QUO VADIS, XENON ONUBB?

Ben Jones,

University of Texas at Arlington and University of Manchester

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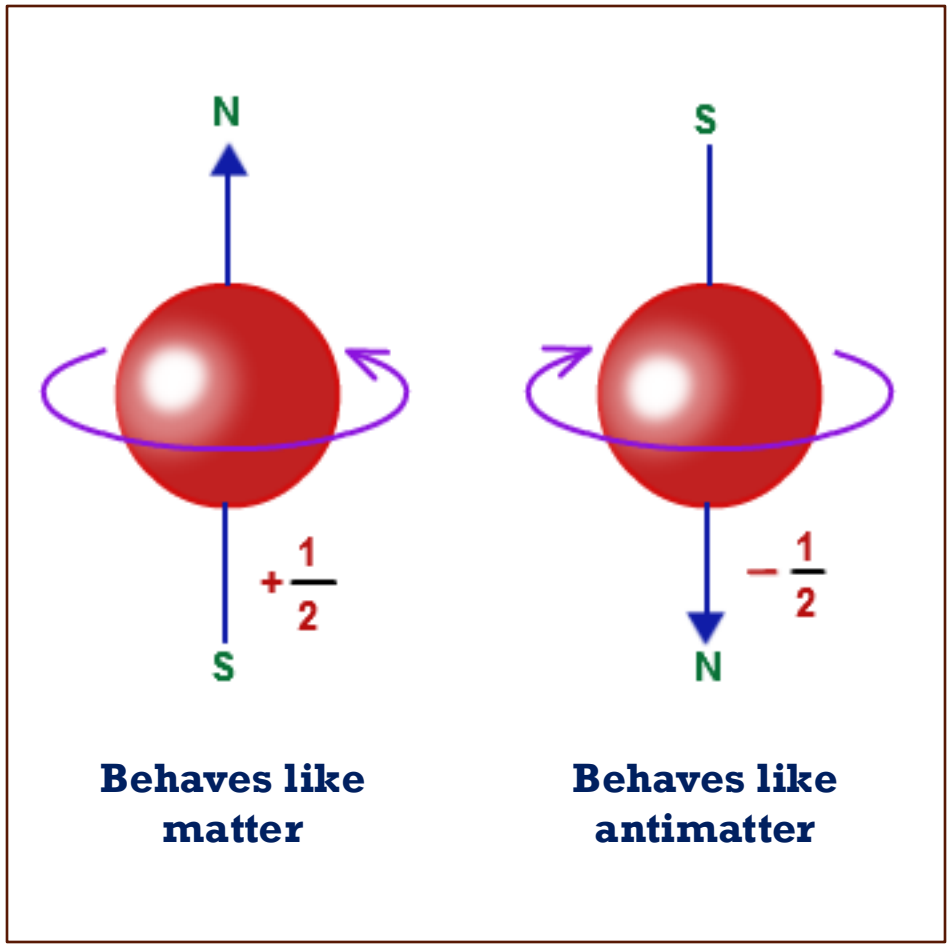
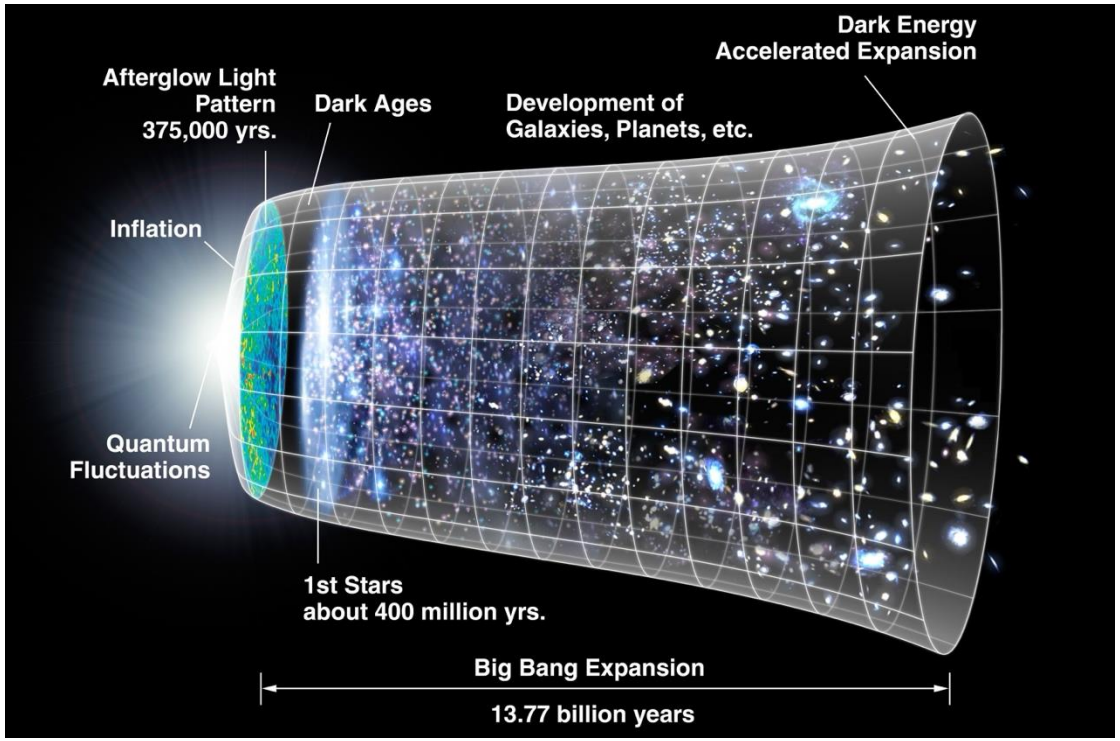


$$\frac{L_1}{E_{new}} = y_{ij}\frac{\nu^i H \nu^j H}{E_{new}}$$



WHERE ARE WE GOING?

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Inexorably towards a state of increased entropy and disorder.

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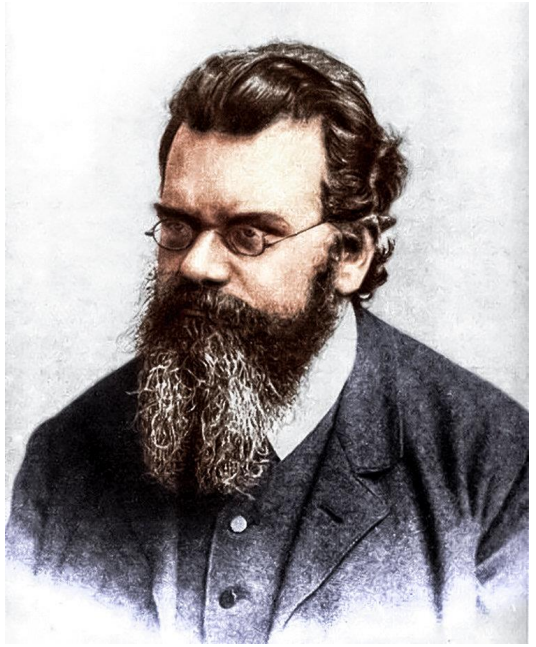
(because that's a law of physics)

$$\frac{dS}{dt} > 0$$



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Hopefully we are doing something intelligent at this meeting

THIS MEETING

Our goals here were to:

1. Bring the community together for discussion;

2. Explore whether there are mutually beneficial opportunities that we are missing;

3. Understand what paths may be open for xenon 0nubb, in a significantly changed international funding climate relative to a few years ago.


