3S Framework

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"3S" Integration

Nuclear Safety

Operating conditions, prevention of accidents/mitigation of consequences, resulting in the protection of workers, the public, and the environment from undue radiological hazards

Nuclear Safeguards

Prevention and detection of theft or diversion of special nuclear material from civilian facilities through the use of material control and accountancy

Nuclear Security

Prevention and detection of, and response to sabotage, unauthorized access, or other malicious acts involving nuclear material, other radioactive substances or their associated facilities

"3S" Culture

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Safety

Security

Safe-guards

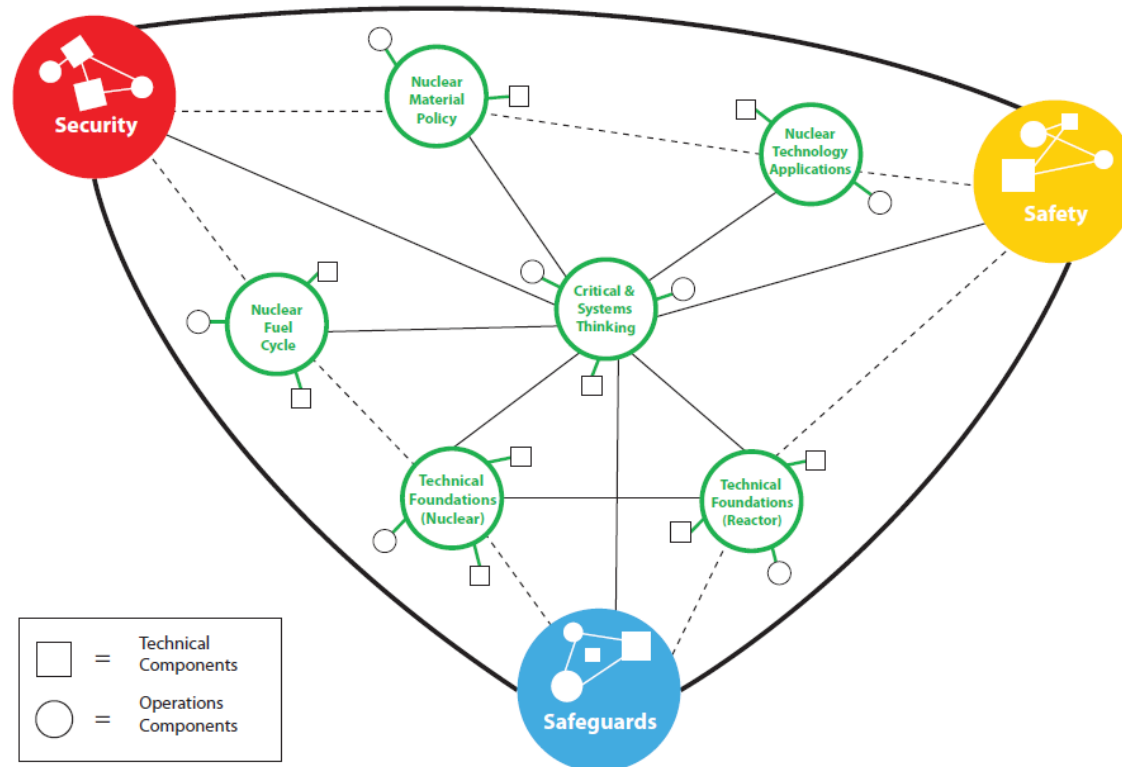Sandia National Laboratories

"3S" Integration

Elements work together to provide safe, secure, reliable, and economically viable electric energy

