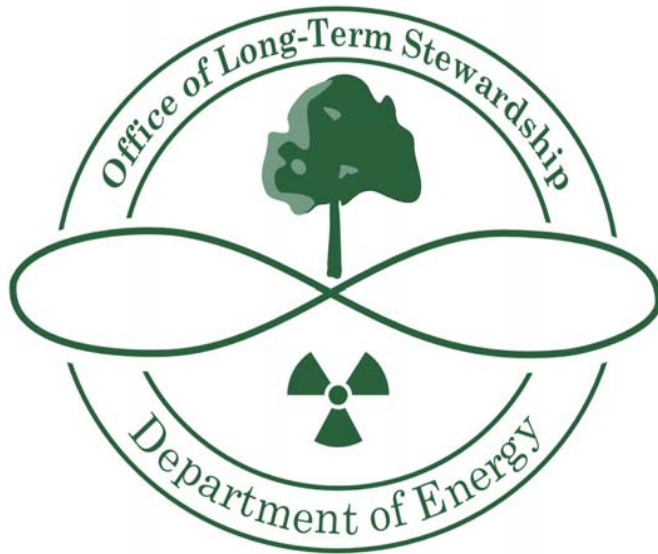


Long-Term *Stewardship*

Science and Technology

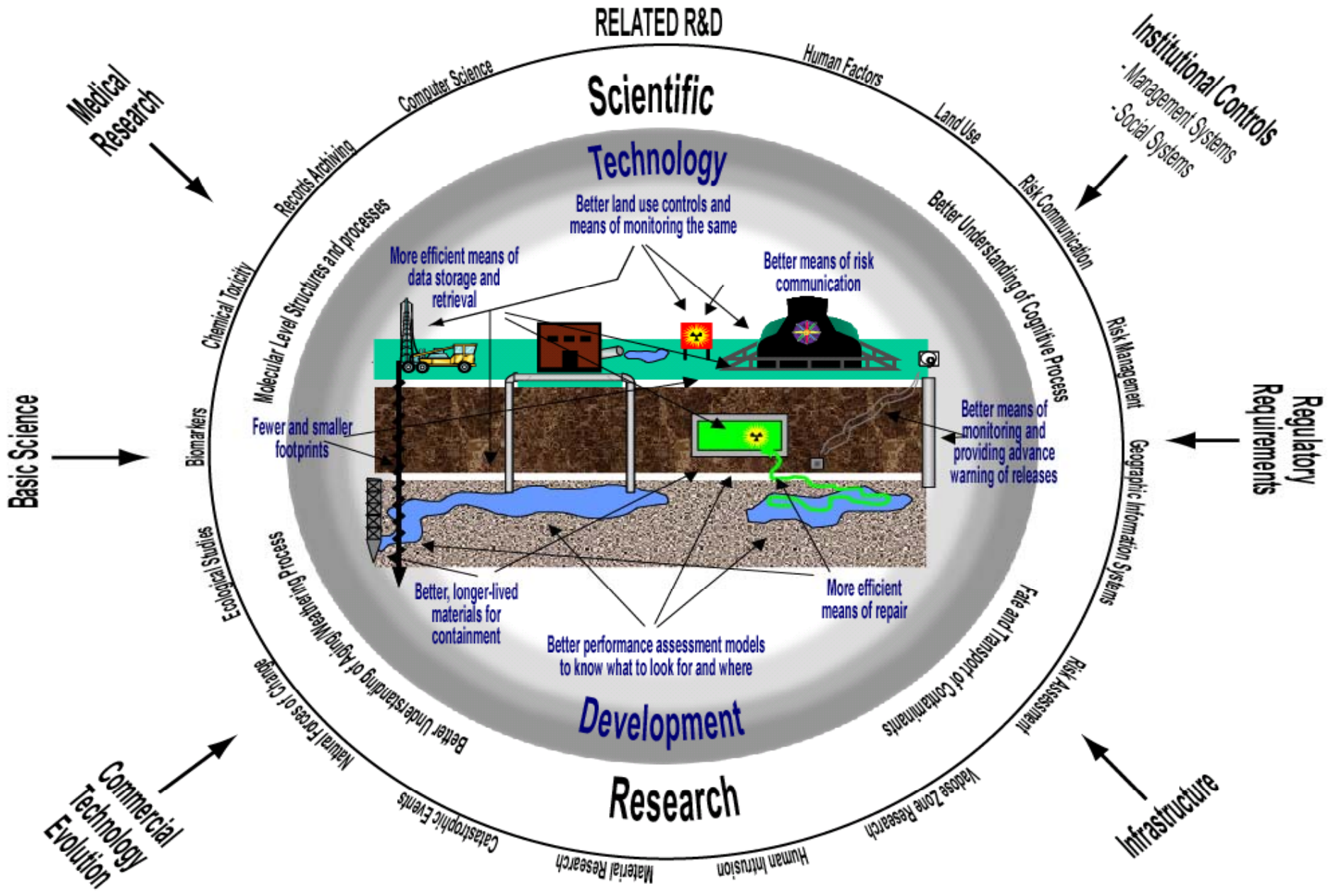


Long-Term Stewardship Science & Technology Roadmap: Starting the Trip