"I HAVE REALIZED, OVER THE
YEARS, THAT A LARGE FRACTION OF
EXPERIMENT BUILDING IS COMMUNITY BUILDING"
- M. HEFFNER
imgflip.com

GOALS

We hear your feedback from the panel Q&A:

"The next meeting should have clearer goals"
"There should have been a charge"
"We should have written a white paper"
etc

- This meeting, by design, aimed for none of the above.
- The next meeting can, and perhaps should, aim for some of them.
- This session intends to focus our attention on how to do that.

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A goal for all major collaborations today is to reach the intermediate (but ambitious) milestone of $t_{1/2}=10^{28}$ y, with various stagings.

All of the major TPC technologies would, with sufficient time and support, deploy detectors that would in principle reach that value.

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I'll poll you on this later, so think about whether you agree.

BIGGEST QUESTION:

How can this be accomplished, given the available resources and international interests?

BIG QUESTIONS (AS I SEE THEM):

1. Should the move from $5x10^{25}$ yr to 10^{28} yr with TPCs be a single step, or staged?

   and is that decision driven by money, risk, geopolitics, or other?

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We will not be able to answer them today.

Click to download as image

Now to the interactive part:

Note added after meeting:

The rest of the talk was interactive / poll based, with all audience voting on their phones. The next slides show poll questions and results.

Just to warm up

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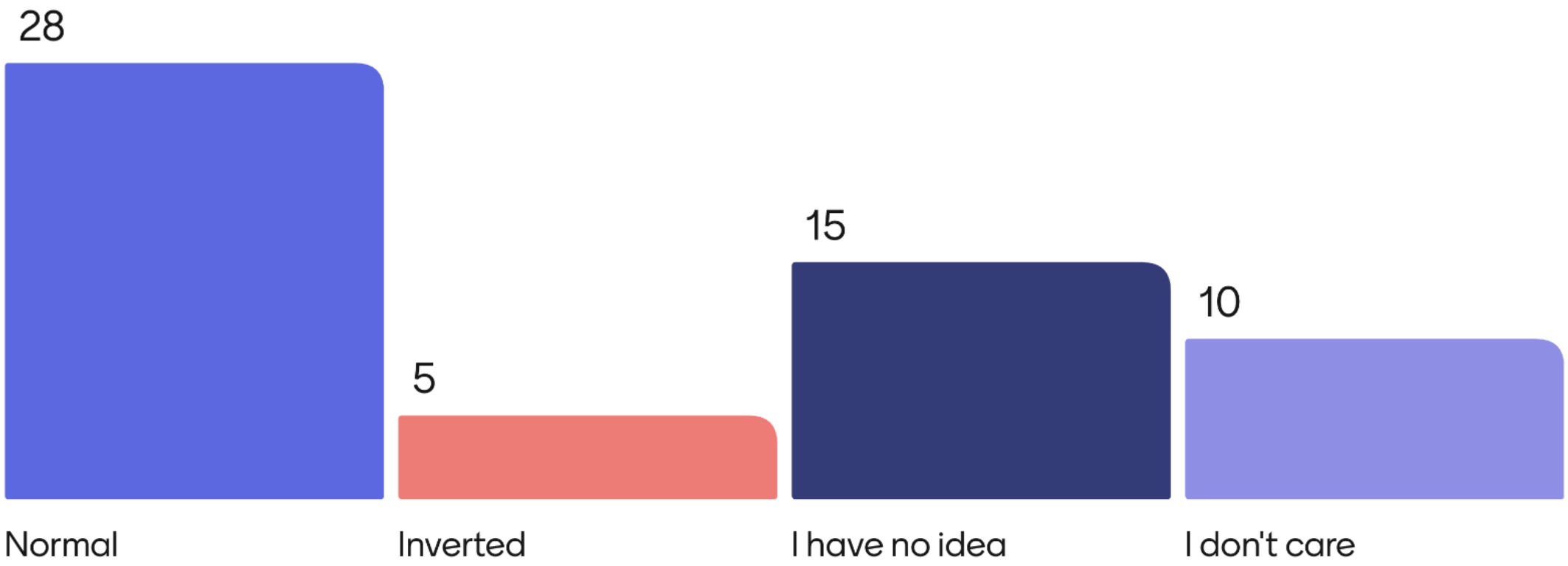
Mentimeter

The mass ordering is slightly more likely to be



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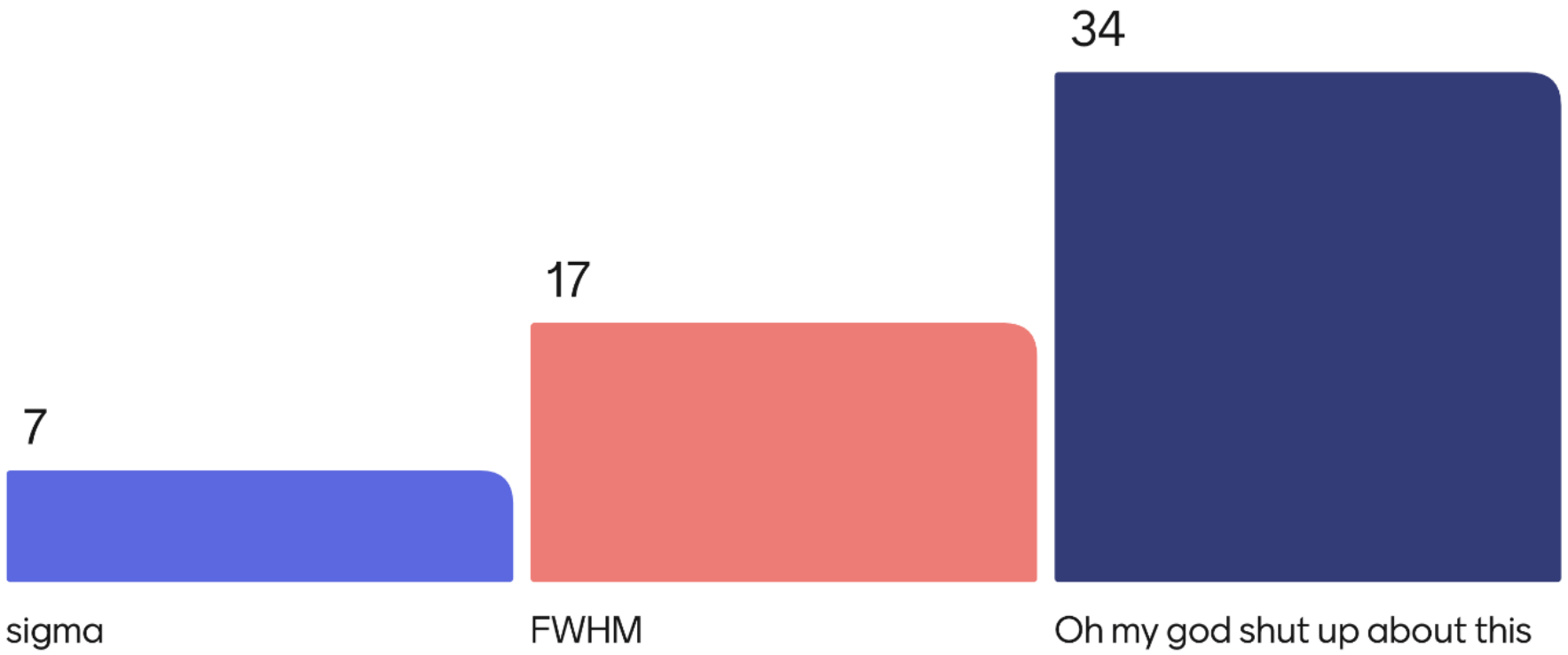
Mentimeter

