

A New P2- Preventing Pollution with Our Science and Engineering



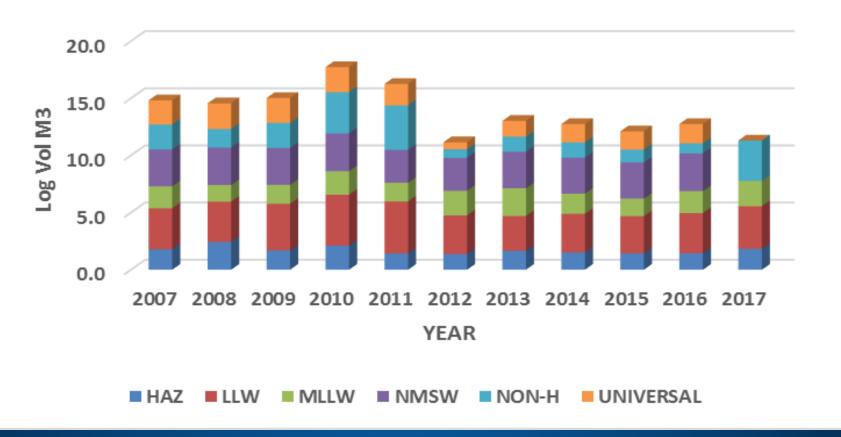
October, 2019





We have definitely made progress

Waste Generation at LANL



Since 2007, generation totals are highly variable, minimization of baseline waste generation essentially complete.

Los Alamos National Laboratory

How was environmental (and some social) progress achieved?

Extrinsic motivation







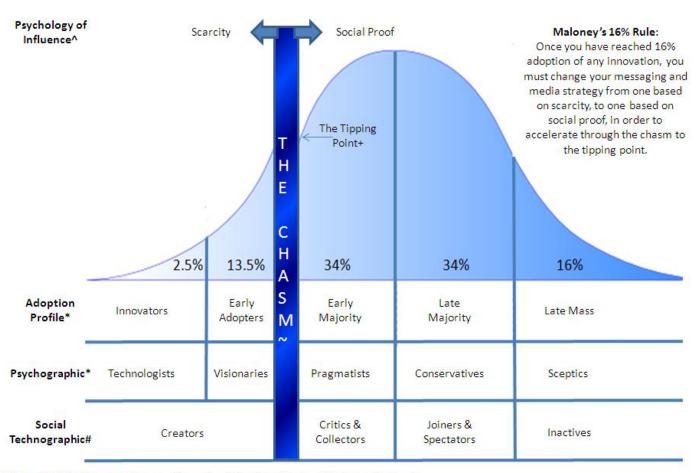
P2/Waste Minimization at LANL: Summary

- Since 1993 most baseline waste generation with available alternatives has been successfully and permanently optimized
- Waste generation 2007-2017 is stable in total (except for special events like fire recovery and clean-outs) but shows variation year to year by waste type
- Further progress in P2/Waste Minimization requires applied research directed to LANL-specific opportunities
- To secure resources projects must show strong ROI and operational improvements in addition to environmental progress and worker health and safety assurance

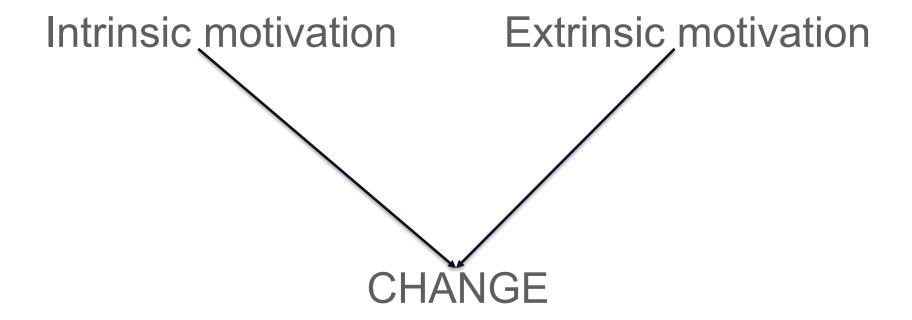
Future P2/waste minimization progress will be slower, more expensive and ultimately more productive

How do we continue making progress?

Accelerating Diffusion of Innovation: Maloney's 16% Rule®



[^] Robert Cialdini *Everett Rogers #Forresters ~Geoffrey Moore + Malcolm Gladwell



Not ready for prime time: cost motivation



Not ready for prime time: global climate chaos motivation



A powerful intrinsic motivation:

our calling
our career
our job
our skills, education and training

Water as a LANL Resource

Challenges	Opportunities
Compliance with permits	Early detection and treatment of contaminants
	Elimination of contaminants
Optimized water use	Silica removal
	Cooling tower efficiency
	Non-water cooling
Reduced availability due to changes in precipitation and vegetation	Use intensification through improved sensors and controls
	Modeling to understand use constraints

Information and analysis as a LANL Resource

Challenges	Opportunities
Reduced toxicity of materials	In-silico modeling of alternatives
	Accelerated testing competing alternatives
Reduced toxicity of processes	Modeling of improved processes
	New process development
Seek alternatives buried in literature	Advanced search algorithms
	Al to develop modeling parameters
Dissemination	3-D graphic display, interactive

Criteria for new P2-as-Source-Reduction Efforts

Criterion	Best result
Simple financial payback	< 5years
Environmental impact	Elimination of the cause of a problem
Waste reduction	Source reduction (before waste is created)
Waste reduction type	Mixed TRU and TRU
Social benefit	Beyond regulatory or legal compliance
Unique	Something not yet commercialized as public science or clean technology
Transferability	Everywhere
Persistence	Structural change, institutional

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