

Medical Radioisotopes: NEA Updates on Report and Workshop

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Outline of Presentation

- **Recent Outcomes on Demand and Capacity**
 - 2018-2019
 - Covid-19 Pandemic
 - 2020-2022
- **Findings of 2023 NEA Report on Demand and Capacity**
 - Recent Developments



Supply Status 2018-2019

- Supply stress in 2018-2019 due mainly to problems at the NTP processing facility in South Africa
 - Despite chronic levels of ^{99}Mo supply shortage in some markets, Canadian facilities (AECL/Nordion) were held securely offline for 18 months, and did not return to service in an emergency backup role. This was primarily an economic decision by supply chain members
- NTP facility returned to full service in the 3Q 2019
- Problems restricted processing capacity at the new ANM processing facility in Australia in late 2019
 - Capacity was incrementally increased between 2020 and 2022, but total capacity has not yet reached the levels envisaged in the 2019 report

COVID-19 Pandemic Impacts

- COVID-19 pandemic disruptions significantly impacted the 2020-2021 period
 - Covid-19 responses varied significantly from country to country based on societal lockdown measures
 - Healthcare systems faced significant challenges related to the supply chain and international airfreight distribution, including for medical isotopes (Other presenters will speak further about these challenges)
- ^{99}Mo supply chain should be congratulated on successfully managing production programs and logistics and maintaining global supply throughout the pandemic period

Supply Status 2020-2022

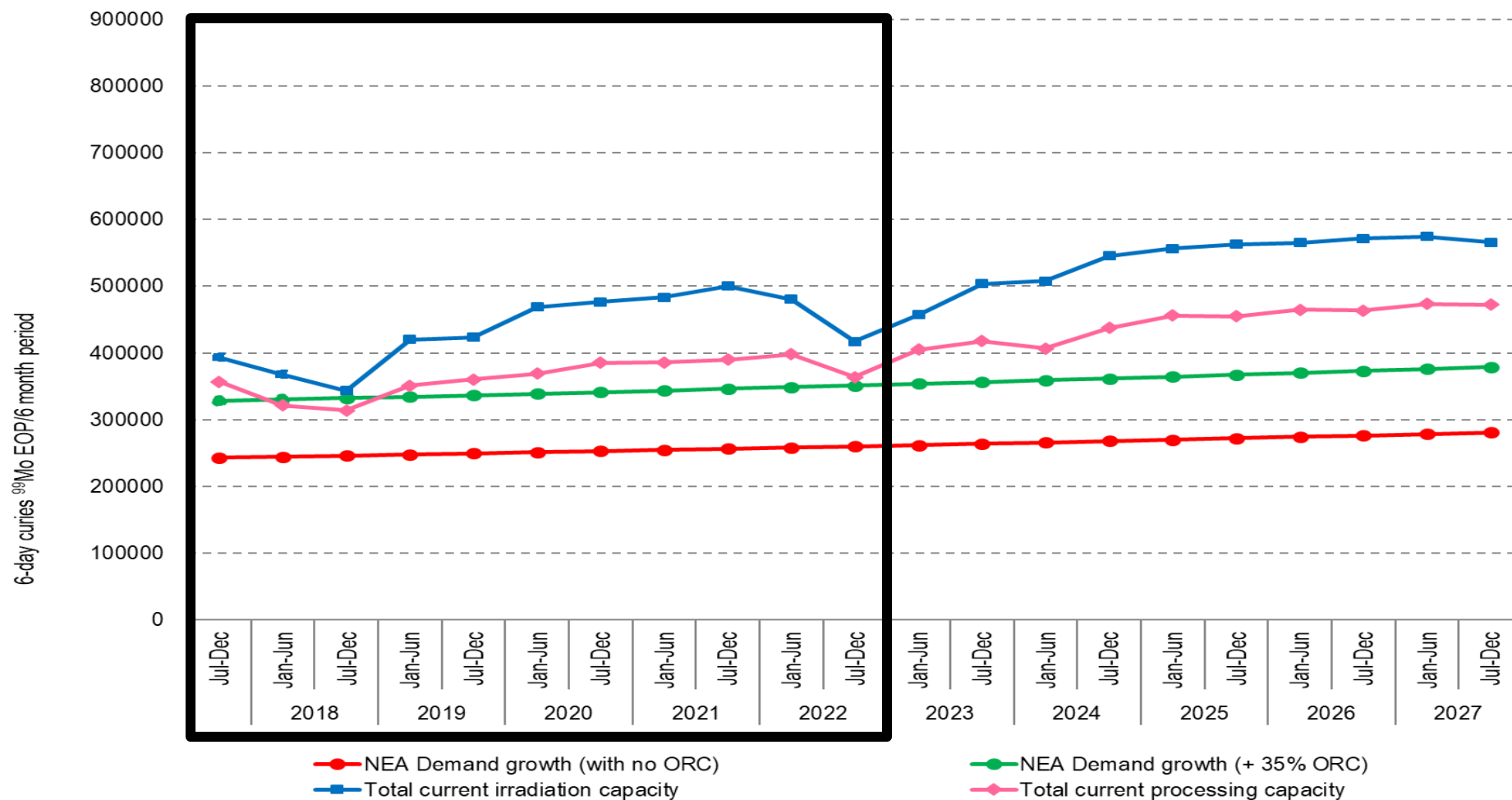
- A combination of unplanned outages and planned extended maintenance periods in 2022 led to significant global shortages of ^{99}Mo and reactor-based therapy isotopes
 - Unplanned BR-2 outage (highest irradiation capacity in the global supply chain) resulted in there being no irradiation capacity from the network of European reactors (directly stopped the operation of the extensive ^{99}Mo processing capacity in Europe, leading to global supply shortages)
 - The BR-2 had been scheduled to operate alone in Europe
 - The LVR-15 reactor was able to respond and returned to service earlier than scheduled, but this was insufficient to overcome all of the shortages
 - Supply only recovered when the HFR reactor returned to service from planned maintenance in late November 2022