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3S = Nuclear Safety, Security, and International Safeguards
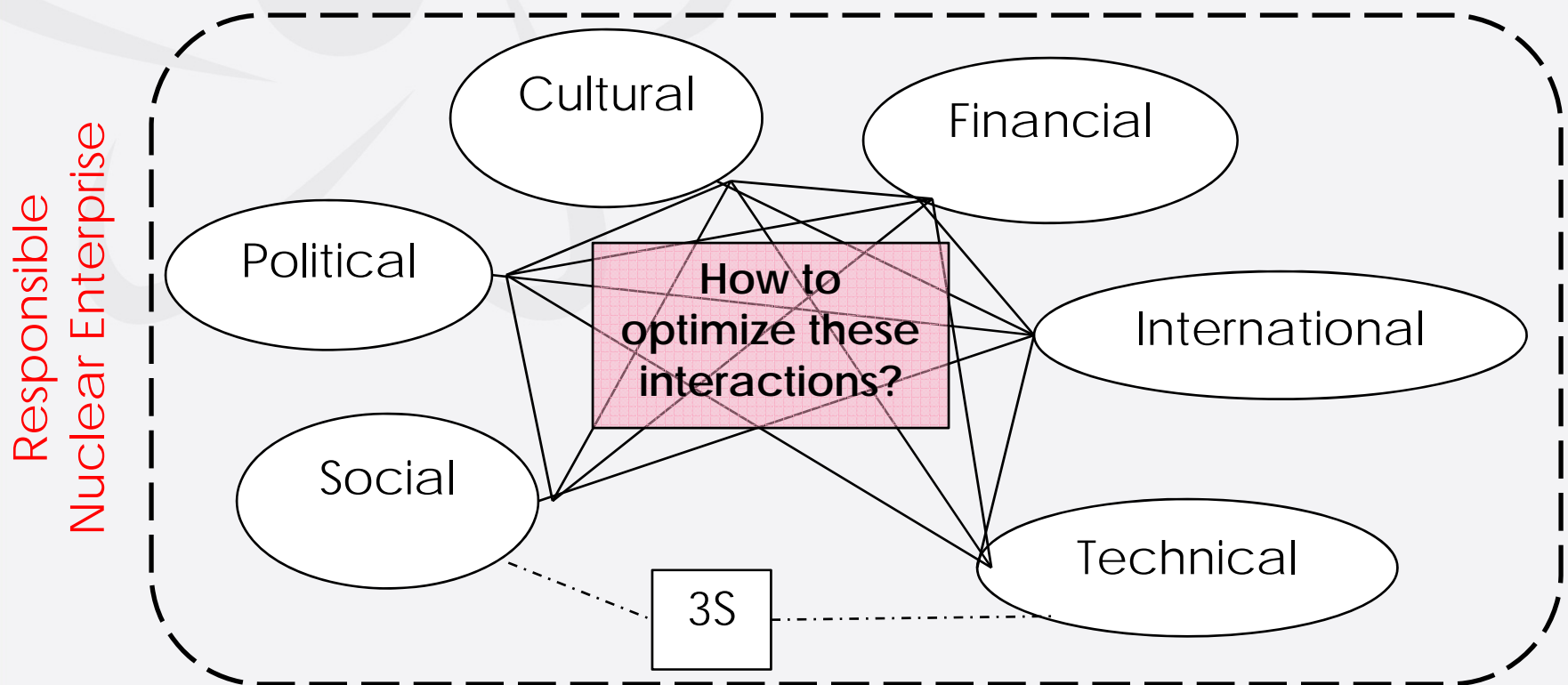
An Integrated Nuclear Energy 3S Model:

Responsible Nuclear Energy Program

➤ Integrated Safety, Security, & Safeguard (3S) Framework

1. Systems Analysis Approach
2. Critical Thinking

Thank you

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What elements or factors affect or influence decisions related to an RNEP?

