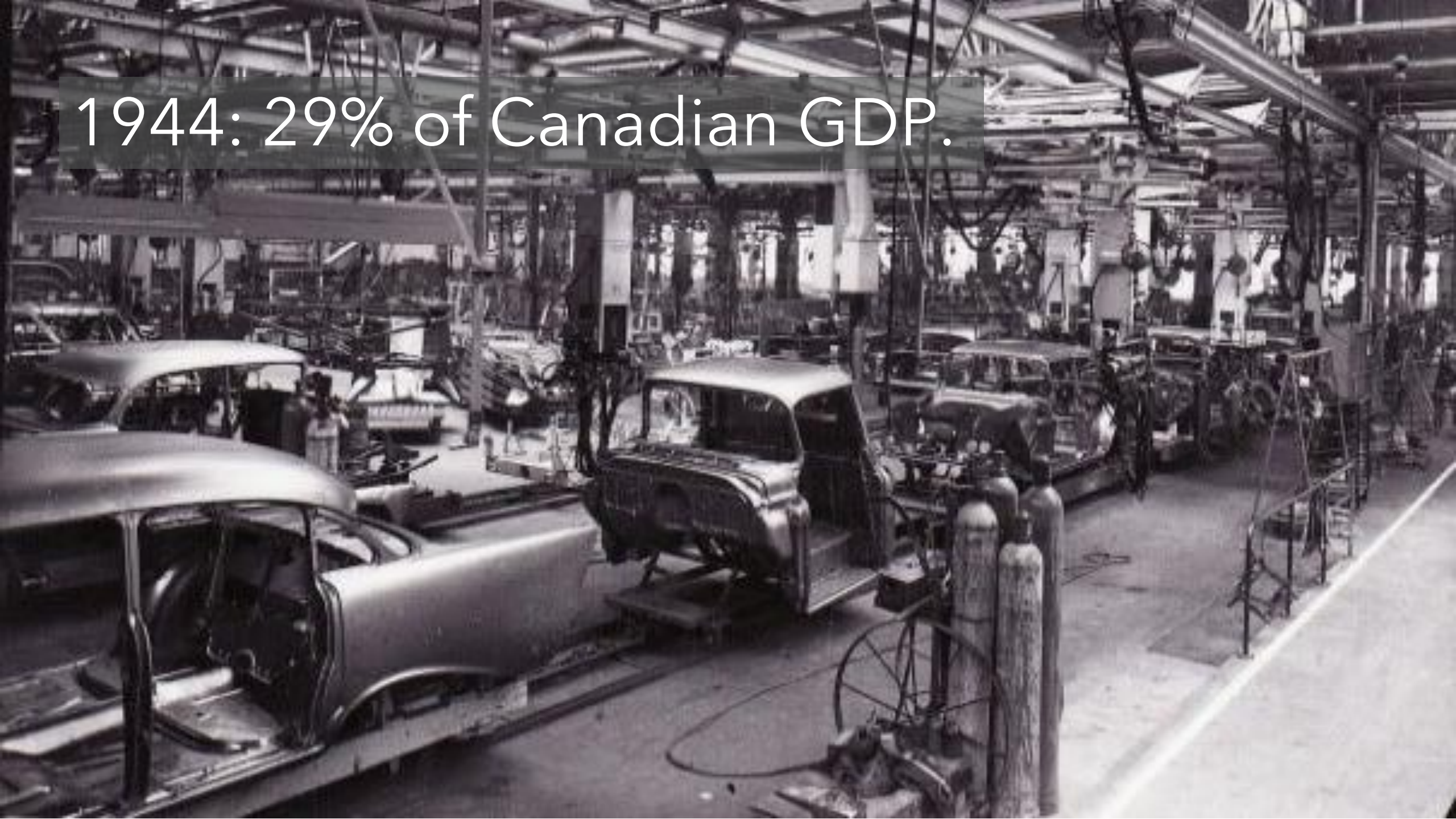
Navigating the Shift to Advanced Manufacturing

John Laughlin - Chief Technology Officer

February 4th 2020

NGen Next Generation Manufacturing Canada


Manufacturing was a pillar of
Canada’s 20th century economy.


1944: 29% of Canadian GDP.

It delivered the prosperity that we used…


to make Canada a great place to live.

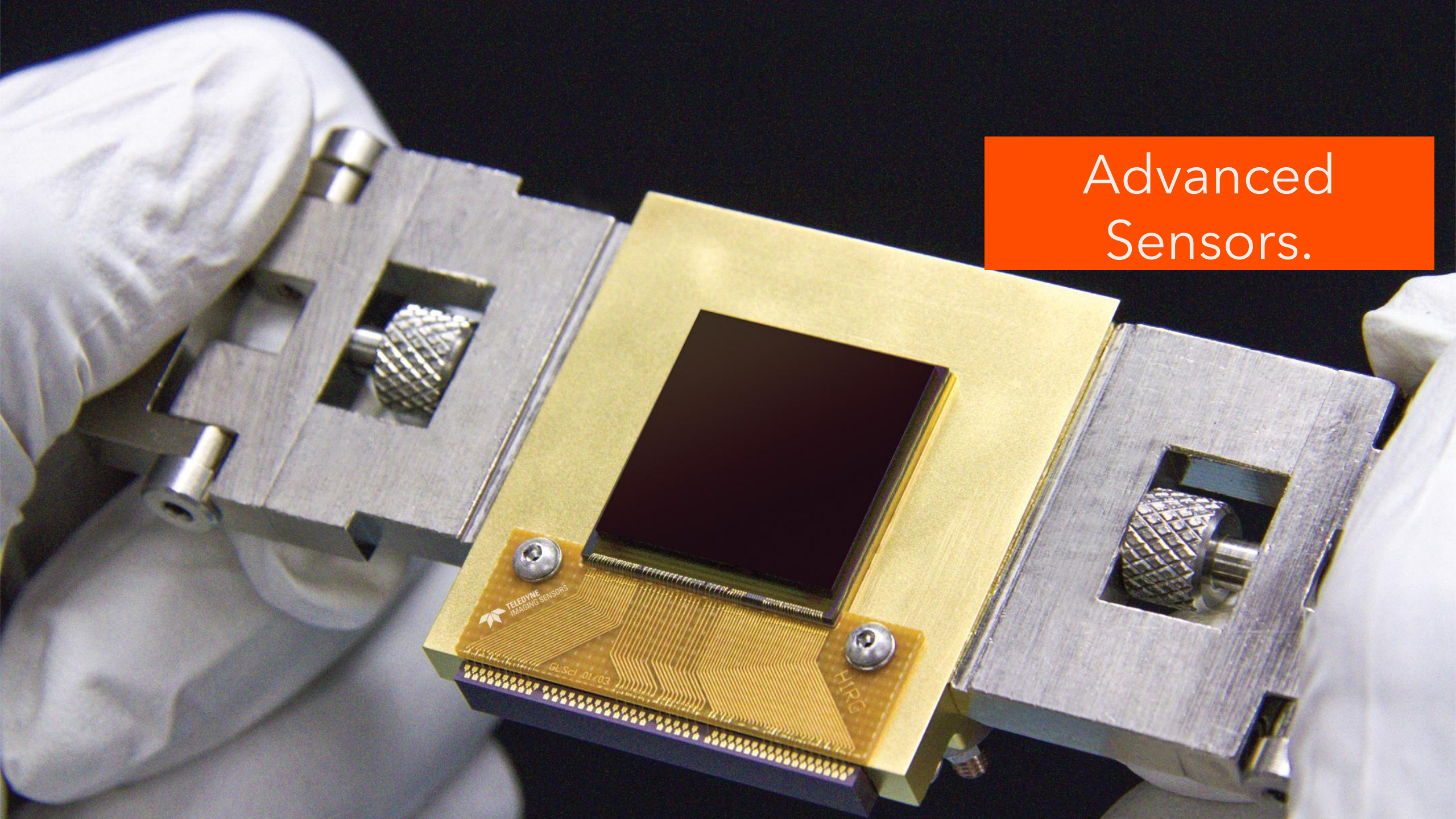
But in the 21st century…

Canadian manufacturing faces
a new industrial revolution.