**Presented to
ITRC Rad-Team
Washington, DC**

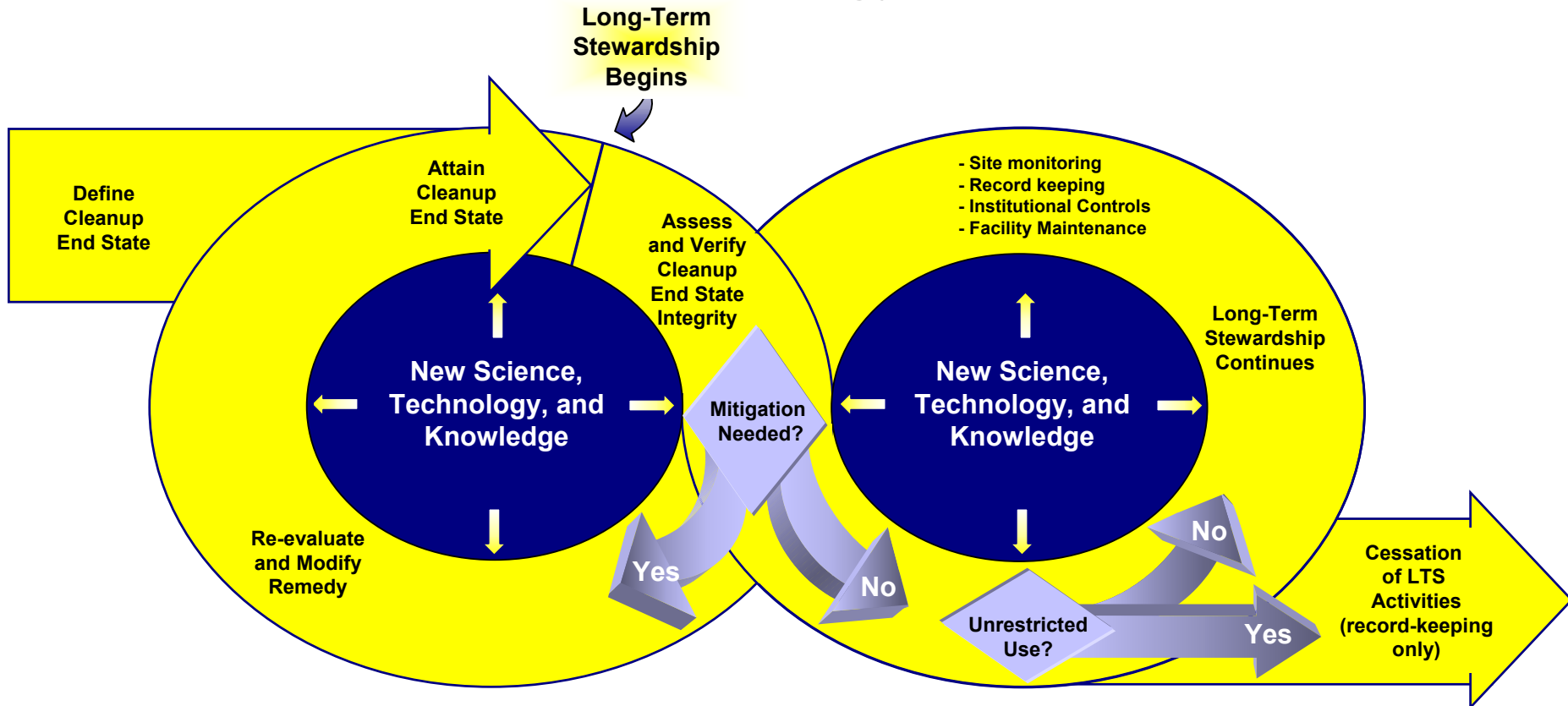
7 November, 2002



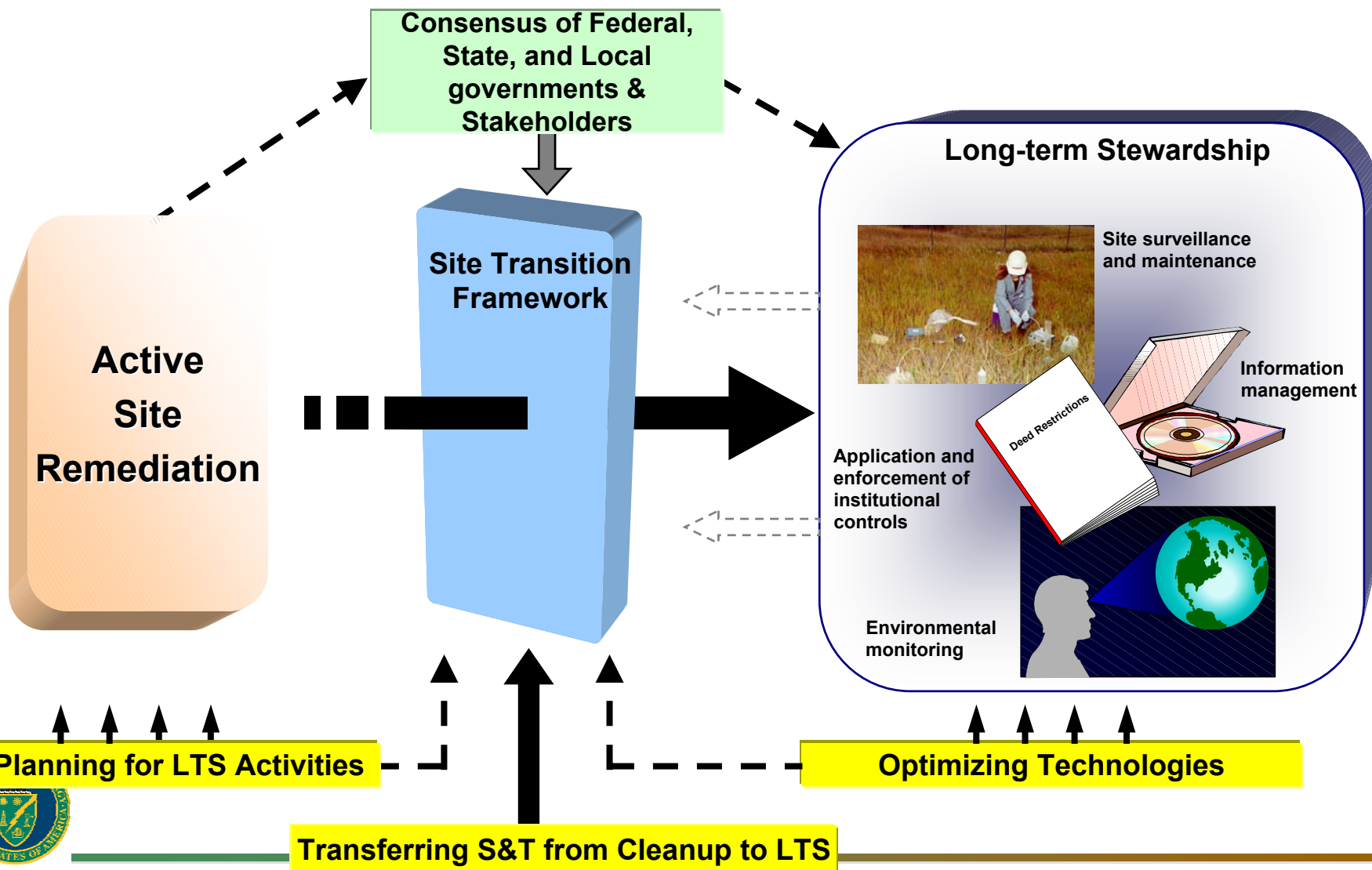


Science & Technology Developments Enhance the Cleanup & LTS “System”

The costs of long-term stewardship are driven by the cleanup technology employed at the site. LTS life-cycle costs must be factored into the cleanup decision-making process as well as the technology development process



