, if necessary, updates NGen’s Five-Year Strategy at its fall meeting.

NGen’s by-law stipulates that the voting members of NGen are the members of our Board of Directors. Therefore, the composition of NGen’s Board is and will remain reflective of Canada’s advanced manufacturing ecosystem. NGen’s Board currently consists of 16 members and five observers who are representative of and experienced in a broad range of sectors, including automotive, aerospace, IT and digital technologies, electronics, defence, automation and robotics, solar and wind energy, materials and resource processing, and health care industries. Board members are also involved and expert in building capabilities in the EV value chain, industrial decarbonization and alternative energy, advanced materials, and supply chain management.

Currently, three directors are from SMEs, four from larger companies, and four from advanced manufacturing associations. Two colleges, one university, one private investment fund, and two regional development agencies (one federal and the other provincial) are represented as Board members and observers. Eight out of 15 Board members are women, including our Chair. Seven are independent directors. Two of the four members of NGen’s Executive Committee are women.

Succession planning for NGen’s Board takes industry, academic, and regional representation into account, as well as requirements to maintain at least 50% women Board and Executive Committee membership and at least one-third independent directors. Board members may hold appointments for two consecutive three-year terms. Recommendations for Board Chair, Committee Chair, and director and observer succession are made by the Human Resources and Nominating Committee of NGen’s Board. Board members and observers are elected during NGen’s annual Members’ meeting which is held in the fall of the year.

## OPERATIONS

Over the next five years, NGen will make a number of important changes in the way we operate:

We will strengthen our leadership role in identifying strategic opportunities for advanced manufacturing and industry transformation in Canada, engaging industry and ecosystem leaders in regular meetings and structured consultations.

We will focus more selectively on Technology Leadership projects and Ecosystem Development initiatives that align with our investment priorities, create a strategic advantage for Canada, leverage further co-investment by industry and other federal and provincial funding programs, and have high commercialization potential.

We will assign responsibilities for our Ecosystem Development initiatives to teams from across the organization to ensure we focus on strategic outcomes, provide support for project commercialization, and coordinate activities effectively.

We will create a business development role to diversify NGen’s sources of funding and support the commercialization of solutions developed by NGen, our members, and ecosystem partners.

We will also create a coordinating role for our international business development activities to help us pursue international investment and talent attraction opportunities, strengthen our international promotion and collaboration activities, and undertake work with Trade Commissioners, EDC, Invest in Canada, and other partners within Canada and internationally.

We will expand our operational presence in Quebec.

We will improve our IT infrastructure to automate project application and data reporting processes and provide online tools and services for collaboration, showcasing technology use cases, managing IP, and improving workforce and management capabilities.

We will develop new guidelines for funding Ecosystem Development initiatives that will allow NGen to take the initiative in their design and execution.

NGen will, however, maintain our processes for developing, assessing, contracting, and monitoring our GIC Technology Leadership projects. We will manage project intake through widely

communicated calls for proposals. Guidance will be provided to applicants for each of these calls outlining their objectives, eligibility criteria, and the steps that will be followed in NGen’s project development, assessment, and approval process. NGen will organize briefing sessions for applicants, as well as collaboration events for them to pitch their projects and identify potential partners and other funding or investment opportunities. NGen’s project team will also advise applicants with respect to project development, potential partners, IP strategies, and eligible costs.

Strategic eligibility criteria will remain the same as in Phase I of the GIC program – projects must be industry-led, transformative, collaborative, contribute to ecosystem development, and have high commercialization potential. In Phase II, projects will also be assessed on the basis of their contributions to environmental sustainability, supply chain resilience, and building a more equitable, diverse, and inclusive workforce.

As in Phase I, project proposals will be evaluated by panels of independent industry experts. Government observers will also be invited to participate in panel assessments. Prior to contracting, partners in approved projects will be required to undertake a collaboration agreement stipulating how projects will be managed, IP shared, and costs and responsibilities allocated during their project. (NGen’s collaboration agreements are modeled on internationally recognized Lambert Agreements for collaborative R&D.) Project partners will need to have IP strategies developed or in place and approved by NGen as a condition of funding. A Master Project Agreement concludes the contracting process reflecting the terms and conditions for GIC funding in NGen’s Contribution Agreement.



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