Greater global competition…


and game-changing new technologies...


are upending the ways the world builds things.


Advanced
Sensors.
TELEDYNE
IMAGING SENSORS
HIRG


Additive
Manufacturing.

Robotics.

Artificial Intelligence, IIOT and more.


New technologies and platforms are creating
the promise of next generation production...

that combines the physical and material world with the digital, virtual and cyber ones…

in which machines can talk to other machines…


and machines can talk to people.

This is advanced manufacturing.


Canada has been slow to
react to this new reality.

At least 30% of Canadian manufacturers risk going out of business because of their failure to adopt advanced technologies.

Source: Jayson Myers Strategic Business & Policy Solutions

45% of manufacturers that invest in advanced technologies in Canada do not achieve their business objectives.

Source: Statistics Canada

Only 24% of Canadian manufacturers collaborate with other organizations on a regular basis.

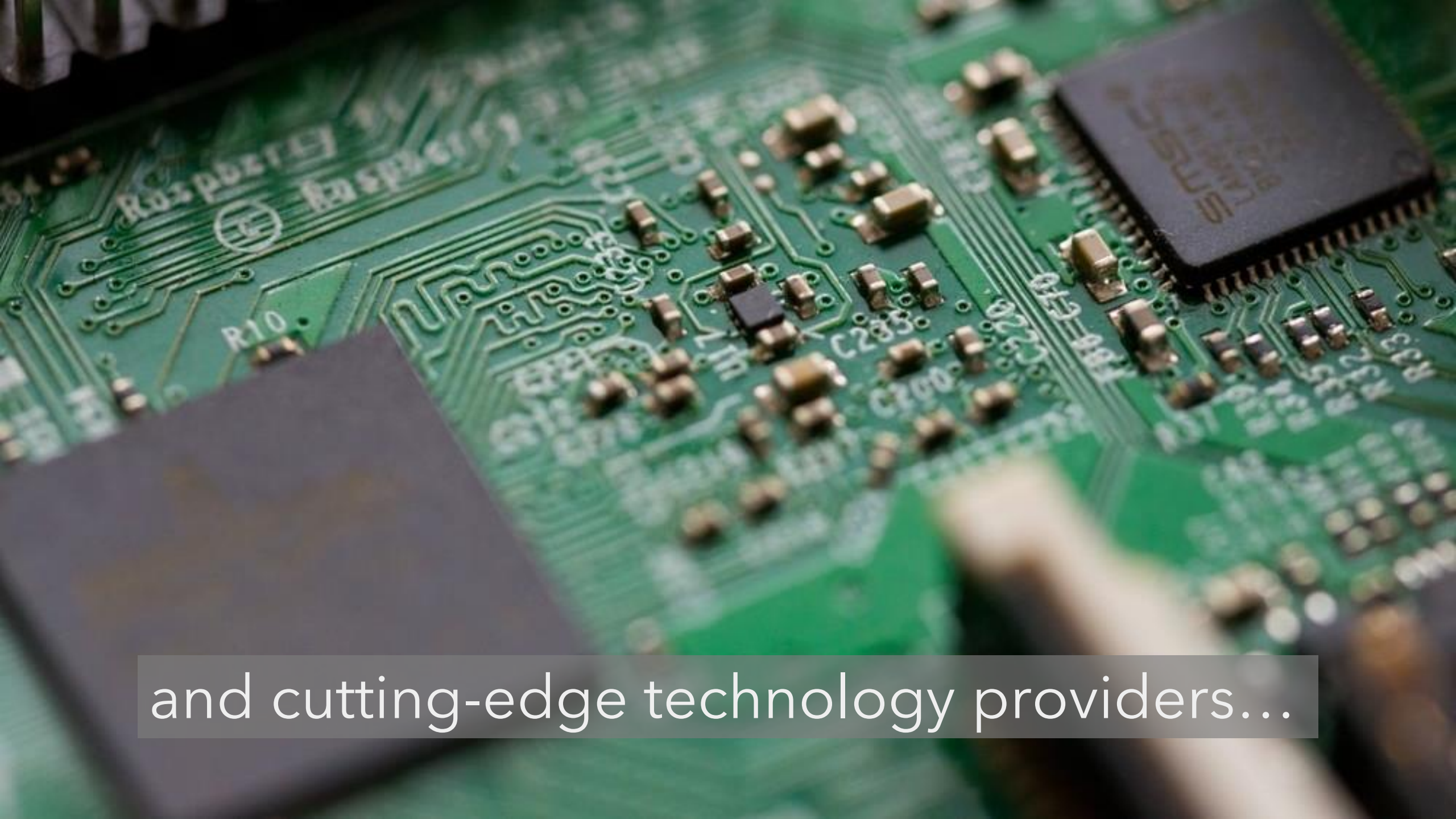
Source: Jayson Myers Strategic Business & Policy Solutions

This threatens the competitiveness of Canadian manufacturing.

Yet great disruption also
offers us a great opportunity.

Canadian manufacturing is well-positioned to succeed in this digital revolution.


Our strong manufacturing companies...


and cutting-edge technology providers…


led by a highly-skilled workforce…


could make Canada a global
leader in advanced manufacturing.

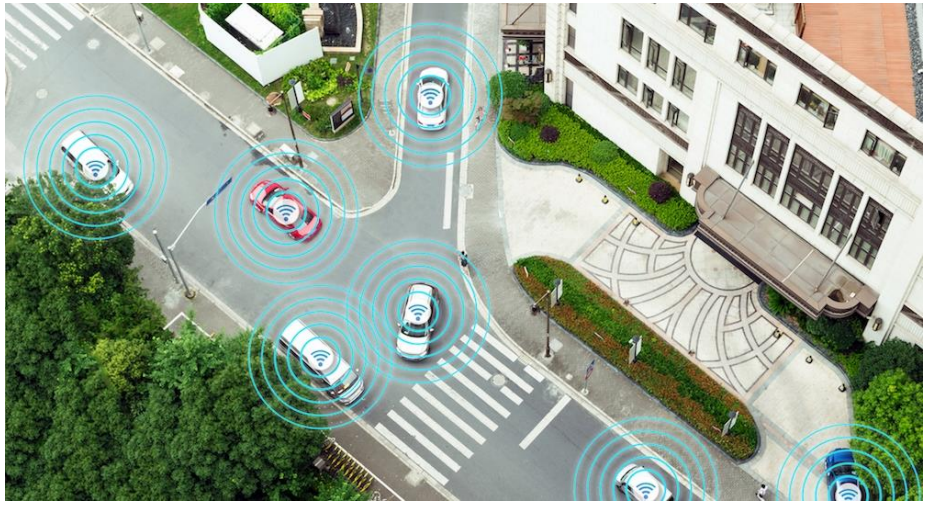
Canada’s challenge?