Technology can help ensure a smooth transition to long-term stewardship



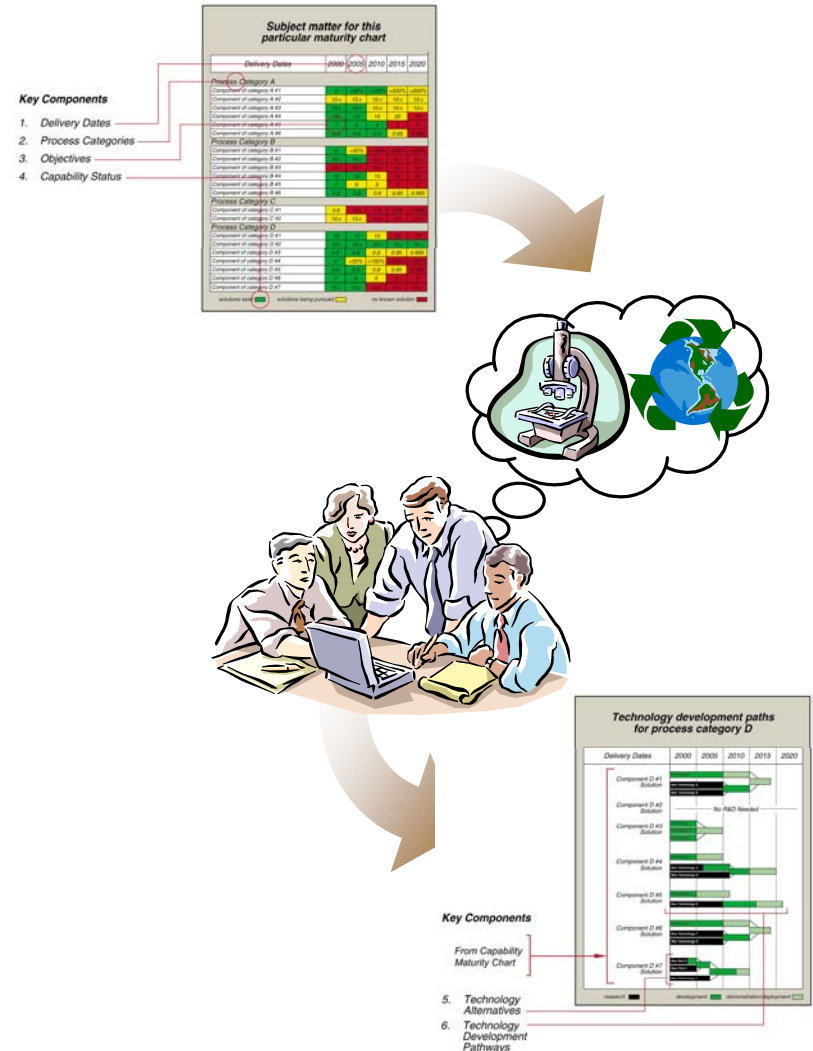
Purpose of the LTS S&T Roadmap

- Create a shared vision for LTS based on the activities and associated capabilities needed now and in the future
- Communicate capability-based technical needs among cleanup and closure sites and the R&D community
- Leverage associated S&T activities for LTS across academic, public and private sectors
- Develop an acquisition and transition strategy for S&T investment to optimize LTS life-cycle activities



LTS S&T Roadmap Approach

- Identify needed stewardship capabilities and compare with current capabilities and practices
- Identify science and technology that will provide needed capability improvements
- Identify tasks to complete R&D, and put capability improvements into practice.



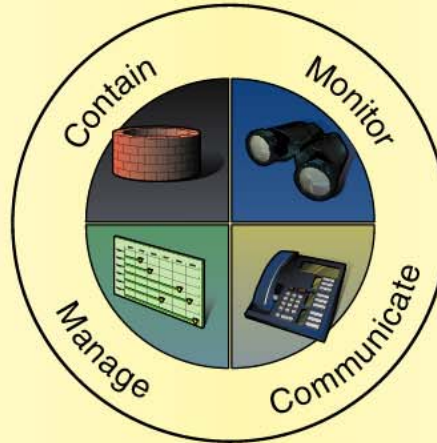
What Capabilities Are Needed?

