



# SNOLAB STRATEGIC PLAN COMMUNITY SURVEY

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THE COMMUNITY INPUT TASK FORCE

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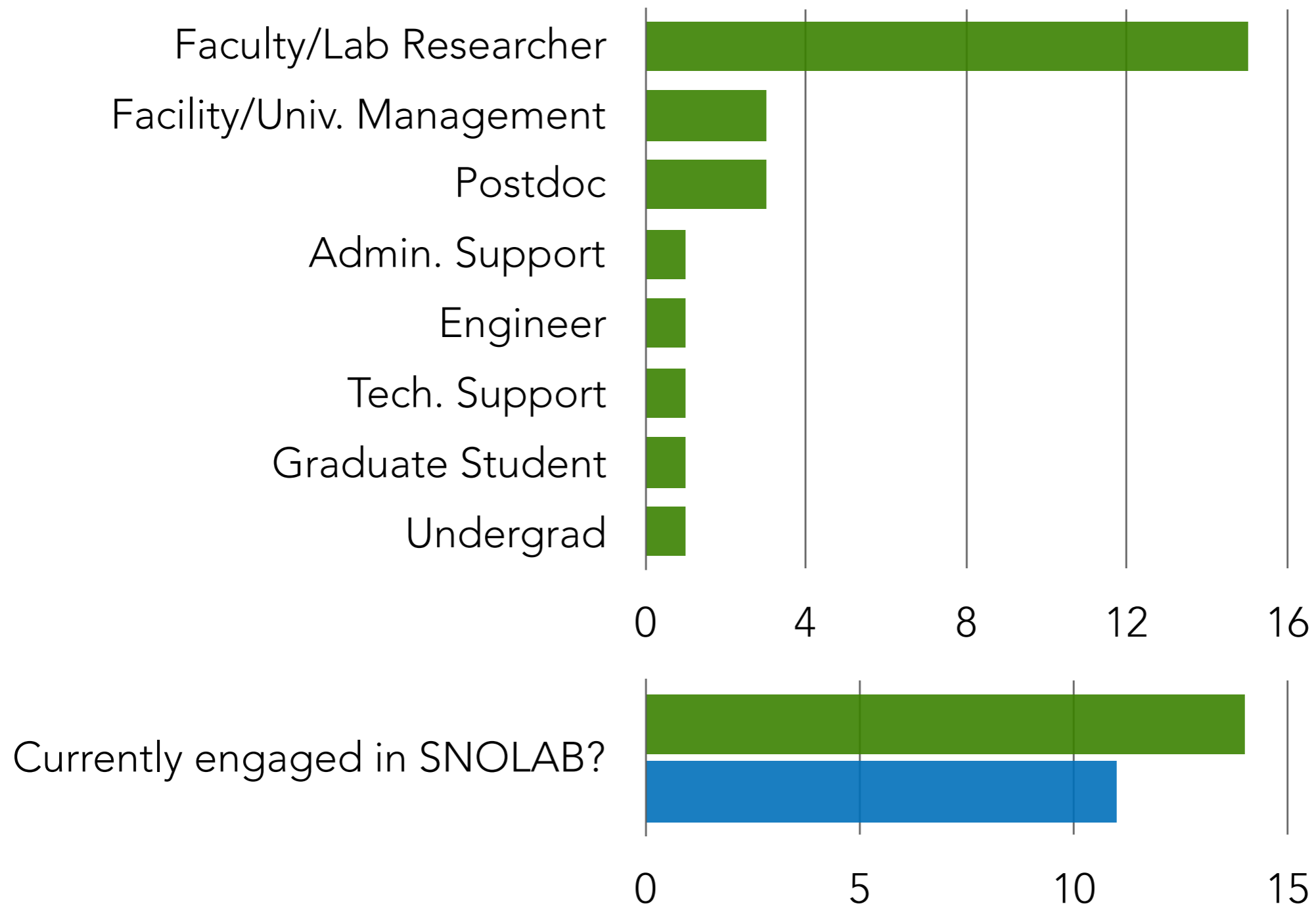
# SPECIAL THANKS

