



Helium Gas Management at the Los Alamos National Laboratory (LANL)

Michael Moss - Pollution Prevention Program

October 20th, 2025

LA-UR 25-29331

Learning Objectives

- Learn about the economics of helium at a national laboratory
- Understand how a shared resource can be managed in a more efficient way
- Understand how sustainability projects can be measured to show add-value
- Recognize how environmental programs can add value to a national laboratory with a national security mission

Project Task:

Due to helium being finite and expensive, the Los Alamos National Laboratory must manage the resource in a more efficient way thereby integrating sustainability into research operations.

Pollution Prevention Program Response

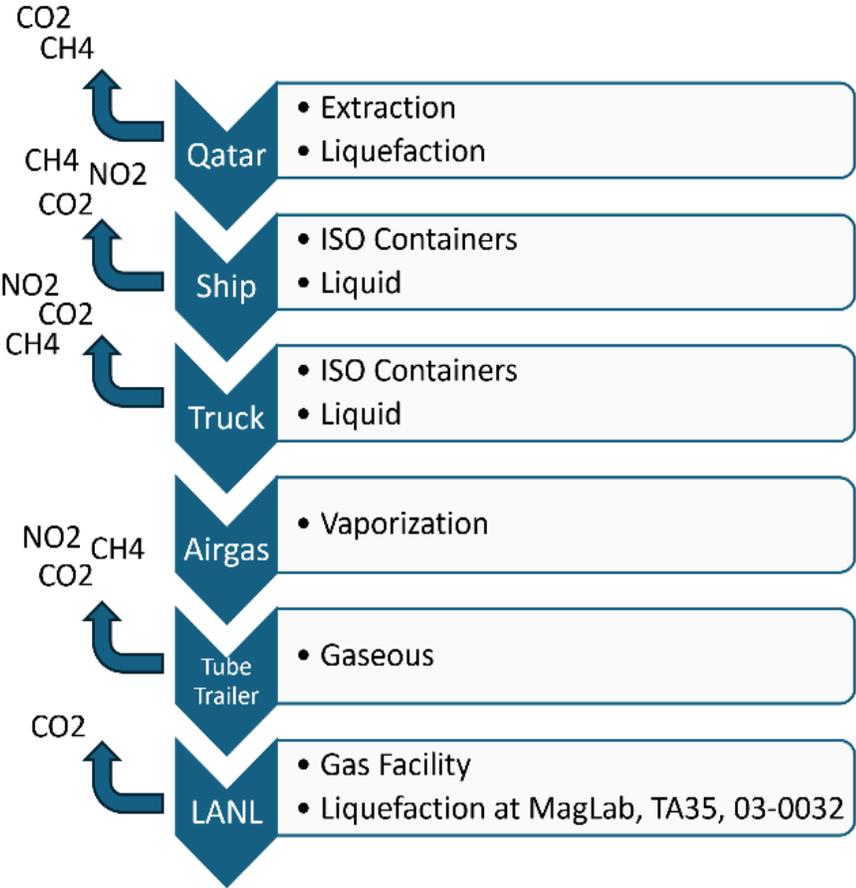
Characterization Study

Gas Facility Liquid Helium Purchasing Data

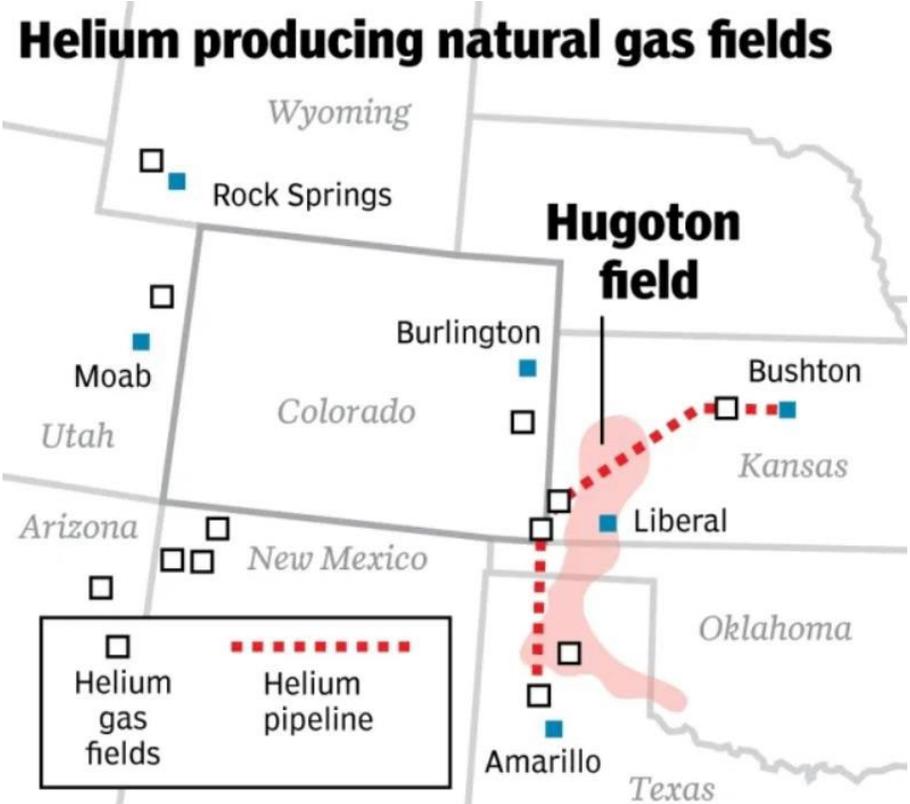
Walk-downs with users:

1. Liquid helium boils-off after running experiments
2. Liquid helium boils-off in dewars over time
3. Identified conservation opportunities

Helium Background



Helium producing natural gas fields

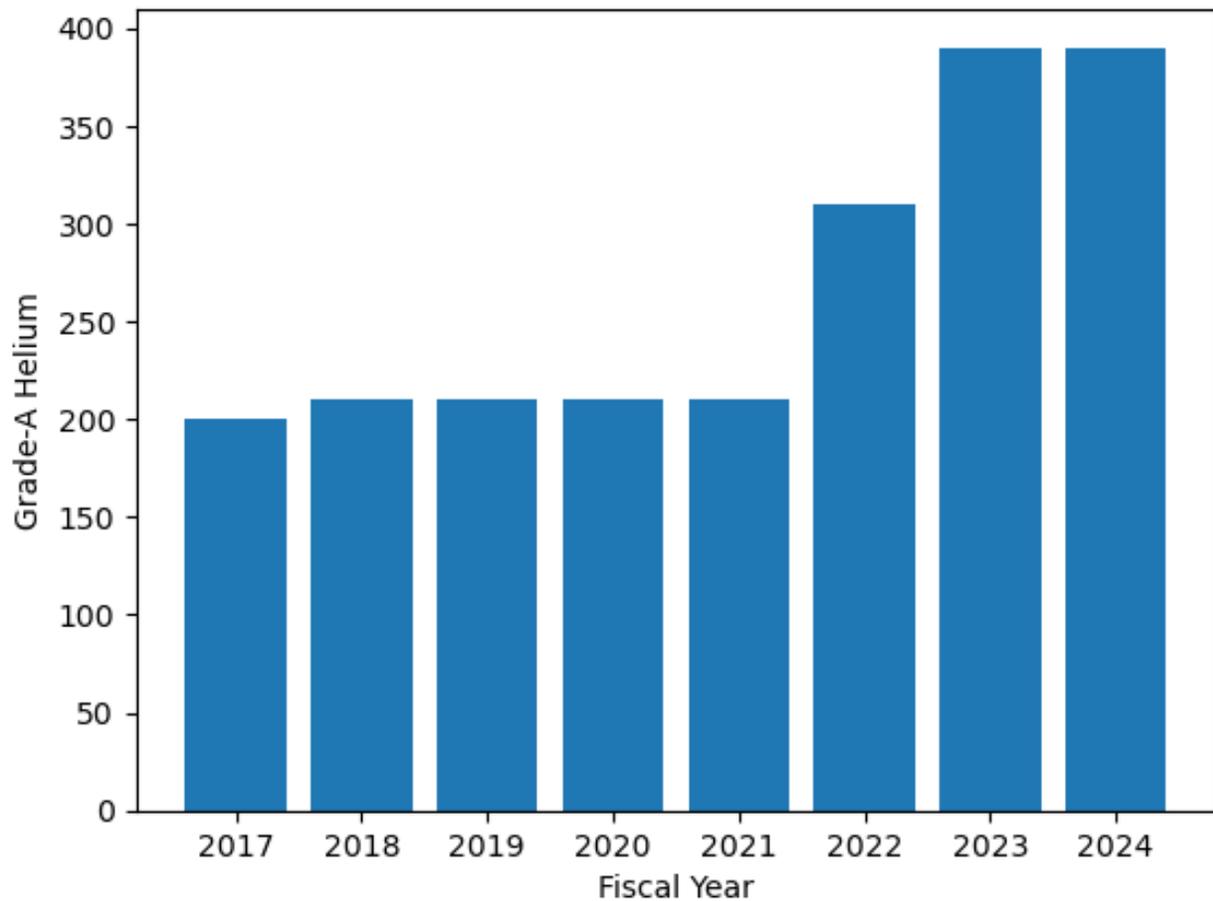


Source: U.S. Department of Interior's Bureau of Land Management

Well suited for cryogenic applications (Around 4 Kelvin/-269 C/-452 F)