Our strengths are not well-connected
& each sector has its own dynamics

Automotive Sector Trends

Emissions Legislation, Autonomous Vehicles & Localised Regulation

Source:- www.ukmfgreview.com/

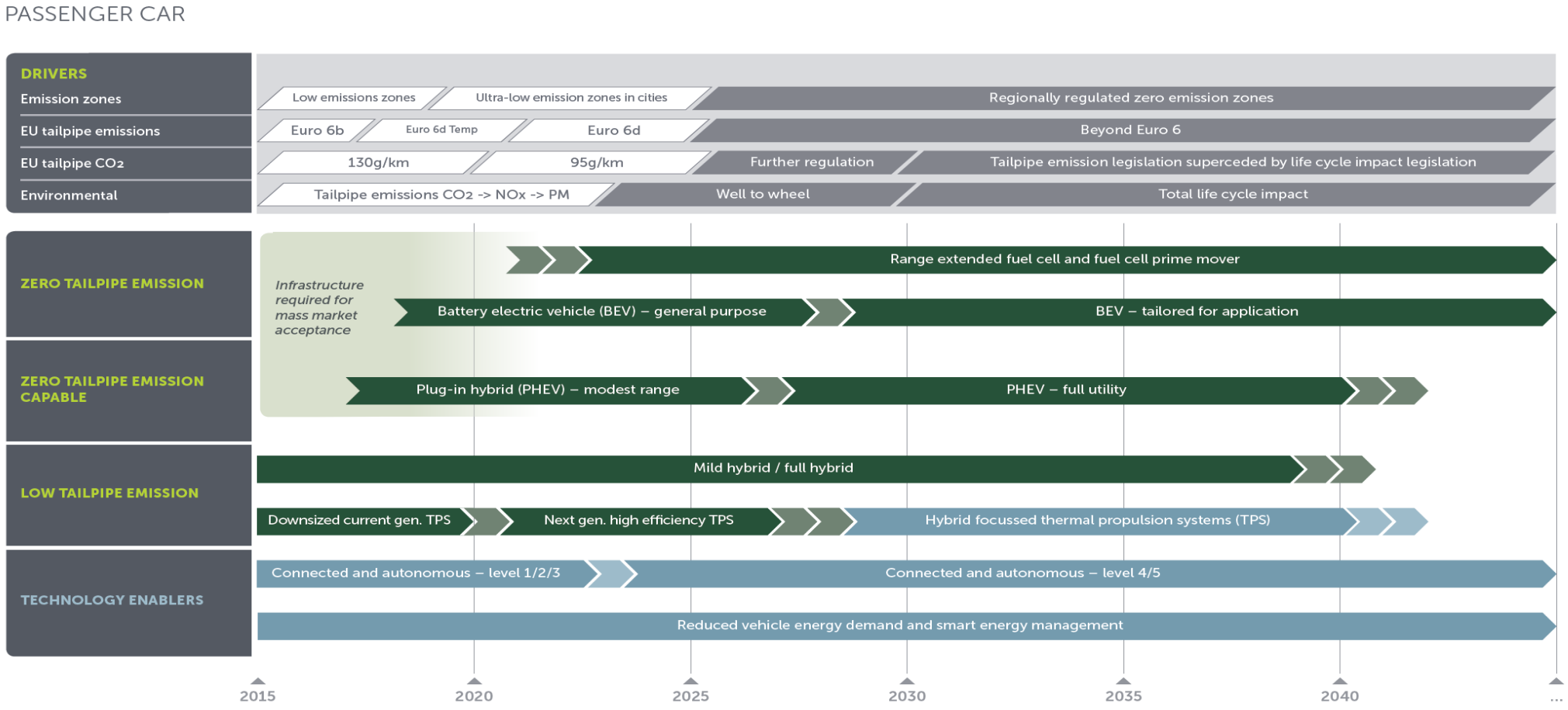


Source:- www.electricautonomy.ca/

Source:- www.tourismvancouver.com/

Automotive Manufacturing Impact

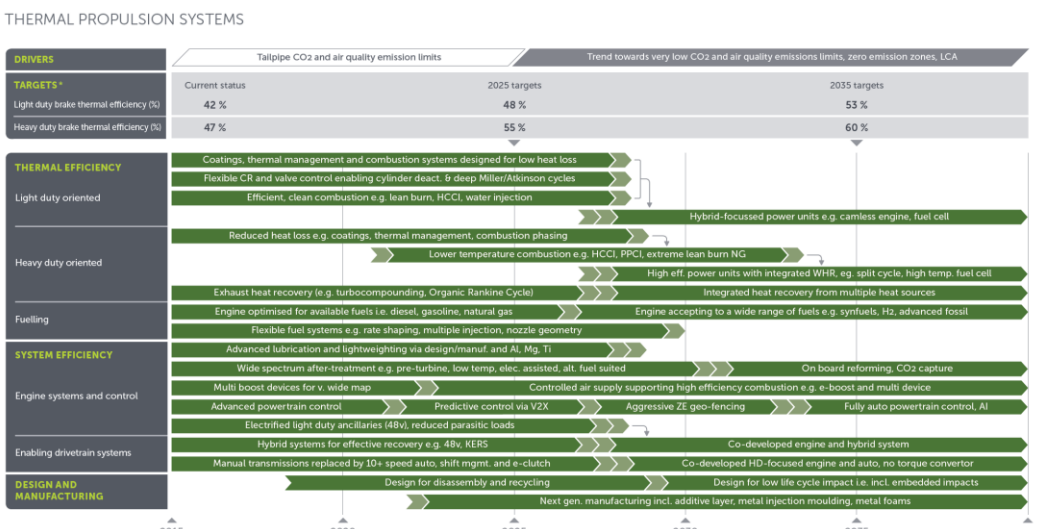
Emissions Legislation, Autonomous Vehicles & Localised Regulation