The right way to measure energy is



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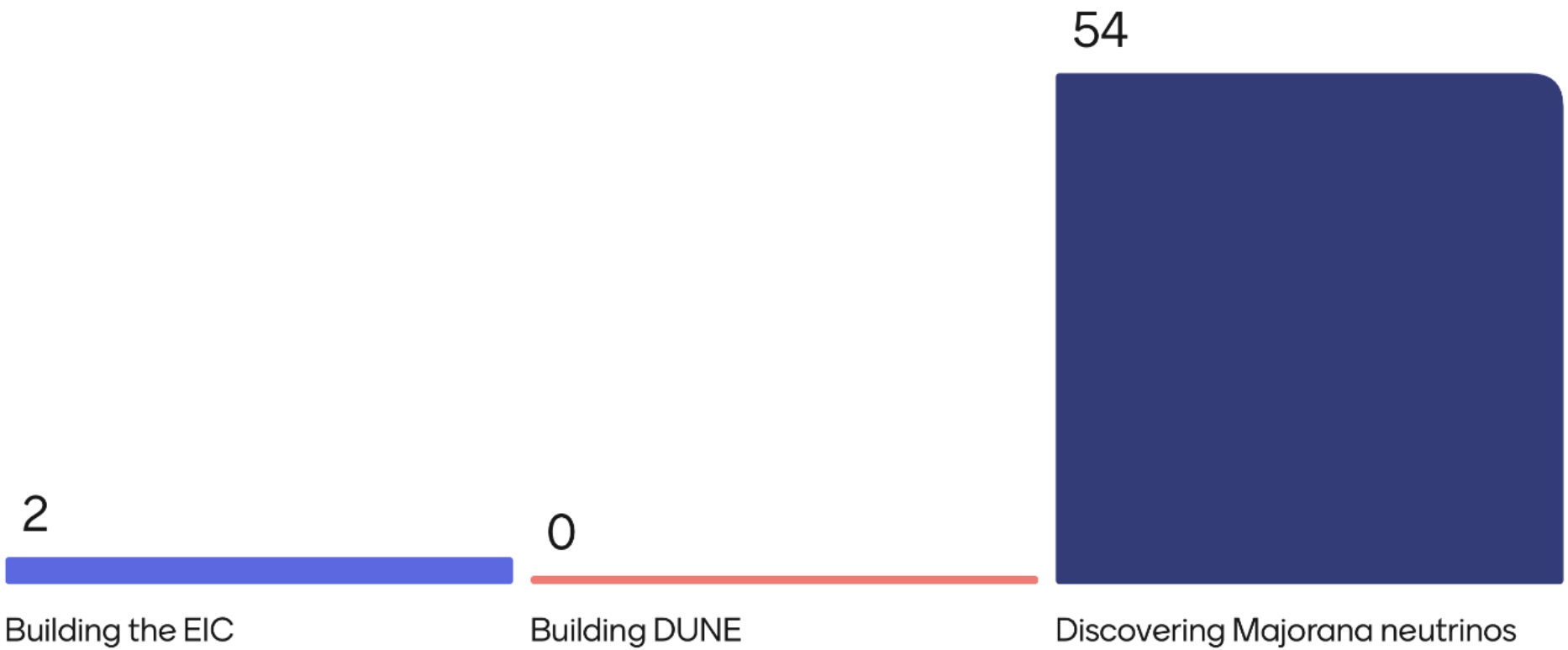
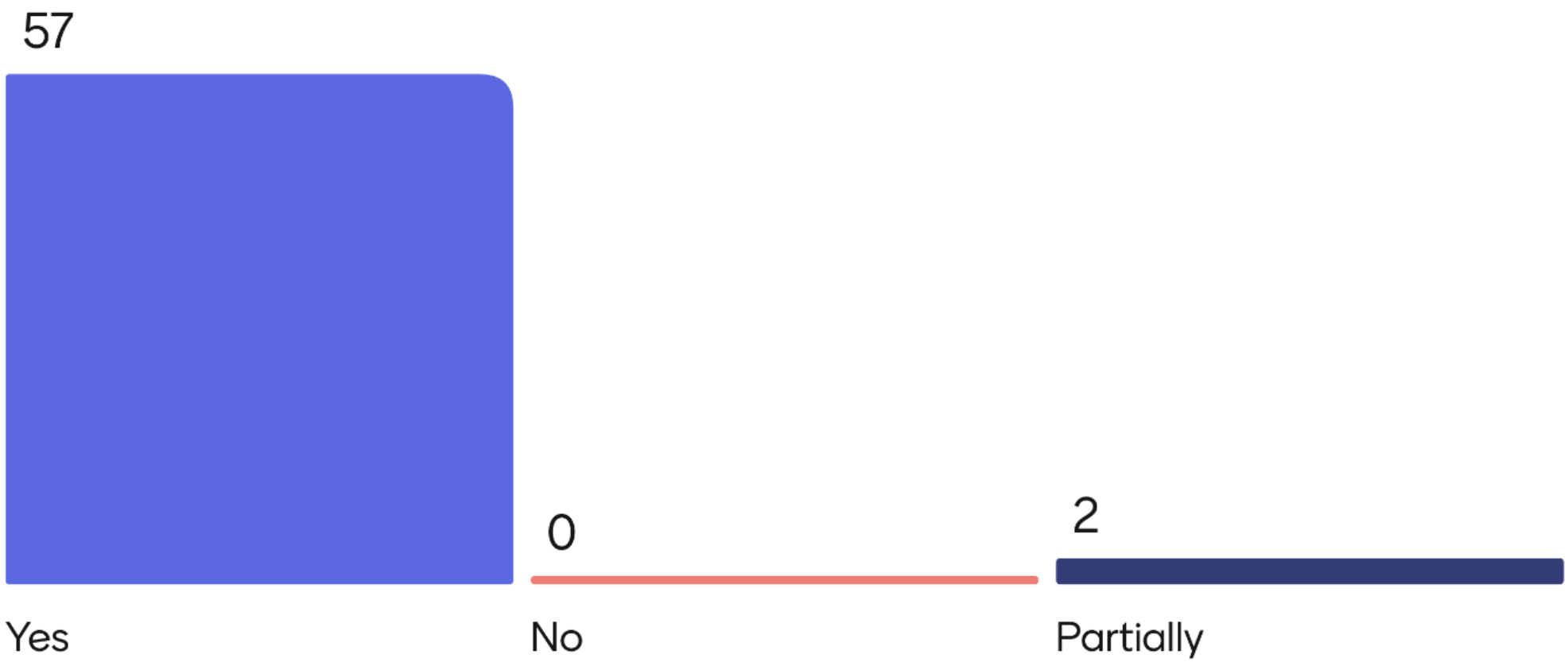
The most important physics will come from

