



# Advancing Technology Innovation in Site Cleanups

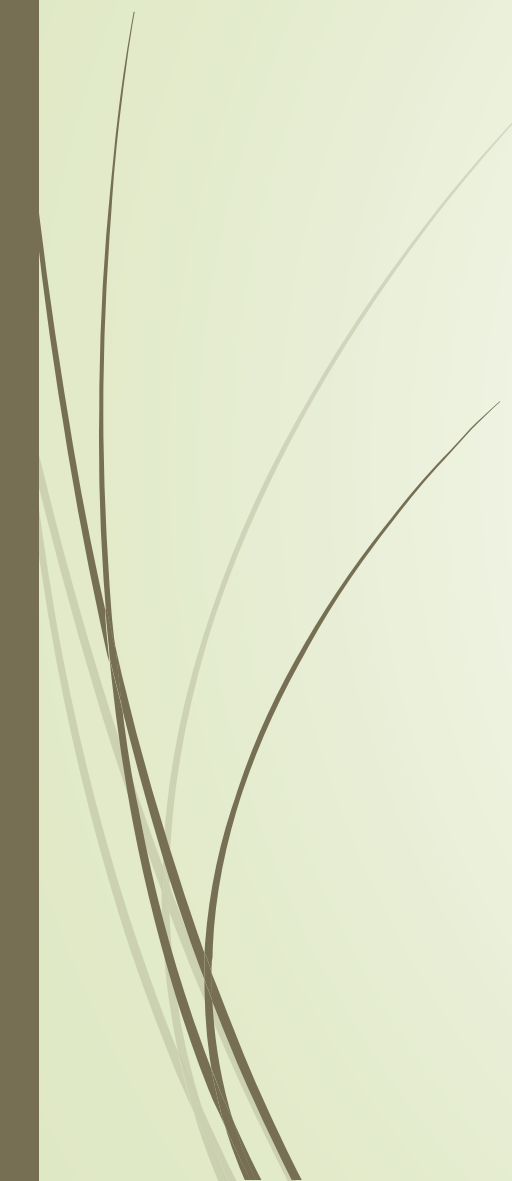
Insights and Considerations for ICCL  
Copenhagen, October 4, 2017



Perspectives by  
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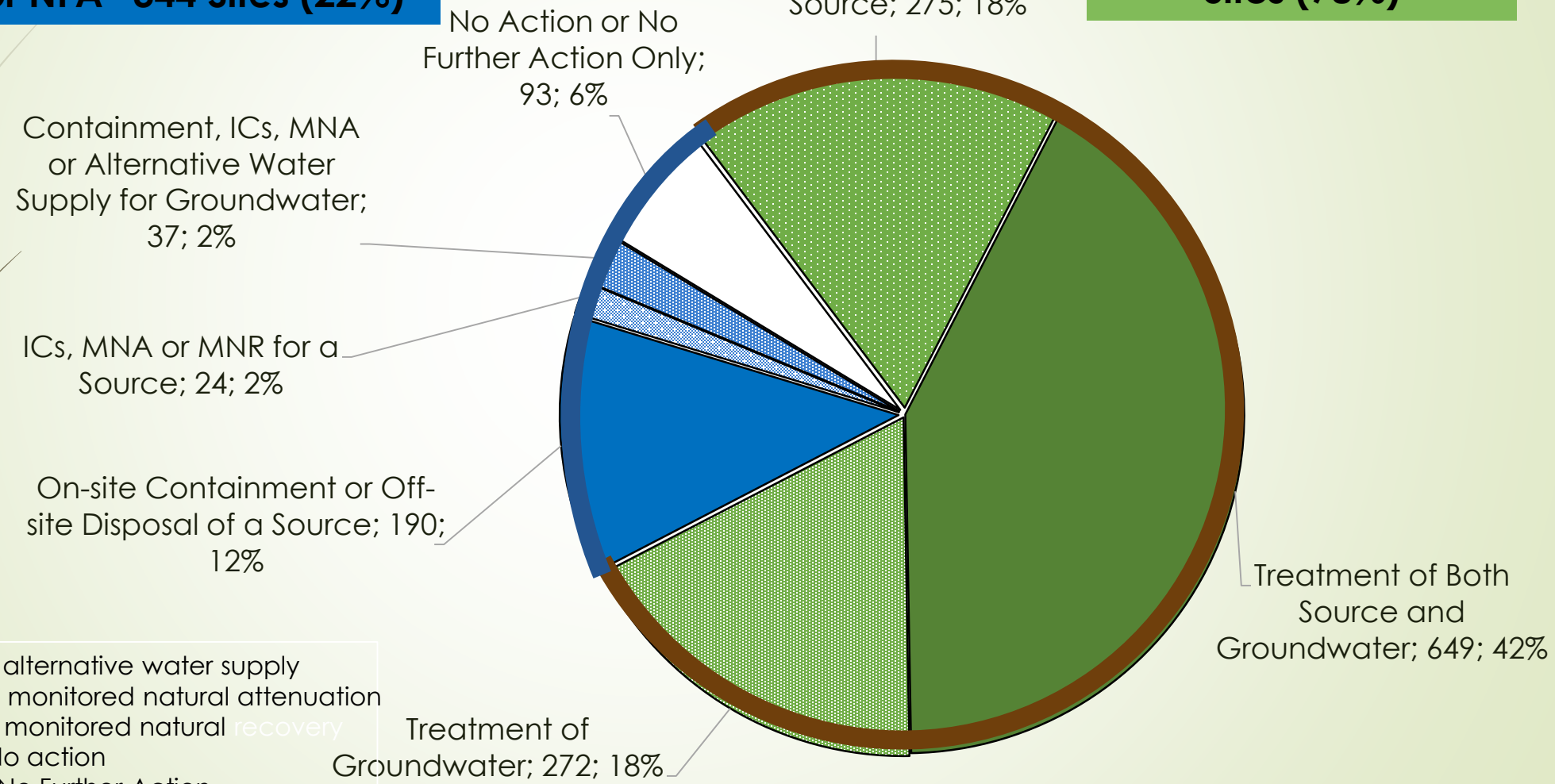
# Agenda