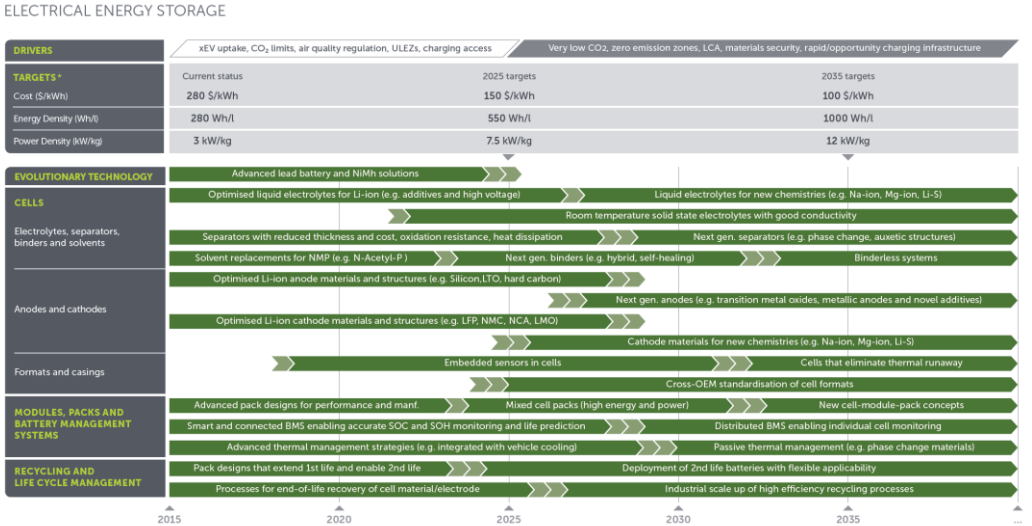


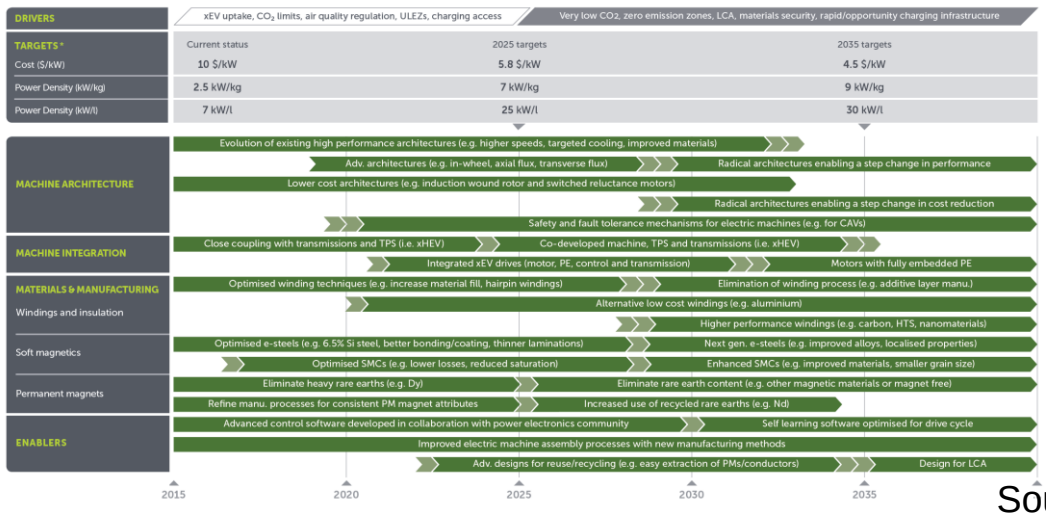
Source: UK Automotive Council

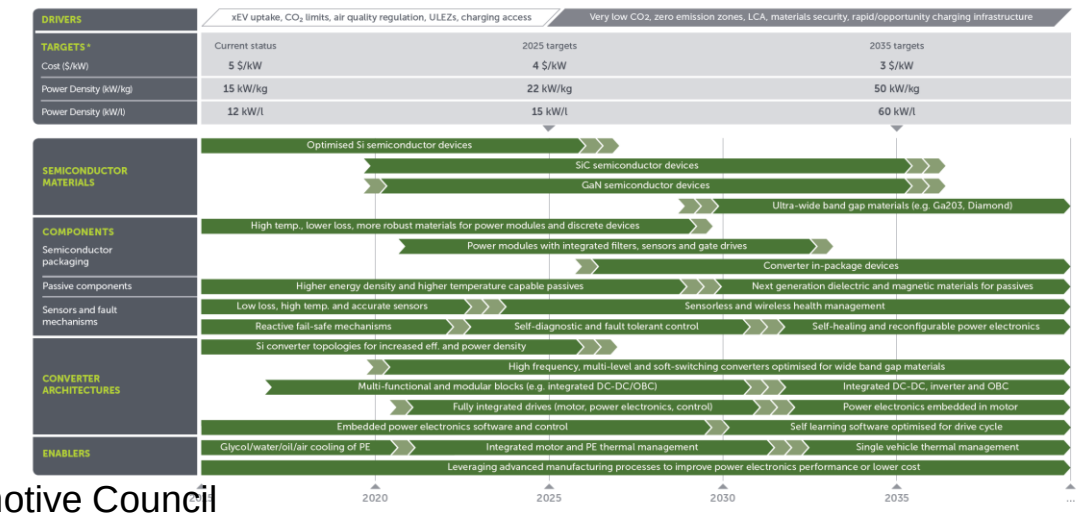
Automotive Manufacturing Impact

Emissions Legislation, Autonomous Vehicles & Localised Regulation









Source: UK Automotive Council

Automotive Manufacturing Impact

