



# TRIUMF 5-Year Request Nigel Smith (ED/CEO) & Sean Lee (CoS)



*NAVIGATING  
NEW HORIZONS*

# Canada has a unique 'Big Science' research ecosystem

- Federal government laboratories run by science-based departments and ministries (including NRC) in support of government missions; government owned and operated
- TRIUMF and the Major Science Initiatives facilities (CFI funded) are university owned and operated; universities generally fall under provincial governments
  - Strong driver is academic (university and hospital) driven research initiated by university faculty
- 'National laboratories' do not exist c.f. DOE or European national labs – generally 'bottom-up driven' resources developed from academic roots
  - This sets up some tension with federal operational support structures as no clear model for support
- Industrial R&D investment is below similar G7 countries



# The Canadian Research Ecosystem

## Mission development for TRIUMF

- TRIUMF develops its strategic vision and mission through dialogue with all stakeholders including university members, national and international academic communities, government funders, industrial sponsors and emergent opportunities
- Connections to similar organisations across Canada and the world

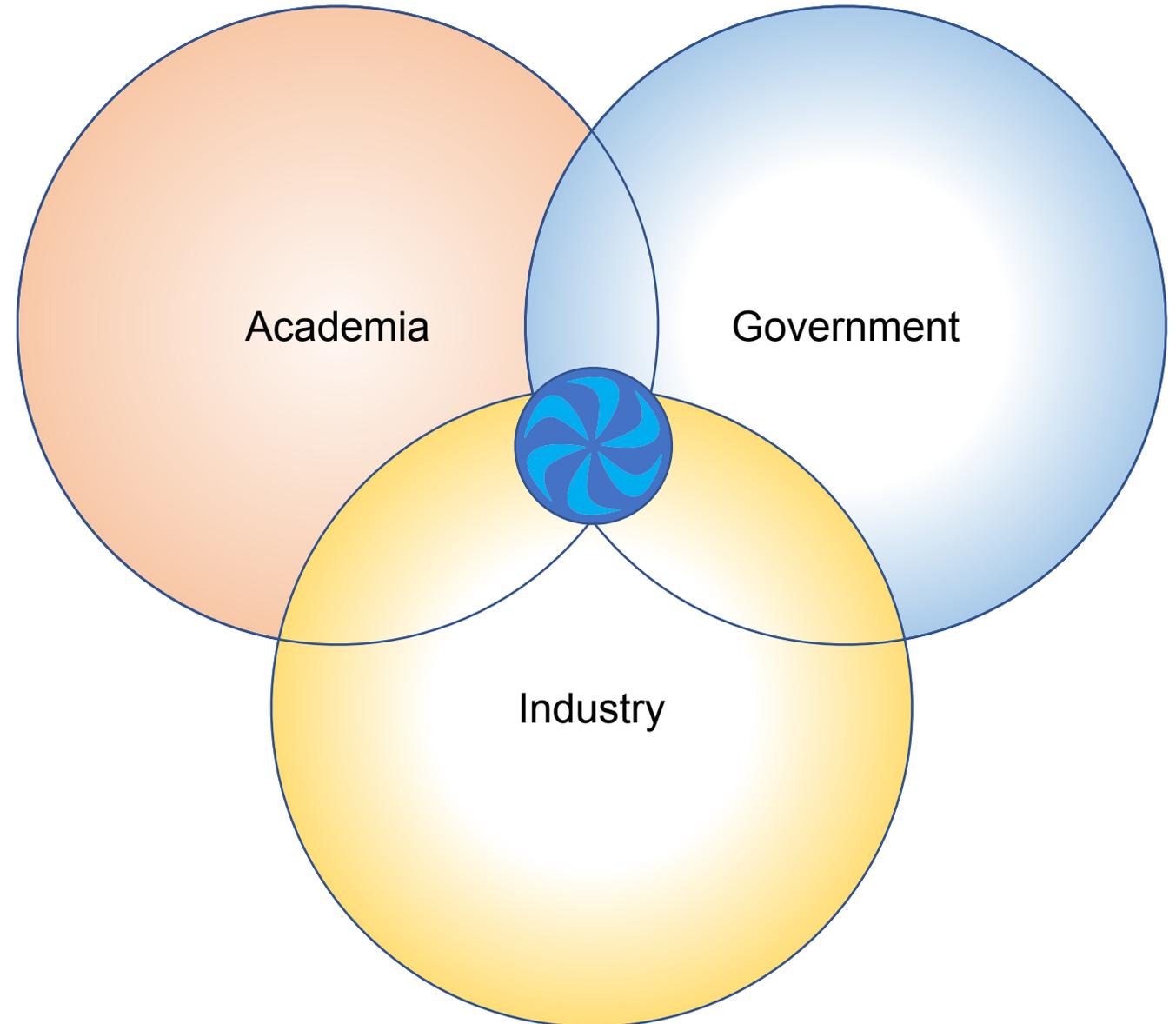
## Major Research Facilities structural evolution

- Canadian federal government (ISED) is assessing the framework for supporting Major Research Facilities such as TRIUMF and the CFI MSI platforms as a response to Naylor (2017) and Bouchard (2023) reports
- TRIUMF is fully engaged in this dialogue; expectation of change is high



# The Canadian Research Ecosystem

- TRIUMF sits at the interface of all components of the Canadian research and innovation ecosystem – we enable all components and drive some
- In addition TRIUMF plays a major role in international collaboration and facilitation



# **TRIUMF Current Funding Overview & Federal Support**

# TRIUMF Funding 2020 – 2025\*

**Total: \$467.6M**

## Operations

- Federal government<sup>1</sup>: \$303.1M

## Capital Expenses

- Federal government<sup>2</sup>: \$26.5M
- Provincial government: \$18.3M
- Other<sup>3</sup>: \$3.4M

## Sponsored Research

- Federal funders<sup>4</sup>: \$37.0M
- International collaborations<sup>5</sup>: \$8.6M
- Canadian collaborations: \$6.2M

## Private Sector

- Industrial partnerships<sup>6</sup>: \$27.8M
- Royalties, commercial revenue & interest<sup>7</sup>: \$36.7M

## Five-year plan 2020-2025

### Contribution Agreement

- Requested: \$320M
- Secured: \$292.7M

### Requirements included

- Additional cybersecurity, IP and security requirements
- CMMS costs transferred to NRC operational budget
- \$25M ring fenced deferred maintenance budget

### Reworked plan

- Limited salary increases planned
- Efficiencies in latter years to reduce operations costs

1 – Comprised of National Research Council support (including the \$25M infrastructure funding + \$10M HL-LHC support), as well as initial operation funds tied to Canada Foundation for Innovation projects

2 – Comprised of funding from the Canada Foundation for Innovation, Infrastructure Canada, Western Economic Diversification

3 – Comprised of funding from research partners for the Institute for Advanced Medical Isotopes

4 – Comprised of funding from the Tri-Council agencies (NSERC, CIHR, and SSHRC) and Natural Resources Canada

5 – This includes funding that flows to TRIUMF from international partners (i.e.: VECC partnership with TRIUMF for ARIEL)