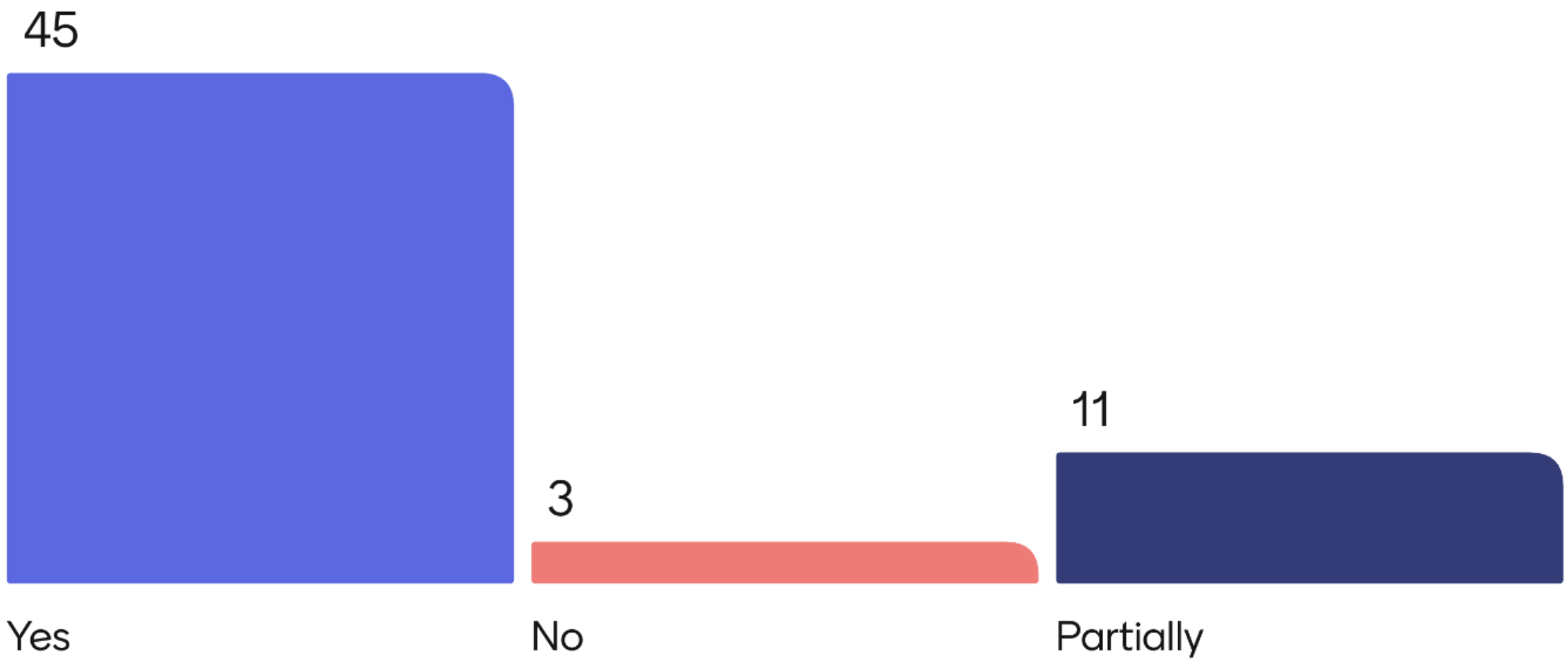


Self evident?

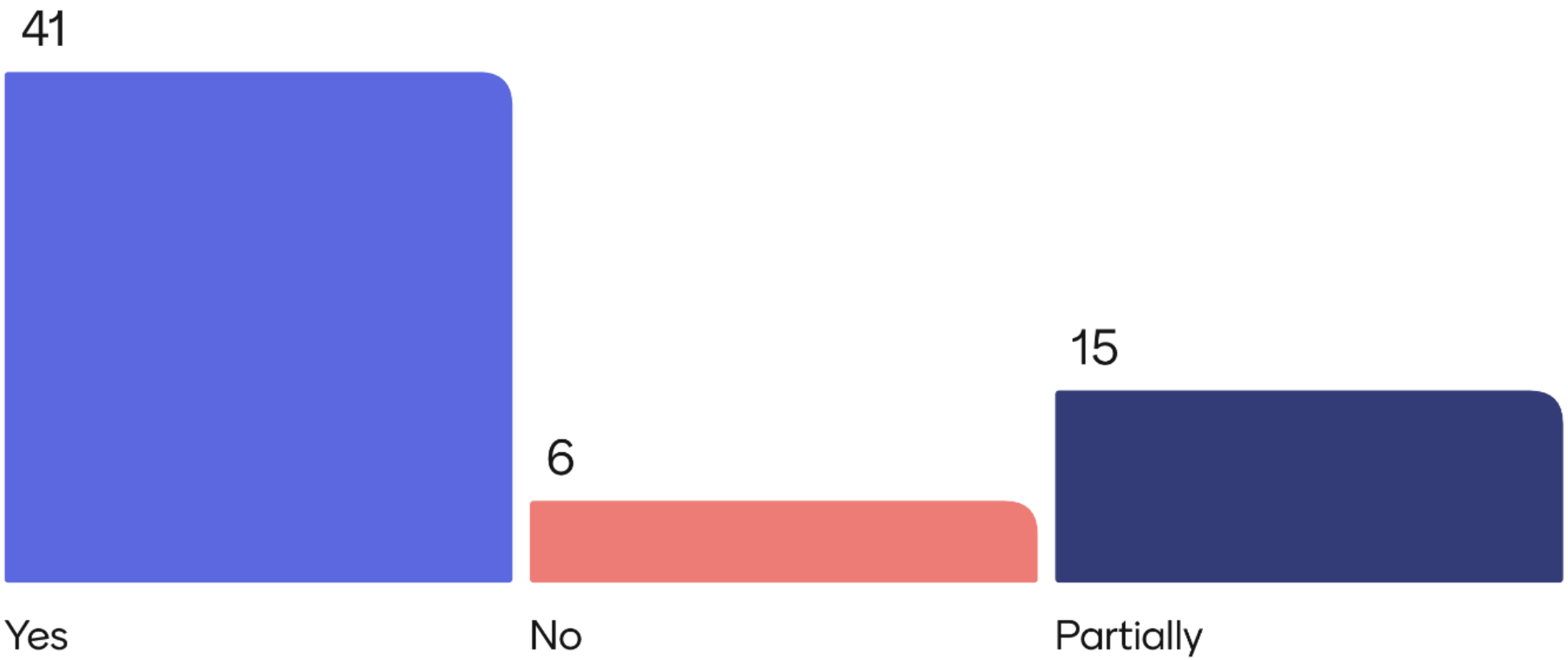
The long-term goal of the field is to either discover or rule out Majorana neutrinos, no matter what mass ordering or absolute mass value.