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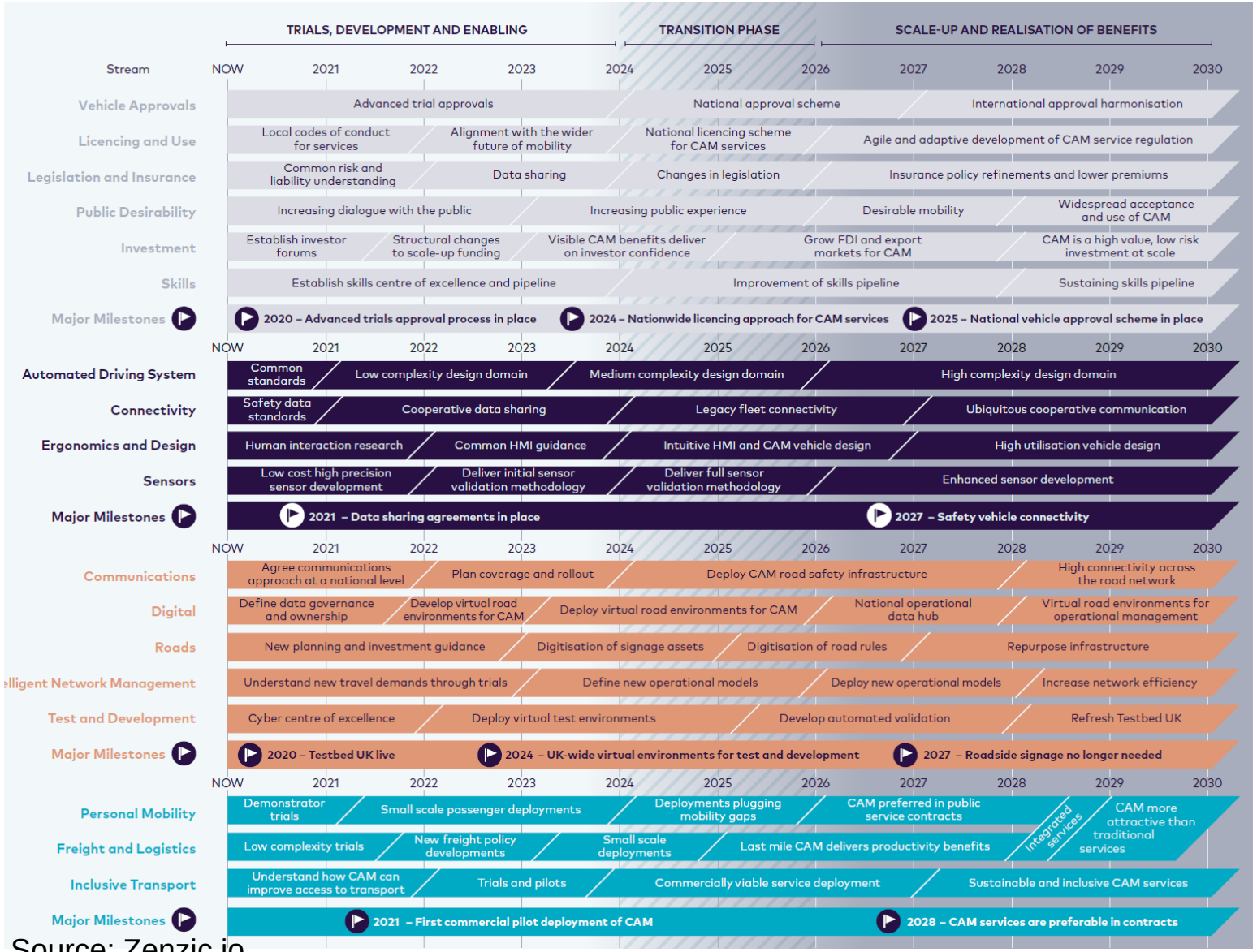
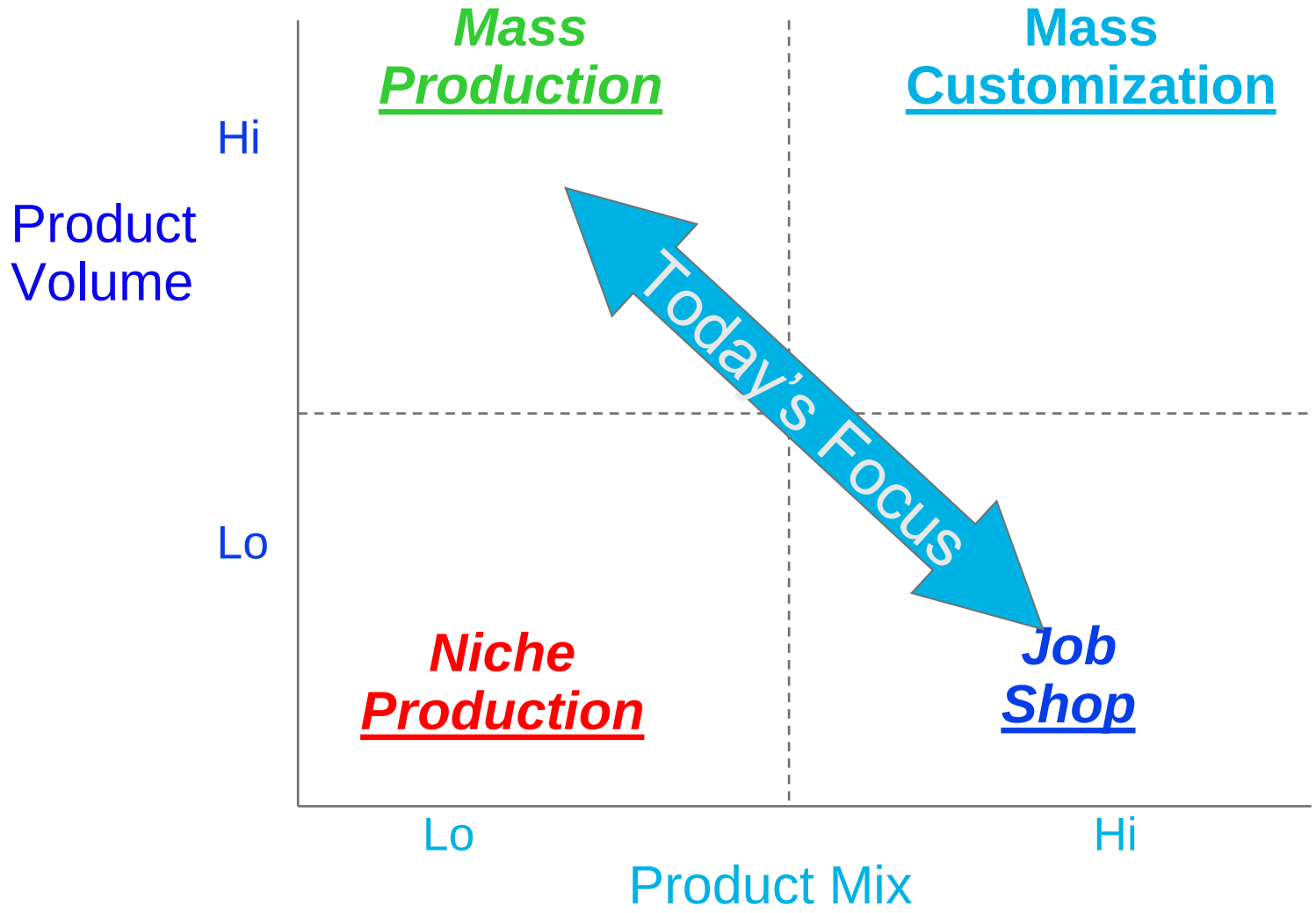


Source: Zenzic.io

What Game Are You In?



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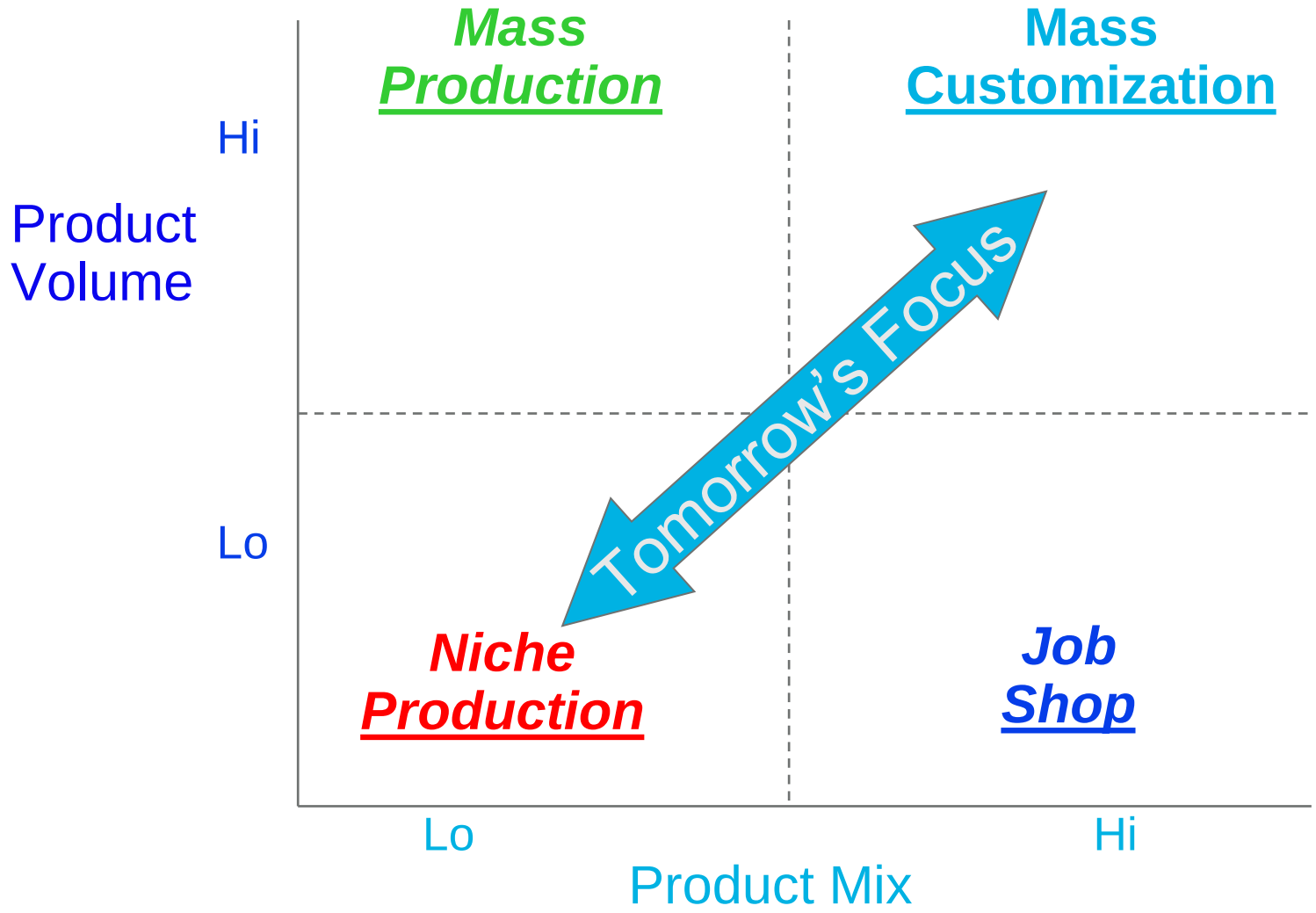
Advanced Manufacturing Allows Us to "Change the Game"