6 – Includes funds received from BWXT and TRIUMF Innovations

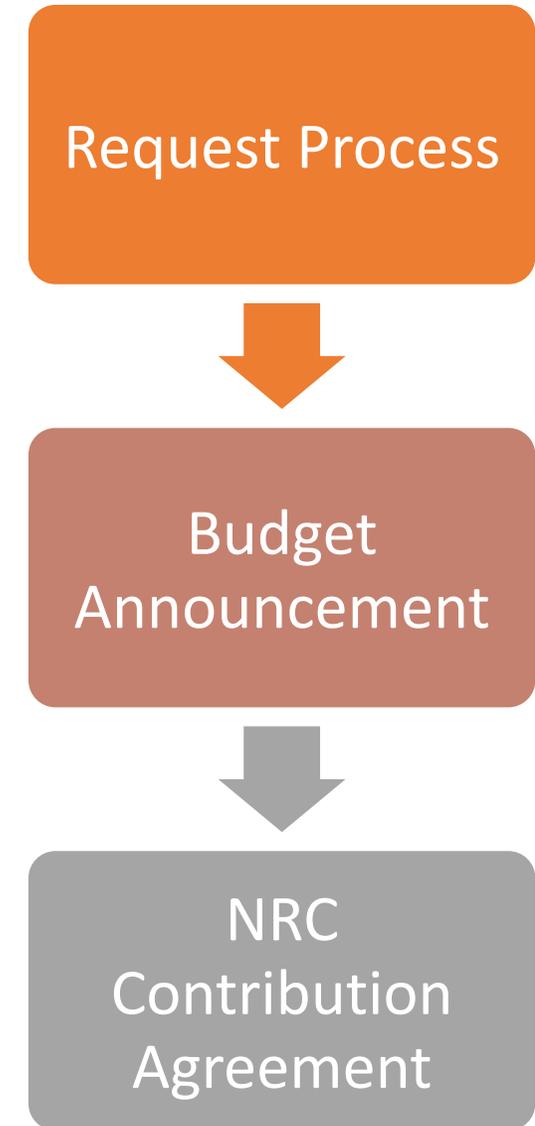
7 – All income is reinvested in TRIUMF

\* Subject to change; includes actual and projected values



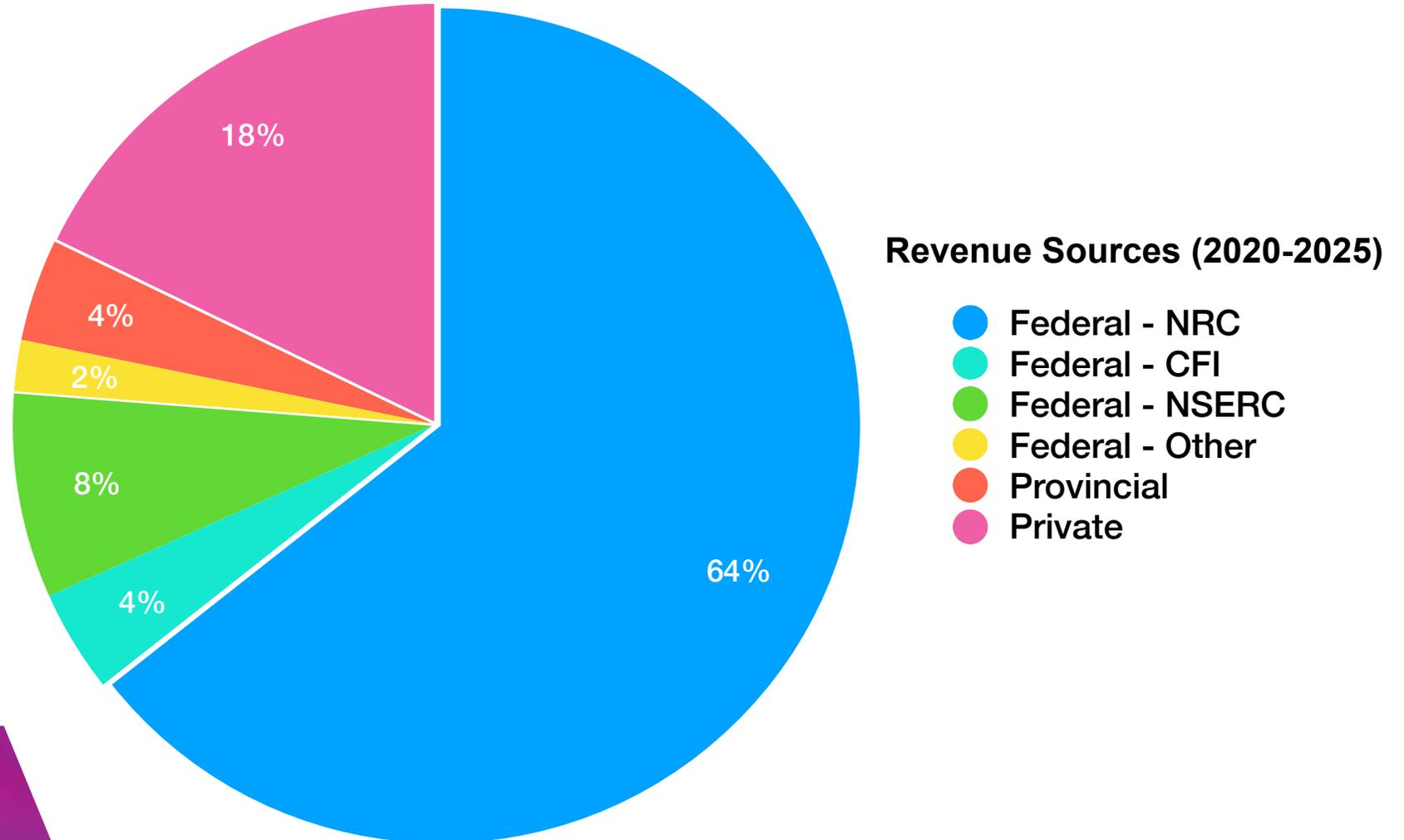
# Funding allocation and oversight

- TRIUMF's funding is allocated through the federal budget as a line item that is administered by the National Research Council (NRC).
- Funding flows to TRIUMF through a Contribution Agreement that sets out the terms and conditions of funding, as well as the deliverables (typically derived from the 5-Year Plan) for the funding period.
- Regular reporting and oversight then tracks TRIUMF's progress on meeting the obligations in the Contribution Agreement, including through the NRC Advisory Committee on TRIUMF (ACOT)