- Respondents:
  - for your thoughtful response to the questions
- SNOLAB:
  - Blaire Flynn: everything behind the scenes
  - Chris Jillings: setting things up for today

# DISTRIBUTION AND STATISTICS:

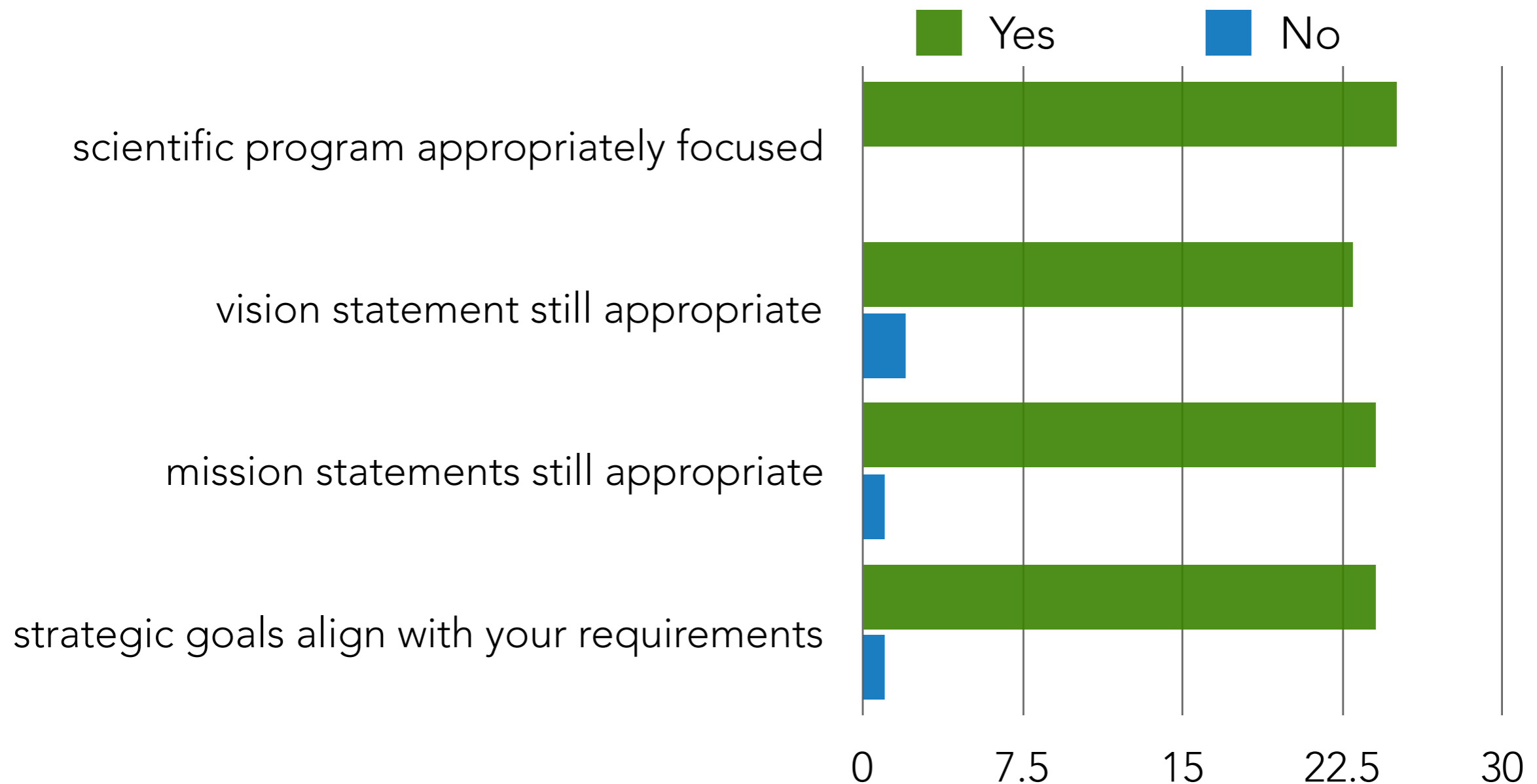
- Surveys distributed through:
  - Canadian Institute of Particle Physics, Institute of Nuclear Physics
  - Canadian Association of Physicists (all fields)
  - SNOLAB and TRIUMF users groups (includes non-particle/nuclear fields such as condensed matter and medical)
  - Experimental collaborations (SNO+, DEAP, SCDMS, . . .)
- 28 respondents
  - survey reports average completion time of ~43 minutes
  - somewhat abstract/high level nature may be difficult to engage with.
    - still we had some undergraduates, etc. respond to the survey.
- We work with what we have . . .

