Safety and Sustainability

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Key Points

Sustainability is global imperative

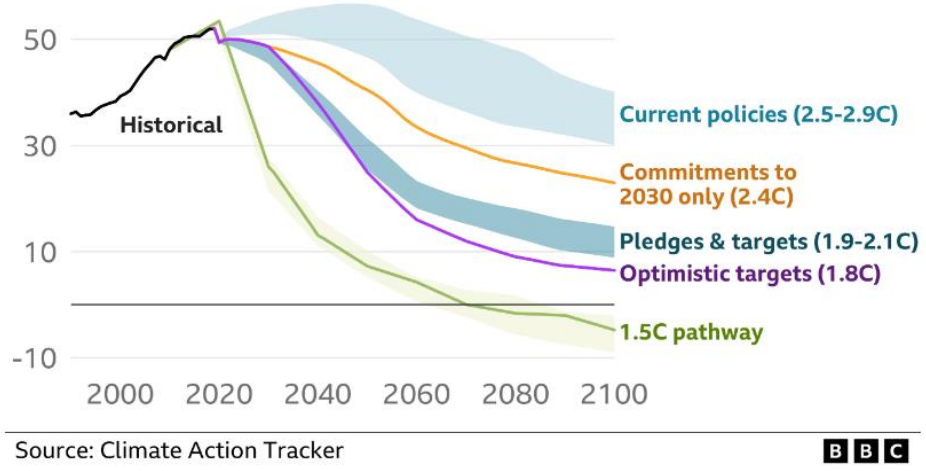
Radiation Safety is often pursued separately to broader sustainability outcomes

Depending on how it is applied, safety regulation can either further promote or hinder sustainability outcomes

There is a need as not only regulators but industry and communities to consider the complex interplay of these two systems

There are challenges in integrating safety and sustainability

Why this is important?



Climate change is expected to cause an estimated **250,000 additional deaths every year** to 2050

WHO 2021

Scaling up medical imaging would avert **3.2% of all cancer deaths**

Lancet Oncology Commission on Medical Imaging and Nuclear Medicine 2021

Asset managers globally are expected to increase their ESG-related assets to **US$33.9 trillion** by 2026

PwC 2022

UN Sustainability Goals

The Separation of Safety and Sustainability

- Fundamentals F-1

  'duly protected from the harmful effects of ionising radiation'

- ICRP Recommendations:

  'protection without unduly limiting the desirable human actions'

- IAEA Safety Standards

  'Safety without unduly limiting the operation of facilities'

- Accounting for economic and societal factors is buried deep
- No mention of better outcomes for people and the environment

