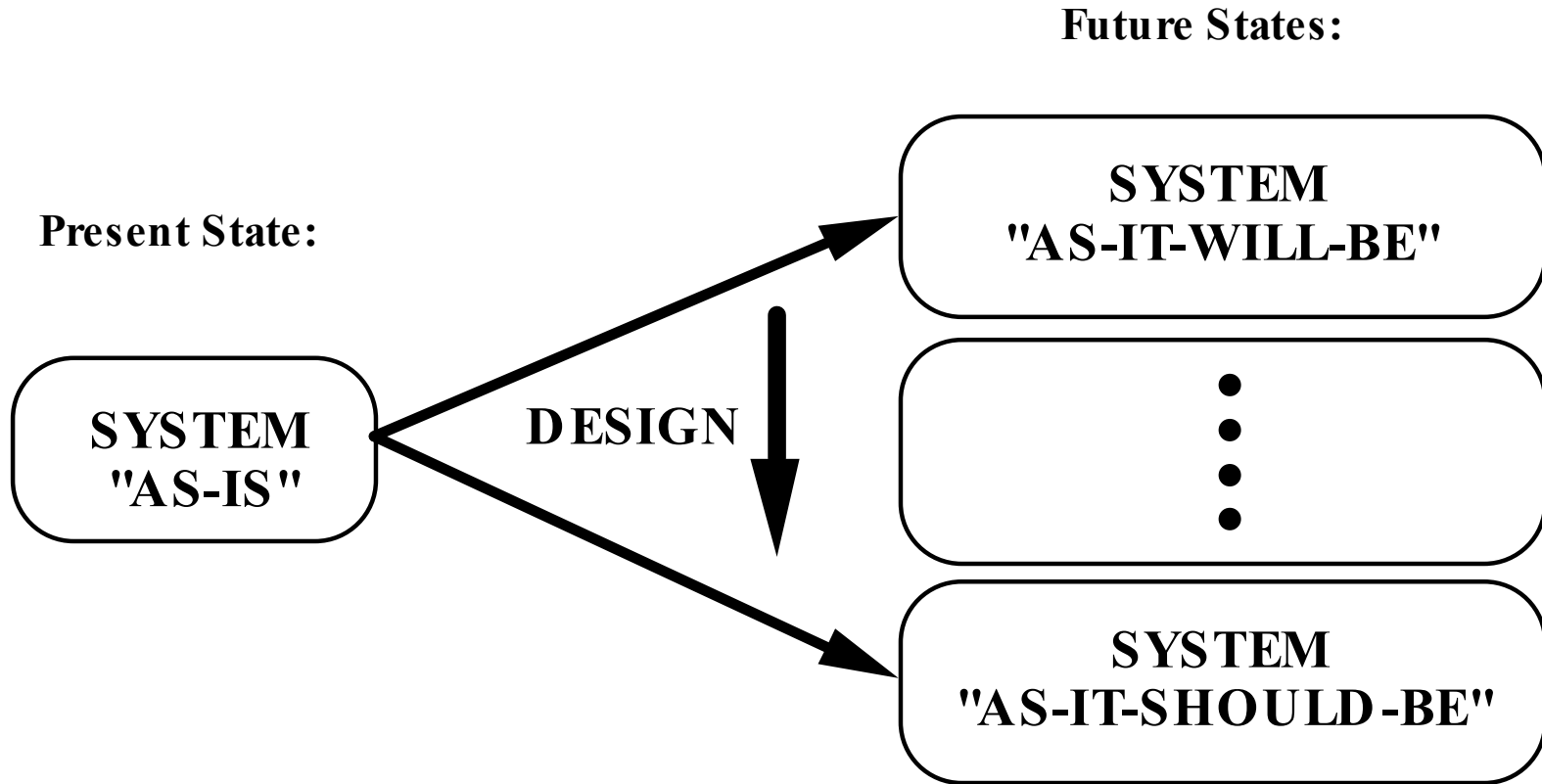


Juggling Multiple Options

If you're a decision maker...