Responsible Nuclear Enterprise

Cultural

Financial

Political

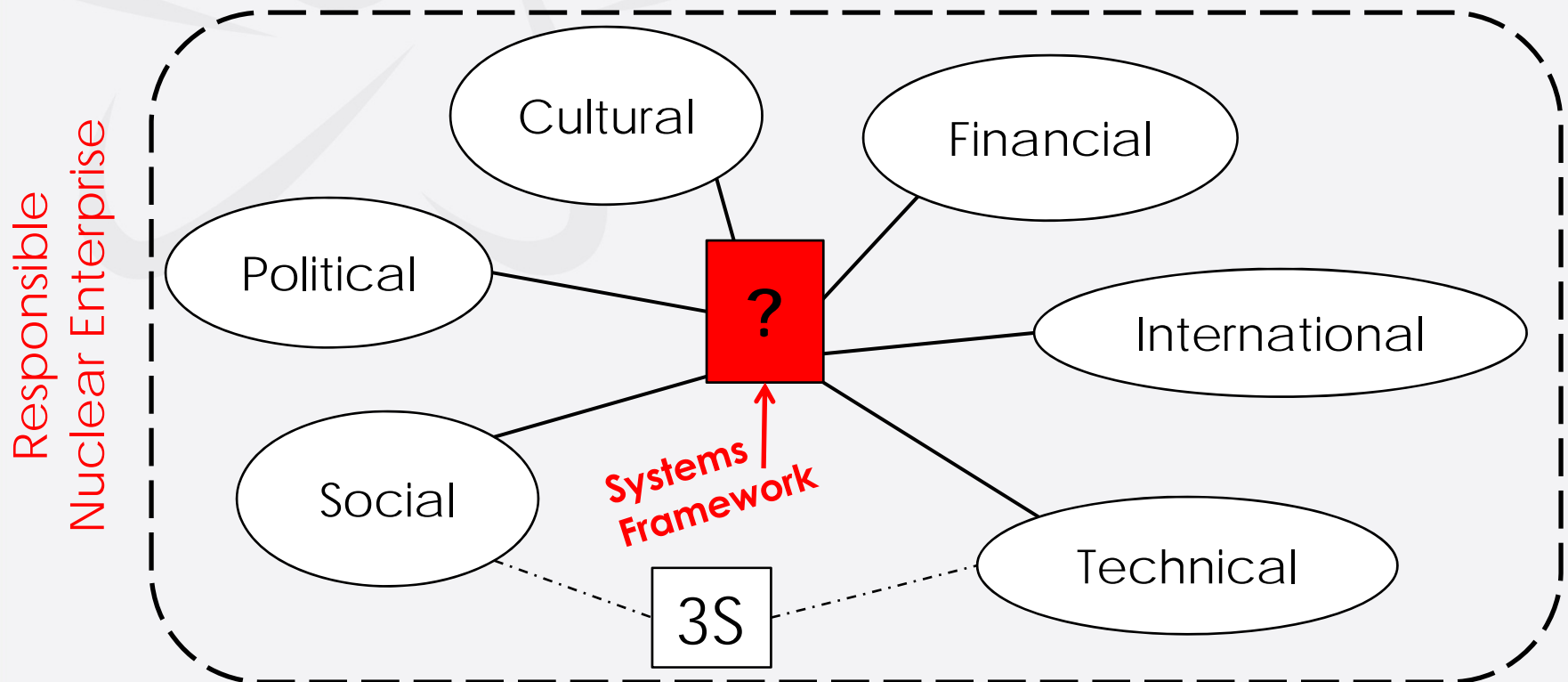How to optimize these interactions?