NEA Demand and Capacity Report 2023-2027

- **Report examines three scenarios for medical isotopes demand and capacity projections**
 - **Scenario A “Reference” Case:** represents historic capacity of the present fleet of irradiators and processors and a projection of future capacity inclusive of any planned additional capacity adjustments to those existing facilities
 - **Scenario B “Projected capacity additions” Scenario:** adds additional capacity from anticipated projects. Given the unproven nature of these alternative technologies and in some cases, their more difficult access routes to market, only 50% of their anticipated new capacity is included in projections from their anticipated first full year of operation
 - **Scenario C “Delays to projected capacity additions” Scenario:** builds on scenario B by assuming that all new projects, whether conventional or non-conventional technology, will be delayed by one year or two years beyond their present anticipated first full year of operation

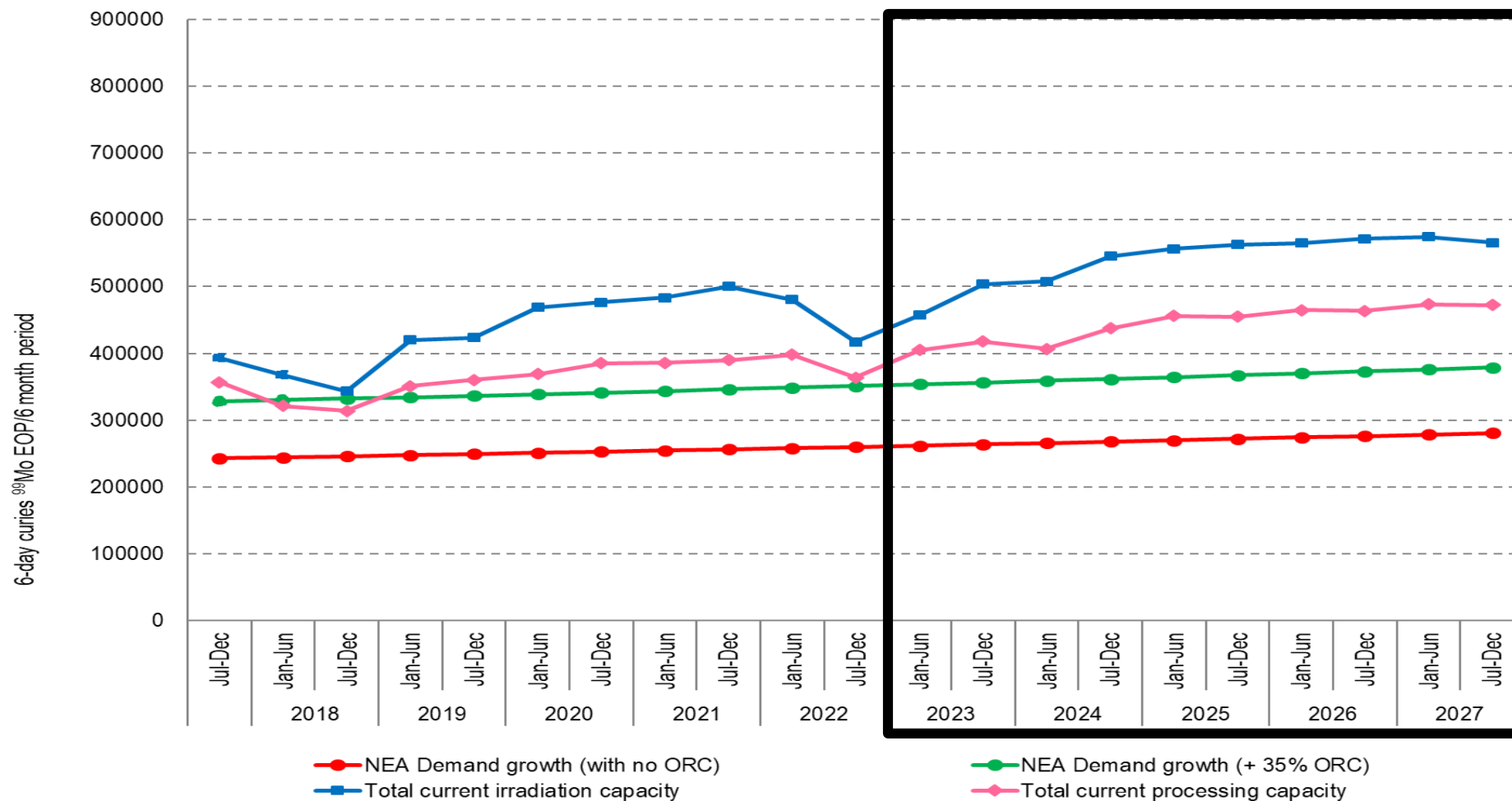
Demand and Capacity Projections: Scenario A