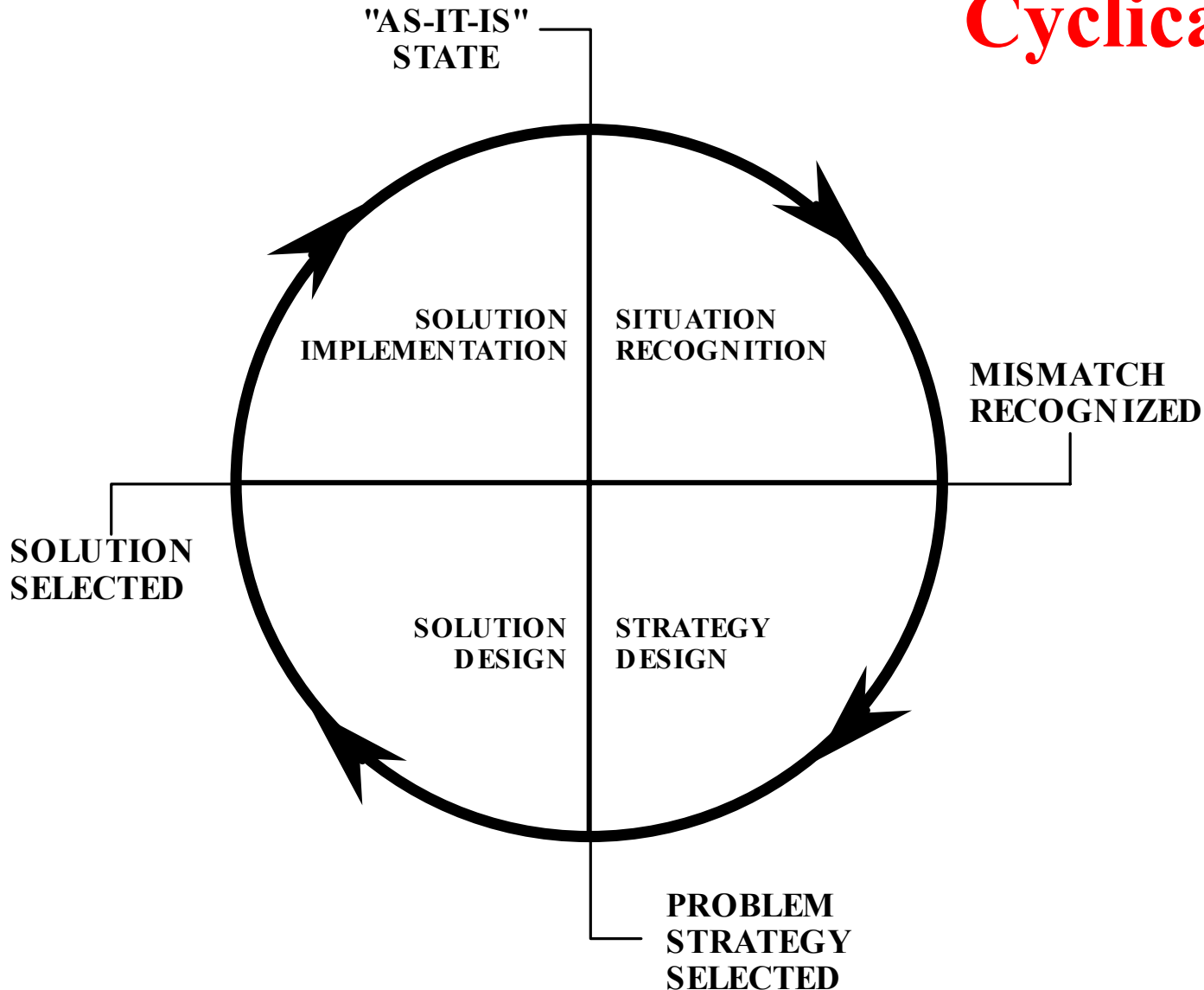
- Many potential solutions exist
- Which ones do you choose, if you can't choose *all* of them?
 - Financial and resource constraints
 - Performance and other constraints
- Which ones are most critical or effective for your particular facility?
- Where do you start?!??