# DEMOGRAPHICS



- similar participation from people engaged/not engaged in SNOLAB program

# AT A GLANCE



- Overall, positive support for current strategic plan elements.
- Let's go to the details

- **1:) In your engagement with SNOLAB to date, what SNOLAB capabilities have you benefitted from, and how have these enabled or influenced your research outcomes?**
- Responses:
  - 6: site for particle physics experiment experiment:
  - 3: looking towards future engagement
  - 2: other technical capability
  - 3: social networking, informal engagement with science
  - 6: no particular engagement to comment on

## **SNOLAB Science**

The SNOLAB science programme has expanded following the last Strategic Plan, and now encompasses subatomic and nuclear physics, astrophysics, genomics and engineering. Specifically, SNOLAB now has dark matter, neutrino-less double beta decay, supernova neutrino, low radiation dose genomics, and mining engineering experiments.

- **2.) Is the SNOLAB scientific program appropriately focused?**
  - unambiguously yes
- **2a.) Are there areas that should have higher priority? Are there areas that are missing?**
  - Focus on dark matter/neutrinos:
    - “double beta decay is a very important direction for the future and SNOLAB should try to leverage its position to expedite the approval process for projects . . . at the site”
    - “High priority on dark matter and neutrino physics in light of Nobel Prize”
  - General support for detector/backgrounds community
    - “expansion of low background counting capability into multi-purpose user facility”
    - “better support for detector development not just for underground physics but also collider experiments”
  - Targeted/Opportunistic engagement with non-particle physics
    - “excellent idea to expand to non-particle physics . . . but ensure particle physics community will get access to the resources needed to deliver on scientific goals.”
    - “Other areas should be considered as proposals or opportunities are presented”
    - “Mining engineering research could have great implications”
    - “I see missing the investigation on nuclear reactions at very low energy”



- **2c.) Are there additional capabilities and overall requirements that SNOLAB should consider including in the strategic plan**

- 8 responses effectively “no”
- Strengthen/institutionalize existing capabilities:
  - “it would be excellent . [to] add a centre for low background engineering”
  - “underground cryogenic facility for testing solid state detectors”
  - “Large detector construction, assembly”
  - “Project management and engineering to assist with the special challenges of . . . large experiments underground”
  - “Support during installation of nEXO”
  - “Basic laboratory infrastructure in underground chem. lab.”
  - “Low radon room/chamber.
- Strengthen ties:
  - “Bring more international partners”, “increase partnership with Laurentian”
- Expand the science:
  - “start a theory department . . . aligned with the current activities at SNOLAB”
  - “An ion accelerator . . . ”
  - “long term effects of low radiation on cellular development”

- **2.d) What role would you like to see SNOLAB play in future developments of your research, through scientific support, community building, or as a connection to international networks?**
- “Keep up the good work”:
  - “already makes a great effort in promoting and supporting the experiments it hosts”
  - “Keep status . . . of world leading facility for underground physics, . . . . measurement campaigns”
- Reinforce/expand role as national laboratory:
  - “a central role in the transition of the field from national labs to international labs”
  - “Move beyond support, become centre for underground science . . take up mantle that DUSEL dropped”
  - “The national underground science laboratory”, “take up the role of the national particle physics lab”
  - “Collaboration between SNOLAB and high energy community in detector building, ties to theory”
  - “More active role vis-avis funding agencies”
  - “build the scientific community through exchange of information and ideas”
  - “Greater effort in having people joining efforts in larger experiments rather than . . . several experiments working on the same problem”
  - “international coordination for dark matter experiments”, “consolidate the community”
- Engage beyond particle physics
  - “Produce a report every 5 years for the public regarding achievements”
  - “Assist with real time access to mine data and IT security concerns”