A clear goal of current technologies is to reach the intermediate (but ambitious) milestone of 10^28 y, with various stagings.



All the major TPC technologies would, with sufficient time and support, deploy detectors that would reach 10^28



Some 0nubb politics...

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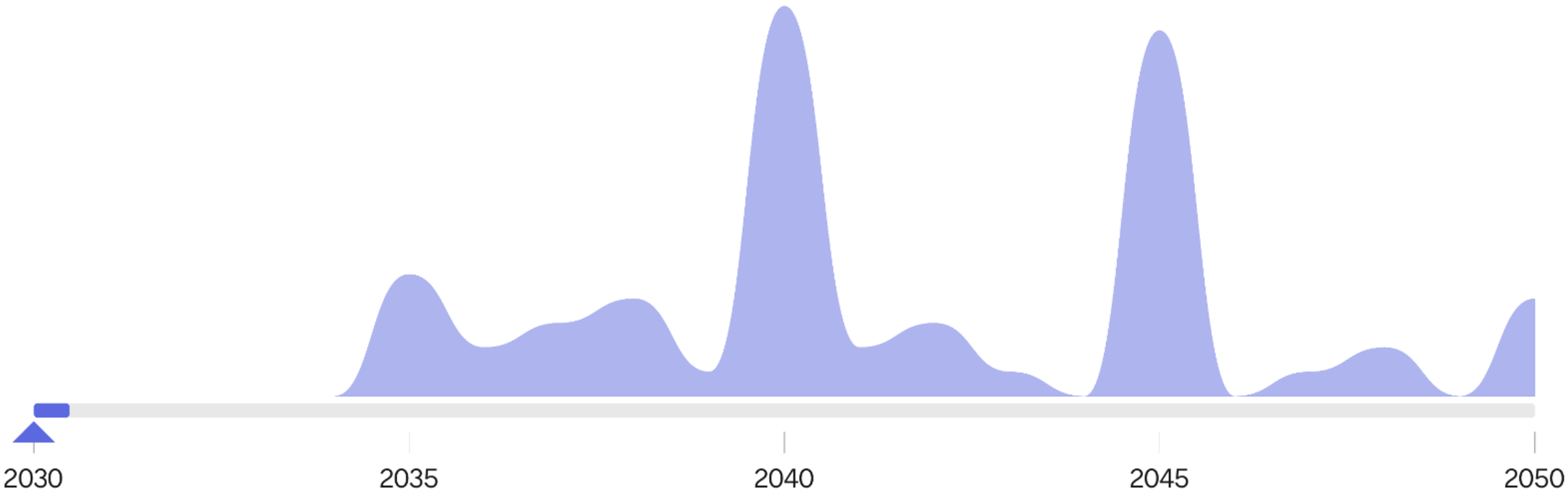
Mentimeter

When will LEGEND reach 10^28 year half life?



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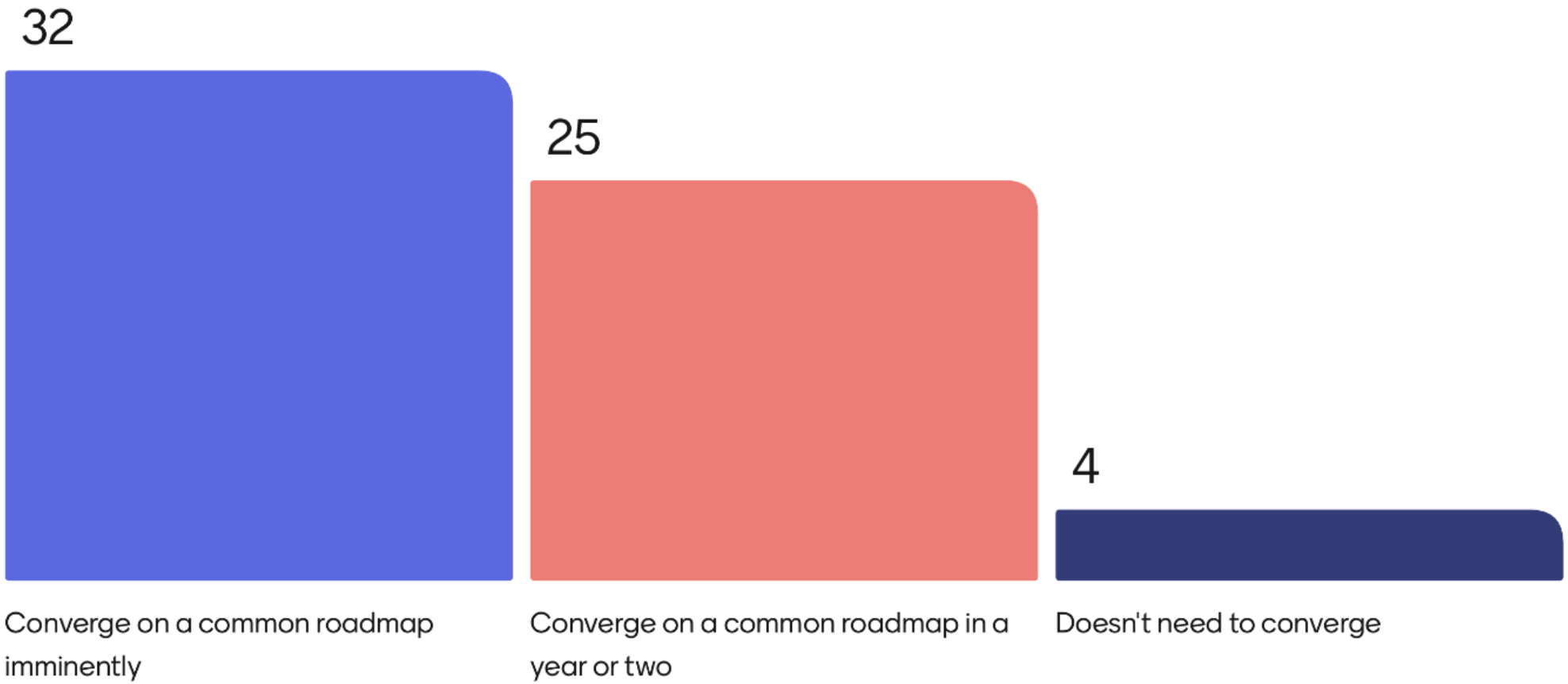
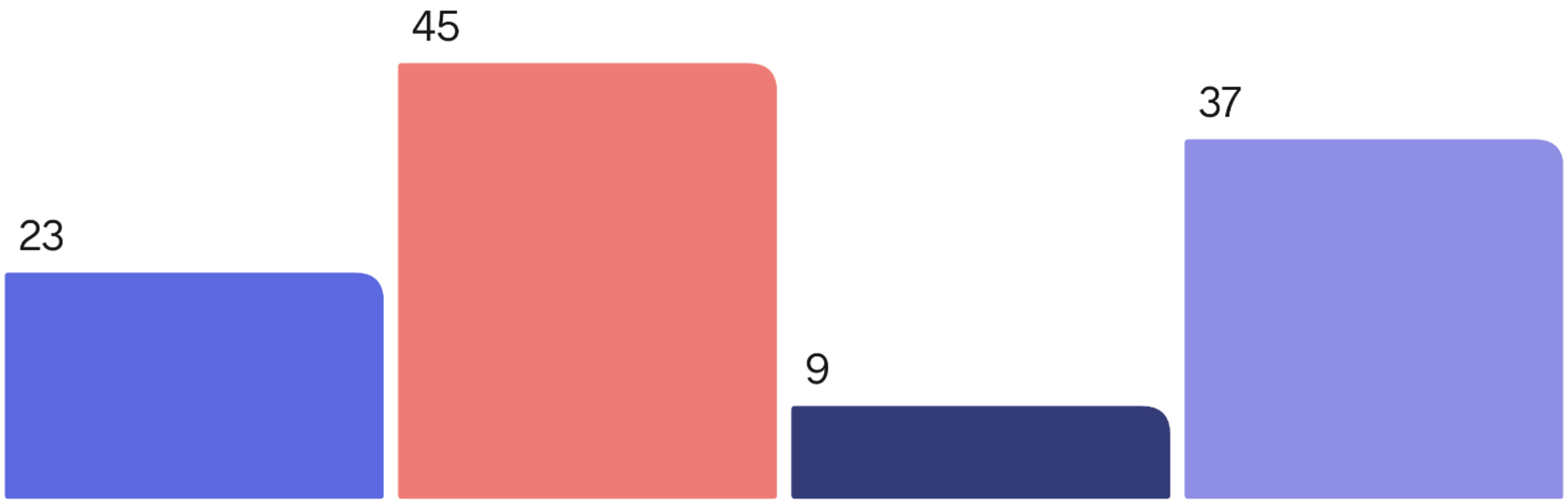
The xenon 0nubb community needs to