The Sustainable and Regenerative (StaR) Systems Design Process



(Source: Zandi 1993)

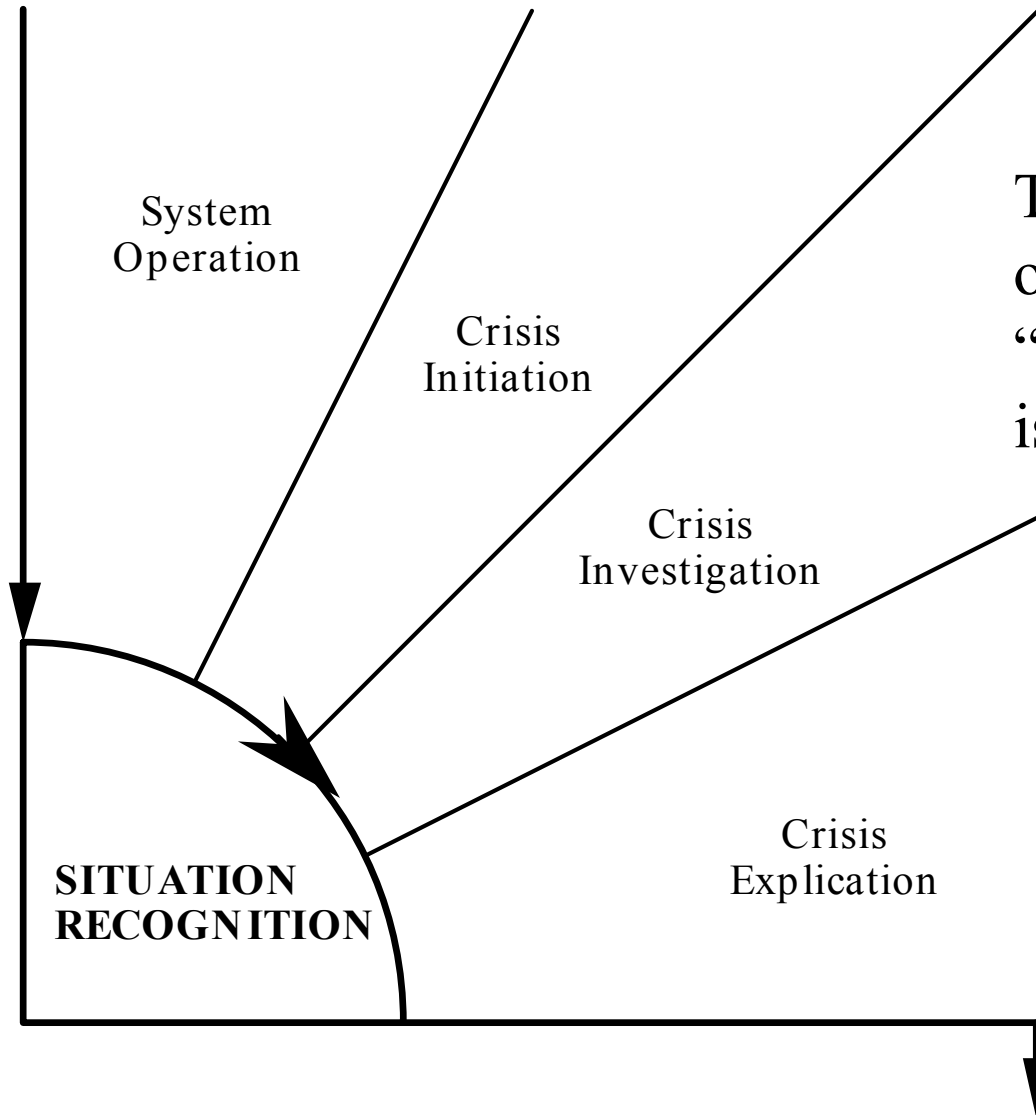
StaR in the Context of Cyclical Problem Solving



(Source: Pearce 1998)

Situation Recognition

"AS-IT-IS"
STATE



**MISMATCH
RECOGNIZED**

(Source: Pearce 1998)