Safety: Can Build Upon or Limit Progress

APPLIED POSITIVELY

Reduce Harm

Build Trust

Culture of compliance

Intergenerational Equity

APPLIED INDISCRIMINATELY

Decrease Business Viability

Stifle Innovation

Reduce Efficiency

Delay or Prevent

Increase Waste

Safety Addressed in Isolation by Numbers

ALARA: driving lower numbers

Transport safety
1 Bq/g, 0.025 mSv/h

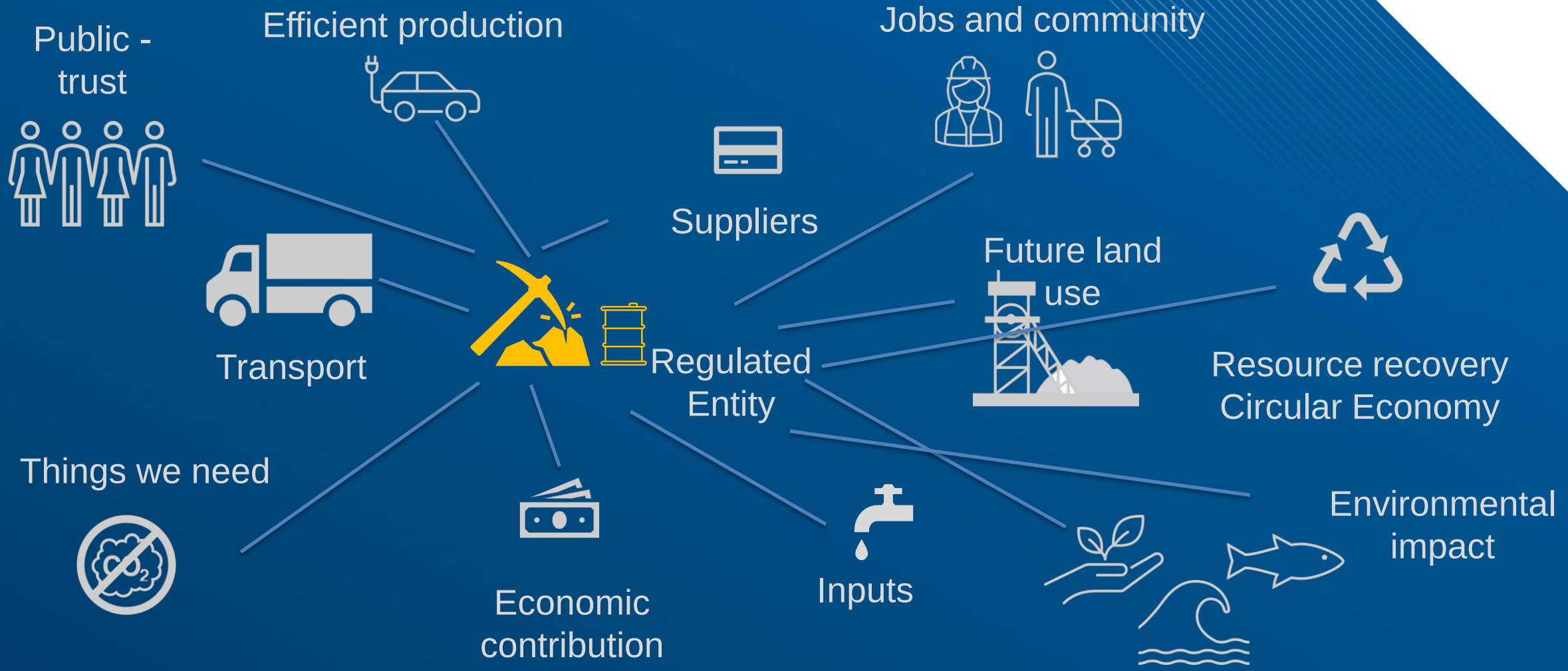
Worker safety
1E+06 monitored workers
Ave dose 0.4 mSv/a

Waste safety
'background radiation'