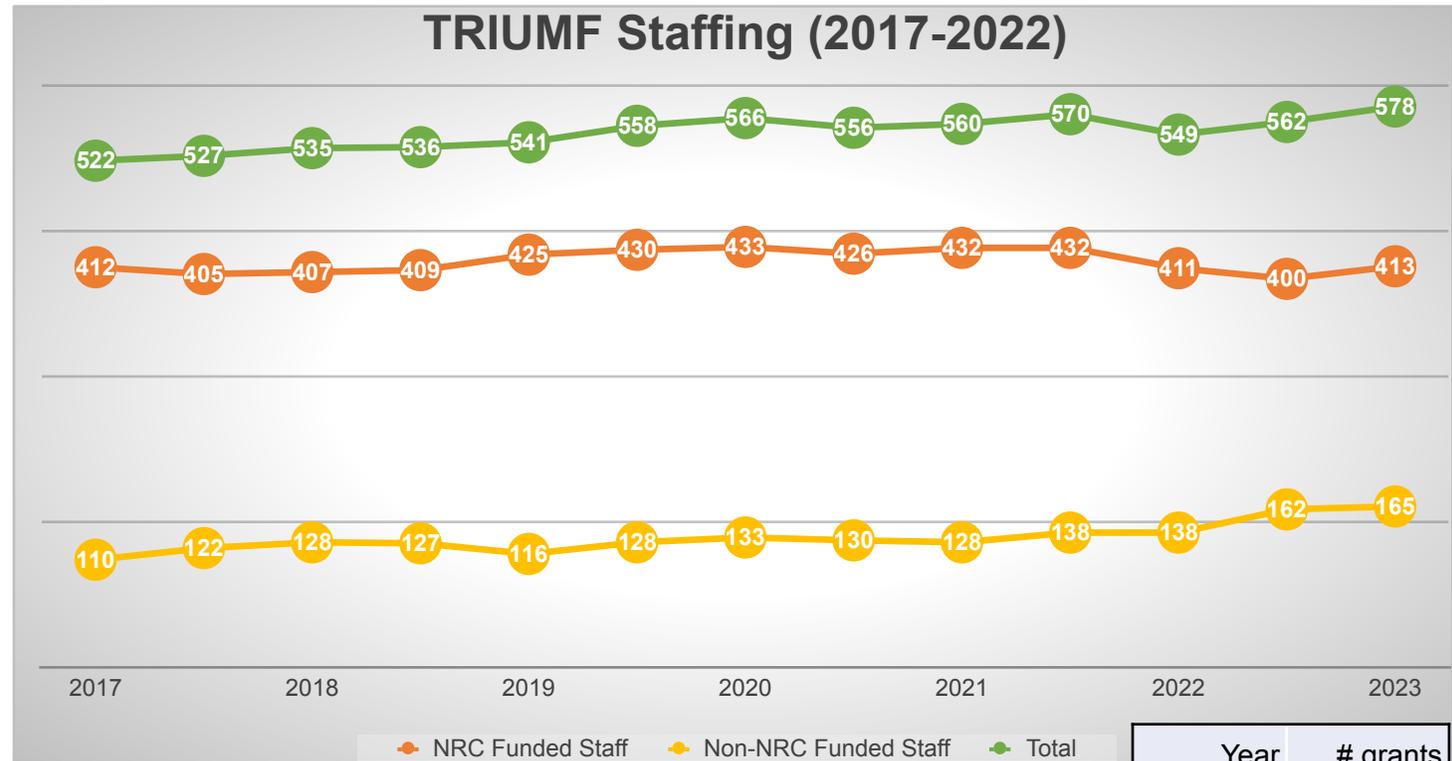
# TRIUMF Funding Sources (Anticipated) 2020 – 2025

- TRIUMF operates using a diverse portfolio of funding sources



# Staff support breakdown

- Standardised methodology from March 2017 to present
- Overall staffing up from 2017
  - Increases in TRIUMF's grant funding and other soft money sources
- Proportion and number supported by NRC funding has reduced over last five years
  - Non-research staff supported by grants and commercial revenues**



Year	# grants
2017	83
2018	92
2019	97
2020	95
2021	114
2022	118

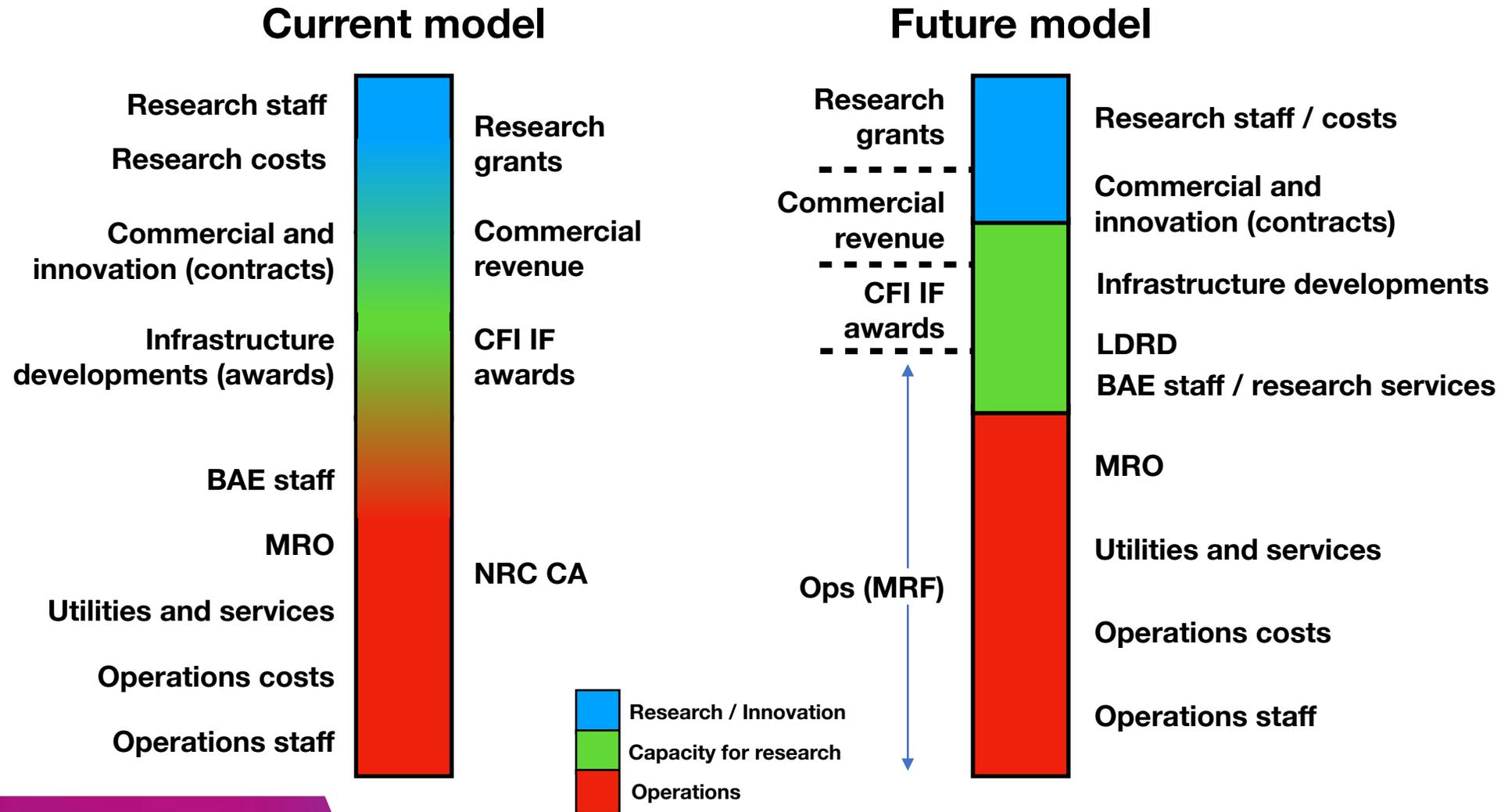


# Major Research Facility (MRF) Developments

- Discussion with ISED to ensure potential MRF framework sympathetic to TRIUMF unique aspects (BAE eligibility; matching fund issues; contingency and decommissioning; governance structure re universities)
- Anticipate MRF framework will need additional funding to fully exploit capabilities of the Canadian Major Research Facilities (CFI MSI was over committed last year)
- Structuring our request to be able to apply next five-year plan to both current funding model and potential new MRF framework, assuming similar to MSI.
- We have defined three categories of expenses to support this model:
  - Baseline Operations - operations staff / costs, services/utilities, MRO
  - Capacity for Research - includes BAE costs, deferred maintenance, infrastructure upgrades, research services, LDRD
  - Research and Innovation - research grants and commercial work



