



NTP Radioisotopes SOC Ltd

A subsidiary of Necsa SOC Ltd

Pelindaba, South Africa

Status of NTP's Conversion Programme

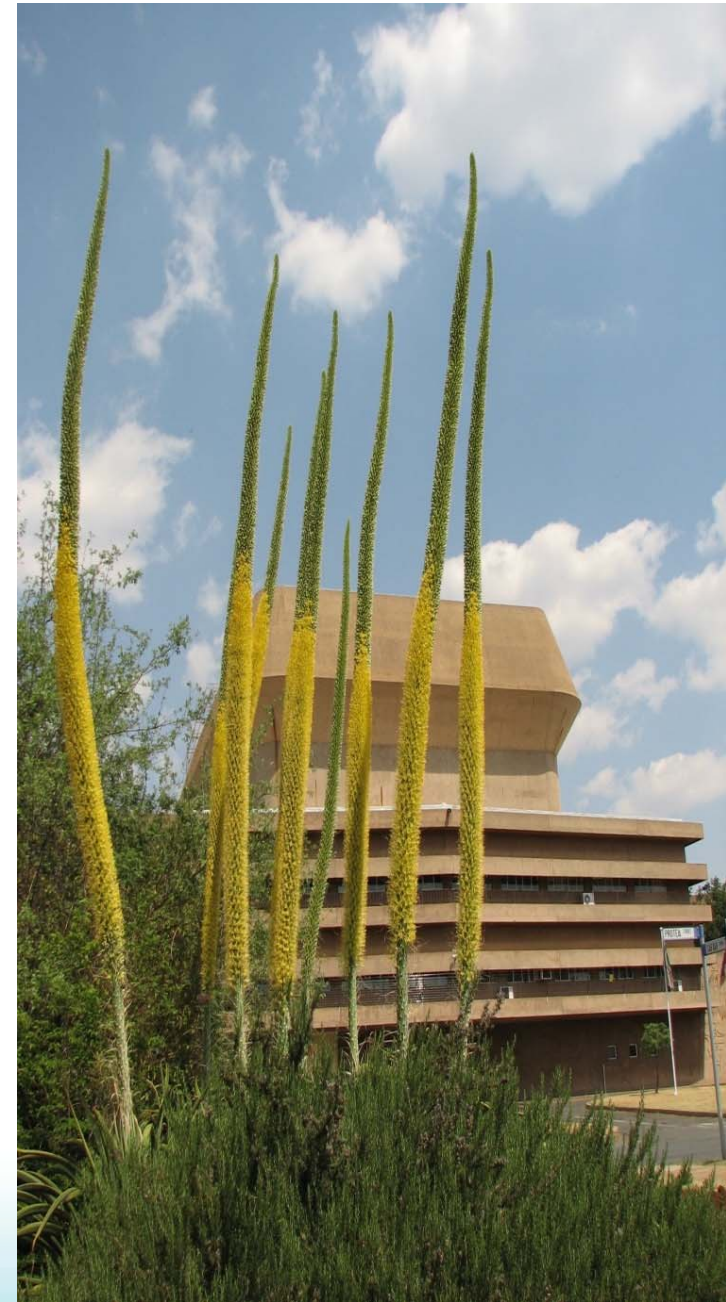
www.ntp.co.za



2017 Mo-99 Topical Meeting on Molybdenum-99 Production Technology Development
10-13 September 2017; Montreal Marriott Chateau Champlain; Montreal; QC Canada