"Reference" – Processing and Irradiation

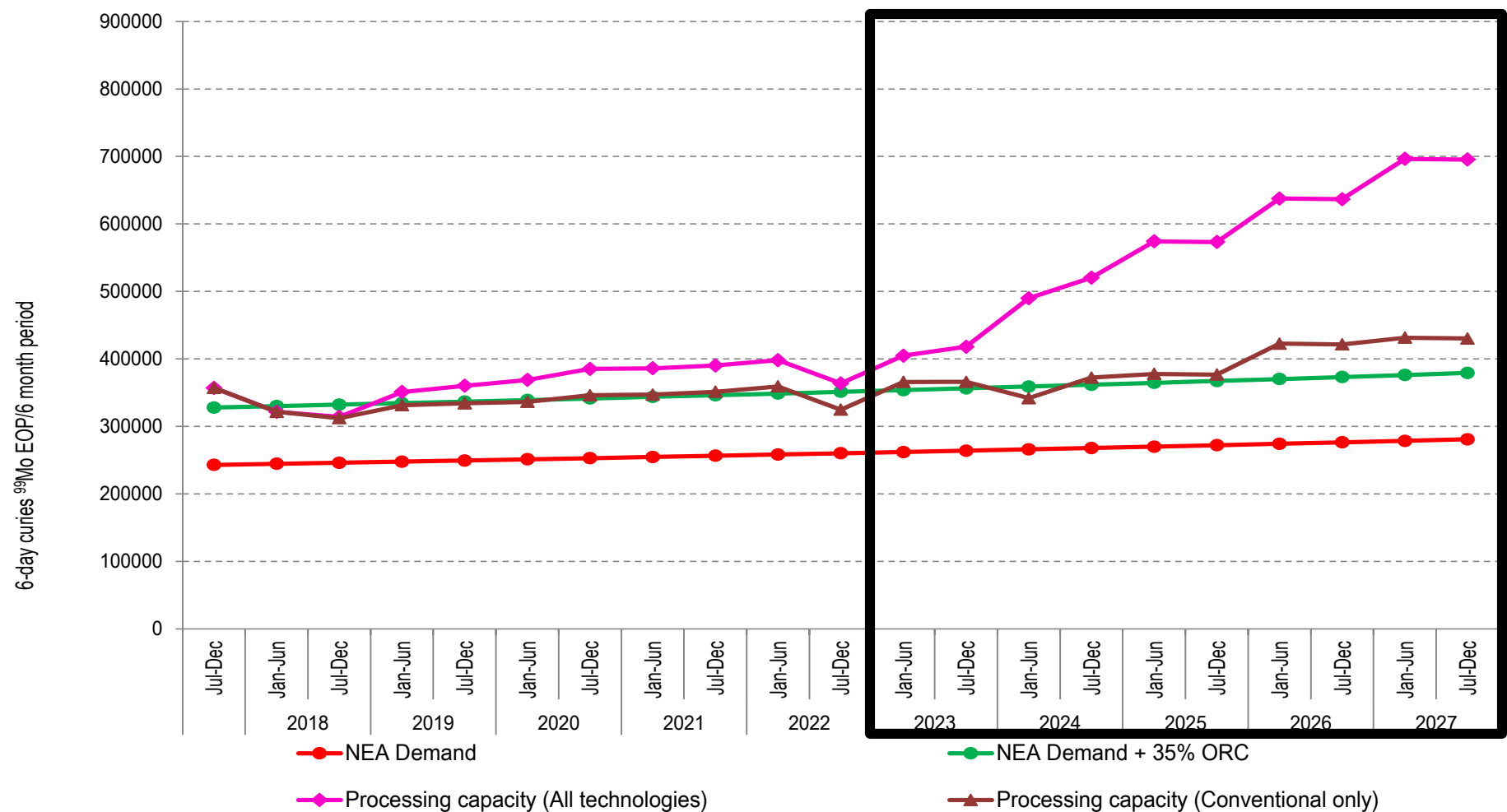


Demand and Capacity Projections: Scenario A

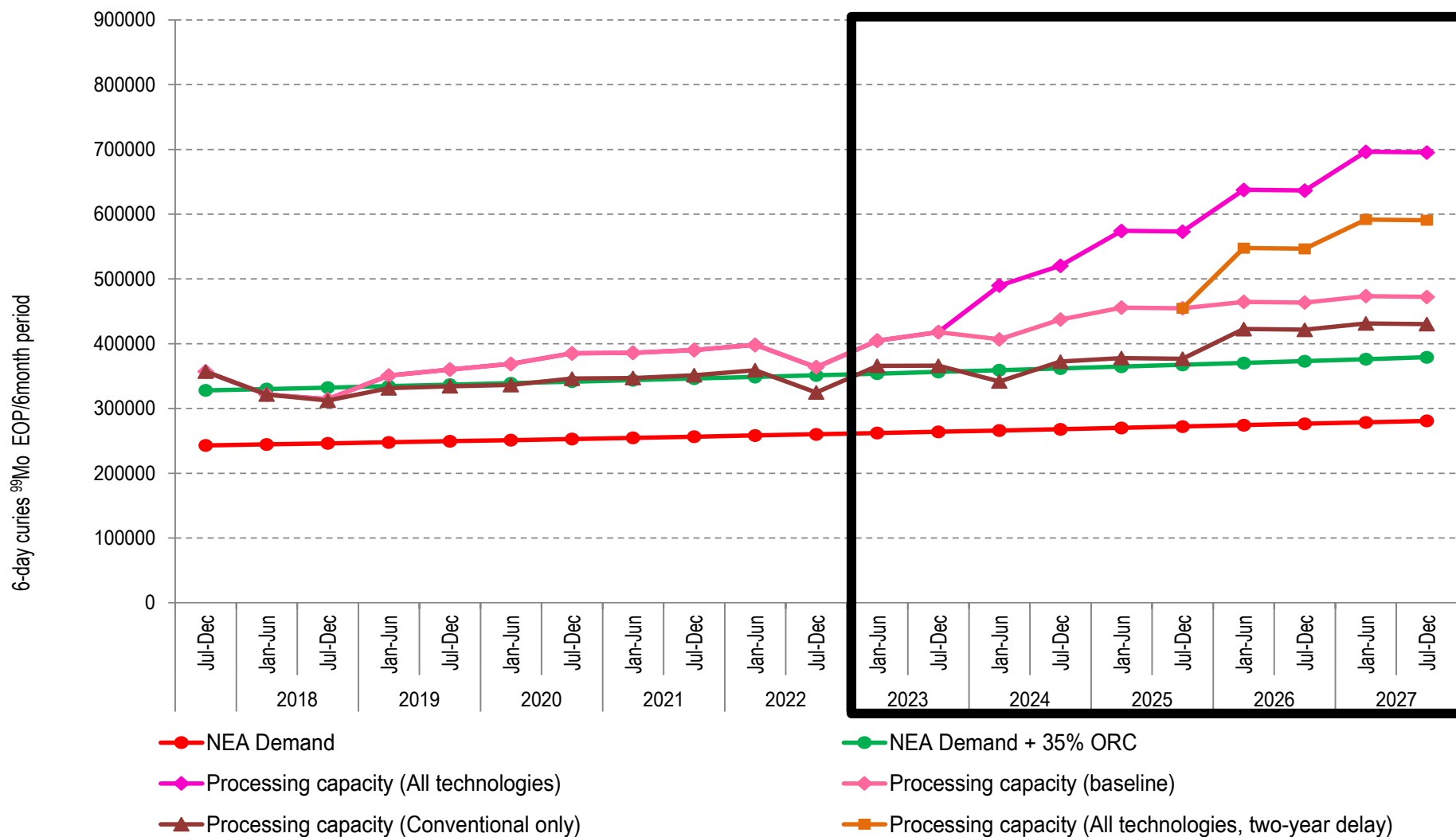
"Reference" – Processing and Irradiation



Demand and Capacity Projections: Scenario B “Projected Capacity Additions” – Total and Conventional Processing Capacity



Demand and Capacity Projections: Scenario C “2-year Delay to Projected Capacity Additions” – Processing Capacity