# MRF Model (expense categories)



# 20-year Vision Process

# Phases of Development

## **Phase 1: Visioning and listening** (Fall 2020 – Summer 2021)

- A broad spectrum of stakeholders were engaged to capture the full diversity of ideas and perspectives of our community

## **Phase 2: Convergence on vision framework** (Summer 2021 – Winter 2022)

- Based on the input and ideas received, the high-level pillars of the Vision were developed and refined via feedback and consultation

## **Phase 3: Finalization** (Spring/Summer 2022)

- The 20-year Vision document was drafted, refined, and the final text was approved by the TRIUMF Board of Governors



# Phases of Development

**Phase 1:** The process began with the **development of a planning and consultative framework** which included the creation of a Steering Committee composed of leaders and experts from TRIUMF’s communities, member universities, government stakeholders, and international partners.

This phase also saw the creation of **12 topical groups** (each with 5-10 members both internal and external to TRIUMF) who worked to **address 6 guiding questions**. This work, in addition to community consultation done, was compiled into a publicly accessible [report](#) and [summary presentation](#) that were used to advance the vision and will be leveraged again for the 5-Year Plan.

Phase 1 Topical Groups	
Nuclear Physics	Scientific Computing
Particle Physics	Emerging trends in Convergence Research
Fundamental Physics with AMO techniques	Accelerator Sciences and Facilities
Life Sciences	TRIUMF Site Development
Probes for Quantum Materials and Biomolecules	People and Skills
Quantum Technologies	Innovation & Collaboration

Phase 1 Guiding Questions	
What is TRIUMF today?	What will TRIUMF have accomplished?
What trends and changes will shape TRIUMF’s future?	What will TRIUMF be doing and what will TRIUMF not be doing anymore?
What will TRIUMF be?	What will TRIUMF look like?

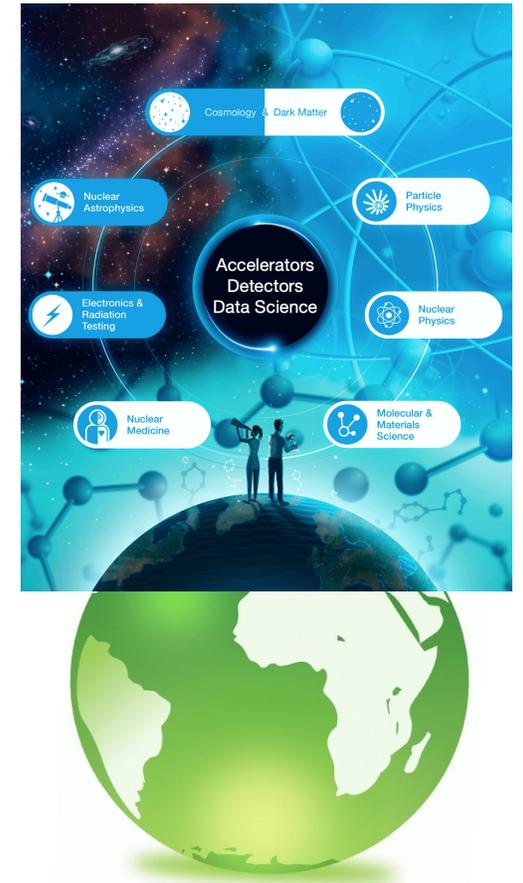


# Phases of Development

**Phase 2:** With the initial input collected, the next set of actions involved collating the ideas and translating them into draft text for review and feedback. This effort resulted in the production of the high-level positioning statements (and supporting content) shared at [Science Week 2021](#) – TRIUMF’s annual community engagement event.

## High-level Positioning Statements (Summer/Fall 2021)

1. As Canada’s particle accelerator centre and radioisotope **hub for science, medicine, and industry**, TRIUMF delivers world-class fundamental and use-inspired research for societal benefit.
2. TRIUMF is recognized and leveraged as a **strategic Canadian** asset with unique infrastructure, expertise, and capabilities, to not only answer the **biggest scientific questions**, but also to address **global societal challenges** through convergence research, and enable Canada to react rapidly to **emerging national needs**.
3. TRIUMF is a catalyst for and a **key player in Canada’s coordinated Big Science enterprise** that delivers world-class science and innovation through large scale infrastructure and **secures our domestic capability to address complex challenges**.

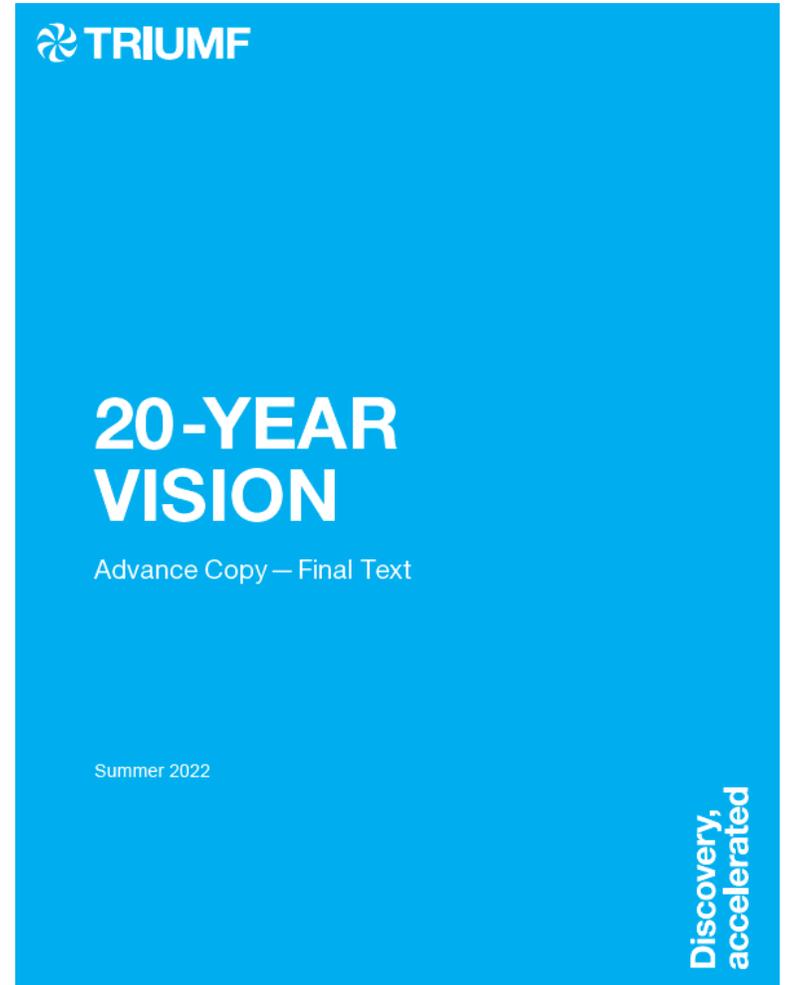


# Phases of Development

**Phase 3:** Beginning in 2022, the Vision was drafted (with support from a professional writer) and revised with support from the Steering Committee, the Board of Governors, the Science and Members' Councils, and the community at large.

