

**CONVERSION TO LEU TARGETS FOR ^{99}MO
PRODUCTION:
NEA STUDY ON MARKET AND ECONOMIC IMPACTS
ON THE GLOBAL SUPPLY CHAIN**

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Why HLG-MR interest in LEU conversion?



- Agreed to by all major ^{99}Mo producing nations
 - Work plan of the Washington Nuclear Security Summit
 - HLG-MR recommendation supports LEU conversion
- For important non-proliferation reasons
- Will have impact on producers and users of $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$
 - Affect the available capacity to produce
 - Increase costs of developing product
- No direct market justification for LEU conversion – externality
- Recognising should and will happen, interest to better understand impacts and best way to address market (capacity and economic) impacts
- HLG-MR key interest is based on security of supply concerns

- Impacts of conversion often cited as barrier, reason for delay
 - Known, perceived, or uncertain
- Past and on-going work to study the technical side of conversion (IAEA): challenges and opportunities
- Very few publicly-available studies on the market impact of conversion
 - Capacity impacts on global and regional markets
 - Economics (full-supply chain costs and price impacts)
- US National Academies study only major economic study done to date
- HLG-MR proposed study from the perspective of market impacts would affect the security of supply
 - Would enough $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ be available and at what cost to the end user?

The project: An economic assessment of conversion



- Focused on the market impacts of conversion
 - Not looking at technical side except to understand potential market impacts
- Develop models of the:
 - capacity and product flows/availability for the ^{99}Mo global supply chain
 - costs and LUCM of the full supply chain, including final user
- Determine capacity and cost impacts of conversion
 - Based on experience and expectations
 - Restricted and then relaxed assumptions
- Develop policy options and recommendations to encourage smoothest market transition to LEU possible
- Mixture of workshops, bi-lateral discussion, research, modelling

Part A: Assessment of impacts with current targetry and processes

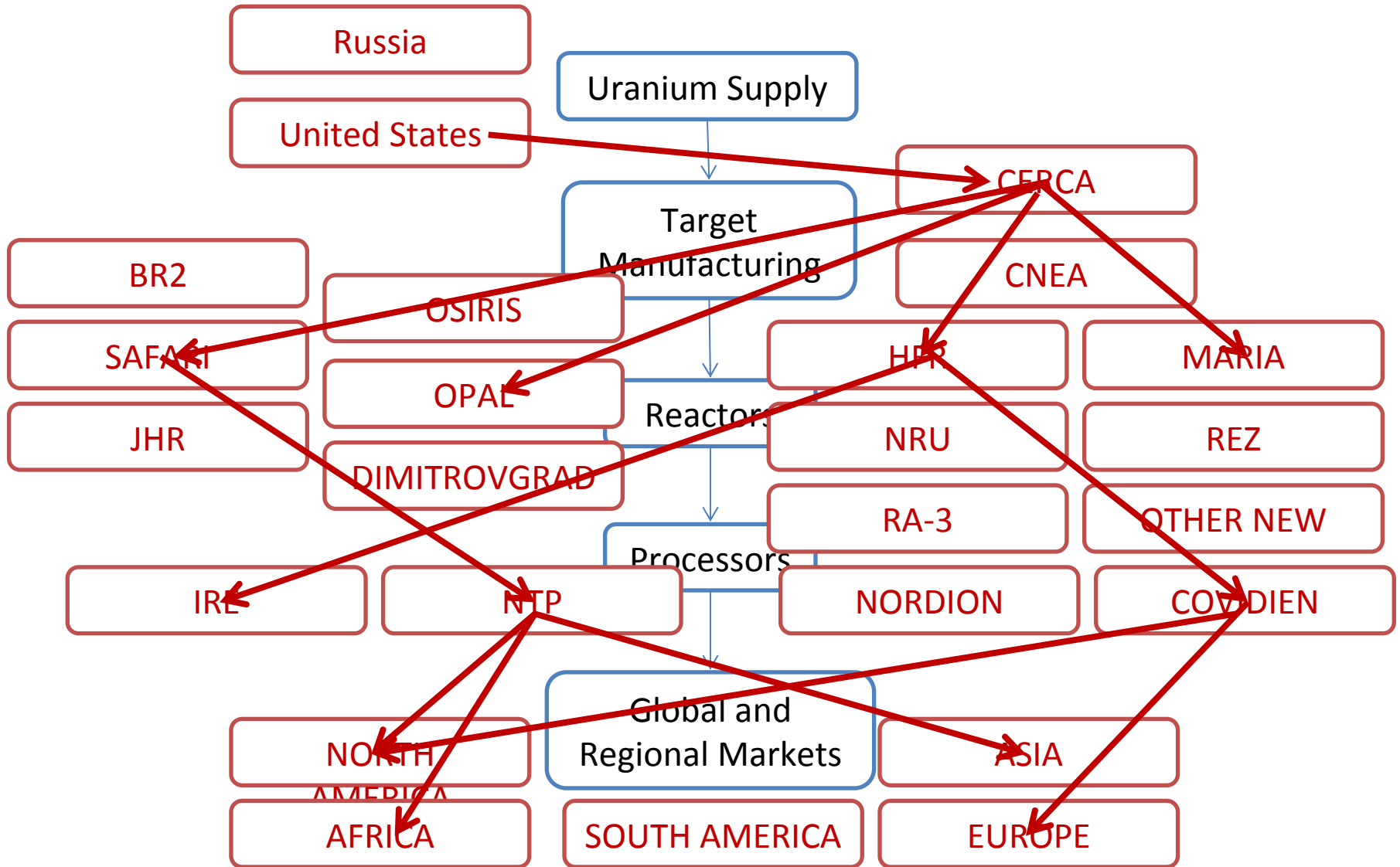
1. Develop a model of ^{99}Mo supply chain
2. Identification of possible supply chain impacts
3. Model impacts of conversion on supply chain
4. Model validation and shortage-coping methods
5. Modelling of impacts using shortage-coping methods