International

Social
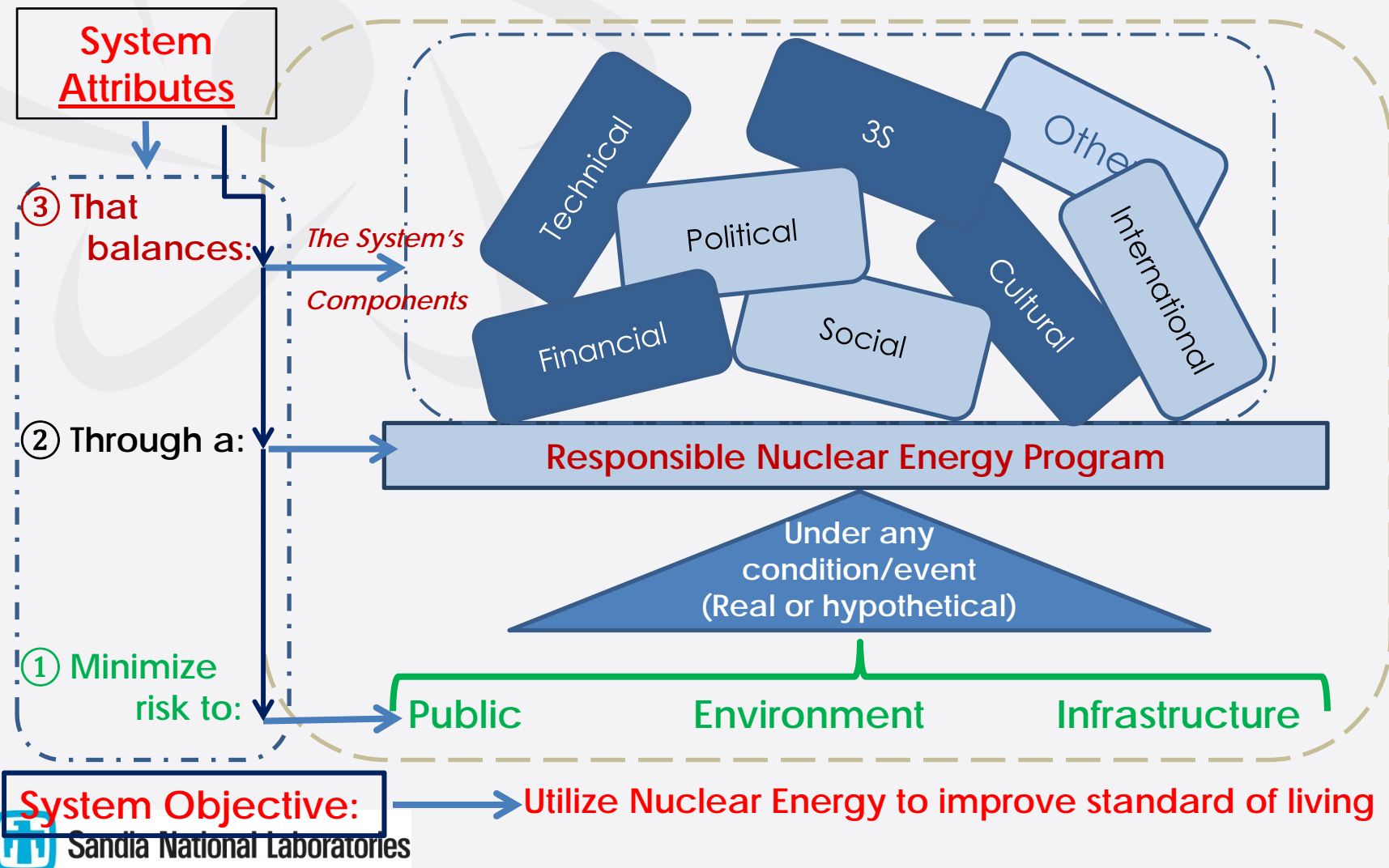
3S

Technical

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All of these elements are related, is there is a clear method for understanding these complex, adaptive relationships?

Our Answer (Hypothesis) is: Systems Framework

SYSTEM: Responsible Nuclear Energy Program

System Attributes

③ That balances:

The System's Components

Technical

3S

Othe

Political

International

Cultural

Financial

Social

② Through a:

Responsible Nuclear Energy Program

Under any condition/event (Real or hypothetical)

① Minimize risk to:

Public   **Environment**   **Infrastructure**

System Objective: → Utilize Nuclear Energy to improve standard of living
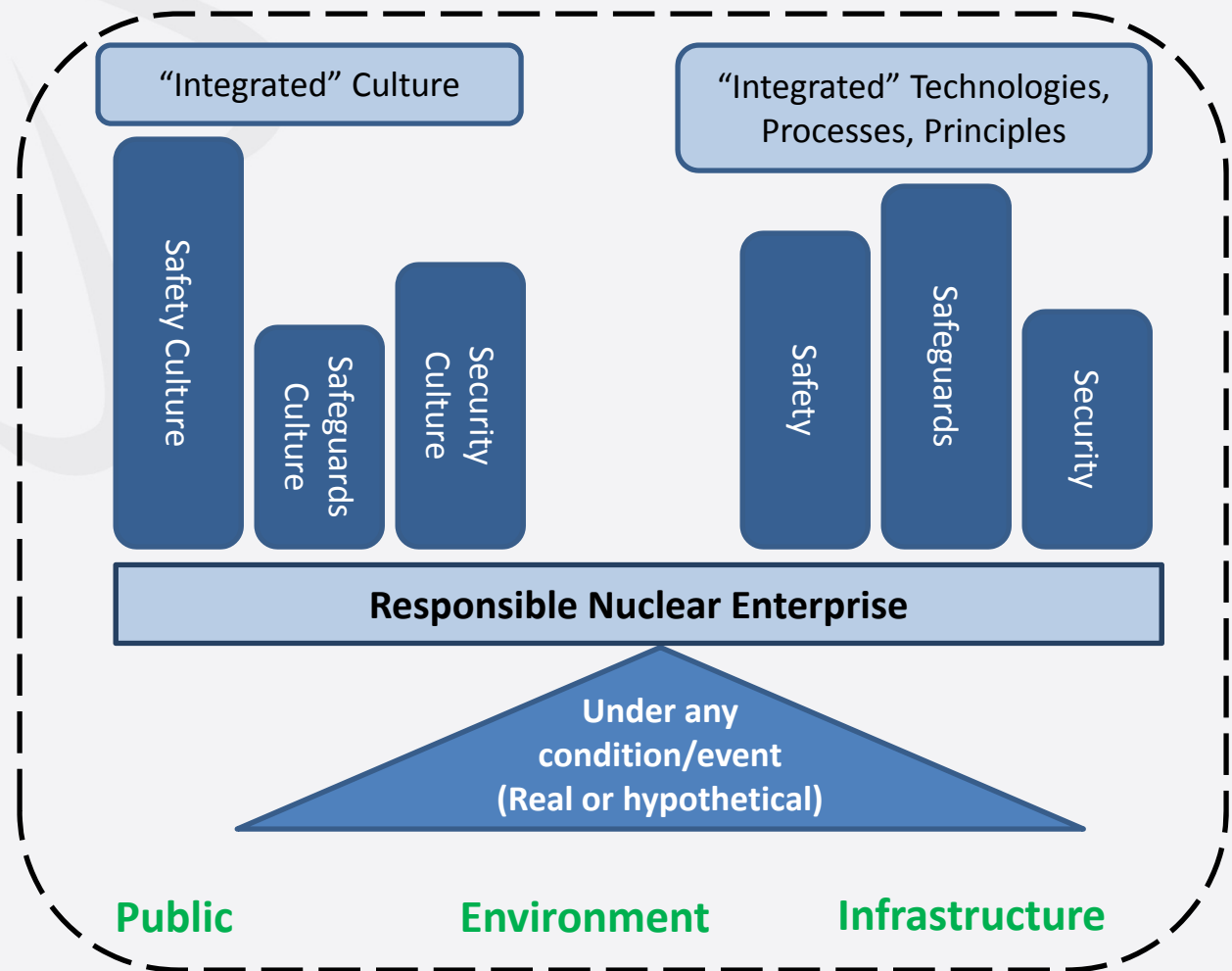
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9

Current (Traditional) Integrated 3S Framework

- Prescriptive
  - Based individually established policies
- Descriptive
  - Focuses on interface between existent culture and tools