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Automotive Sector Trends

Whole Life Cycle Regulation

Impact Today

Cast Iron

To

Aluminium

By Wikipedia-User: Ra Boe - https://commons.wikimedia.org/w/index.php?curid=51380859

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Automotive Sector Trends

Whole Life Cycle Regulation

Impact Tomorrow

Automotive Sector Trends

Whole Life Cycle Regulation

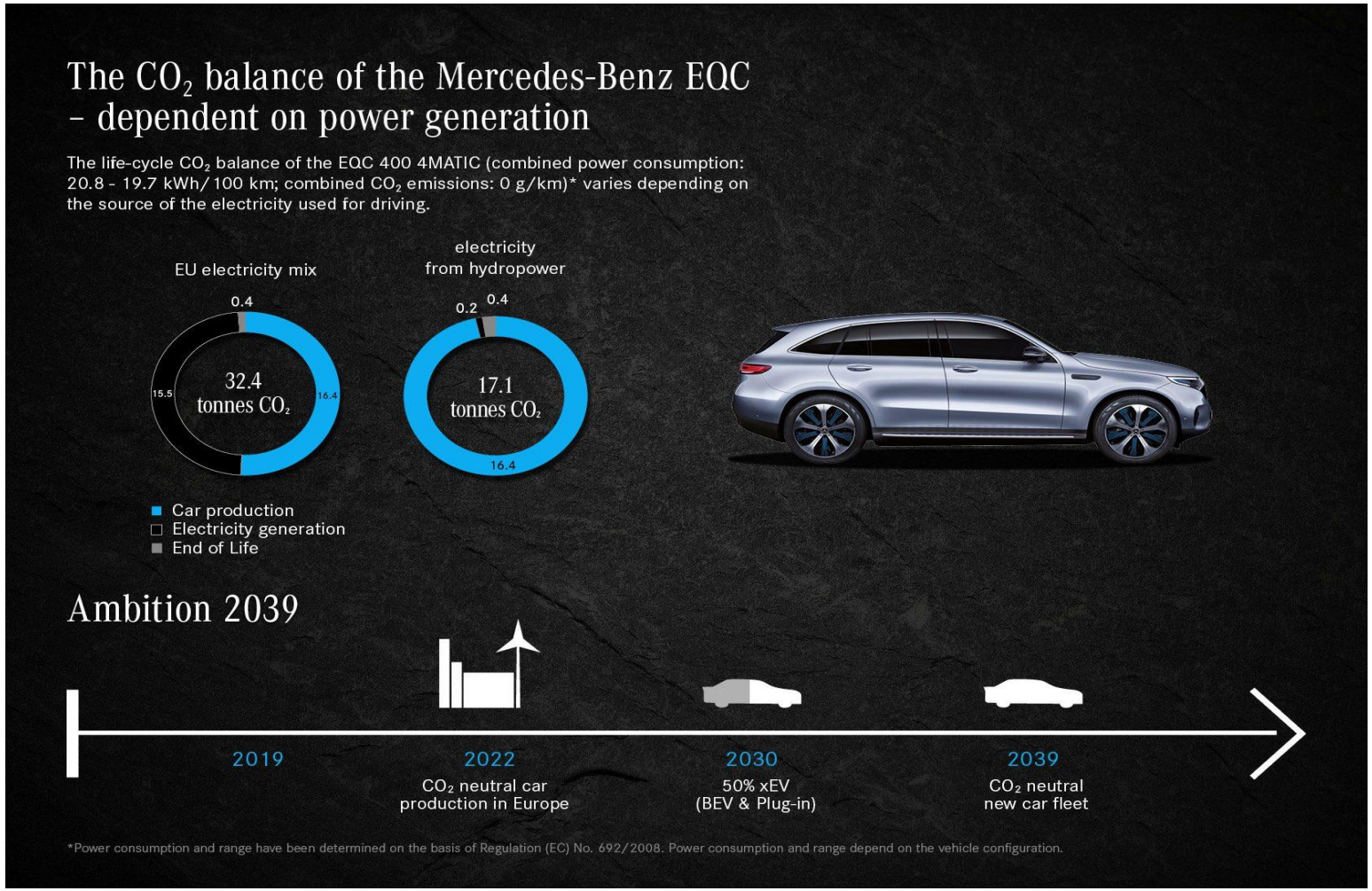
Impact Tomorrow

40°37'32.9"N 109°40'10.1"E

Baotou toxic lake Inner Mongolia

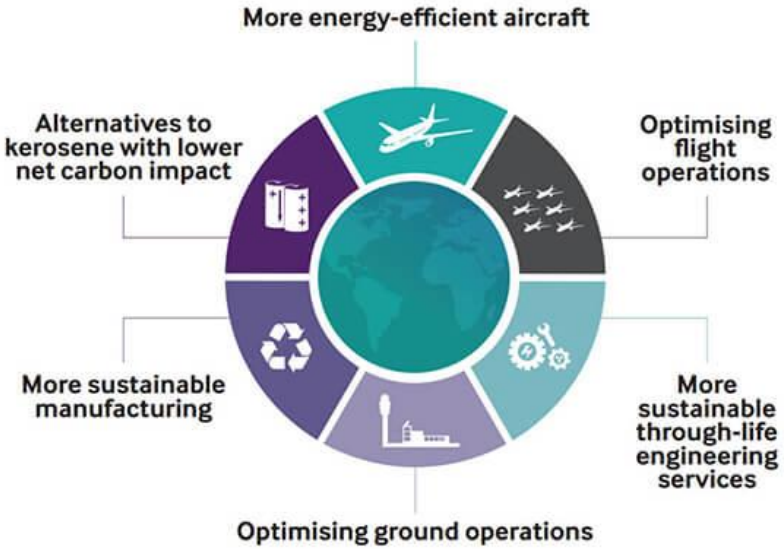
Automotive Manufacturing Impact

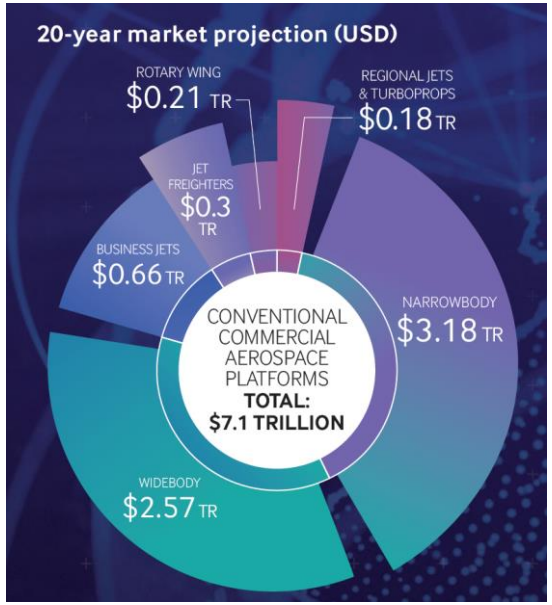
Whole Life Cycle Regulation



Aerospace Trends

- A cap on net aviation CO2 emissions from 2020 (carbon-neutral growth)
- A reduction in net aviation CO2 emissions of 50% by 2050, relative to 2005 levels
- Targets for reduced NOx, reduced noise.
- Opportunities of huge market growth.
- Global commercial pressures.