**The final text was approved by the TRIUMF Board in June 2022,** following a positive recommendation from the Science Council.

The Vision was released to the community, as an advanced version, at Science Week 2022 in July.



science  
week / 23  
JUL 31 - AUG 4



**A global leader in discovery science, delivering breakthroughs that unlock the deepest mysteries of the universe**

Strengthening Canada's leadership in groundbreaking particle and nuclear physics



**A world-class accelerator centre driving use-inspired research – from the life sciences to quantum and green technologies**

Leveraging our unique infrastructure to pursue research in Canada that will change the world



**An inclusive multidisciplinary talent incubator, attracting and developing the best people from around the world**

Producing Canada's future science leaders and innovators



**A leader in a flourishing national Big Science ecosystem**

Catalyzing the success and growth of Canada's network of major research facilities

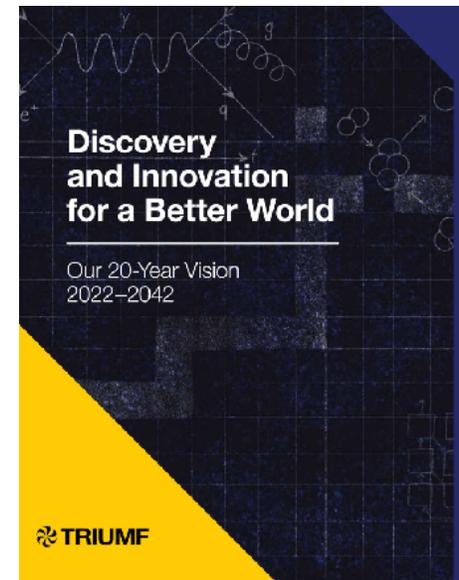


**A national innovation hub translating discovery science into health and sustainability solutions**

Responding nimbly to complex societal challenges for the benefit of Canadians

# 20-year vision for TRIUMF

- TRIUMF released 20-year vision released in September 2022 as a response to previous PRC recommendation
- An 18-month process engaging a broad research and stakeholder community, leading to five core themes
- All previous work leading to the Vision is available on the [TRIUMF web site](#)
  - Includes input from focus groups, interim pillars and themes, and theme development

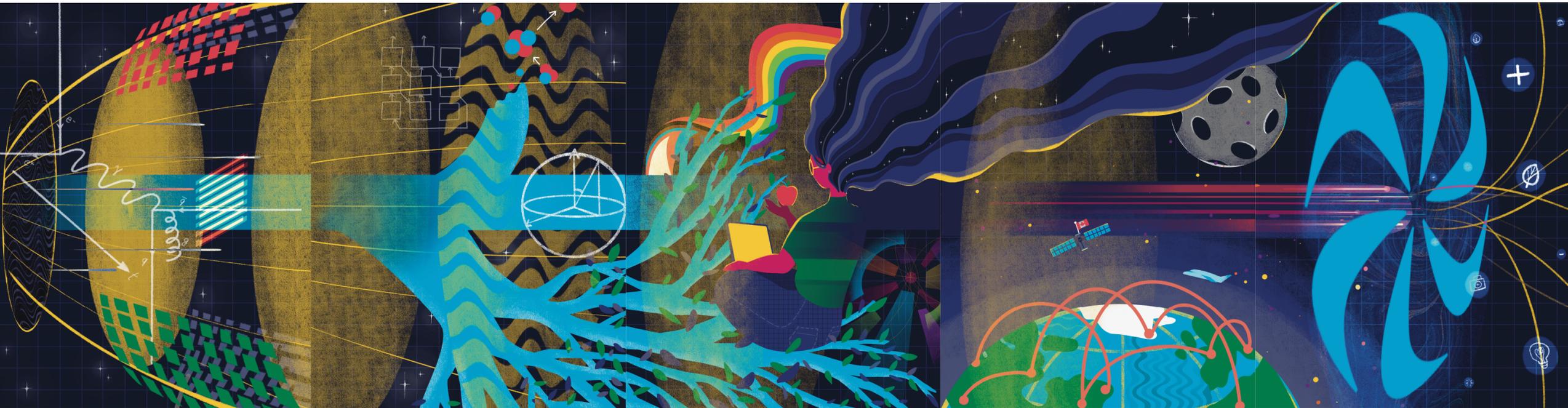


# Our 20-year Vision for TRIUMF

A leader in  
discovery science

An inclusive, multi-disciplinary  
talent incubator

A national innovation  
hub



A world-class  
accelerator centre

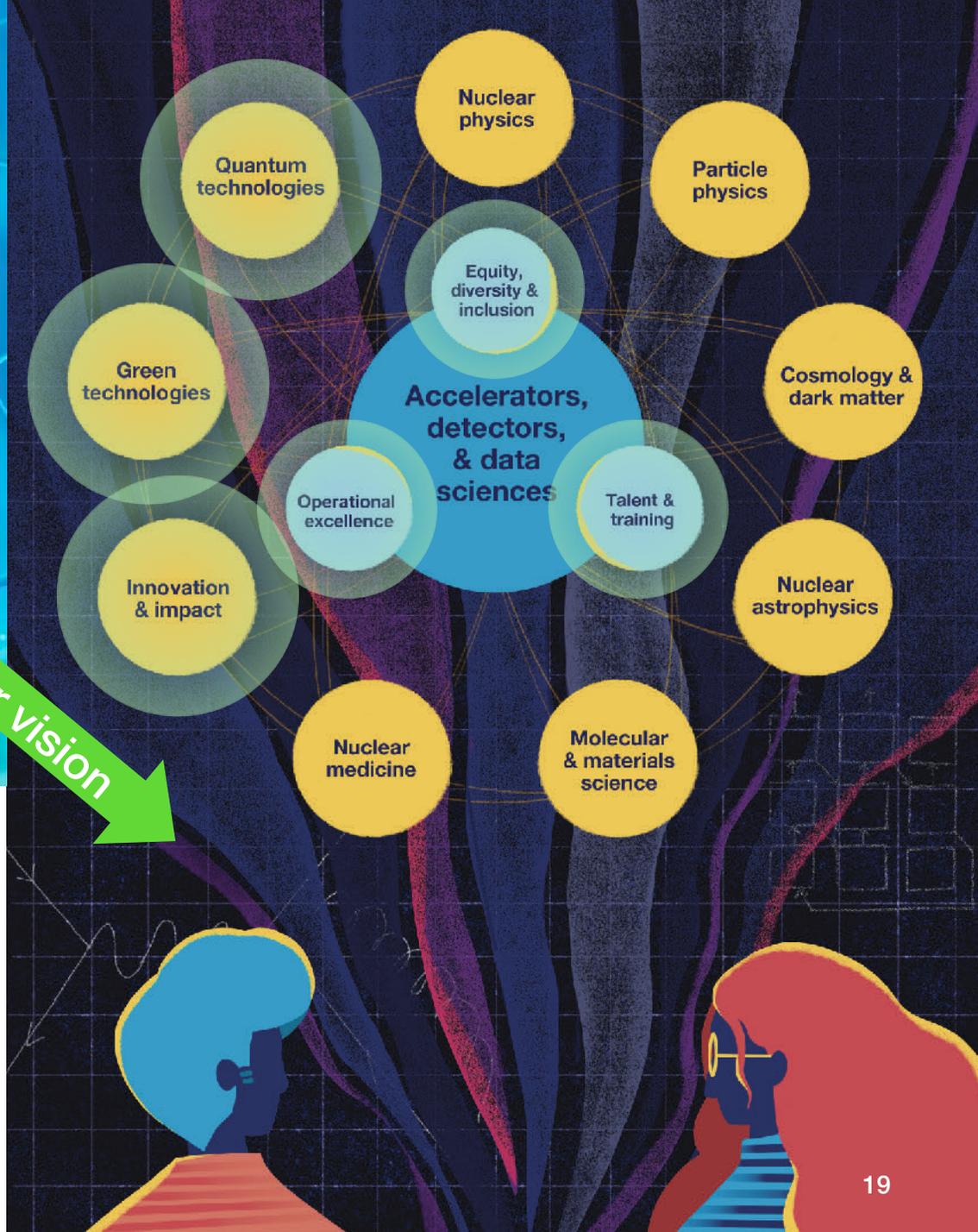
A leader in a national Big  
Science ecosystem