- Recent trends in Superfund site cleanup technologies
  - Opportunities for innovation – 200 professionals opine
  - Considerations for ICCL's role in advancing site cleanup practices
- 

# Treatment at Superfund Sites (FY 1982-2014)

**Non-Treatment,  
NA or NFA- 344 Sites (22%)**

**Treatment - 1,196  
Sites (78%)**

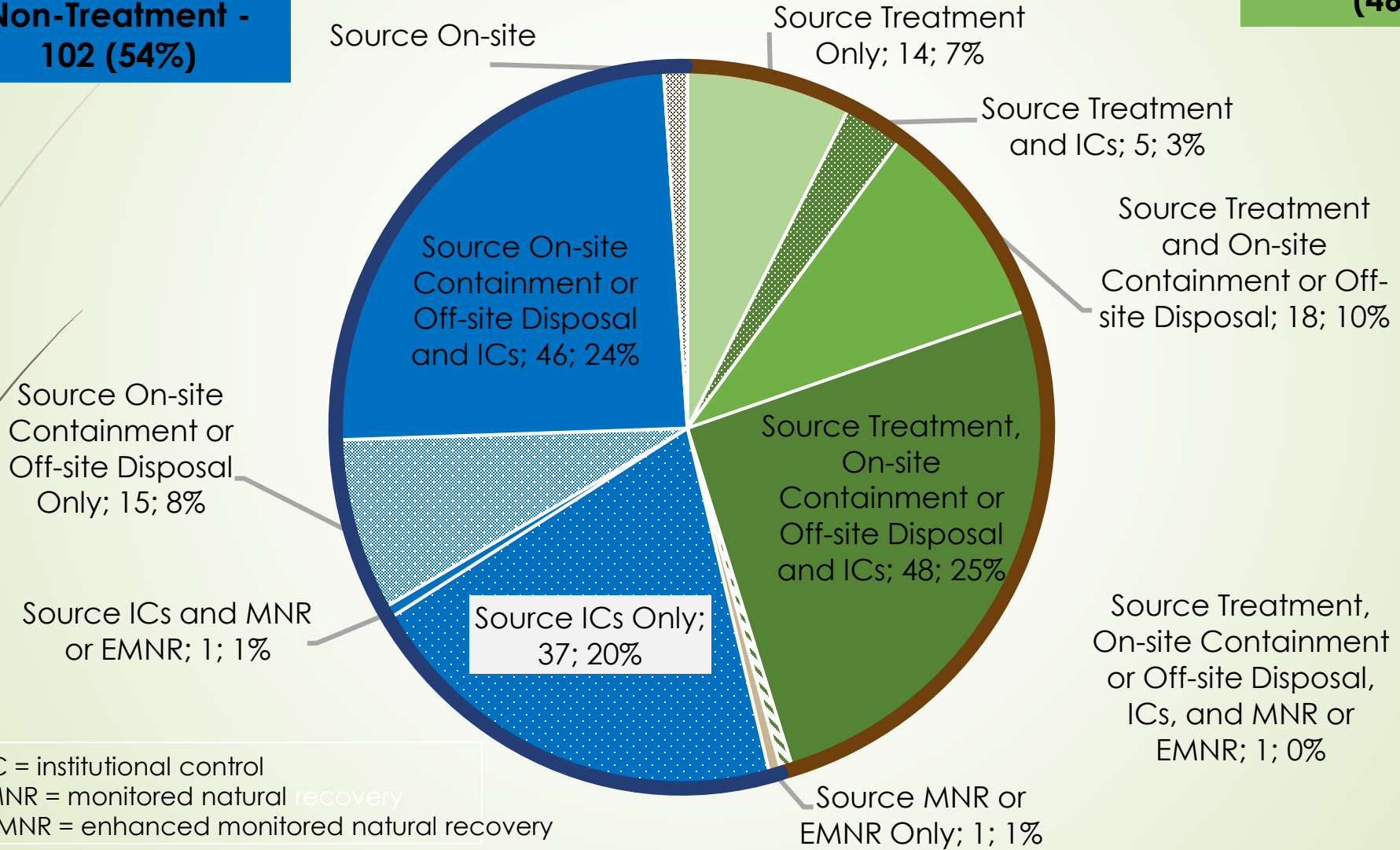


AWS = alternative water supply  
 MNA = monitored natural attenuation  
 MNR = monitored natural recovery  
 NA = No action  
 NFA = No Further Action