- **LTS-specific Capabilities**
 - Sensors and Sensor Systems for Site Monitoring
 - Preservation and Communication of Site Information
 - LTS System Performance Verification
 - Effective and Survivable Land-Use Controls
- **Common Capabilities Needing Improvement**
 - Site Conceptualization and Modeling Tools
 - Contamination Containment and Control Systems
 - Site–Community Relations



LTS Will Require a Systems Approach

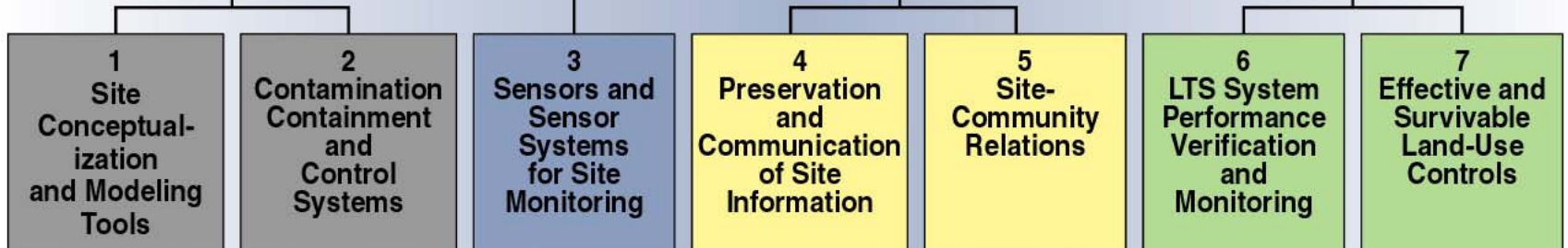
LTS System



Functions



Capabilities



Roadmap Identified Key Capabilities to Enhance LTS

Contamination Containment & Control

- Alternate technologies that detoxify or immobilize contaminants at the source and reduce the volume of ground water needing to be treated.
- Cover and subsurface containment systems that mimic natural processes and accommodate environmental change.
- Models, natural analogues, and indicators that improve design, planning, decision making, monitoring, and maintenance.
- Technologies that significantly reduce the need for maintenance of containment systems.

Monitoring & Sensors

- Validation of containment and safety system performance.
- Monitoring systems that can adapt to changes in knowledge of the geologic, hydrologic, chemical and biologic processes at the site.
- Improved multimedia monitoring capabilities.
- New methods that utilize advances in wireless, miniaturization, non-invasive, and remote interrogation technologies.
- Monitoring for surrogates and indicator parameters to reduce costs and improve accuracy.
- Information management systems that address validity, access, outreach, education, and visualization.

Decisionmaking & Institutional Perform.