Part B: Assessment with adjusted targetry and processes

1. Modelling of impacts
2. Application of shortage-coping methods to model
3. Model validation

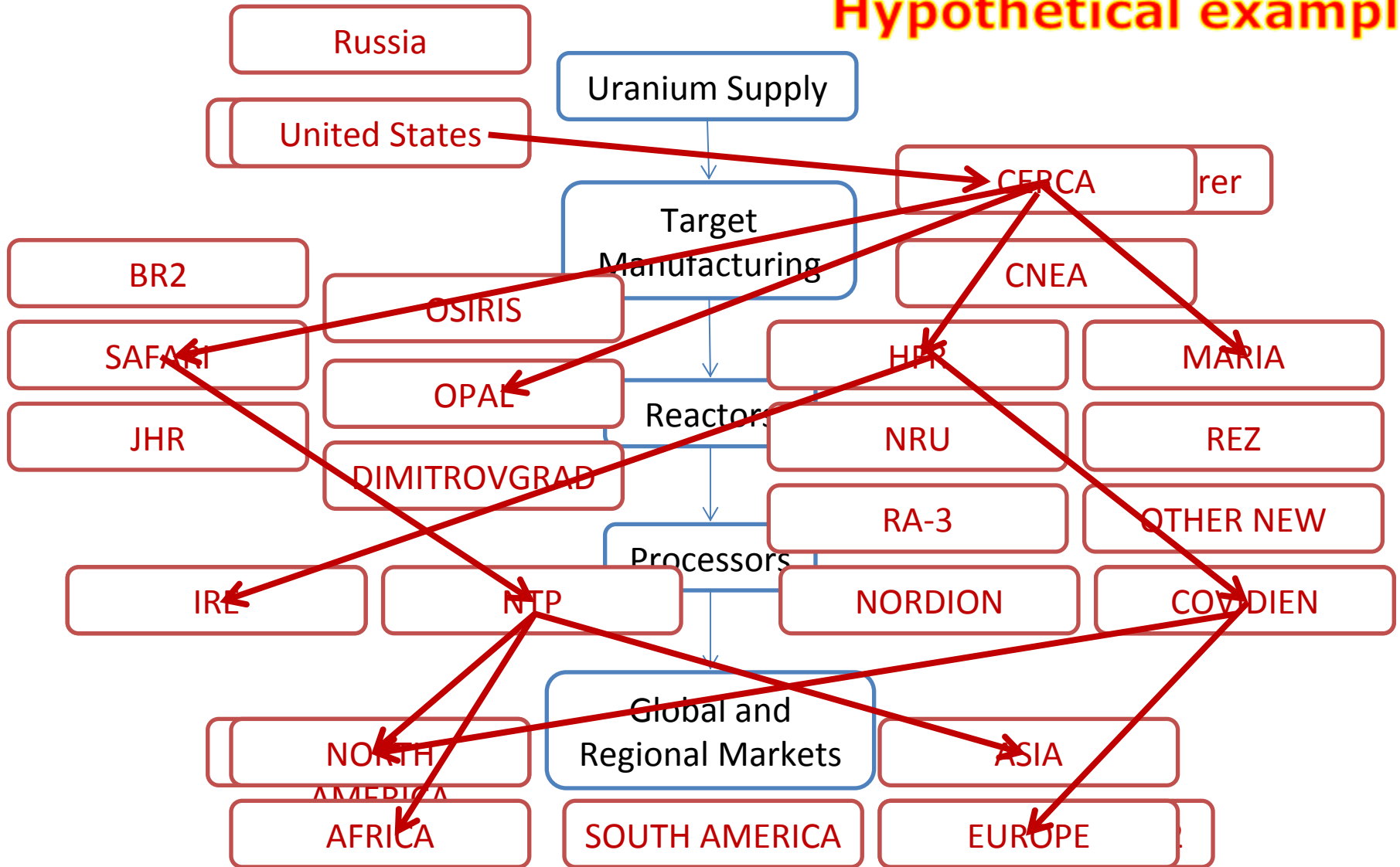
Part C: Policy options and recommendations