- **2e) What long term opportunities or aspirations should SNOLAB be considering to help support your future scientific requirements, on a national or international basis?**
  - Maintain speciality of mid-size but very deep laboratory:
    - “destination of choice for experiments up to a kiloton”
    - “maintain niche of pre-eminent deep but moderately-sized lab”
  - Support for experiments
    - “focus on providing technical support to experiments”
    - “core resource to allocate to experiments with focus on practical expertise”
  - Scientific Leadership:
    - “stay relevant for next generation neutrino and dark matter experiments”
    - “a larger role in scientific direction in the field itself. work with PI to create a branch of the institute at Sudbury . . . focused on dark matter and neutrinos.”
  - Expand scientific scope
    - “expand support to collider experiments . . take up the mantle of national particle physics lab”
    - “underscore importance of living laboratories as resource for real time mining data. Dress cultural resistance to accessing data . . for benefit of mining industry”
  - Outreach, Connections, etc.
    - “support science in developing countries”
    - “Clear liaison with university members/researchers”
    - “continue working on outreach”, “better communication with the community”

## **SNOLAB Vision**

A vision defines where we ultimately want SNOLAB to be in the future. The current SNOLAB vision statement is:

“To be the location and partner of choice for deep underground science, delivering world- class science and benefit to Canada, and her international partners, by providing and promoting national and international access to the unique facilities and expertise at SNOLAB.”

- **3.a) Is the current SNOLAB vision statement still appropriate?**
  - Yes: 17
  - No: 2
- **3.b) Are there any improvements you would suggest?**
  - From "no" respondents"
    - "location and partner" → "promoter and epicentre"
    - "providing and promoting" → "managing projects to ensure they reach international level"
    - "Don't restrict it to just underground science: particle physics in general would benefit from a central lab where neutrino, dark matter, and collider physicist can collaborate"
  - Other comments:
    - "location and partner" → "driver of the science"
    - "link to university and students missing"
    - "make the promoting part to be more active"

## **SNOLAB Mission**

Mission statements define how we are to achieve our vision for SNOLAB. The SNOLAB mission statements are to:

*Enable world-class science;*

*Spearhead world-class science;*

*Catalyse world-class science;*

*Promote world-class science;*

*Inspire the next generation.*

- **4a.) Are the current SNOLAB mission statements still appropriate?**
  - Yes: 18
  - No: 1
- **4b.) Are there any improvements you would suggest or other aspects you would expect to see covered in the mission statement?**
  - From the "no" respondent:
    - "Facilitate world class mining data collection/analysis/management and re-distribution"
  - Others:
    - "exploit commercial aspects of the technologies"
    - "emphasize *spearhead* and *catalyze*"
    - "inspire next generation of *scientists*"
    - "higher priority allocated to inspiring the next generation"
    - "*promote* → *lead* or *make happen*"
    - "consider combining *enabling, spearheading, and catalyzing*" into one statement
    - "de-abstractify them somewhat"

## **SNOLAB Strategic Goals**

Strategic Goals define what we are going to do to fulfil the mission statements. SNOLAB has many stakeholders including the research community, funding agencies, government, public, academic and non-academic partners. Each strategic goal has specific objectives and tasks that we wish to complete within the timescale of the Strategic Plan, with success factors defining if we have achieved these objectives. The four strategic goals that SNOLAB is working to deliver are:

*Enable and spearhead world-class science;*

*Develop and maintain world-class infrastructure;*

*Educate, innovate and inspire;*

*Develop delivery systems of internationally recognized standard.*



- **5a.) Do the current strategic goals of SNOLAB align with your requirements**
  - Yes: 18
  - No: 1
- Are there any improvements or additional strategic goals SNOLAB should be considering?
  - From "no" responses:
    - "work with CEMI through MODCC to develop key linkages to the mining sector"
  - Other responses:
    - "add *inspire to develop and maintain*"
    - "*Develop delivery systems*" is rather oddly phrased. Make more specific
    - A few "maybe", "not sure", etc.