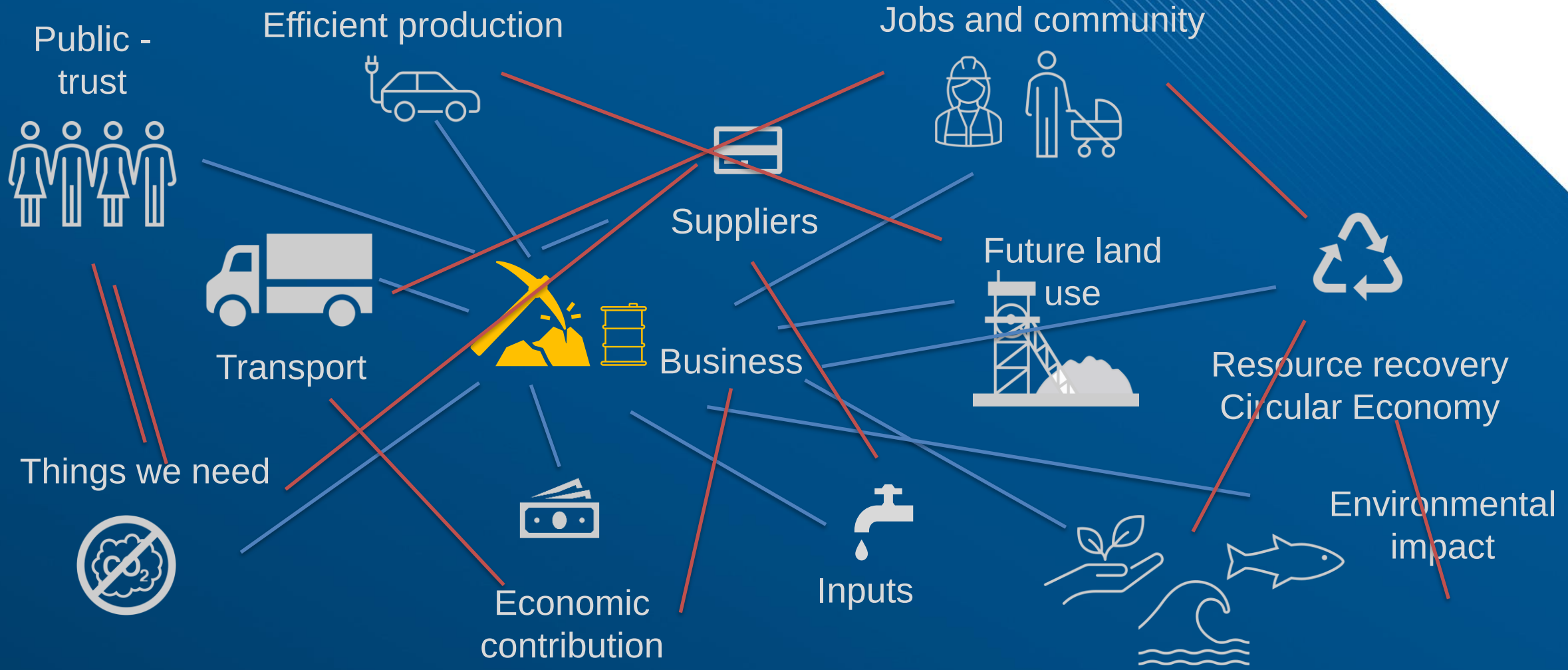
Environment impact
0.4 mGy/h

Public safety
0.3 mSv/a

Safety Operates within a Network
Consider Lifecycle Impacts

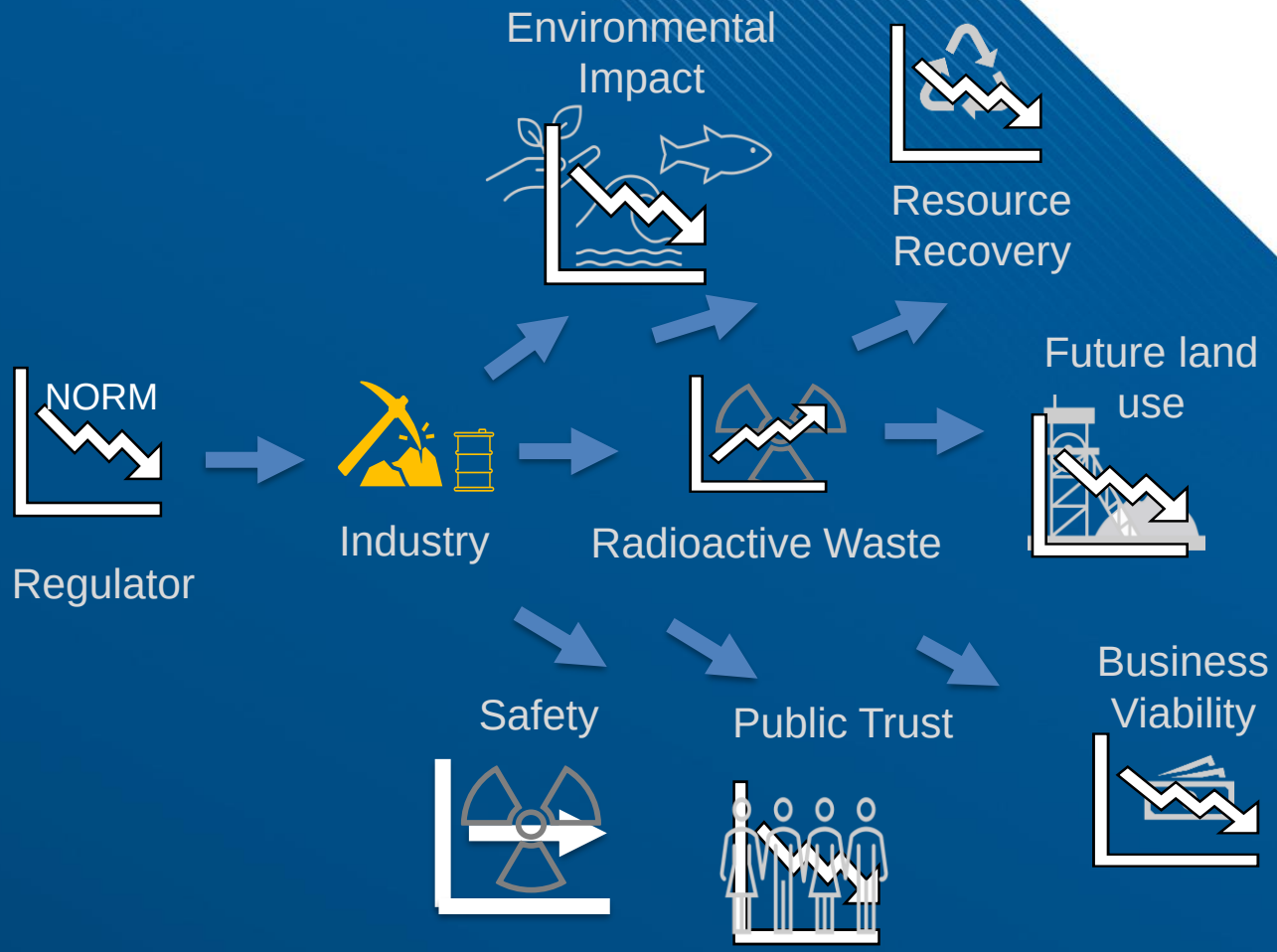


Safety Operates within a Complex Network
Consider Lifecycle Impacts



Unintended Consequences
Consider Life Cycle – Waste Thresholds

- Regulator - Change to regulations *'any NORM residues with a concentration above 0.185 Bq/g as low level radioactive waste'*
- *Industry - Cost of analysis meant it was cheaper to simply declare residues as low level radioactive waste*
- *Impact - bulk waste diverted to low level radioactive waste facilities when they could have very well been placed in a traditional landfill with no additional dose to the public'*