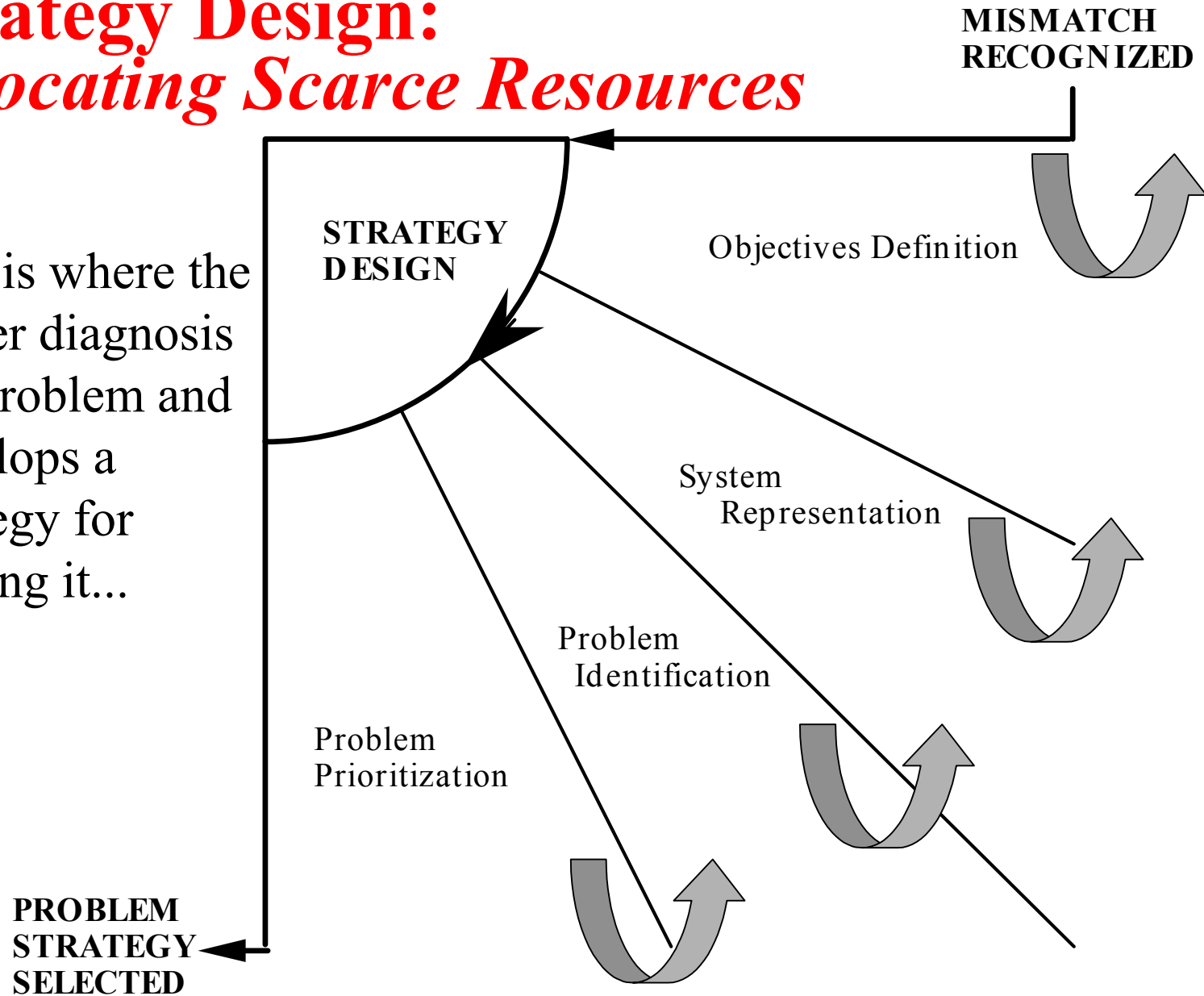
Triggers for Initiation of a System Crisis

	Proactive		Reactive	
Internal	FLASH	Change of:	CRASH	Change of:
	<ul style="list-style-type: none"> • Values • Mission • Perceptions 		<ul style="list-style-type: none"> • Functional Requirements • Physical Integrity / Function 	
External	SPLASH	Change of:	CLASH	Change of:
	<ul style="list-style-type: none"> • Market • Benchmarks • Competition 		<ul style="list-style-type: none"> • Codes • Regulations • Standards 	

(Source: Pearce 1998; Vanegas & Pearce 2000)