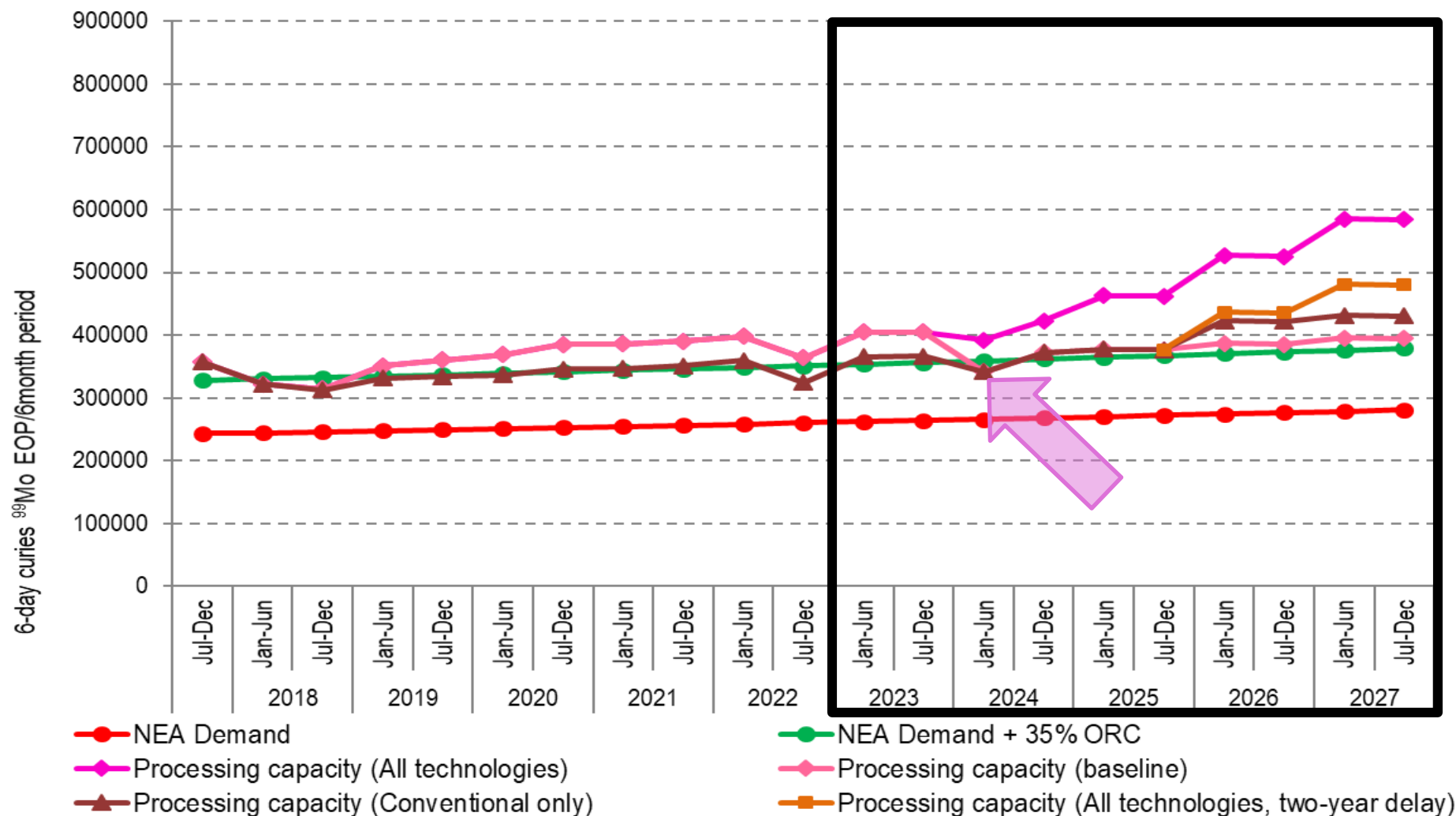
2023 NEA Report: Conclusions

- Demand projections remain unchanged
- Very good progress in conversion from HEU targets
- Good performance by the supply chain during Covid-19
- Continued delays in both conventional and alternative technology projects remain a concern
- Co-ordinated scheduling essential, ORC at times low
- “Reference” scenario A has improved since 2019 report
- Capacity to manage adverse events limited in 2023/24, further project delays could make 2025/26 vulnerable

2023 NEA Report: Recent Development - NorthStar Closure

- On 5 October 2023, NorthStar Medical Radioisotopes, LLC announced that it would “suspend manufacturing and commercialization of molybdenum-99”
 - Reduces capacity available in large US market
 - Increases risks for security of global supply when unplanned events occur
 - Removes projected additional capacity from all Scenarios
- NorthStar indicates that economics are an underlying problem

Scenario C+: “2-year delay to projected capacity additions and no NorthStar” – Total and conventional processing capacity



2023 NEA Report: Conclusions Adapted to New Developments

- NorthStar development indicates that **economics are underlying problem** as Full Cost Recovery (FCR) remains elusive
- Delays **and losses** in both conventional and alternative technology projects are thus of **serious** concern
- With ORC **even lower**, co-ordination even **more essential**
- “Reference” scenario A has **no longer improved** since 2019 report
- Capacity to manage adverse events very limited in 2023-**25** and further project delays **would increase vulnerability**



**Thank you for
your attention**