- **5c.) Are there any specific objectives SNOLAB should be considering between 2017-2022? i.e. what specific tasks should we be looking to complete over the timescale of the Plan?**
  - very few responses . . .
  - Continuation/Push through current activities:
    - “completion of low background counting facility”
    - “Take data with DEAP and SNO+”
    - “With CEMI, determine the level of success of MODCC and assist to develop model improvements to ensure ongoing success.”
    - “Improvement of the project management support/consultation for experiments”
    - “Improve ability and agility of allocating resources of core skills to support experiments”
    - “At least one world-leading physics result . . .”
  - Planning and strategy;
    - “better networking/sharing of resources between worldwide underground laboratories”
    - “Try to unite efforts of experiments with the same goal with about the same technology”
    - “a steady state existence for the lab with large experiments building/completing/running”

- **5d.) What success factors should SNOLAB be considering between 2017 and 2022 to show that we are achieving stakeholder expectations? i.e. what does success in achieving our strategic goals look like?**
  - Metrics: (quantifiable/actionable, etc.)
    - “Next generation international experiments selecting SNOLAB”
    - “competitive scientific publications”
    - “faster concept/space allocation to experimental startup.”
    - “expansion of technical services”
    - “increased infrastructure and personnel, physics on site”
    - “MOUs in place before equipment arrives on site”
    - “Ratio of experiment to overall floor space, on time execution metrics”
  - More abstract:
    - “success defined by science”, “more science output”, “good quality data from major experiments”, “another Nobel Prize”, “results that can stand several years”, “discoveries”
    - “innovative technologies or subjects”
    - “diversify SNOLAB science base through the success of MODCC”

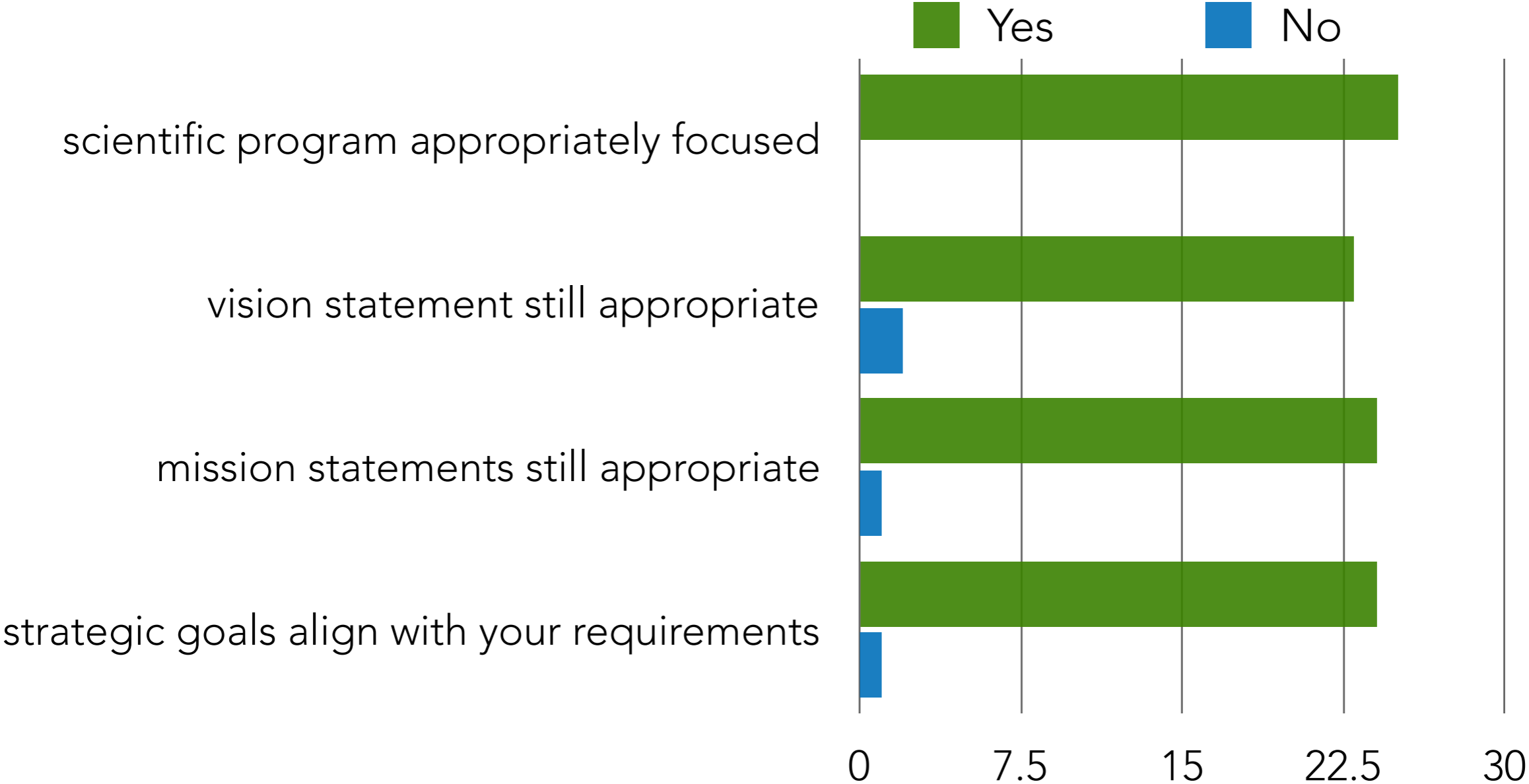
- **6a.) Is the content appropriate to provide you with the information you require about the SNOLAB direction, strategic goals, and objectives?**
- Largely “yes”, but:
  - Bring science program up to date
  - More information about physics targets and goals (plots with sensitivity, etc.)
  - Updates of DMO and MODCC sections.