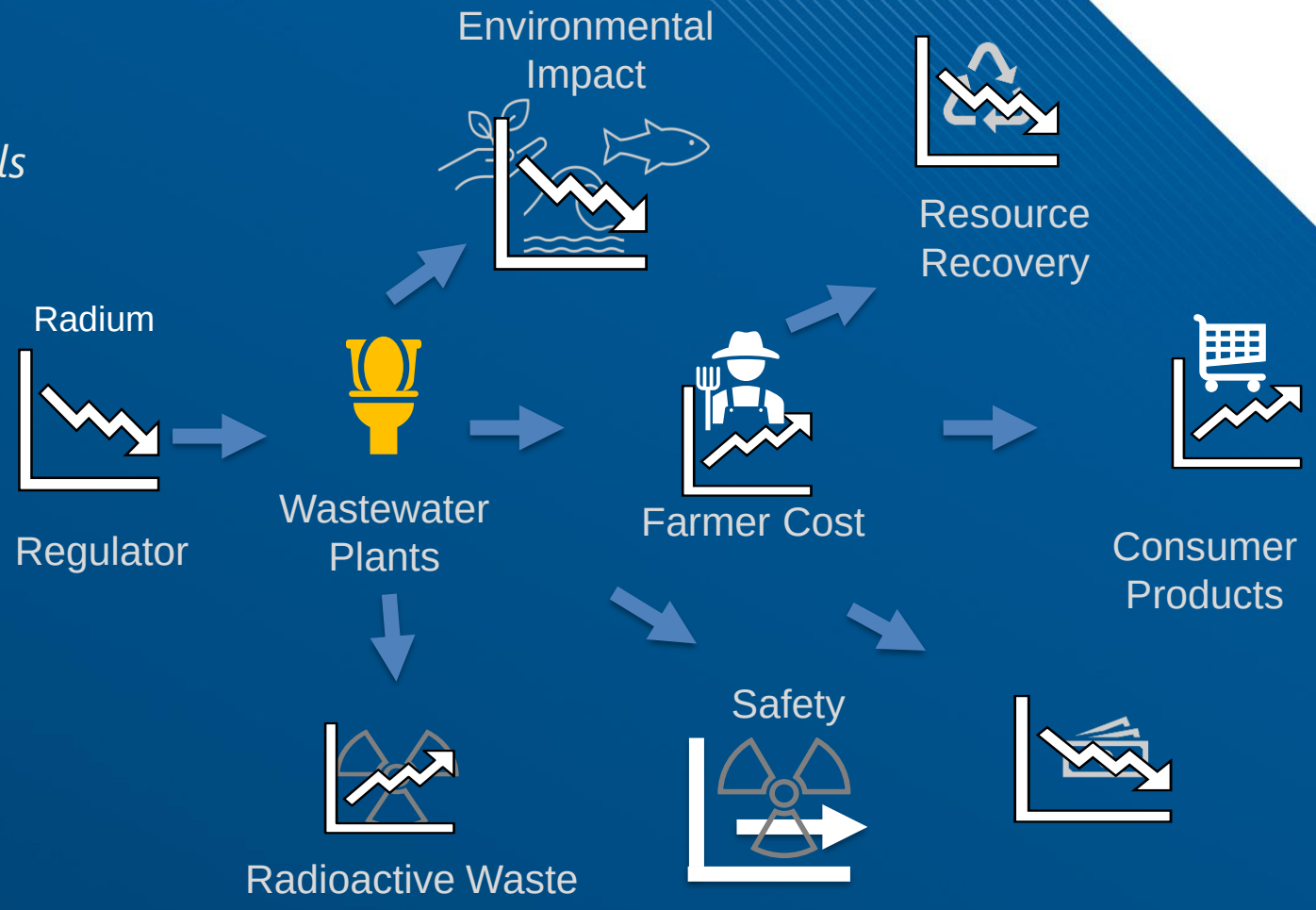
Unintended Consequences
Consider Life Cycle – Wastewater Sludges

Wastewater sludges serve as an agricultural supplement – providing both nitrogen and phosphorus, assisting in circulation of materials for further benefit

Regulator - Limit the land application of residues to reduce radium in the environment (ALARA)
Industry – Sludge now a liability

Impact – Increase in:
- *Waste streams*
- *Cost to wastewater producers*
- *Cost to farmers*
- *Cost to consumers*

No net change to safety



Some Examples

Phosphogypsum

Phosphogypsum is a residue from phosphate production

Regulator Lowered the screening level for what could be accepted for reprocessing

Industry – Applied a 'safety factor' to ensure compliance'

Impact – Reduced access to ores for processing and decreased availability to the market….. with flow on effects to production.

Building Materials

Regulator – Introduced exemption levels for NORM and notification (not re-use)

Industry – Interpreted as a prohibition and decided not to accept material with an activity concentration above exemption level, thus preventing re-use of materials in a circular economy