# Combinations of Recent Source Remedies (FY 2012-2014)

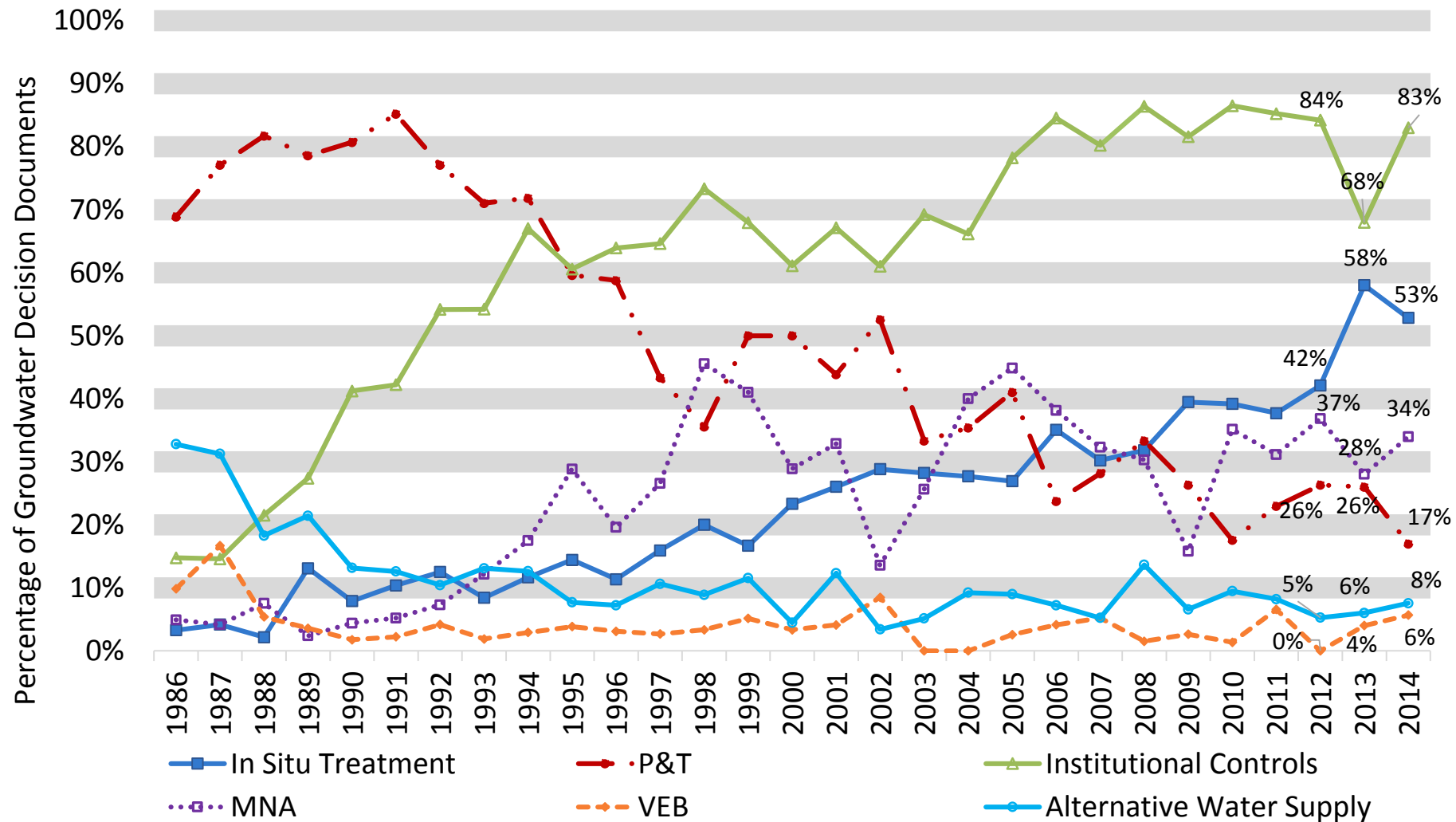
**Non-Treatment - 102 (54%)**

**Treatment - 86 (46%)**

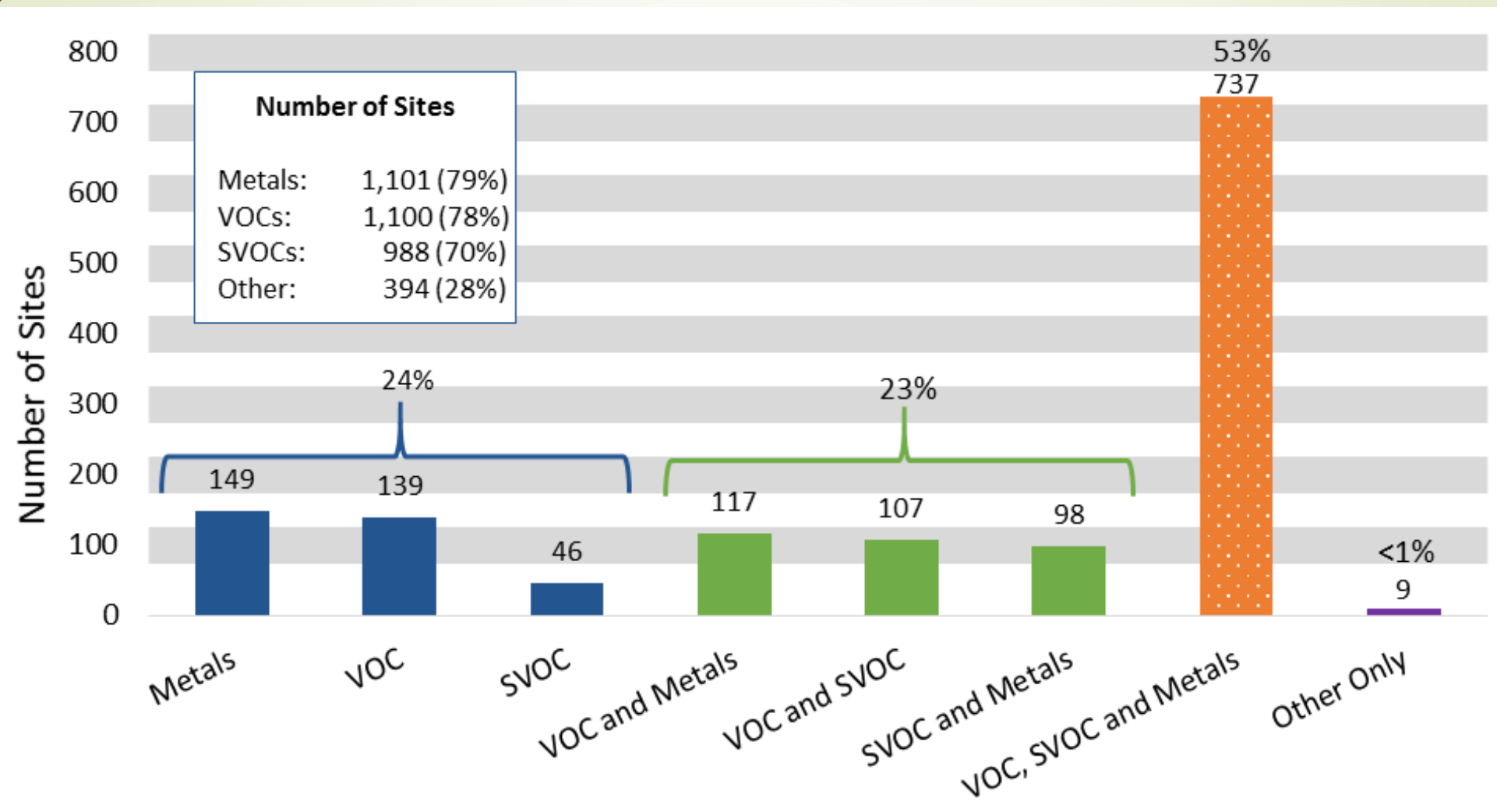


IC = institutional control  
 MNR = monitored natural recovery  
 EMNR = enhanced monitored natural recovery