Capacity model: Development of reference case



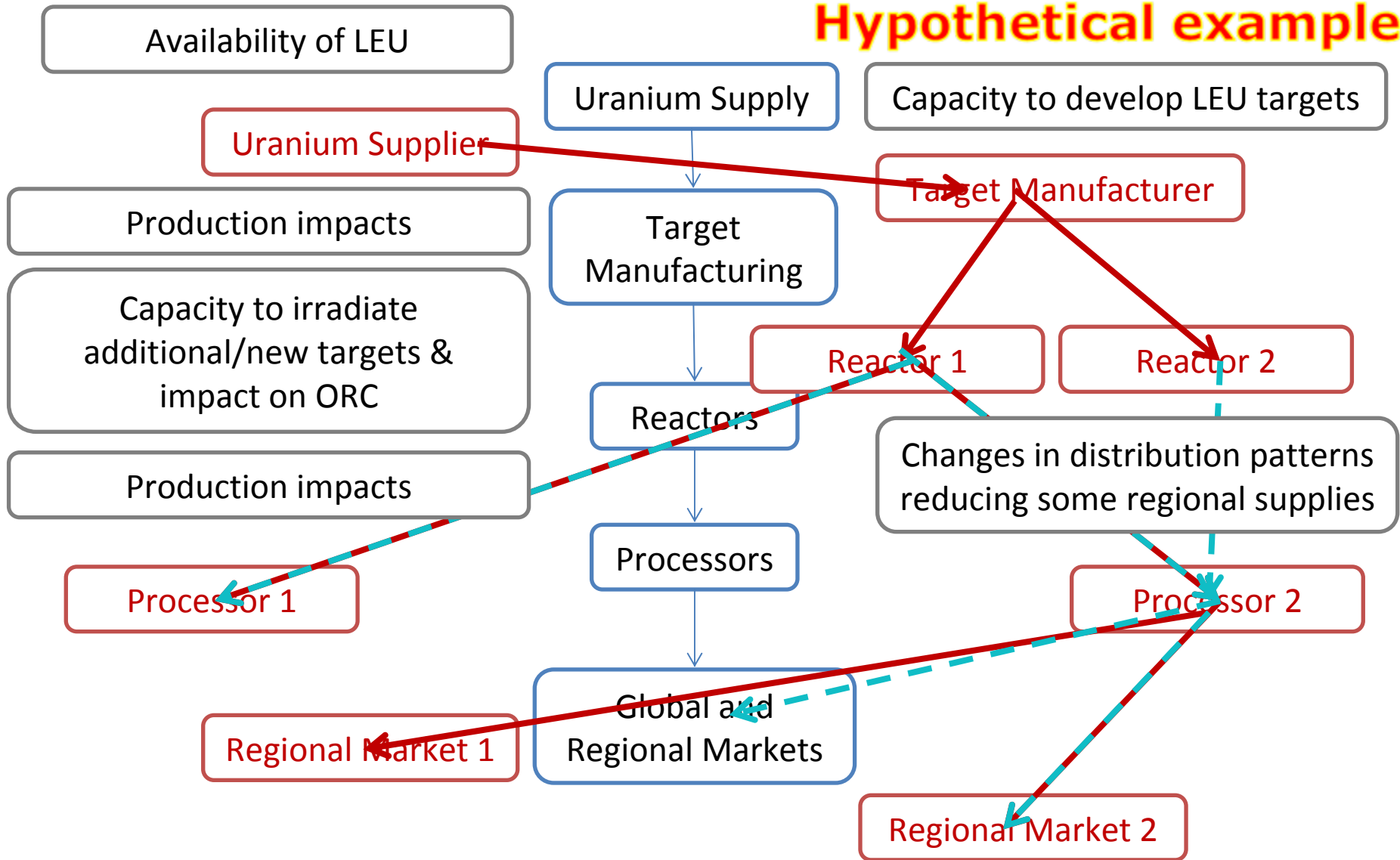
Capacity model: Identification and assessing impacts