- **6b.) Is there enough information to allow you to assess SNOLAB commitment to your science and SNOLAB's performance on delivery?**
- Largely "yes" but add:
  - metrics on hosted co-op students, theses, low background sample processed, underground shifts staffed.
  - bibliometrics
  - plots illustrating physics reach
- Also:
  - "commitment" is there, but evidence for performance seems missing.
  - "assess by what gets done, not what is said will get done"

- **6c.) Is the length and format appropriate?**
- Generally “yes”
  - Level of abstraction is high and affects clarity
  - Add a few “stories” within the plan as concrete examples?
    - technical success, personnel training, etc.
  - More physics

# SUMMARY

# OBSERVATIONS



- Positive support for current strategic plan elements.



# FOCUS AND SCOPE

- Clear support for current program:
  - *dark matter, neutrino-less double beta decay, supernova neutrino, low radiation dose genomics, and mining engineering experiments.*
  - maintain hold on leading medium sized but very deep laboratory
- Calls to expand role:
  - serve as “gateway” for international collaboration/coordination like HEP national laboratories and funding agencies.
    - “aspire to become the CERN of underground physics”
  - more active role in defining scientific program both at the lab and internationally
    - “promote”, “drive” the program
    - active role in “scaling”/“convergence” process of experiments as they get larger
    - maintain portfolio of smaller scale, high risk, high pay-off options?
  - targeted expansion of scientific program
    - mining, biology
    - theory, broader particle physics scope?

- How to maintain balance of support for existing program while taking a more prominent role in the world stage?
  - need to do both at the same time.
    - need to build on and capitalize on ongoing successes in order strengthen position for the future
  - better defined partnerships with TRIUMF and PI, Laurentian, CFREF, other underground labs?
- Defining Success: metrics
  - expanded metrics on publication and HQP training
  - "capacity": how much of the potential is being tapped?
  - More science-based metrics
  - sensitivities, plots, etc.
  - show frontier of sensitivity across all experiments and potential future experiments?
- Delivery of science the most important thing.
  - how do SNOLAB and community work together?
  - are we doing everything we can?

# DISCUSSION