Some Examples

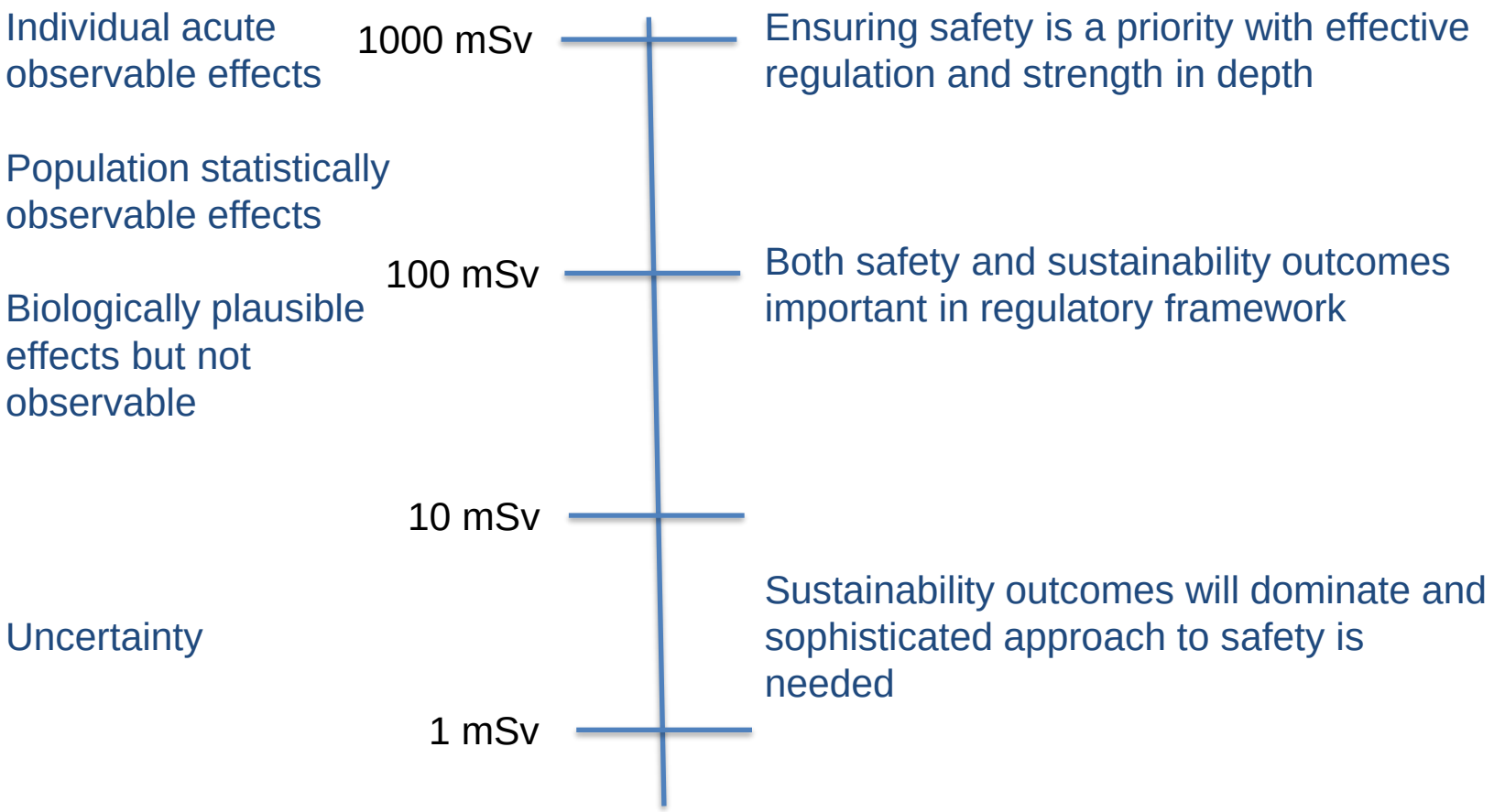
Reprocessing of Waste to Meet a Prescribed Number

‘rare earth processing facility is required to reprocess residues to below 1Bq/g in order to continue production in that country’