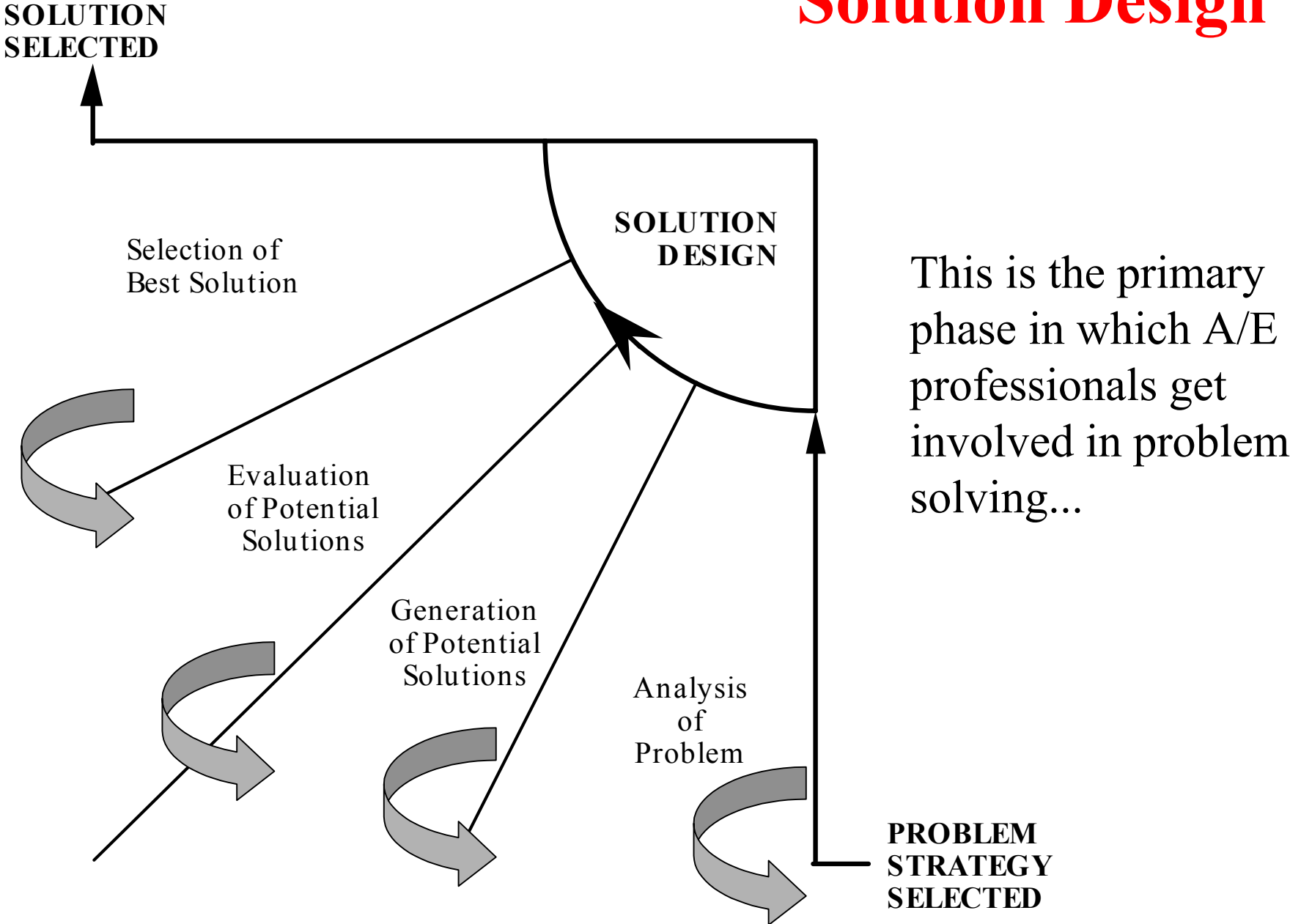
Strategy Design: *Allocating Scarce Resources*

This is where the owner diagnosis the problem and develops a strategy for solving it...



(Source: Pearce 1998)