# Selection Trends for Decision Documents with Groundwater Remedies (FY 1986-2014)



# COCs at Superfund Sites (FY 1982-2014)



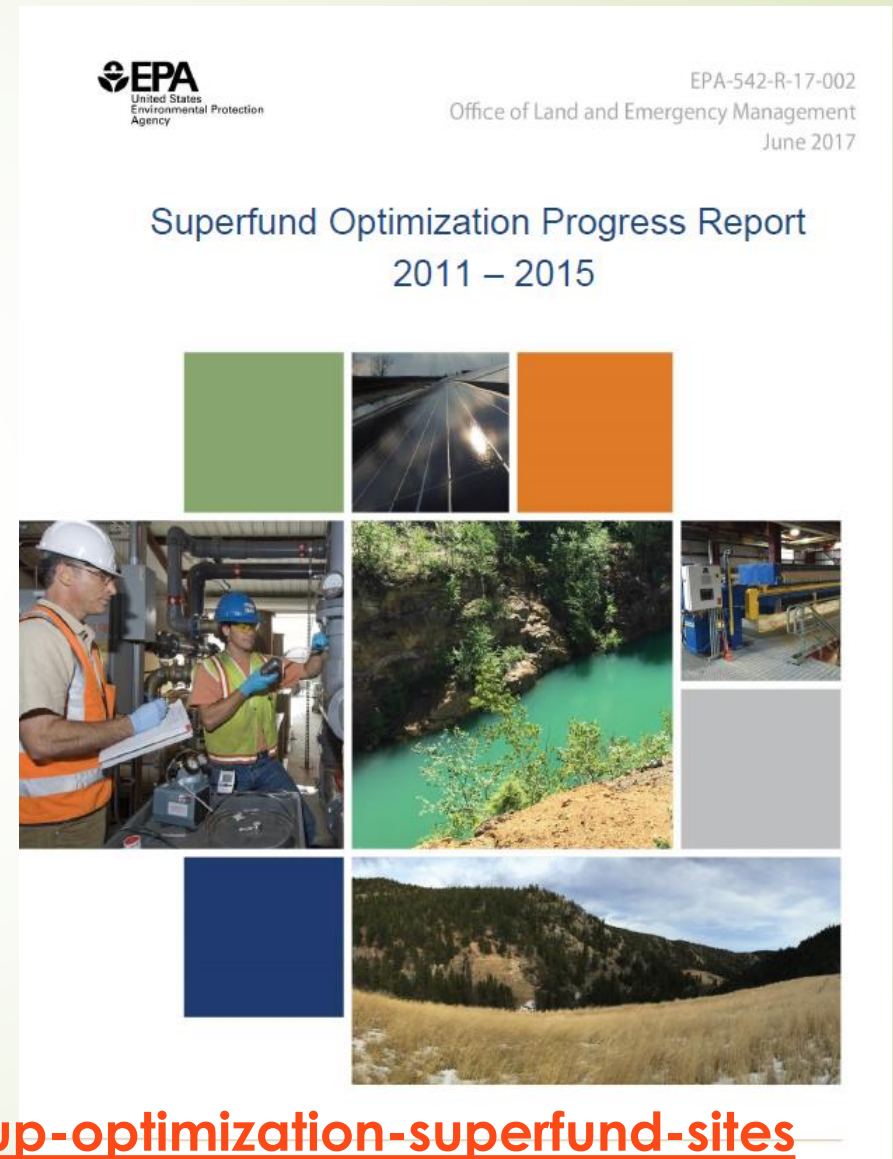
"Other" COCs may also be present at sites with metals, VOCs and/or SVOCs. At 9 sites they are the only COCs. Examples include cyanide, nitrate, sulfate and asbestos.



# Superfund Optimization Progress Report (2017)

Summarizes EPA's progress on:

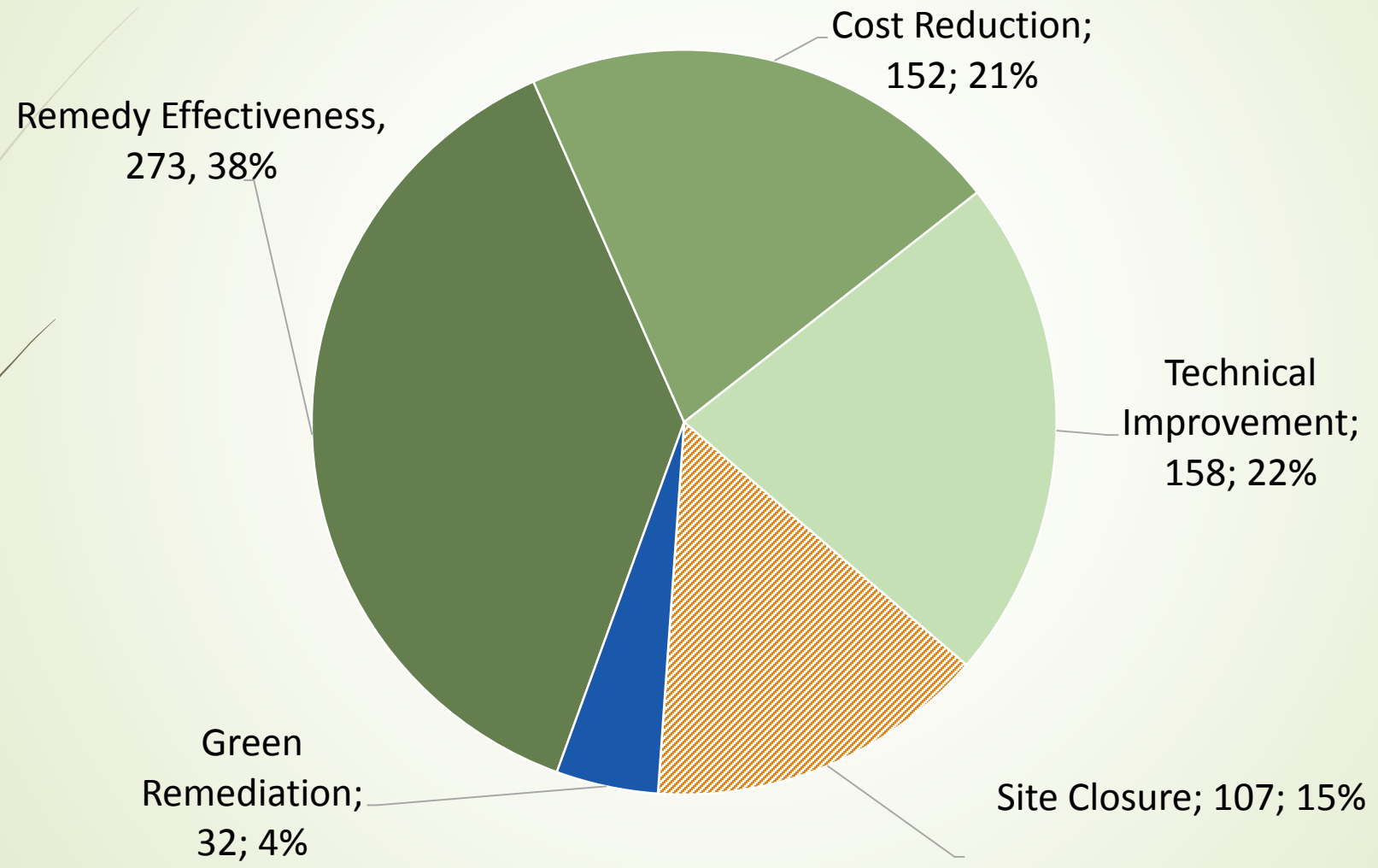
- Implementing of optimization recommendations for individual optimization events
  - 41 New optimizations
  - 20 Updates of previous events
- Updates on 25 Tech support projects
- Includes 21 project highlights
- Implementing the elements of the overall 2012 strategy



<https://www.epa.gov/superfund/cleanup-optimization-superfund-sites>

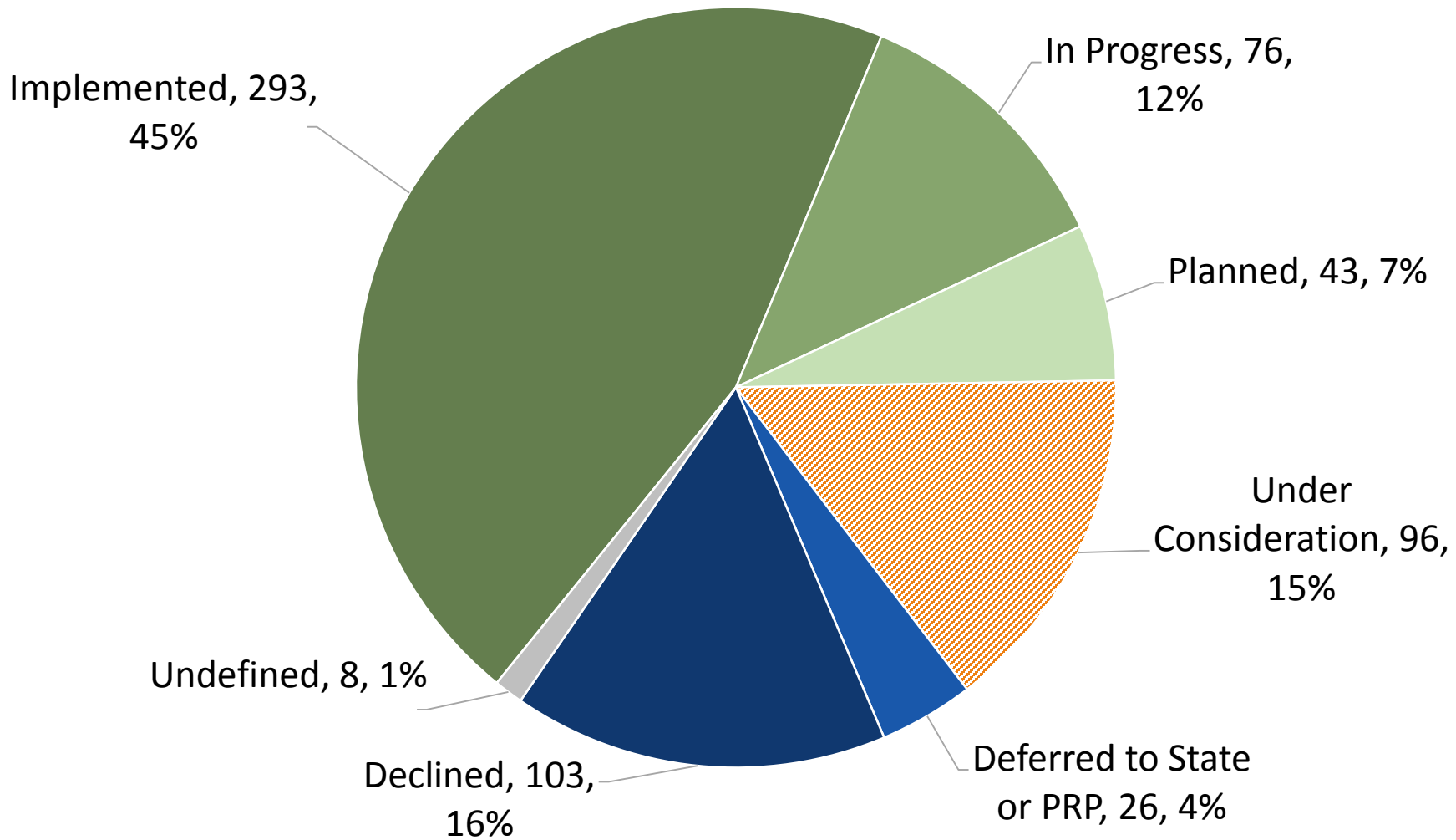
# Summary of Outcomes from Remedy Optimization Efforts