science  
week / 23  
JUL 31 - AUG 4



20 – year vision



- Core themes remain on nuclear / particle physics and life / material science
- Additional themes to be developed around green and quantum technologies
- Innovation and societal benefit called out directly
- Strengthened focus on EDI, our people and operational excellence as enablers

# **NRC Quinquennial Evaluation & Peer Review Committee**

# Peer Review Committee Feedback

- Positive answers to all questions they are being asked
- Really supportive of the science programme, recognising we could do even more if we had additional resources; Very complimentary regarding our science and accelerator programmes, our role in national and international programmes, and how we ‘punch above our weight’
- Areas for improvement exist. Recognise that we are stretched with resources, need to improve our EDI systems, develop our programme management, research security, tell our story more widely, and reduce substantial oversight load from internal and external stakeholders

Theme(s)	Question for PRC
<b>Scientific Excellence</b>	1. To what extent is TRIUMF a platform for scientific excellence, including in its: <ol style="list-style-type: none"> <li>knowledge creation (e.g., scientific publications, technology development)</li> <li>connector role (i.e., extent to which Canada's participation in TRIUMF connected Canada to the world in TRIUMF-related fields)</li> <li>infrastructure</li> </ol>
<b>Relevance</b>	2. Is TRIUMF focusing on the right areas to stay relevant to the TRIUMF community and beyond?
<b>Capabilities</b>	3. To what extent does TRIUMF have the capacity, competencies and facilities needed to achieve its objectives moving forward?
<b>Governance</b>	4. To what extent is the governance of TRIUMF (e.g., committees, policies, and controls) effective / efficient? Are there any efficiencies to be gained? (taking into account the Canadian environment and system)



# Quinquennial evaluation

- The final evaluation report has now been received from NRC, and will be made public later this year
- Recommendations:
  - The NRC should encourage TRIUMF to advance roles and responsibilities associated with the TRIUMF BoG and its committees, the Science Council and TRIUMF Innovations Board of Directors to enhance efficiency and effectiveness
  - The NRC should work with TRIUMF to advance TRIUMF's business processes and reporting tools as part of its commitment to operational excellence. Adjustments should align with resources and program requirements
  - The NRC should invite TRIUMF to formalize an overarching HR Plan to deliver future key areas of strategic focus and embed practices into TRIUMF's culture. The plan should include a formal retention plan, a formal succession plan and a broadened EDI strategy with metrics that incorporate the many dimensions of diversity
  - The NRC should encourage TRIUMF to develop risk-based tools and processes for project prioritization and resource management



# Peer Review Committee Feedback

- Related to five-year plan, PRC asked the question “what are we doing differently?” to ensure success and a changed paradigm
  - PRC evaluation shows most departments are under strength, ie we are not exploiting the full capability of the lab, and that resources are stretched for refurbishment, deferred maintenance, etc.
  - Recommendation to build a compensation strategy that is competitive to market - or end up with fewer, better compensated staff (with commensurate impact on programme)
- New approach adopted:
  - Sequencing (20YV, Evaluation, Pre-budget Submission, 5YP)
  - Advocacy (NRC + TRIUMF + ISED)
  - Environment (ISED MRF, CFI IF issues, NRC evolution)
  - Process (as previously articulated)



# Overall Process Flow and Historical Perspective

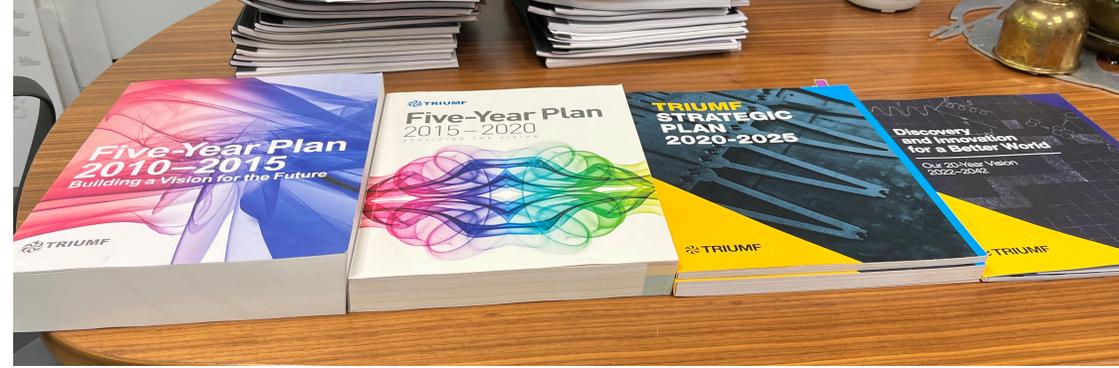
# Five-year Plan/Proposal Process

- TRIUMF currently exists in the federal budget as a sunsetted line item
  - Positive as we exist within the budget
  - Negative as we exist within the budget as a fixed value time-bound project, which is at risk each five year cycle
- Previous iterations of 5YP blended strategic planning, future vision and subsequent five year request for support
- Last four iterations were not funded as requested - usually flat-flat plus one-off indexation and deferred maintenance injections
  - Strategic and Implementation plans were not adjusted for actual funded levels, and no follow up with stakeholders to define programme achievable with secured funding
  - Creates risk through mismatch of expectations



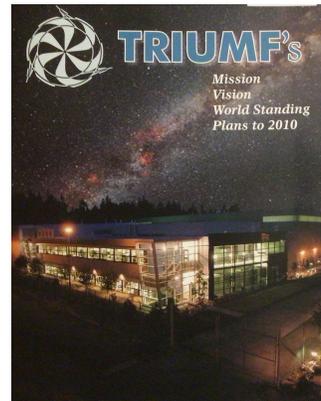
# Previous Support Levels

Previous requests followed NRC-led process  
Requests delivered flat-flat support, with additional funds from ad-hoc engagement