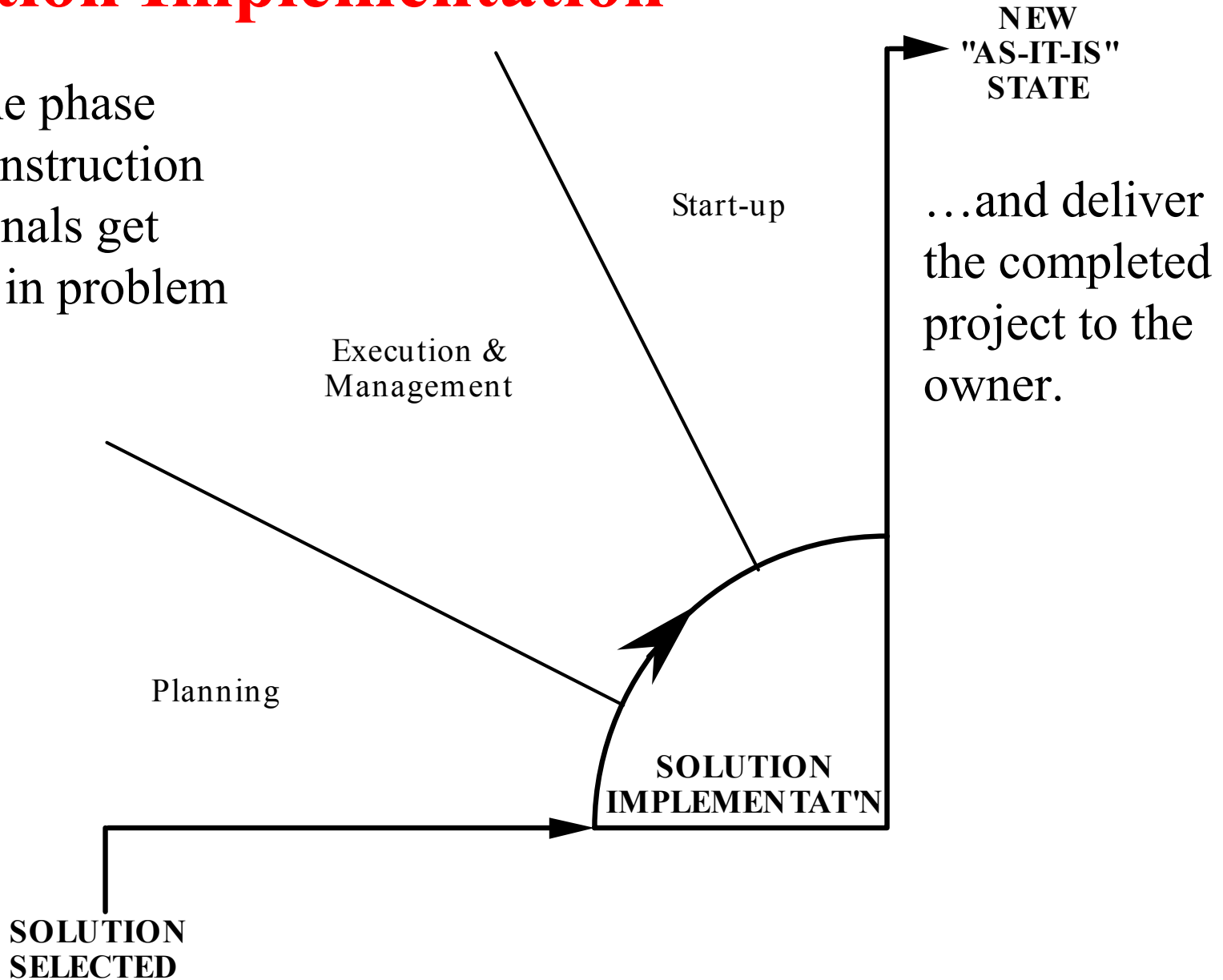
Solution Design



(Source: Pearce 1998; Vanegas 1987)