Total Number of Recommendations = 645

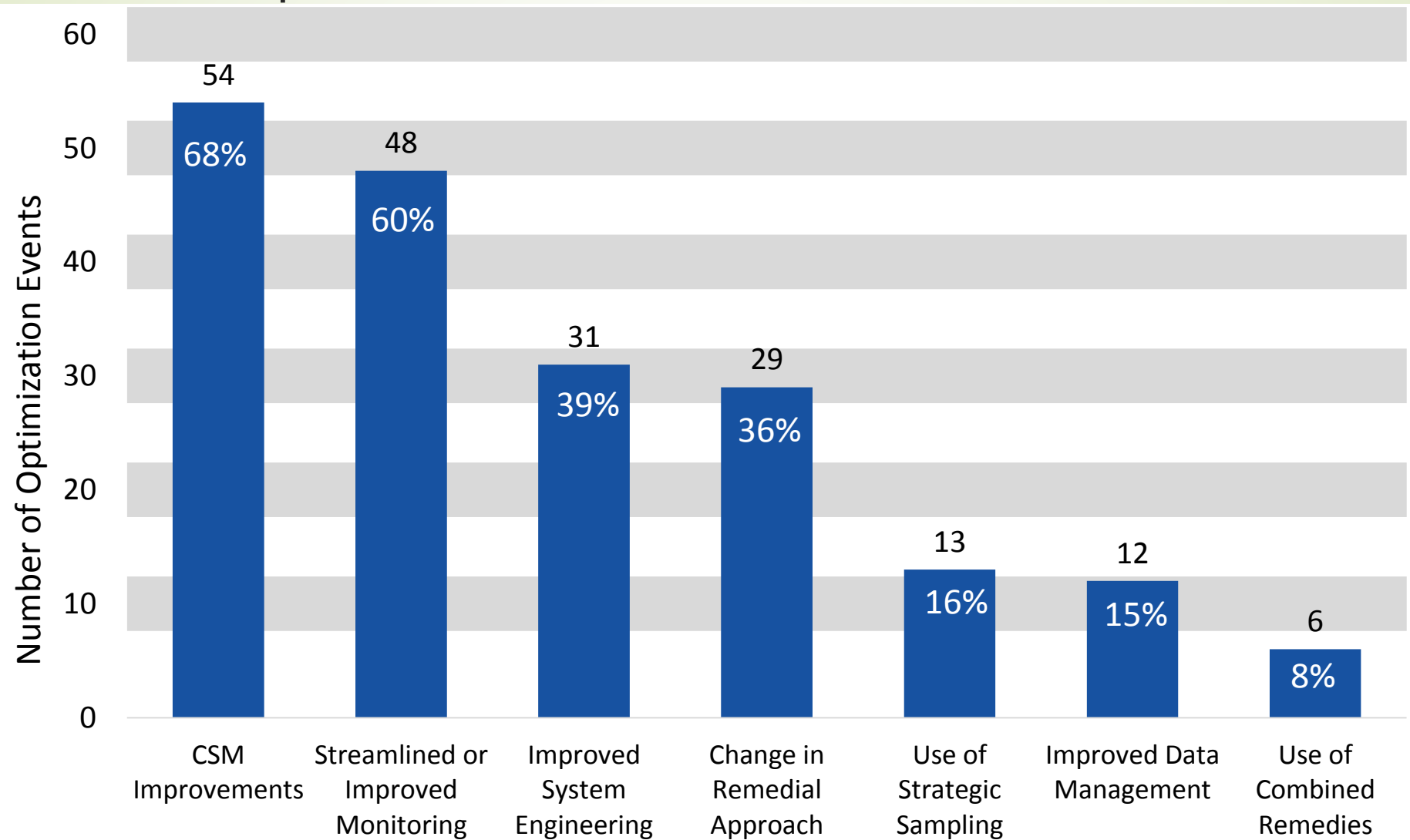




# Overall Status of all Optimization Recommendations




# Number of Implemented Tools and Techniques





# New Resource Highlights:

- ▶ Cluin focus area on Per- and **Polyfluoroalkyl Substances (PFASs)**. Overview of the current understanding of per- and polyfluoroalkyl substances (PFASs), particularly perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), <https://clu-in.org/pfas>
- ▶ **Superfund Remedy Report**, Fifteenth Edition. Review of data on US EPA Superfund remedies for soil and sediments, groundwater, surface water and air related to vapor intrusion. The report also analyzes media and contaminants for sites with remedies, with updates through 2014. <https://clu-in.org/asr>
- ▶ **Superfund Optimization Progress Report 2011 – 2015**. The report describes EPA's optimization efforts to make its cleanups more efficient and effective. Optimization reviews continue to identify many opportunities to reduce project management costs without affecting remedy performance. <https://semspub.epa.gov/src/document/11/196740>
- ▶ **Ecosystem Services at Contaminated Site Cleanups** Information about ecosystem services may be considered in the characterization of future land use options or the design of a cleanup that is consistent with anticipated ecological reuse, depending on the regulatory authority of the cleanup program. The concepts and tools described in this issue paper are useful in communicating the positive results of cleanup in addition to achieving the goals of cleanup <https://semspub.epa.gov/src/document/11/100000459>