Hypothetical example

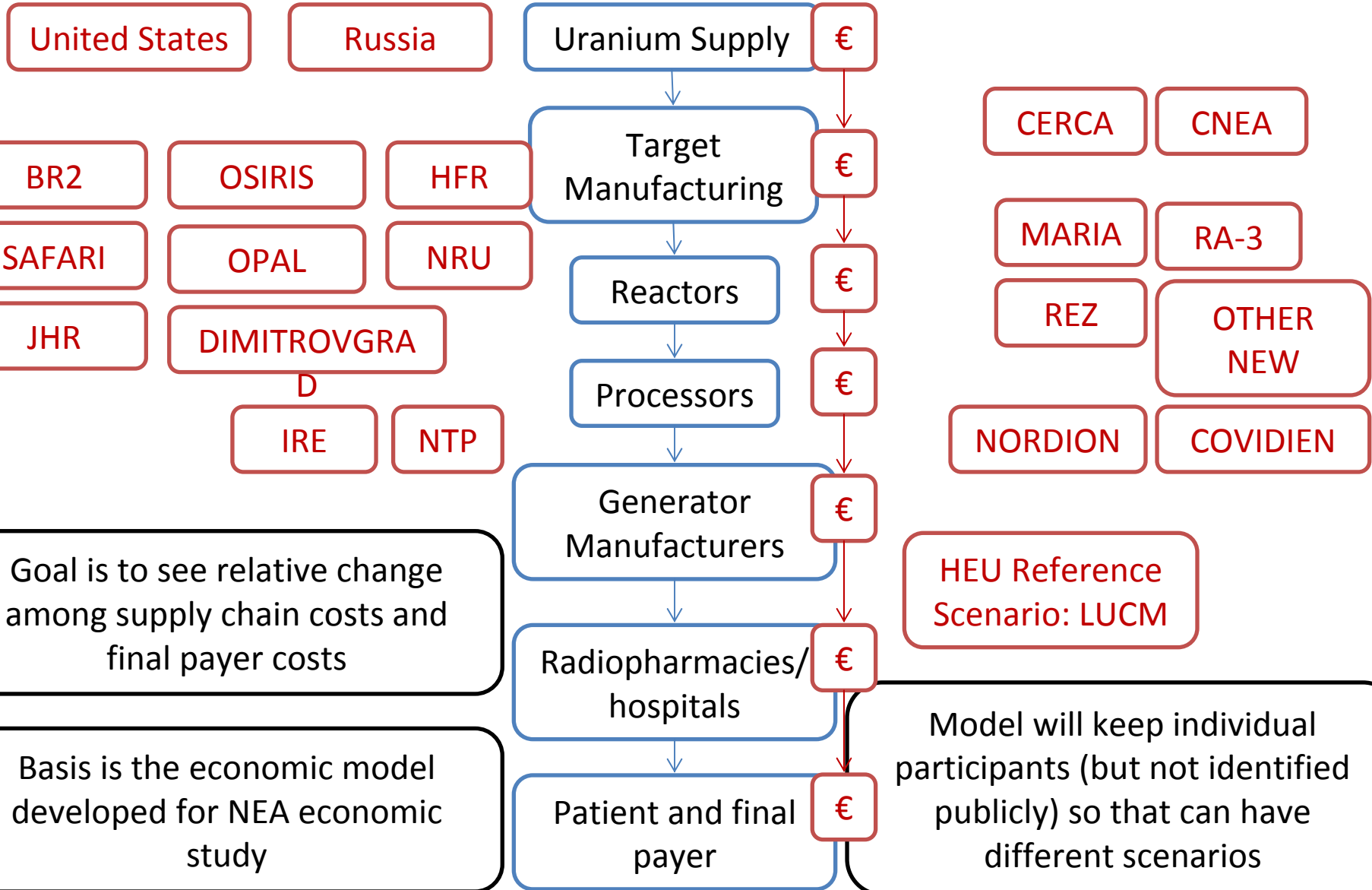


Capacity model: Identification and assessing impacts

Hypothetical example

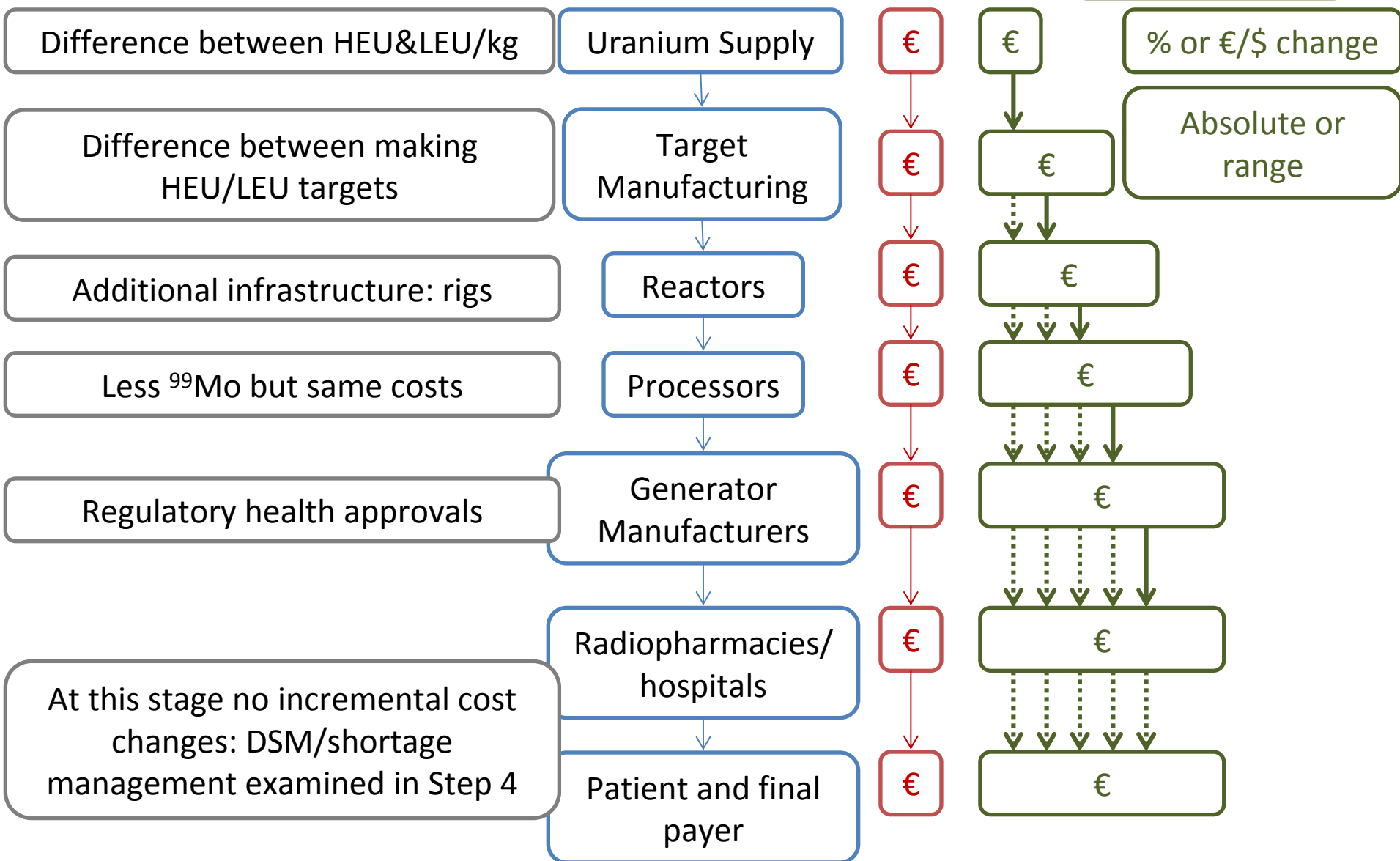


Economic model: Development of reference case



Economic model: Identification and assessing impacts

LEU Impact Scenario: LUCM



- First workshop on project (22-23 November 2011):
 - Agreement on general framework of model
 - Agreement on important impact elements
 - Main incremental impacts: on reactors and processors
 - First discussion on degree of impacts
- NEA will seek additional information on impacts from stakeholders
- From information, NEA develop model and create:
 - Reference case
 - Scenarios of conversion under Part A, steps 1 and 2 assumptions, with different timing scenarios (task 3)
- Second workshop to validate model and findings, and discuss actions to address potential supply shortfalls (Part A, step 4)
- Part B: adjusted targetry and processes