- Reactionary

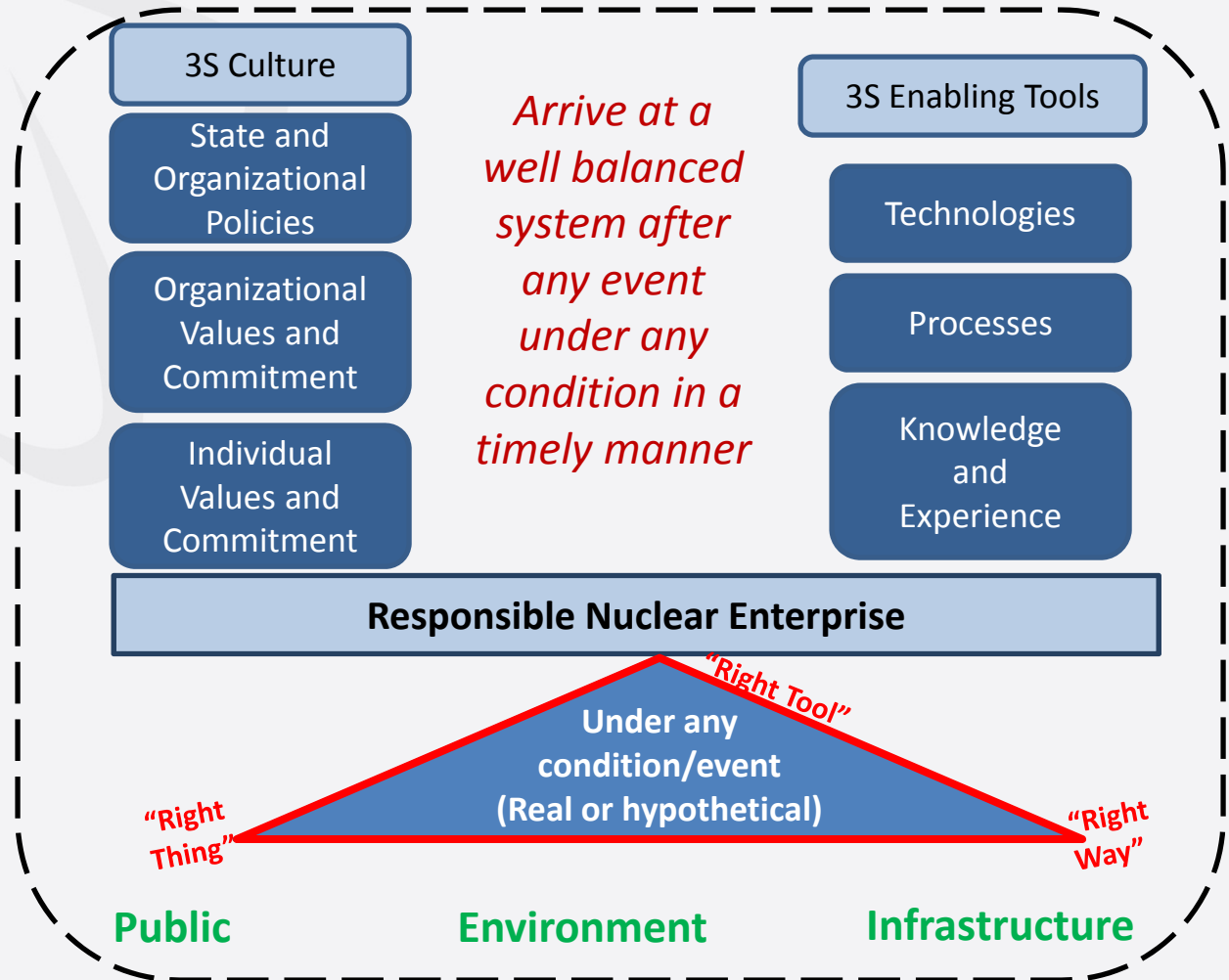- Stove-piped areas of expertise

3S Framework

"Integrated" Culture

"Integrated" Technologies, Processes, Principles

Safety Culture

Safeguards Culture

Security Culture

Safety

Safeguards

Security

Responsible Nuclear Enterprise

Under any condition/event (Real or hypothetical)