*Can we achieve better source zone  
treatment outcomes than we have to  
date?*

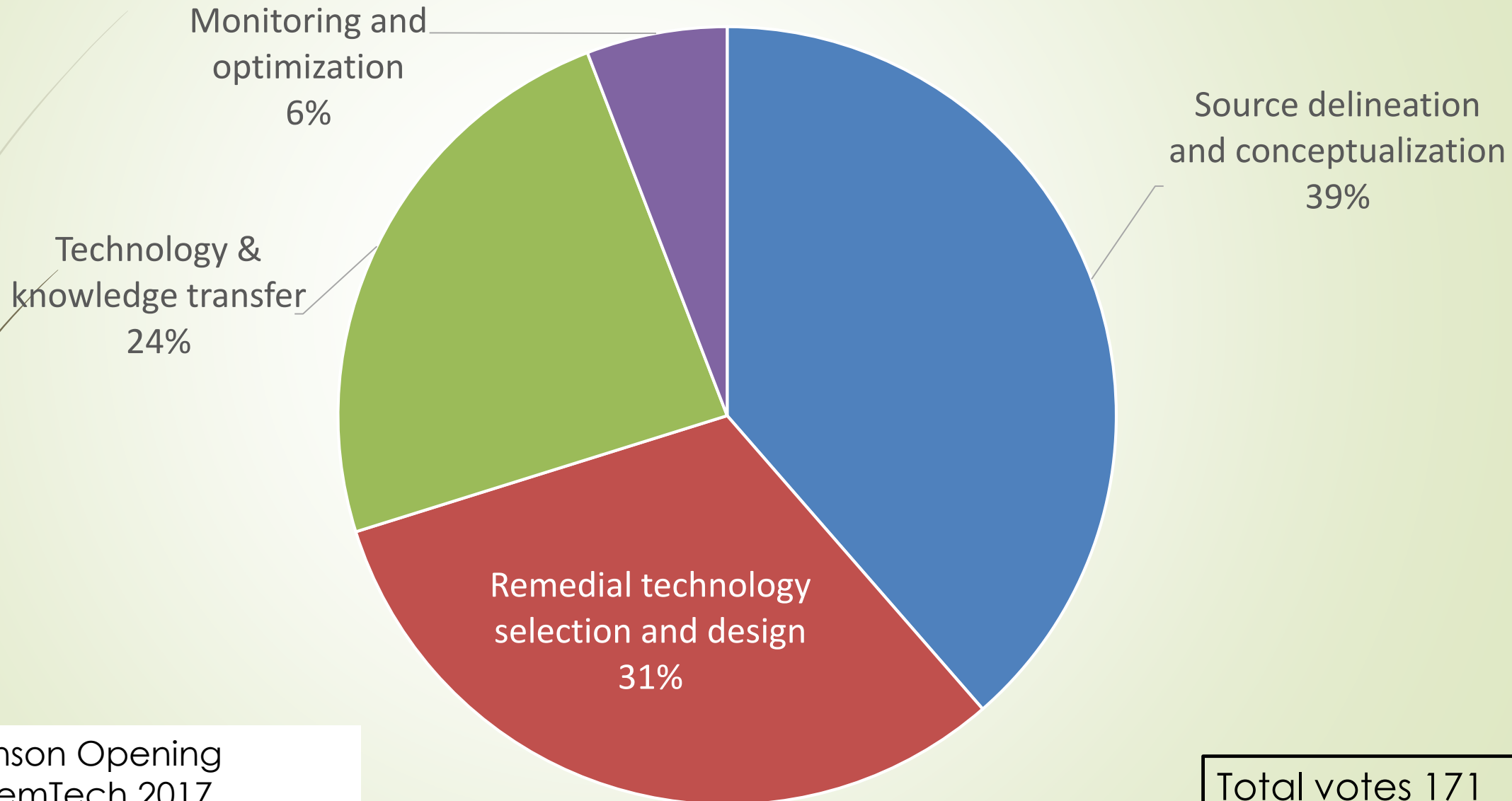
 Yes 167

 No 17

*RemTech* Opening Plenary by Paul Johnson,  
President CO School of Mines\*

Total votes 185

# The greatest opportunity for improvement lies in:

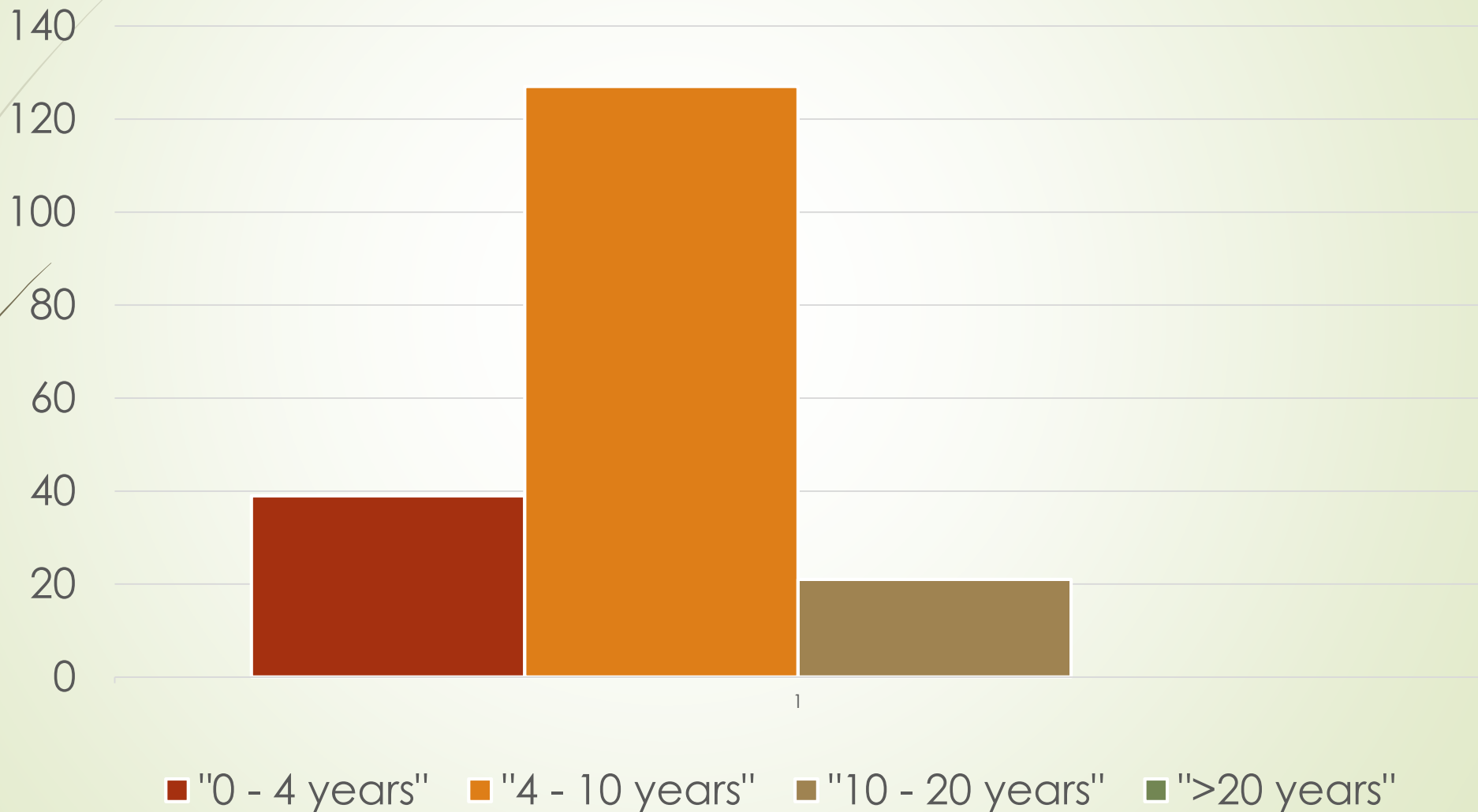


Source: Paul Johnson Opening Plenary Survey, RemTech 2017

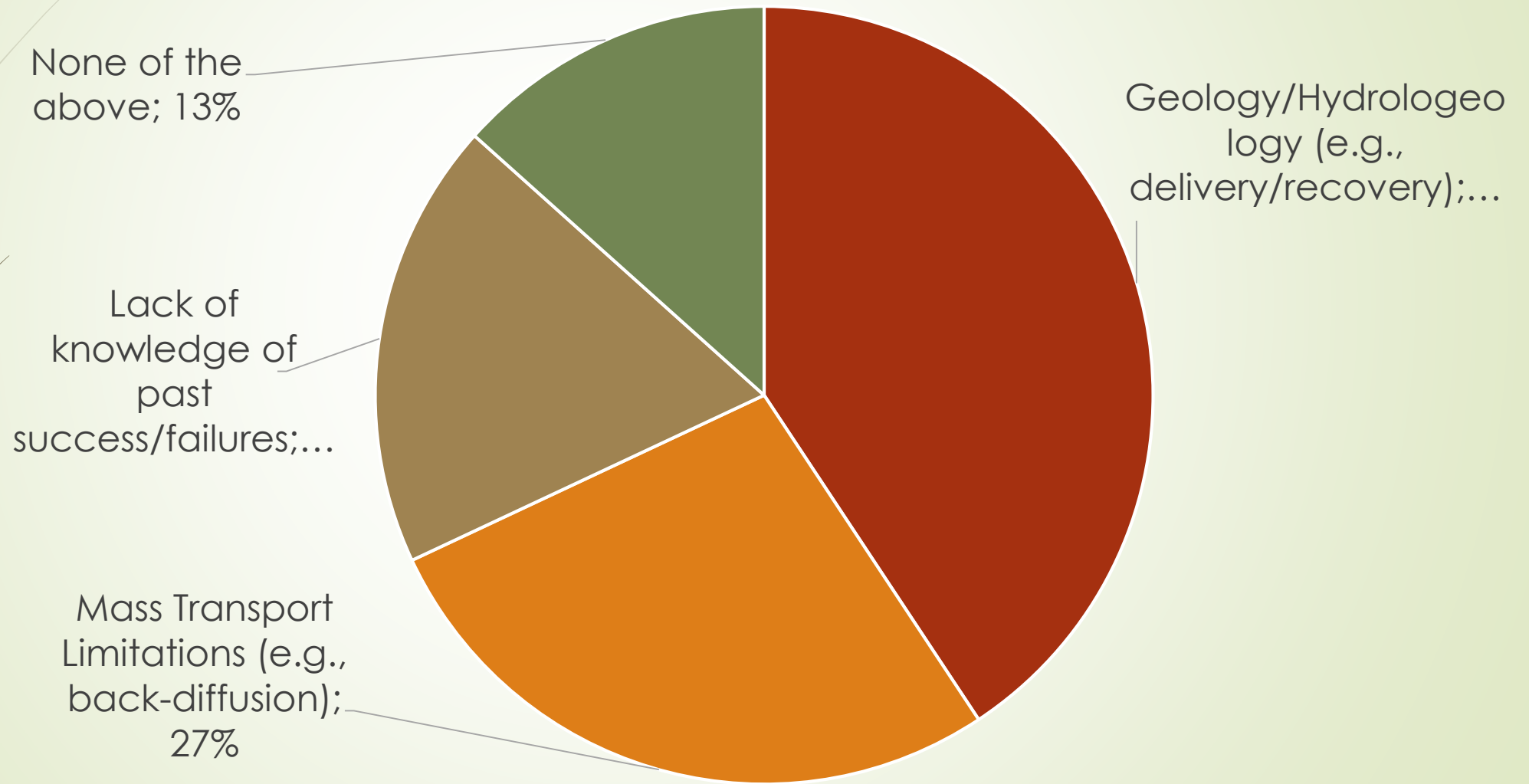
Total votes 171



# How long does it take a new treatment technology idea to be implemented in the field?



# What is the biggest non-financial barrier to success?





# Business case for advancing innovation in site cleanups

1. Improving protectiveness
2. Greater cost effectiveness in implementing cleanups
3. Reduction in cleanup timeframes
4. Increased reuse options for restored and revitalized lands



## ICCL: key assets for innovation

1. Insights by thought leaders in regulatory agencies
2. A global network to share lessons learned
3. A capacity to focus multiple efforts on overcoming challenges of shared interest
4. Credibility as a robust & unbiased information source



## Prioritizing areas of innovation: Considerations

- Regulatory, program and emerging contaminant drivers (new MCLs, health advisory, etc)
- Opportunities offered by emerging & promising technologies facing barriers of entry to cleanup markets
- Technical challenges identified in the field





Thank you!

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