Outline

- Who are we?
- Broad Principles of Conversion
- Current Status
- Reflections



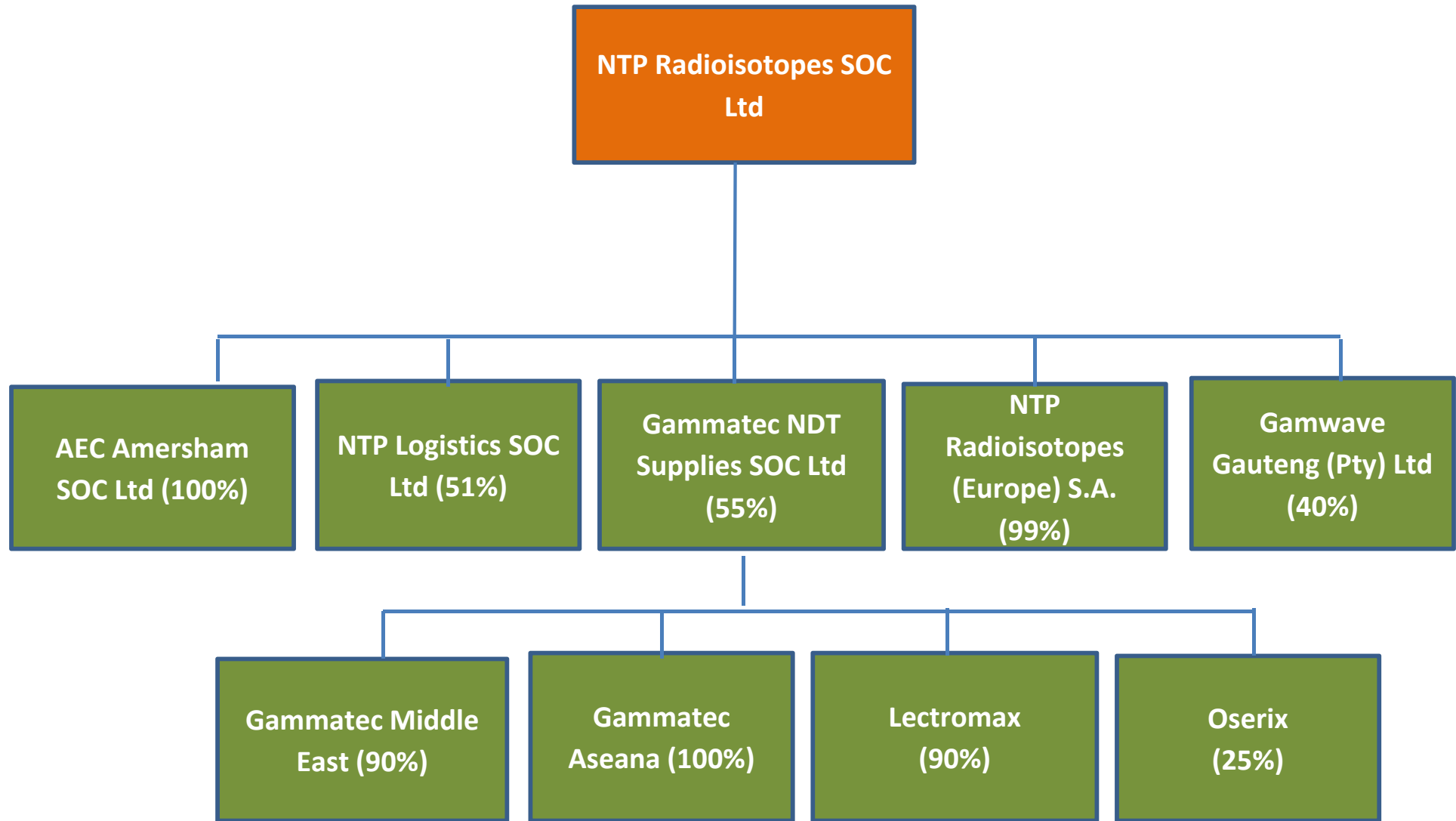
Who are we?

NECSA MANDATE

The Company derives its mandate from the Nuclear Energy Act, No. 46 of 1999. In terms of Section 13 of this Act, Necsa is mandated to:

- Undertake and promote research and development (R&D) in the field of nuclear energy and radiation sciences and technology and, subject to the Safeguards Agreement, to make these generally available;
- Process source material, special nuclear material and restricted material and to reprocess and enrich source and nuclear material; and
- Co-operate with any person or institution in matters falling within these functions, subject to the approval of the Minister.

Who are we?



Who are we?



Who are we?