## 5-Year Plan 2005 – 2010:

- Targeted funding: \$276.9M
- Funding received: \$222.3M



## 5-Year Plan 2010 – 2015:

- Targeted funding: \$328M\*
- Funding received: \$222.3M



## 5-Year Plan 2015 – 2020:

- Targeted funding: \$290M
- Funding received: \$267.3M\*\*



## 5-Year Plan 2020 – 2025:

- Targeted funding: \$320M
- Funding received: \$292.7M\*\*\*



\* This request included funding for several projects that would later be supported through the CFI Innovation Fund, including ARIEL and the ATLAS Tier-1

\*\* This funding was allocated in two tranches beginning with an initial \$222.3M commitment in 2014, followed by a \$45M supplement in 2015

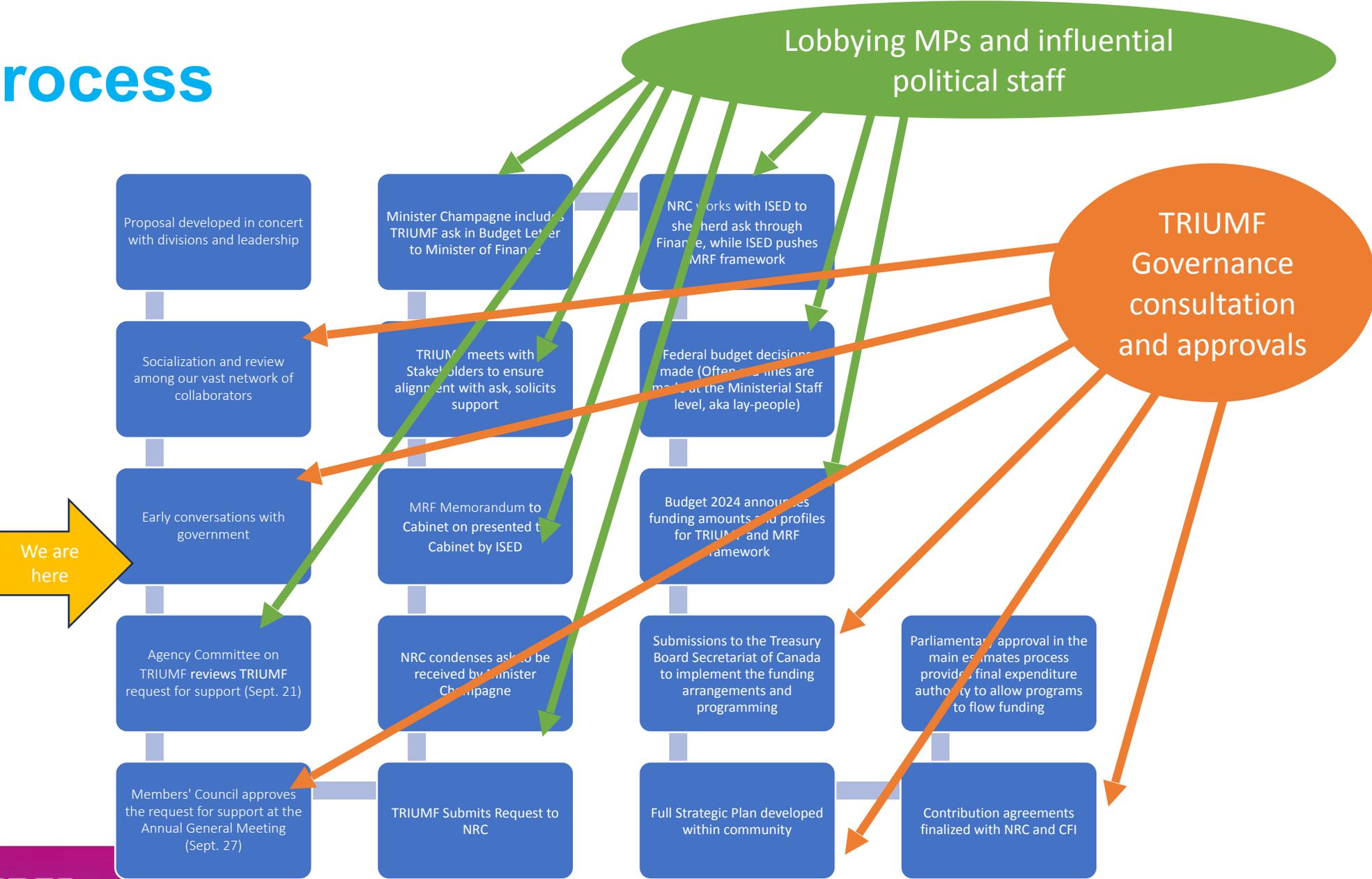
\*\*\* Finance Canada arrived at this value by starting with the flat-flat amount of \$267.3M and adding a one-time increase of ~\$25M for critical capital projects and deferred maintenance



# How federal grants are decided (tri-council, CFI)



# Our process



# TRIUMF's 5-Year Plan Documentation

	Lead-up	Pre-Budget	Post-Budget
5-Year Plan 2020 – 2025 Process	None	Strategic Plan  Implementation Plan  Quinquennial evaluation & PRC review, + assorted summary and pitch documents (i.e. 1-3 pagers, memos, etc.)	Contribution agreement negotiation  <i>Internal planning only</i>
5-Year Plan 2025 – 2030 Process	20-Year Vision  Quinquennial evaluation & PRC review	Funding request document for government  Briefing document for government agencies & pre-budget submission to Finance  Assorted summary and pitch documents (i.e. 1-3 pagers, memos, etc.)	Post-award Delivery Plan (with community)  Contribution agreement negotiation



# Request Workflow 2025 - 2030

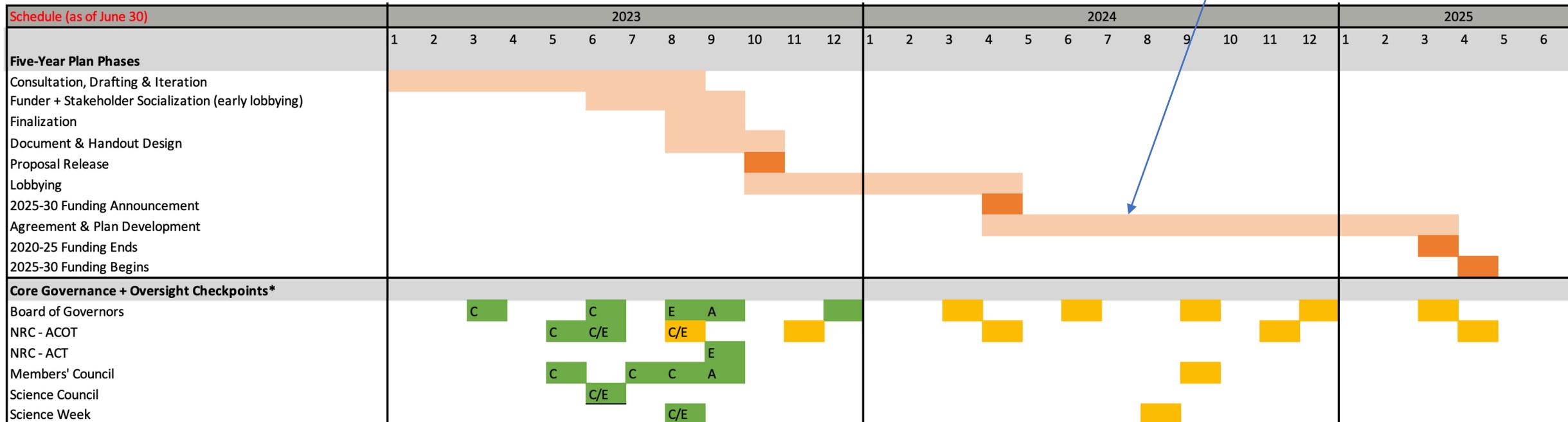
- Community requirements developed through 20-year Vision
- Framework defined through SAP LRP, domestic and international plans, ...
- Scope and framework refined through NRC Evaluation and Peer Review Committee feedback
- Scenario planning based on these inputs developed through Divisional processes and Leadership Team discussions
- Documentation created for government pitches, pre-budget submissions, request for support