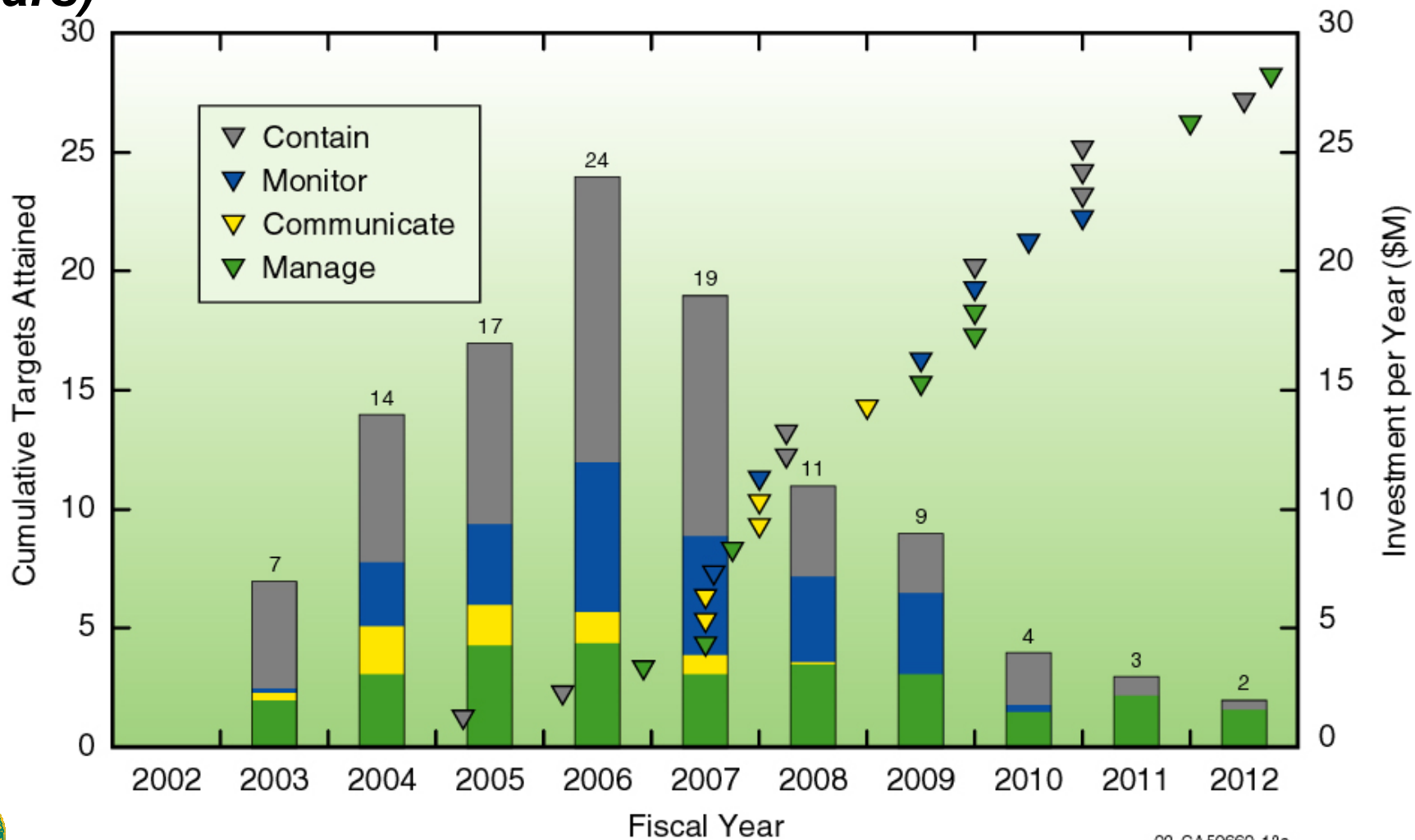
- Improved institutional credibility and community interaction to best maintain trust and confidence
- Continuous improvement of LTS decisions to sustain stakeholder support and reduce life-cycle costs.
- Institutional mechanisms that sustain and improve LTS.

Safety Systems & Institutional Controls

- Approaches to select standardized, risk-based safety systems that enhance efficiency of cost and operations.
- Criteria for analyzing data to ensure the integrity of security and access control systems.
- Technology that preserves site information for intergenerational continuity.
- Legal strategies and associated instruments to facilitate handoff of closed sites to stewards.



Projected Investments and Cumulative Targets Attained through FY 2012 (FY02 dollars)



What Does DOE Gain with Capability Enhancements?

- Reduce LTS life-cycle costs
 - Waste generation
 - Remedy monitoring and permanence
 - Workforce productivity
 - Environmental Liability
- Reduce risk to public and environment
- Expand land reuse options
- Reach site closure sooner