Public　　　**Environment**　　　**Infrastructure**

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- Dynamic
  - Based on combining right thing, way and tool in timely manner
- Adaptive
  - Able to easily (and dynamically) find the balance; focuses on integrating necessary components of culture/tools
  - Feedback capable
- Proactive
- Comprehensive understanding across areas of expertise

Proposed Model for 3S Framework

3S Culture

State and Organizational Policies

Organizational Values and Commitment

Individual Values and Commitment

Arrive at a well balanced system after any event under any condition in a timely manner

3S Enabling Tools

Technologies

Processes

Knowledge and Experience

Responsible Nuclear Enterprise

Under any condition/event (Real or hypothetical)

"Right Tool"

"Right Thing"

"Right Way"

Public　　**Environment**　　**Infrastructure**

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- A Strong 3S Framework should allow:
  - Identify "right thing"
  - Identify "right way"
  - Identify "right tool"

  All in the "right time"

- A critical thinking and systems analysis approach considers both the:

—3S Culture
- Individual (All) Values and Commitment
- Organizational Values and Commitment
- Sate and Organizational Policies

AND

—3S Enabling Tools
- Technologies
- Processes
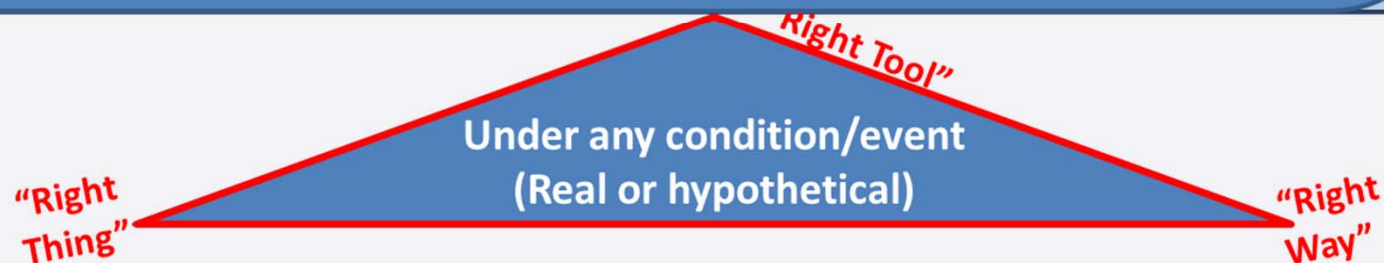- Knowledge and Experience

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Critical Thinking: a process for consistent evaluation of thought processes and examinations of assumptions, values and behaviors
- Elements of thought
- Intellectual standards
- Intellectual traits

Systems Analysis Approach: developing and using complex mental models to analyze the mutual interaction of components of a system , or systems:
- Components
- Attributes
- Relationships

"Right Tool"

Under any condition/event
(Real or hypothetical)

"Right Thing"

"Right Way"