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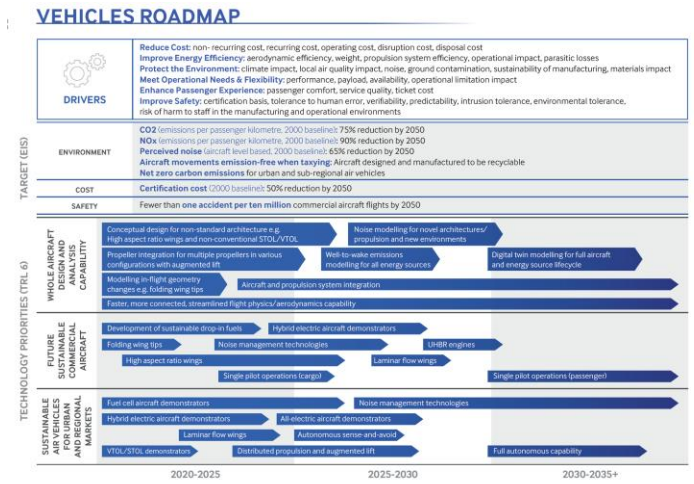
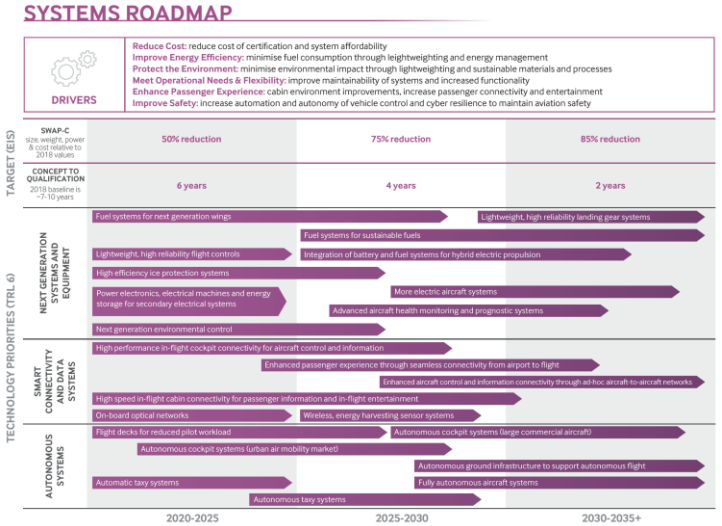
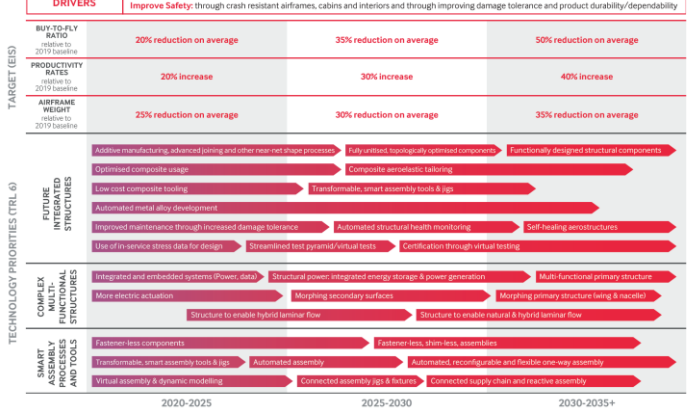
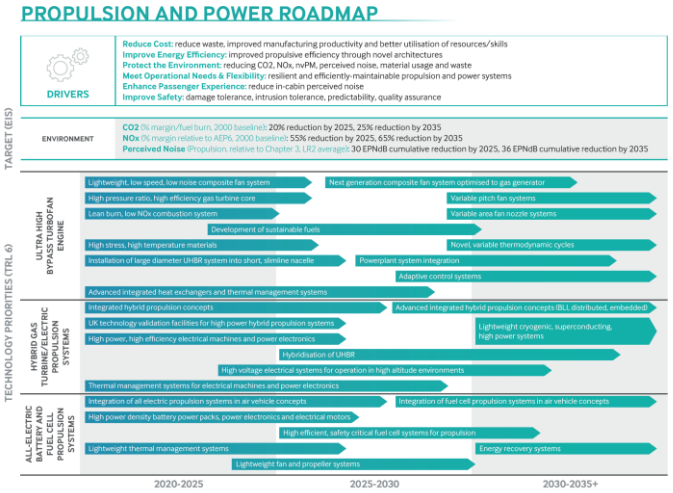
Aerospace Manufacturing Impact









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Aerospace Manufacturing Impact

- Opportunities with additive manufacturing and composites in aerostructures.
  - Creating greater component functionality, lighter and stronger structures and greater efficiency from the overall airframe.

- Conventional manufacturing techniques constrain structural designs.
  - Advanced Manufacturing techniques enables new concepts for components to be manufactured and assembled.

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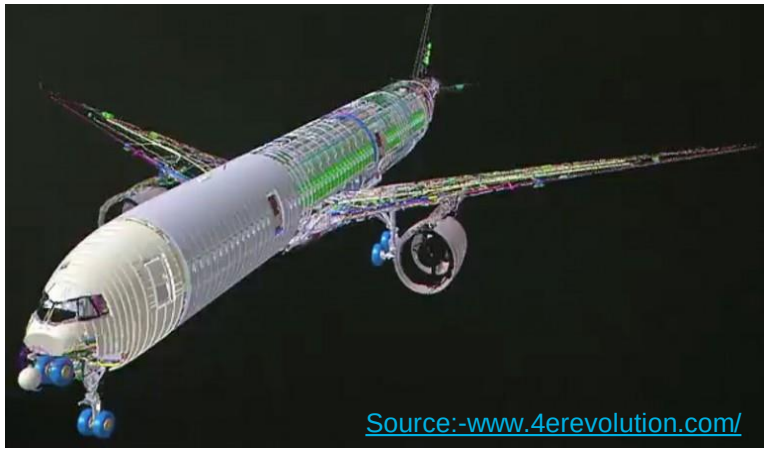
Aerospace Manufacturing Impact

- Manufacturing precision and repeatability is essential to remain competitive.
  - By developing the next generation of smart automated assembly processes, tools and flexible assembly cells.