The $$ available worldwide for Xe 0nubb is determined mostly by



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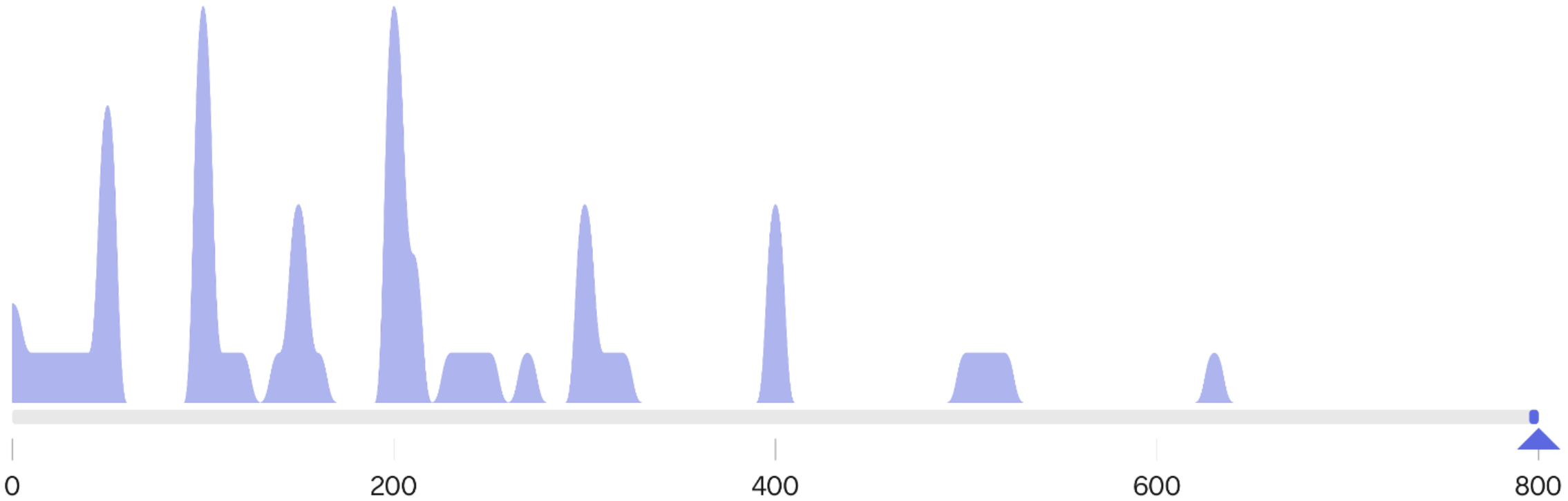
Mentimeter

How much $M may be available worldwide for xenon 0nubb by 2030?