Radiochemicals

Mo-99, I-131, Lu-177

Radioactive Sources

Ir-192, Cs-137, Co-60

Irradiation Services

Neutron Transmutation doping of Silicon, Neutron Irradiation Services

Radiopharmaceuticals

NovaTec-P Tc-99 Generator, FDG, MIBG, Cold kits, I-131 Capsules and Solution

Radiation Technology Products

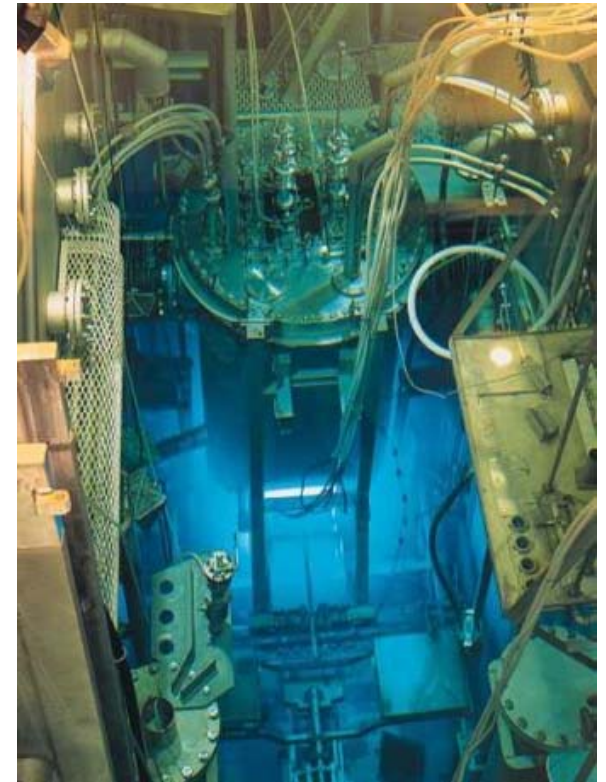
Transport containers



Broad Principles of Conversion

Strategic Considerations

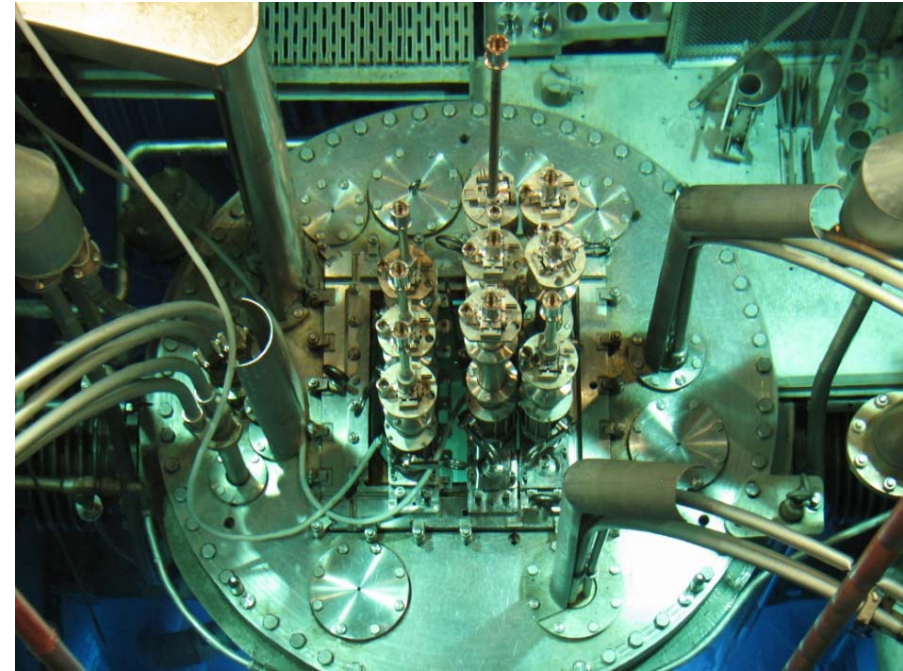
- Minimum changes to target, irradiation, handling & chemical processes
- Retention of production capacity
- No interruption in current production



Broad Principles of Conversion

Envelope

- Within HEU safety envelope
- With existing handling equipment
- With existing transfer flasks



Broad Principles of Conversion

NEA OECD HLG-MR principles:

- Take co-ordinated steps, within our countries' to implement a verifiable process for introducing full-cost recovery at all;
- Ensure availability of reserve capacity;
- Ensure availability of ^{99m}Tc produced on an economically sustainable basis;
- Encourage those not party to the present Joint Declaration, to take the same approach;
- Report on an annual basis to the OECD Nuclear Energy Agency (NEA) on the progress made.