		Leads	Engaged	Outcome	Completed?
Community Requirements	20YV: Community Topical Groups	Divisions	TRIUMF Divisions Community	Vision frameworks Topical group outputs	Yes
	20YV: Vision Framework	DDR	Steering Committee Community	Vision frameworks	Yes
	20-year Vision	DDR/ED	Board of Governors	TRIUMF 20-year vision	Yes
Framework	NRC OAE Evaluation	NRC	TRIUMF Divisions Community	Evaluation report	Yes*
	Community alignment to Long Range Plan, strategic plans for stakeholder groups	Leadership Team	Community Science Week	Alignment to 20-year Vision	Yes
	MRF Framework discussions	ED/CoS	ISED/NRC	Understanding of scope and framework	Yes*/ Ongoing
Contents and Scenarios	Staff compensation model	ED/HR	Consultants	Compensation model	Yes
	Long term objective setting	Leadership Team	TRIUMF Divisions	Resource spreadsheet	Yes
	Resource requirement setting based on objectives	Leadership Team	TRIUMF Divisions	Resource spreadsheet	Yes
	Scenario planning	ED	Leadership Team	Priorities and scenario planning	Yes
5-year Request for Support	"Two-page" brief document	ED	Leadership Team	Brief	Yes (evolves with input)
	Pre-budget submission document	ED	Leadership Team	PBS	Yes
	Proposal construction	ED	Leadership Team	5-year request for support	Underway
	Proposal dissemination	ED/CoS	Leadership Team / community	Socialisation of request in government	Underway
	Proposal submission	NRC (ACT)	ED	Submission to government	No
After award					
5-year Plan	Comparison to proposal	Divisions	TRIUMF Divisions	Framework document	No
	5-year Plan Construction	ED	TRIUMF Divisions Community	5-year Strategic Plan	No
	5-year Plan Approval	ED/CoS	Board of Governors	5-year Strategic Plan	No



# Request and Strategic Plan Timeline

Post-'award' planning



\* Milestones related to 5YP-specific consultative processes (i.e. community outreach events, steering committee meeting, etc.) have not been included

**LEGEND**

- C - Consult
- E - Evaluate
- A - Approve



# 5-Year Funding Request

# General Narrative

- TRIUMF is a National Asset and provides direct benefit to Canadians; we support discovery and applied research exploring contemporary challenges in science and applying them for socioeconomic benefit
- Supported by a national network of universities, and providing infrastructure beyond the scope and scale of any single institution, TRIUMF enables Canada to collaborate and compete with the world at the highest levels
- Guided by a new 20-Year Vision, TRIUMF is poised to continue delivering major benefits and national resiliency for decades to come
- With decades of operational funding below requested levels, a reduced allocation in 2024 would dramatically impact TRIUMF, triggering cascading impacts on the Canadian research ecosystem and impacting our ability to deliver on obligations
- Overall, Canada is at a critical inflection point for large-scale research and major research facilities (MRF). Investment is needed to sustain Canada's strong international reputation and position of leadership, retain talent, foster innovation, and deliver economic prosperity



# General Commitments

- We will continue to deliver world class science and societal benefits utilising the major investments historically and currently being made at TRIUMF
  - We will integrate research threads aligned with the 20-year Vision through the development of Research Centres
- We will strengthen the Canadian research ecosystem through finishing the major platforms currently under construction and starting operations
- We will maintain legacy infrastructure through deferred maintenance and refurbishment of essential infrastructure
- We will continue to develop highly qualified personnel and attract and retain amazing talent
- Our research, and the capabilities we develop, have major impacts on all Canadians
- We will ensure alignment to national objectives, including mission-driven research and connection to societal challenges that fall within our sphere of expertise



# Key Themes of the Proposal

- WOW! Great science coming, and great innovation (next talks)
- Completion and operation of major platforms to deliver new science (~\$42M)
  - Complete ARIEL and IAMI, initial operation phases
- Talent attraction and retention - additional 55 staff at end of 5YP
  - Aligning compensation to market requirements, attracting international expertise, supporting HQP
- Regulatory compliance and operational excellence (~\$20M)
  - New requirements being placed on TRIUMF (CNSC, EGBC, NRC, ...)
- Deferred maintenance (~\$45M)
  - Major components (electrical substation, BL1A, ATLAS T-1, ...)
- Scientific programme alignment to 20-year Vision
  - Development of research centres for new initial thrusts in the vision



# Operational Support Request

- **Anticipated request will be \$450M**
- Additional resources from TRIUMF commercial revenue targeted towards infrastructure and research centre development
- Operations and capacity for research only, direct costs of research from commercial and grant lines, to align to potential MRF programme
- Includes capital for deferred maintenance, ARIEL/IAMI construction & operations
- Operational excellence from existing staff lines

	Funding Level								
	267	293	320	350	380	400	420	450	500
Legacy facility operations	Green	Green	Green	Green	Green	Green	Green	Green	Green
ARIEL completion	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green
IAMI completion	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green
ARIEL operations	Orange	Orange	Yellow	Yellow	Green	Green	Green	Green	Green
IAMI operations	Orange	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green
Facility maintenance	Orange	Orange	Yellow	Yellow	Green	Green	Green	Green	Green
HQP education and training	Orange	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green
User engagement	Orange	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green
Onsite TRIUMF-led research programs	Red	Orange	Yellow	Yellow	Green	Green	Green	Green	Green
Offsite TRIUMF-led research programs	Red	Orange	Orange	Yellow	Green	Green	Green	Green	Green
International leadership	Red	Orange	Orange	Yellow	Green	Green	Green	Green	Green



# Work in Progress and Help Required

- Pre-budget submission completed; evolving government brief completed with stakeholders
  - will be at <https://www.triumf.ca/node/79/Five-Year-Plan-2025-2030> later today
- Proposal draft close to completion - next step is Board ad-hoc committee
  - Appendix will articulate the various scenarios and ensure clear understanding of impact of flat-flat and flat scenarios
- Continue with NRC and ISED on strategic positioning, and engaging government bodies on messaging (PMO, PCO, Finance)
- Have been engaging university members, academic groups and administration
- Will be looking for expressions of support from many stakeholders and partners, including industrial, business, academic, facilities...
  - Looking for support in engagement with universities, U15, Universities Canada, etc.





Questions and Comments...



*NAVIGATING  
NEW HORIZONS*