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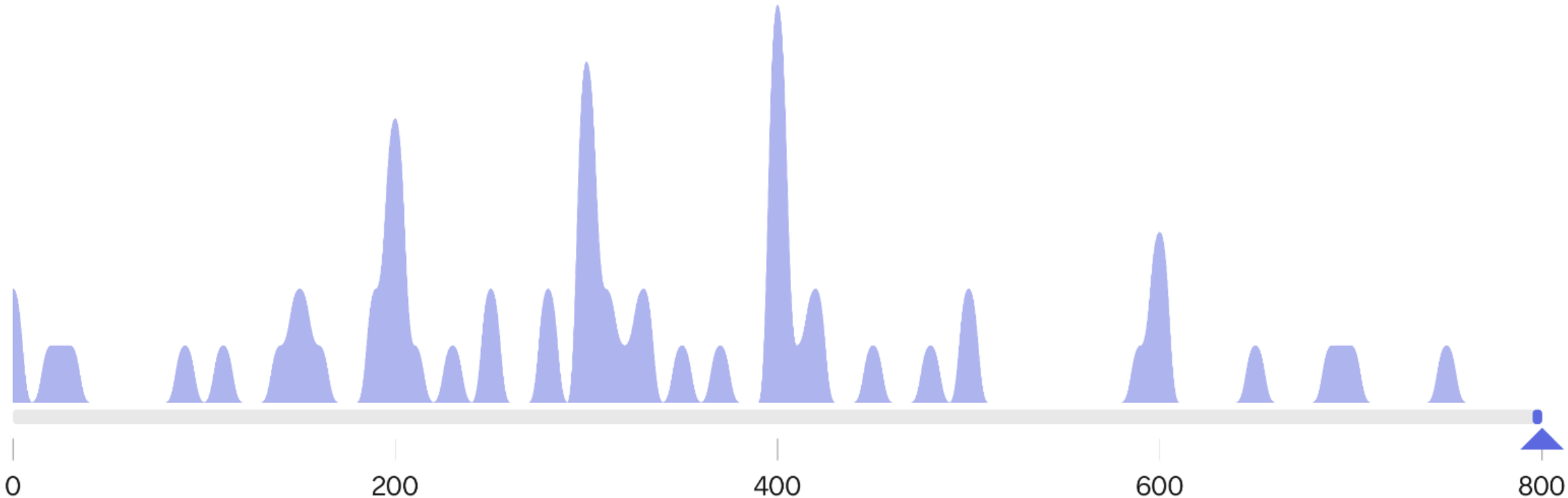
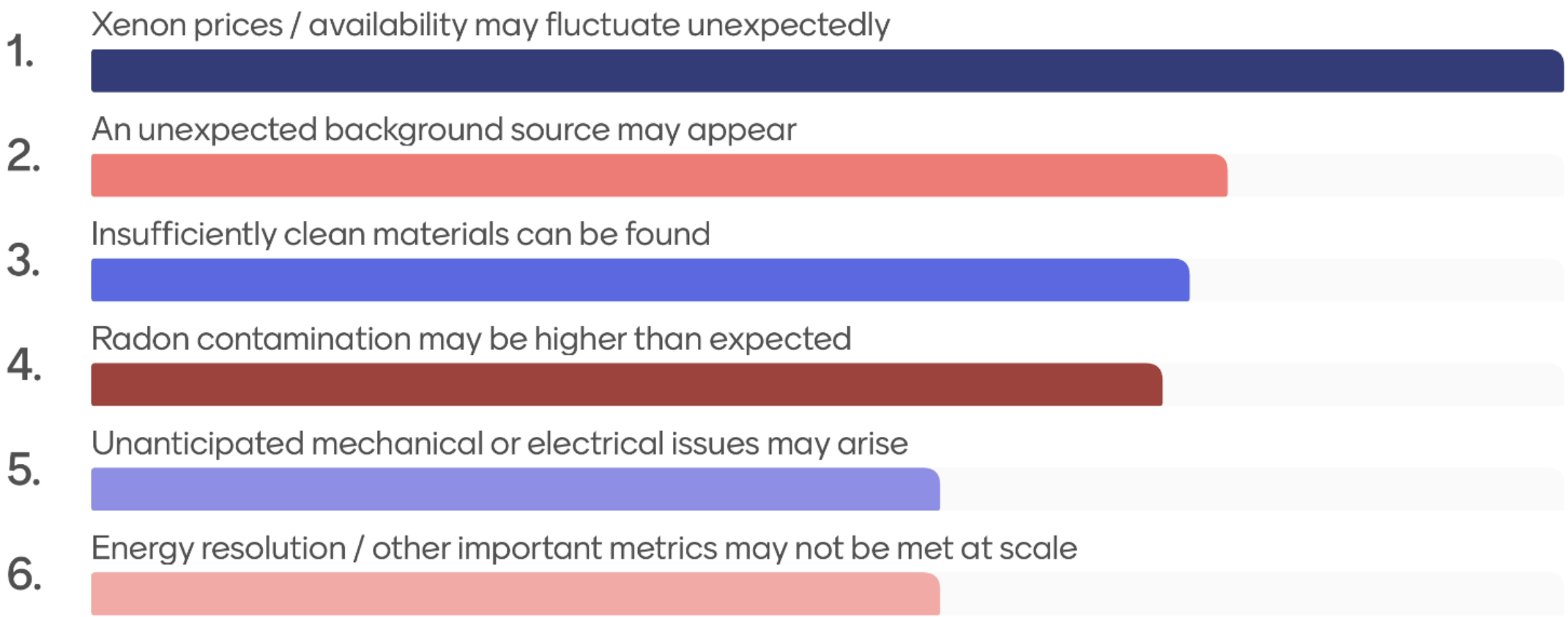
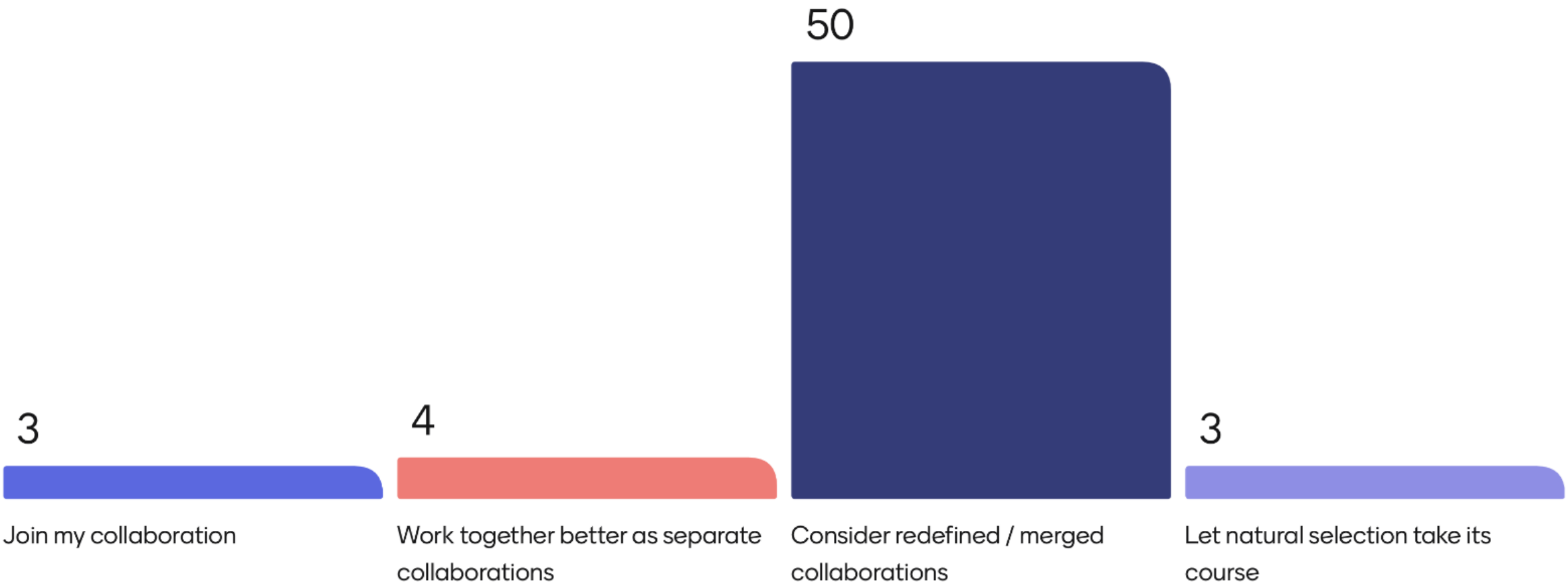
How much $M may be available worldwide for xenon 0nubb by 2035?