LTS S&T Strategy will help Close Sites Cheaper, Faster, Better

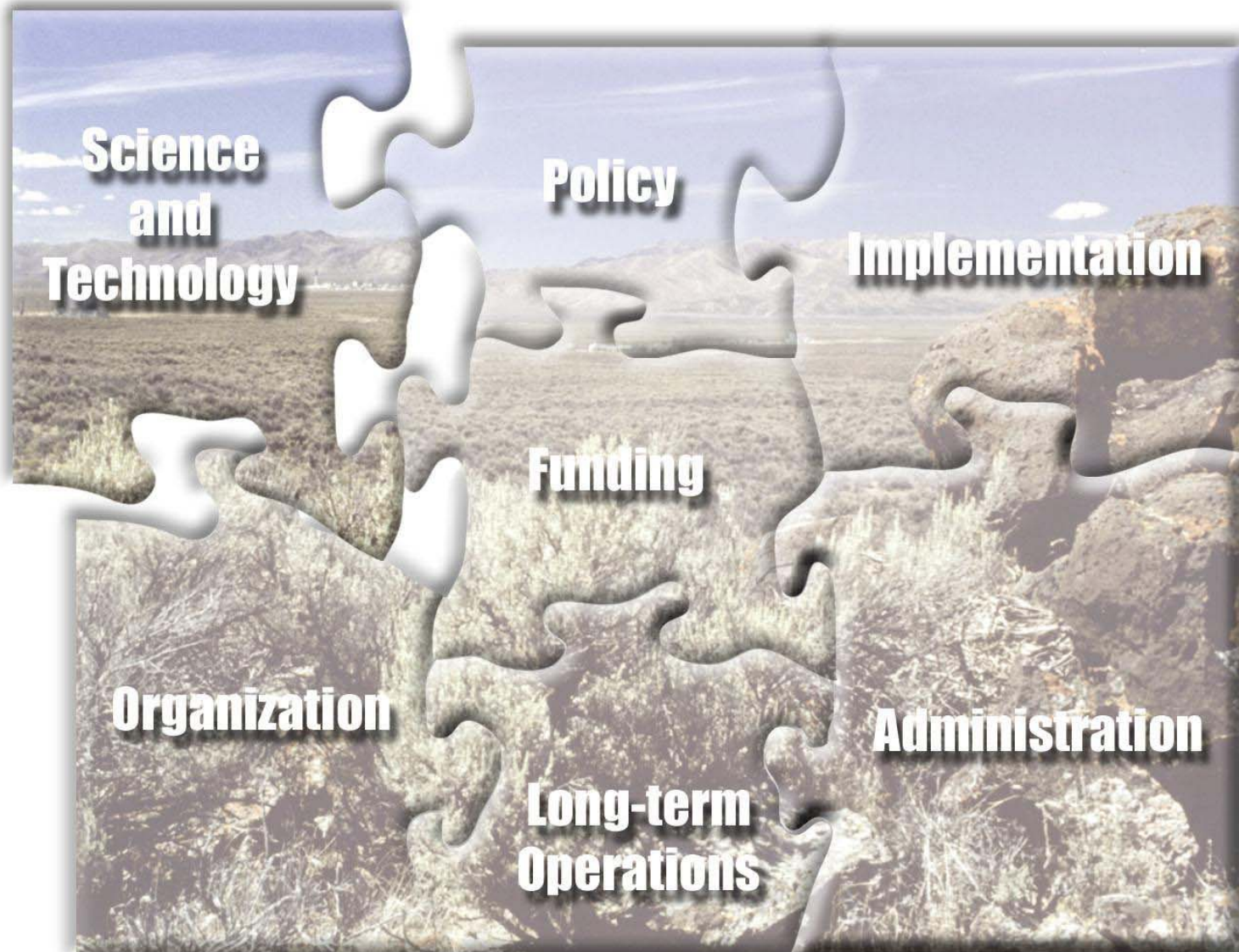
- Locate potential customers that will benefit from LTS capability enhancements
- Identify S&T investments in other sectors with high-payback potential for LTS
- Assist DOE sites in application/validation studies of best practices
- Collect activity-based cost data for specific technologies/procedures
- Put together LTS “toolbox” to identify and communicate LTS “best practices” to sites



What Can We Put in the LTS Toolbox Today?

- Large Area Contamination Monitors (Rapid Monitoring of Surface Contamination - Three Complementary Systems)
- Remote Wireless Sensor Platform (Wireless Transmission of Information from Embedded LTS Sensors)
- In-situ Water Sampling and Near Real-time Analysis System (Remote Sampling and Analysis of Well and Surface Water)
- Passive Diffusion Sampling for Organics/Inorganics
- Alternative Landfill Cover Technologies
- LTS-related P2 Return-on-Investment Projects





Draft Available for Review

Stakeholders are involved at all stages of LTS
S&T Roadmap process:

- Direct participation on the Executive Committee and Working Groups
- Internal technical review of draft Roadmap recommendations
- External comment on the roadmap draft via by various groups (e.g., Federal organizations, Intergovernmental groups, DOE Field elements, State Regulators, etc)



SUMMARY

- Roadmap revision is available for external review
- Develop LTS tool box of techniques and approaches to facilitate knowledge transfer and solution development using an integrated systems approach
- Facilitate the leveraging of research from other federal agencies to eliminate duplicate research
- Roadmap provides clear direction for development of additional tools to improve future planning and resource allocation



LTS Roadmap Web Site and Contact Information

- Website: <http://lts.inel.gov/st-roadmap/>
- DOE HQ Project Manager - Jeff Short
jeffrey.short@em.doe.gov
- DOE ID Project Manager- Brooks Weingartner
weingacb@id.doe.gov

INEEL Project Manager - Gretchen Mathern
gtn@inel.gov