- High-fidelity learning models will enable highly precise and repeatable assemblies.
  - Dynamic models will depend on connected assembly machines, factories and ultimately entire supply chains.



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Why NGen

Canada's Advanced Manufacturing Supercluster

What We Do

NGen connects Canada's strengths in manufacturing and technology with its skilled workforce to build a world-class advanced manufacturing ecosystem.

How We Do It

$200m funding available

Helping companies:
de-risk, accelerate or be more ambitious.

Why the industry collaboration model

- European Cluster Excellence Scoreboard.
  - **Employment.** 33.3% of firms in clusters showed employment growth greater than 10%. Compared to only 18.2% of firms outside clusters.

- Innovate UK collaborative projects grant recipients vs non recipients.
  - **Turnover**. Showed a 12% increase on average over 4 years.
  - **Employment**. Higher employment levels compared equating to an increase of between 11%-14% within 2-4 years.
  - **Survive**. 95% of companies supported survived for three years after receiving a grant, compared to 84% of the similar companies which didn't receive a grant. After five years the gap grows to 16 percentage points.

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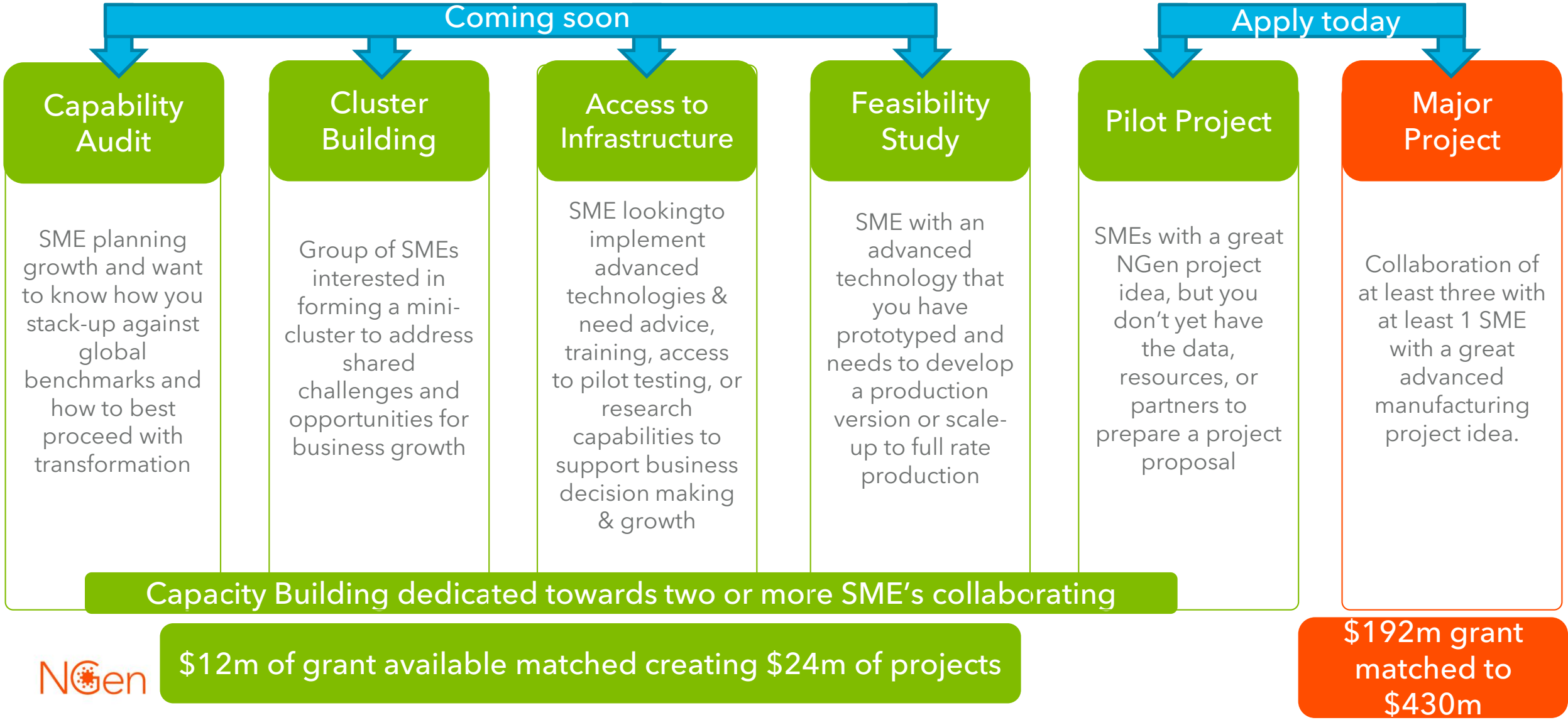
6 Funding Streams



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NGen Project Types

	Pilot Project	Supercluster Project
NGen Reimbursement	50%	44.4%
Total Project Size	$100k - $500k	$1M - $20M
Partners	2 or more SMEs	3 or more partners (at least 1 SME)

How it works

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Step 1: Join NGen

Become a Member at **www.ngen.ca/join**
Membership is free.

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Step 2: Contact us

Capacity@ngen.ca

Project@ngen.ca

We can help:-

- Explore ideas,
- Identify partners,
- Offer presentation opportunities,
- Navigate the funding process
- Review proposal drafts

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Strategic Evaluation Criteria

Transformative

Positioning Canada as a global leader in advanced manufacturing.

Applied

Involving later stage technology and manufacturing readiness with a potential to generate significant commercial benefits.

Collaborative

Involving the participation of industry partners, co-investors, academic and research institutions.

Enduring

Leaving a legacy in skills development, tools, testbeds, IP, business knowledge for Canada's advanced manufacturing ecosystem.

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Application

Application 10 questions

- 4 Qs - Business case
- 4 Qs - Project & delivery
- 2 Qs - Funding and adding value

Project Size Determines the Process

$100k - $500k	$1M - $5M	$5M - $10M	$10M - $20M
Single Application	Single Application	2-Stage Application	2-Stage Application + Partner interview
10 Questions	10 Questions	10 Questions	10 Questions
400 Words / Question c8 pages	900 Words / Question c18 pages	Stage 1: 900 Words / Question	Stage 1: 900 Words / Question
		Stage 2: 2000 Words / Question	Stage 2: 2000 Words / Question

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Collaboration days
Save the date 28th April 2020 at LOT42
Free to attend

Tell us how we can support your transformation.

Get involved Join - www.ngen.ca/join

Major Project - project@ngen.ca

Capacity building project capacity@ngen.ca

John.Laughlin@ngen.ca

Thank you

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