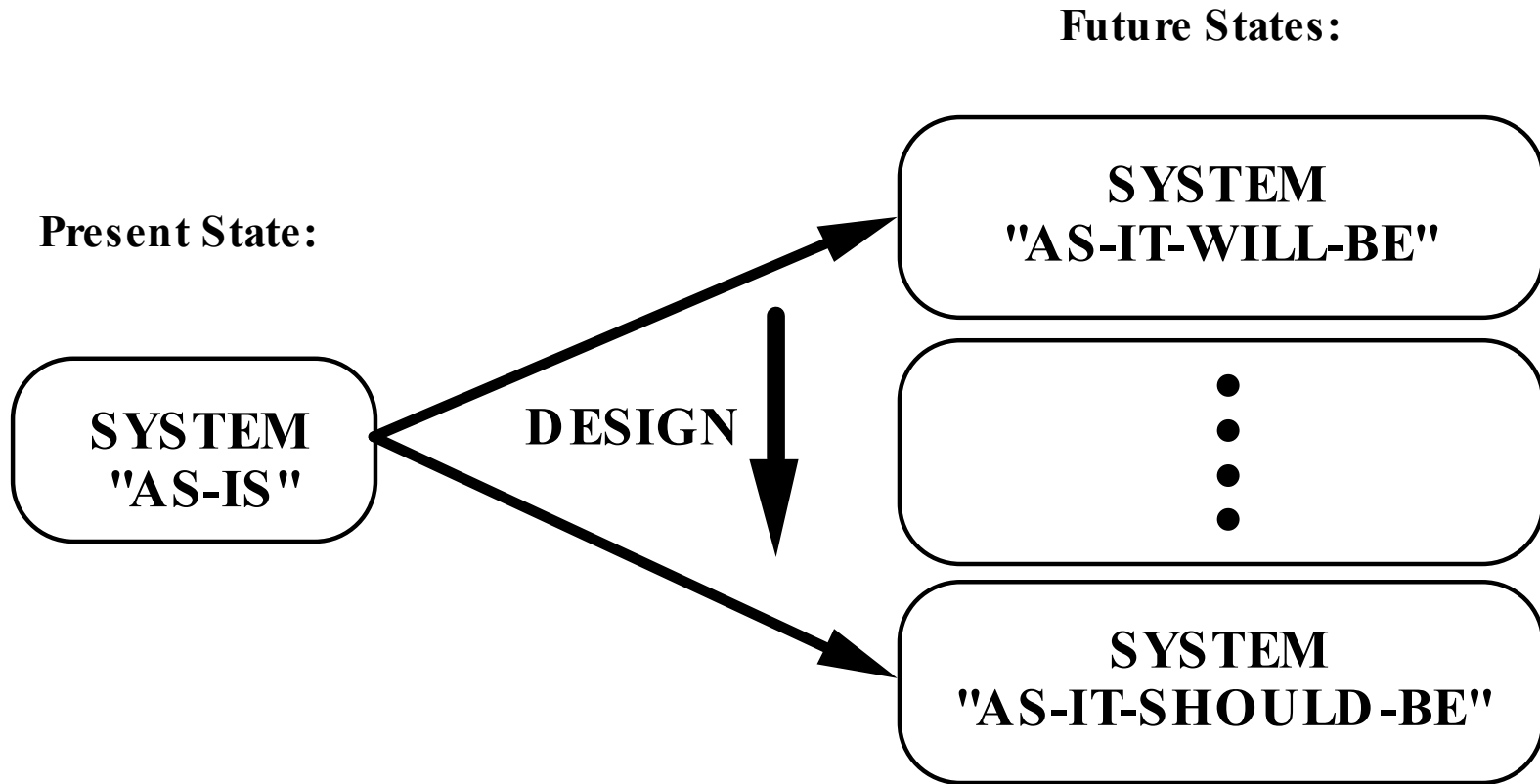
Solution Implementation

This is the phase where construction professionals get involved in problem solving...