Current Status

Year	Event
2007/8	Theoretical feasibility studies & cold experiments
2009	NNR approval received for test stage and first hot runs commence
2010	Hot runs, process validation, regulatory approval
Sep 2010	US FDA approves LEU ⁹⁹ Mo for a customer in the US
Dec 2010	First large scale commercial FDA approved batch of LEU ⁹⁹ Mo produced and shipped to US for patient use
Jun 2011	Routine commercial supply of LEU ⁹⁹ Mo commenced
Sep 2011	Commencement of investment in plant modifications for increased LEU residue storage requirements
Jan 2014	Hot commissioning of new LEU specific production line
Dec 2014	Commencement of project to manufacture & install 2 nd LEU design dissolver cell
Jan 2017	Hot Commissioning of new uranium residue facility
May 2017	1 st month that 100% LEU based Mo-99 production achieved

Current Status

Previously

- 2 production lines (HEU design)

Currently

- 1 LEU designed and 1 HEU designed production line

Future

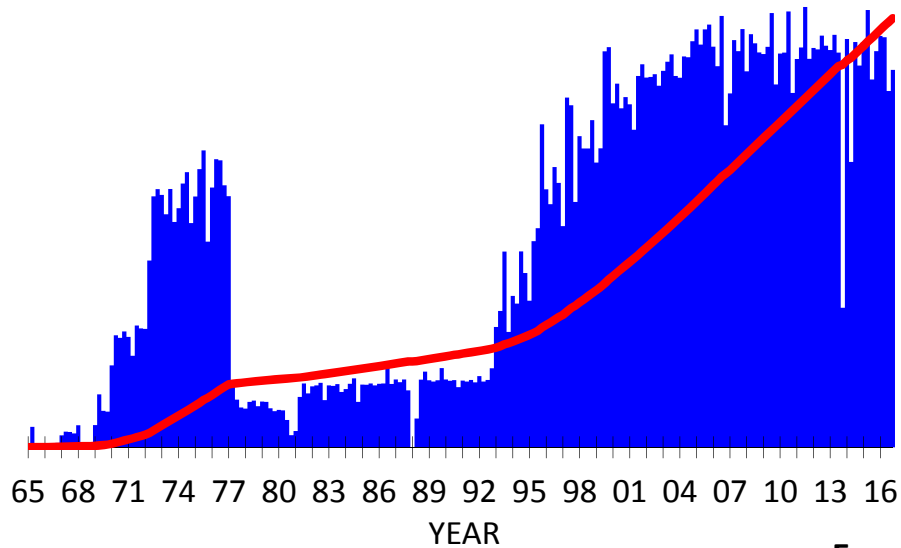
- 2 LEU designed and 1 HEU designed backup production line