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- "Right thing" and "Right action" …?
  - Decisions and options = choices
    - The "human factor" cannot be always regulated
  - Sets of values, beliefs, commitments, and attitudes
    - Individual & organizational
      - policies, processes,..
  - Examine decisions and actions (feedback)
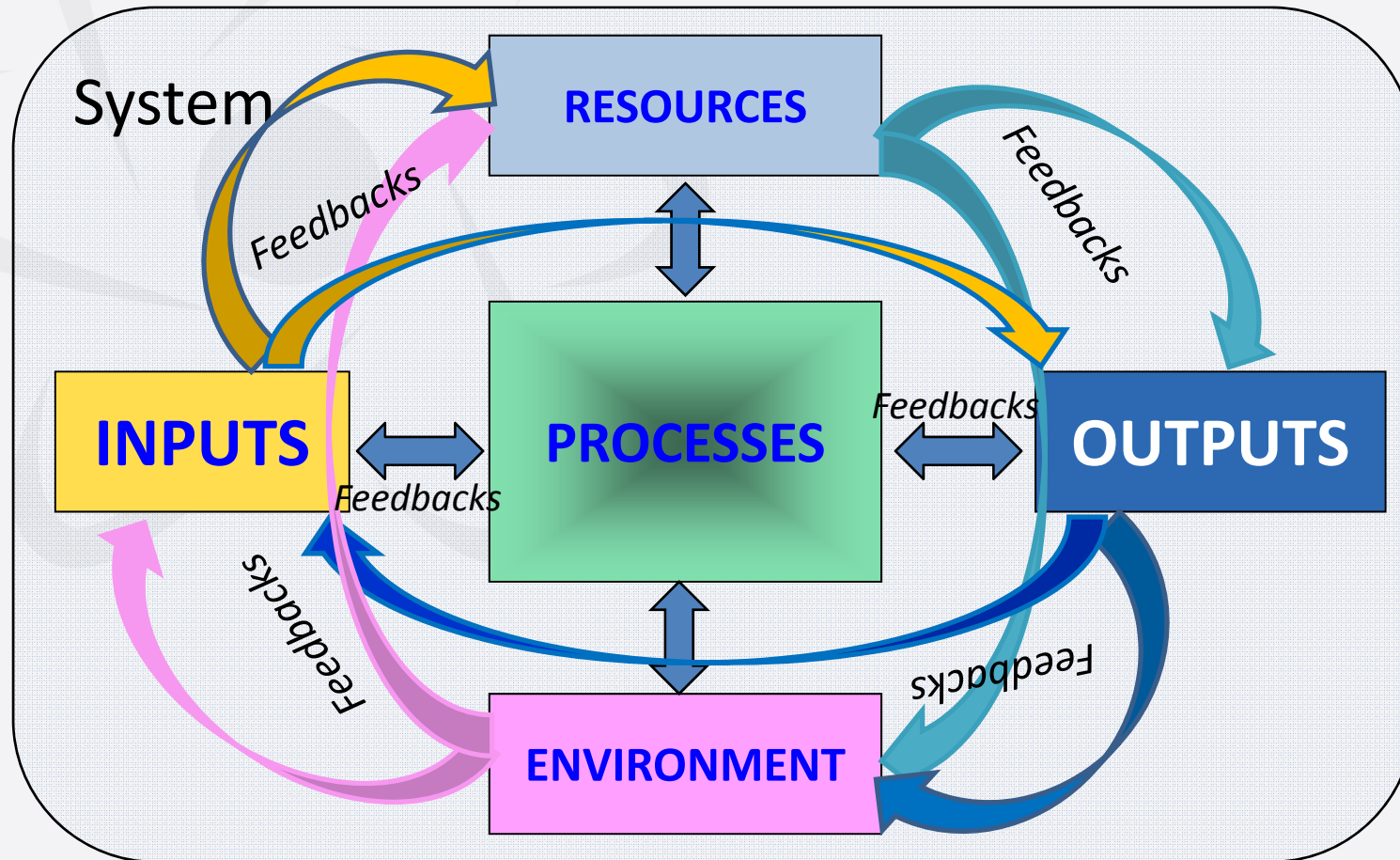   - Objective and consistent

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How to Impact 3S Culture?

- **Basic Assumptions**
  - Impact must be at the deepest level

  - Make a positive impact each individual's "values, beliefs and assumptions"

- *Fair-minded Critical Thinking*
  - Consistent evaluation of thought process
  - Examine values, beliefs and assumptions

- *Systems Thinking & Approach*
  - Analyze interactions among a system's elements & components

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3S is a complex "system-of-systems"
each subsystem has many components with multiple interactions & feedbacks.