The most important scientific risks are

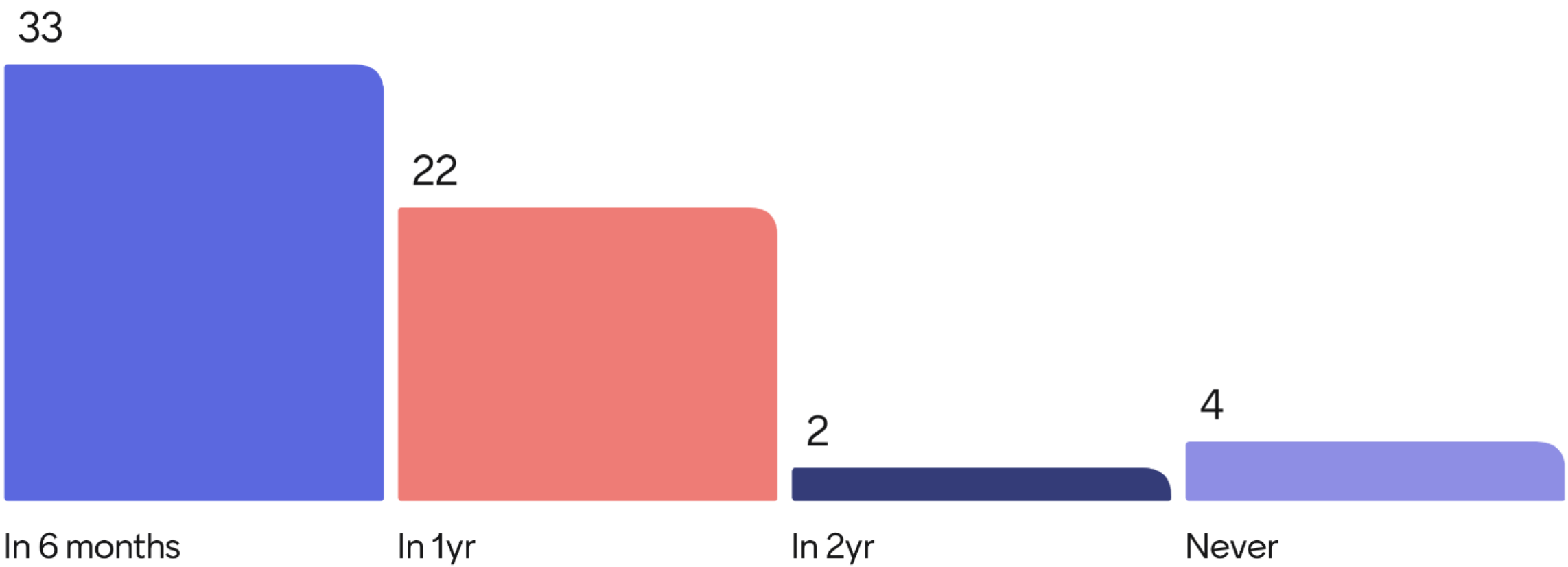


In the long term, what everyone should do is

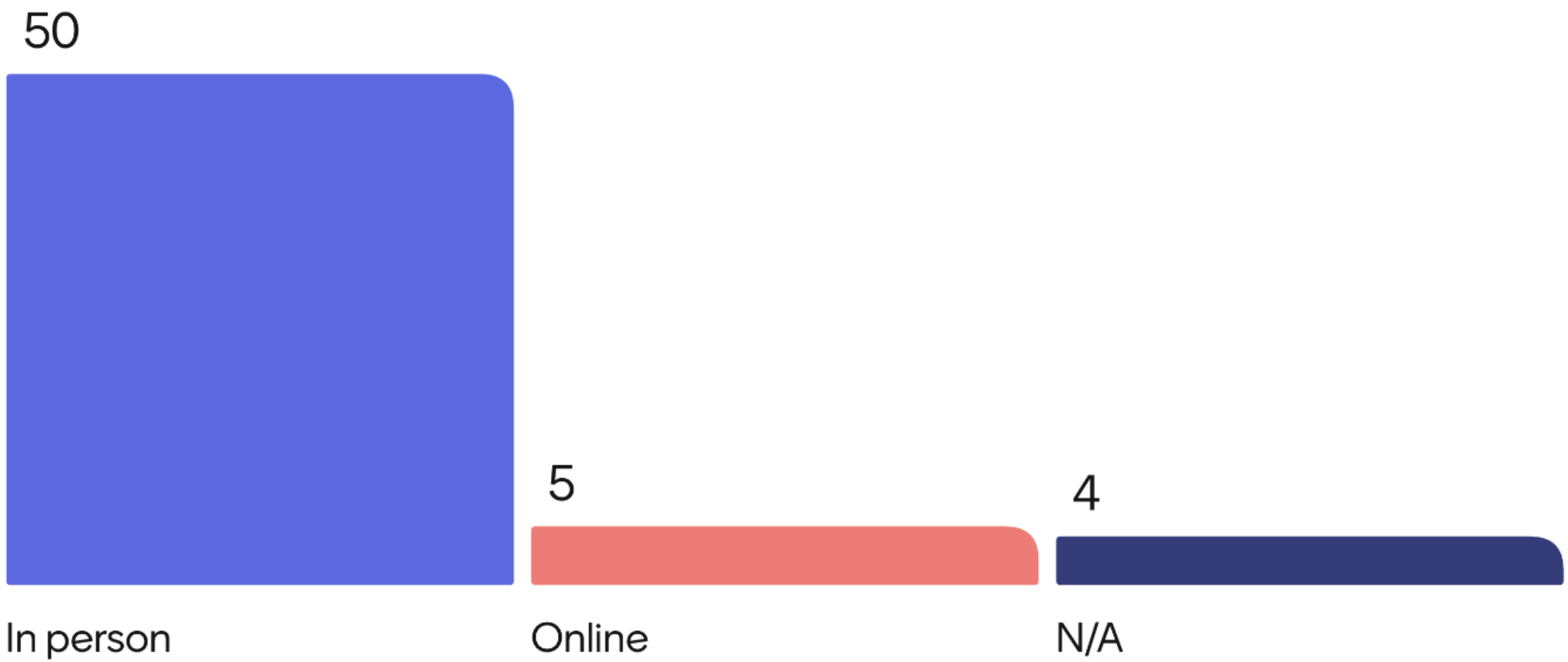


About this meeting

This meeting should happen again...



We should meet next



Should the Xenon 0nubb community should produce a document of some sort?