LEU based Mo-99 production



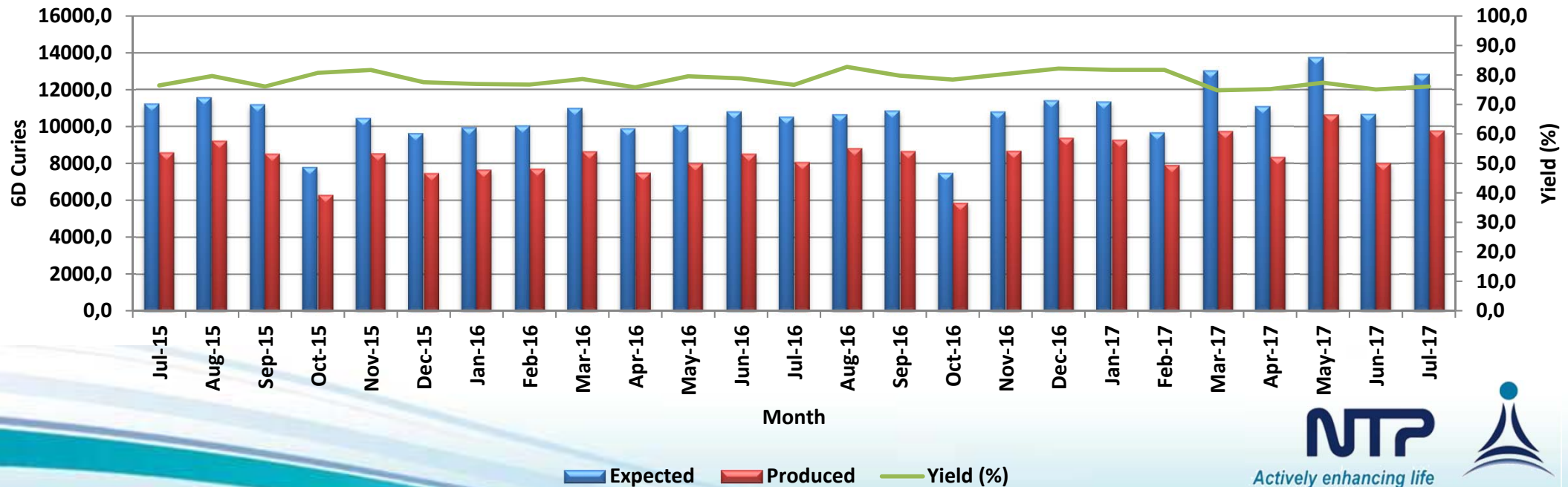
Current Status

SAFARI-1 Power History



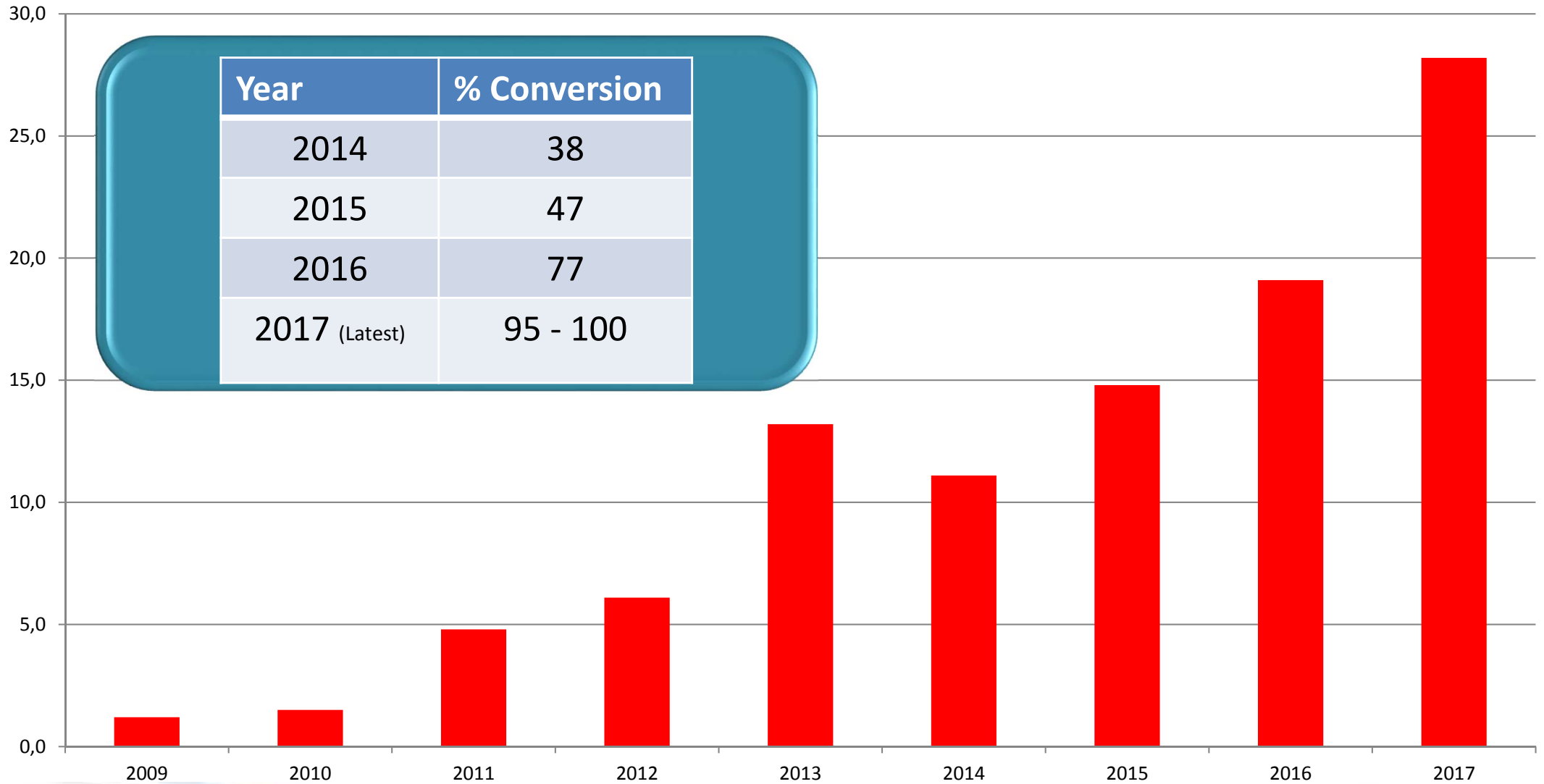
Year	Operational availability compared with schedule
2008	99.9
2009	99.4
2010	101.1
2011	102.4
2012	101.4
2013	100.5
2014	100.1
2015	100.3
2016	100.1