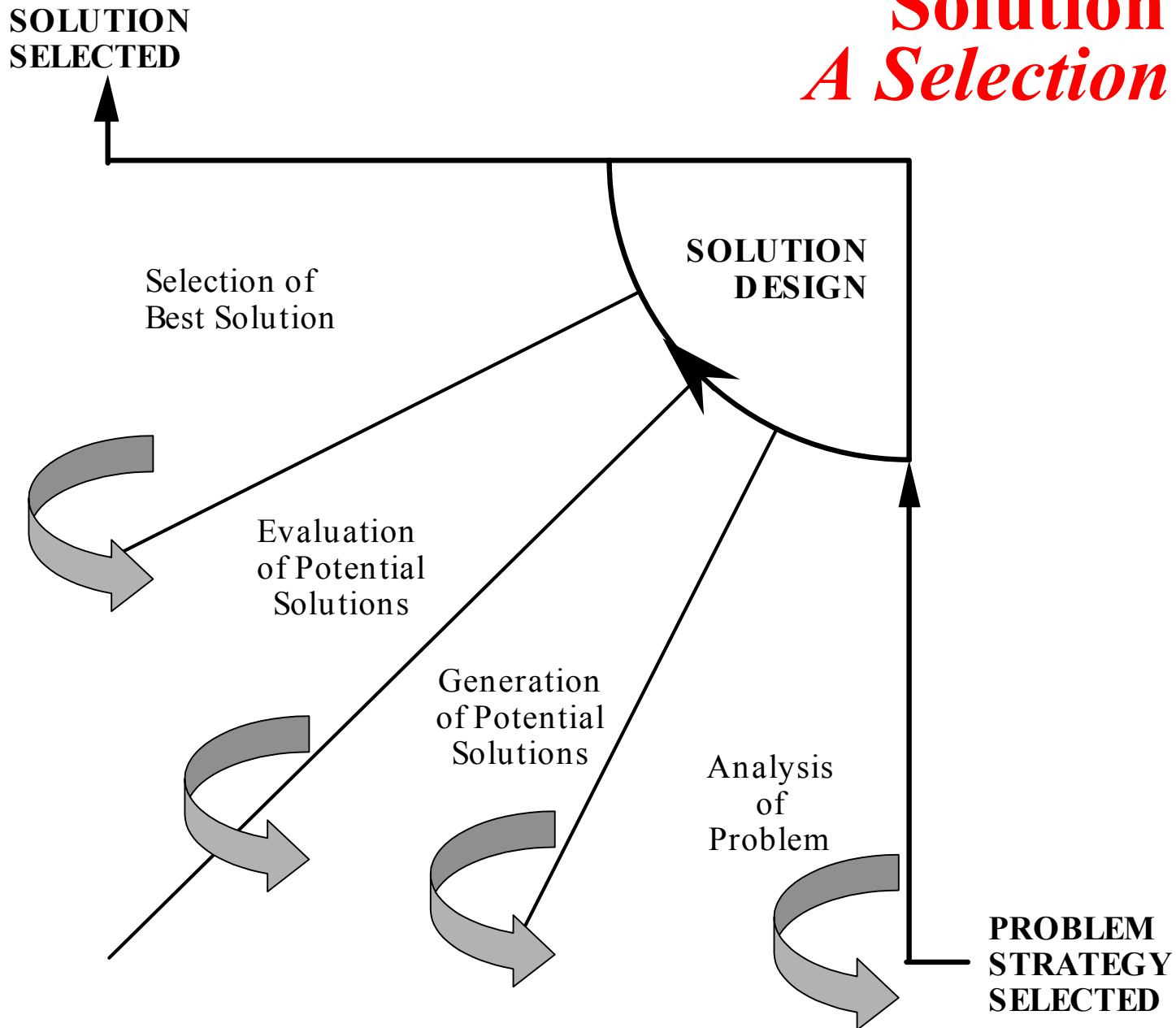
(Source: Pearce 1998)

The Sustainable and Regenerative (StaR) Systems Design Process



(Source: Zandi 1993)

Solution Design: *A Selection Process*



(Source: Pearce 1998; Vanegas 1987)

Analyzing Problems

- What kinds of problems are posed to us?
- Who is “us”? Whose interests do we represent?
- Let’s consider a simpler problem, to illustrate some basic principles...

Analyzing the Problem: *The Solution Tree* Method

- Establishing the initial cluster:
 - State the presenting problem
 - Identify the obvious or presented solutions
 - Articulate the need satisfied by the solutions
- Expanding horizontally:
 - Ask yourself, “What else?” Identify other solutions that would meet the need as it is stated.
- Expanding vertically:
 - Ask yourself why the need exists. What’s the next highest or generalized need?
- Continue recursively until you identify a fundamental need for which there are no viable alternatives.

Analyzing (and Framing) the Problem

Considerations:

- **Stakeholder perspective** – the viewpoint or viewpoints we *consciously* choose to adopt in defining our objectives and criteria for evaluating possible solutions
- **Scale of the problem definition** – how big we decide to define the problem we're going to solve. This corresponds to the level of the solution tree that we believe is realistic to tackle, depending on the constraints we have to accommodate.
- **Potential optimality of solution** – In general, the bigger the scale we consider, the better our chances are of finding an optimal solution.
- **Moral:** Always question the question!

Generating Solutions: *Building on the Solution Tree*

Strategies:

- Examine the solution set you've already generated in framing your problem...
 - **Categorization** according to common attributes
- Expand on that solution set, subject to your objectives and constraints...
 - **Innovation:** Identifying gaps in solution space
 - **Adaptation/Customization:** Modifying existing solutions to match a specific situation
 - **Optimization:** Systematically improving upon an existing solution to minimize its flaws or weaknesses

Recap and Overview: *Incorporating Sustainability into Professional Practice*

StaR Decision Making Principles:

- Question the question...
- Understand the context - the answer is always, “It depends...”
- Systematically account for impacts of decisions...
- Keep in mind the “as-it-should-be” state...

Implementing StaR: *Challenges*

- Resistance to change...
 - **Ignorance:** “Sustaina-what?”
 - **Skepticism:** “Healthy, schmelthy!”
 - **Vestedness:** “If it ain’t broke...”
 - **Risk aversion:** “I won’t be the guinea pig”