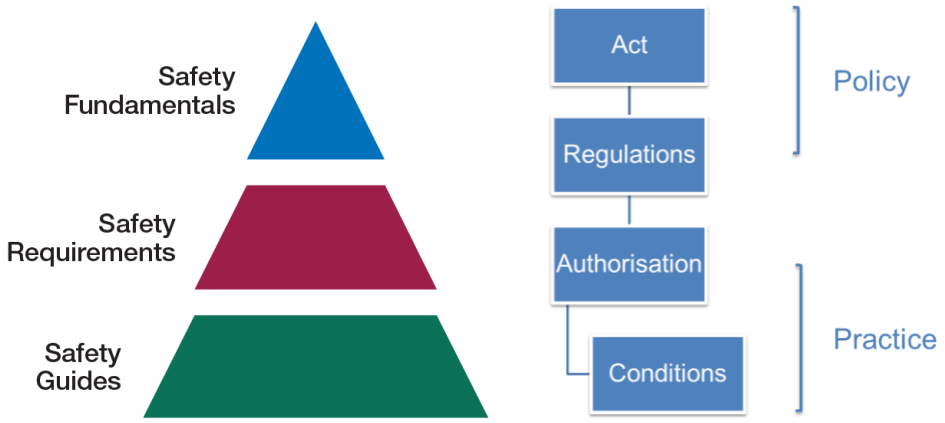
Radioactive Material and Surface Contamination

changed the scope of what is considered a radioactive material to include certain types of surface contamination. We are presently working with stakeholders to ensure this does not unduly impact recycling and increase waste which in fact we have mandate to increase recycling

Regulatory Implications



A Top Down Approach



Principle level agreements Vs End-of-pipe or case specific

Vision and leadership vs individual application

ICRP Working Groups?

Radiation Protection and Control Act 1982

23—General objective

The Minister and the Committee…….. must, ***'as low as reasonably achievable'***, social and economic factors being taken into account.

Radiation Protection and Control Act 2021

5—Objects of Act

(c) to recognise the benefits of the safe and justified uses of radiation; and

(d) to promote the principles of ecologically sustainable development.

UN SDGs: A Framework and Common Language

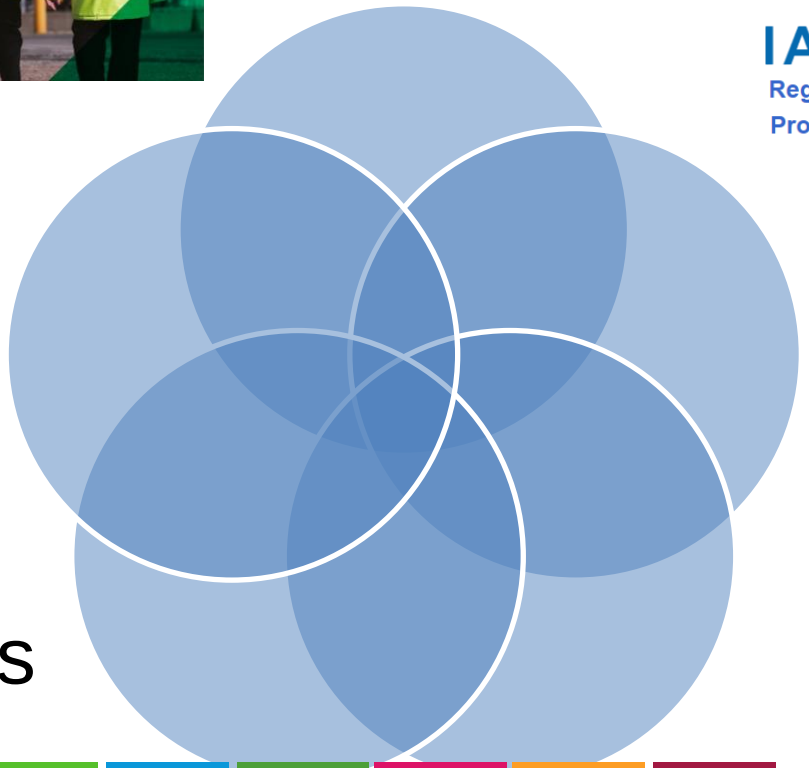
This is complex… we need partners

Regulators

International

IAEA
Regulatory Forum for Safety of Uranium Production and NORM (REGSUN)

NGOs



Industry

Government

Communities

A Way Forward

‘As regulators the challenge is to formulate strategies and mechanisms to integrate sustainability objectives into safety legislation and regulatory approaches’

“Por qué no los dos?”

Thank you

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