Expected Mo-99 Curies and Yields



Current Status

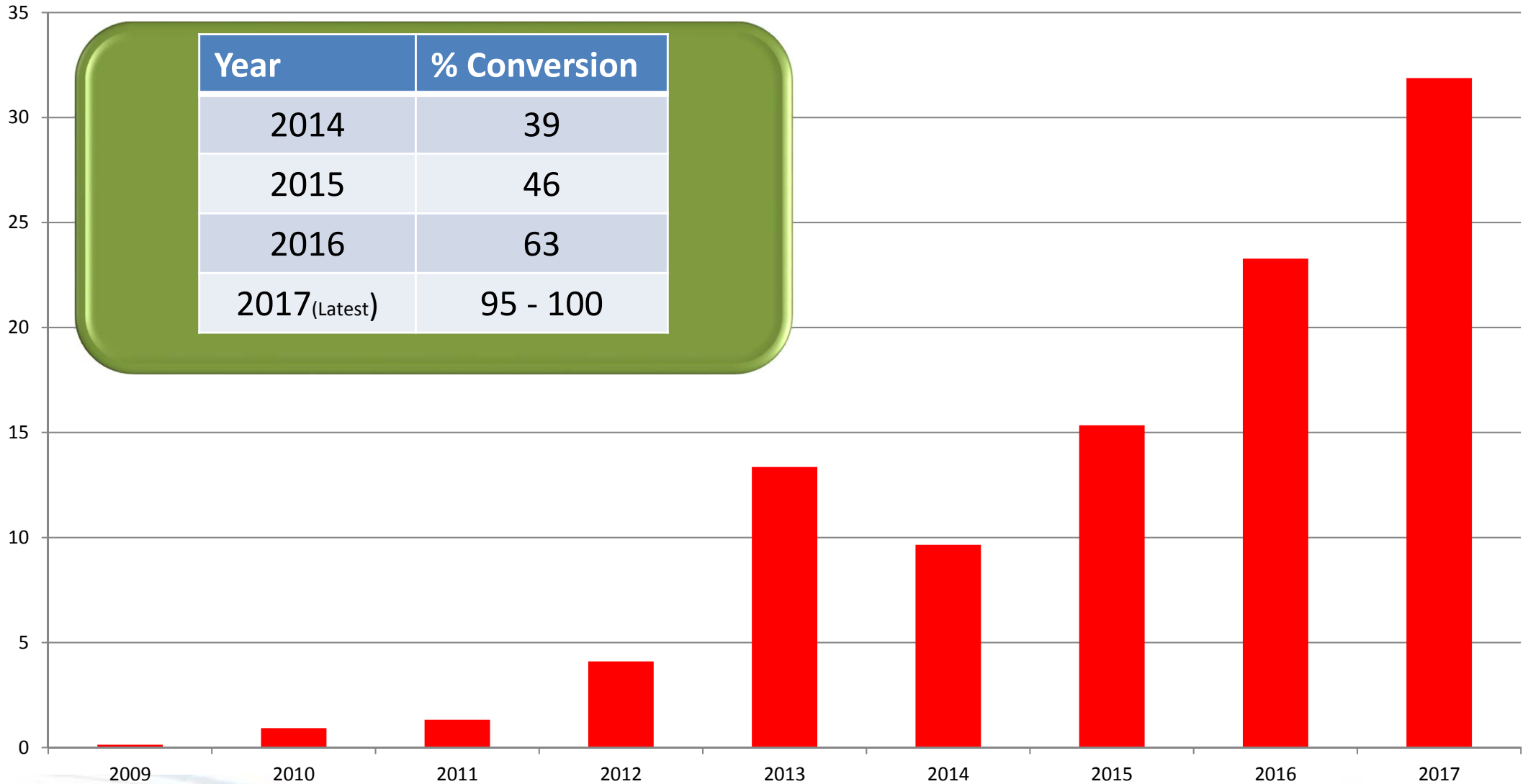
Mo-99: % LEU Distribution relative to all LEU runs since inception



Conversion to LEU completed!

Current Status

I-131: % LEU Distribution relative to all LEU runs since inception



Conversion to LEU completed!

Reflections

Technically feasible

Full cost recovery not implemented

More challenging production operations

Sustainability of the industry questionable

Reflections

The future of the nuclear medicine industry depends heavily on:

- Full-cost recovery through the entire supply chain
- Realistic ^{99m}Tc pricing
- Aspirant entrants realisation of the actual level of effort for development, industrialisation, validation and regulatory processes
- Realistic time frames from new market entrants



Thank you for your attention