Helium Prices

Price of Grade-A Helium (in \$/1,000 cubic feet)



Source: USGS Data

Price of Grade-A and Crude Helium (in \$/1,000 cubic feet)



Helium Recovery and Liquefaction Plant Economics

Tube Trailer



Liquefaction and Recovery Plant



dewars



Tube trailer of compressed helium gas



1 tube trailer makes 1,600 liters of liquid helium



100 liters of liquid helium in transport dewars

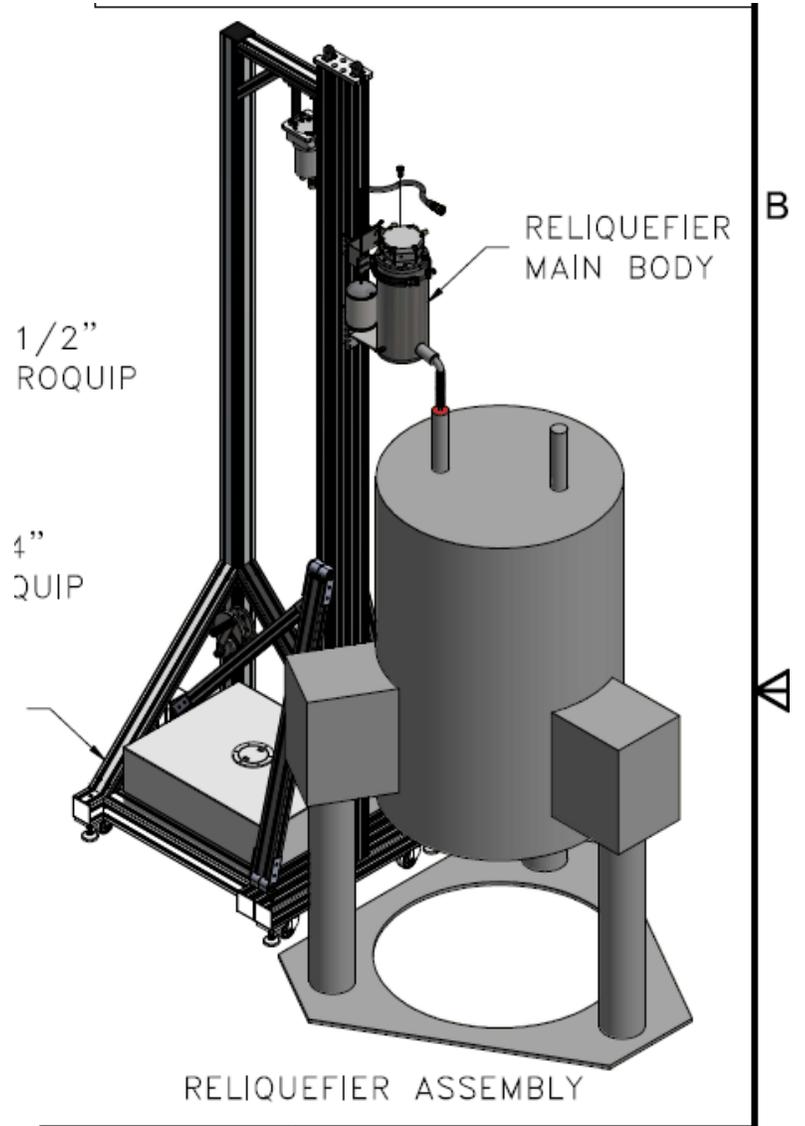
Characterization Study Facts

- 3 Helium Liquefaction and Recovery Plants
 - Use case: Nuclear Magnetic Resonance Spectroscopy
- 13 small users of liquid helium
 - Use case: Optical Spectroscopy and Nuclear Magnetic Resonance Spectroscopy



Opportunity Identified

Purchase Price of a Recovery System	90,000	Dollars
Annual Liquid Helium Usage Low End	250	Liters
Cost Liquid Helium	60	Dollars Per Liter
Project Payback	6	Years



Characterization Study Success Storey

- MPA-CINT operates an optical spectroscopy lab
- Helium supply constraint
- Scale-Up Operations
- Short \$50k pipefitters



Moving Forward

1. FY 25 Funded \$50K to expand helium recovery system

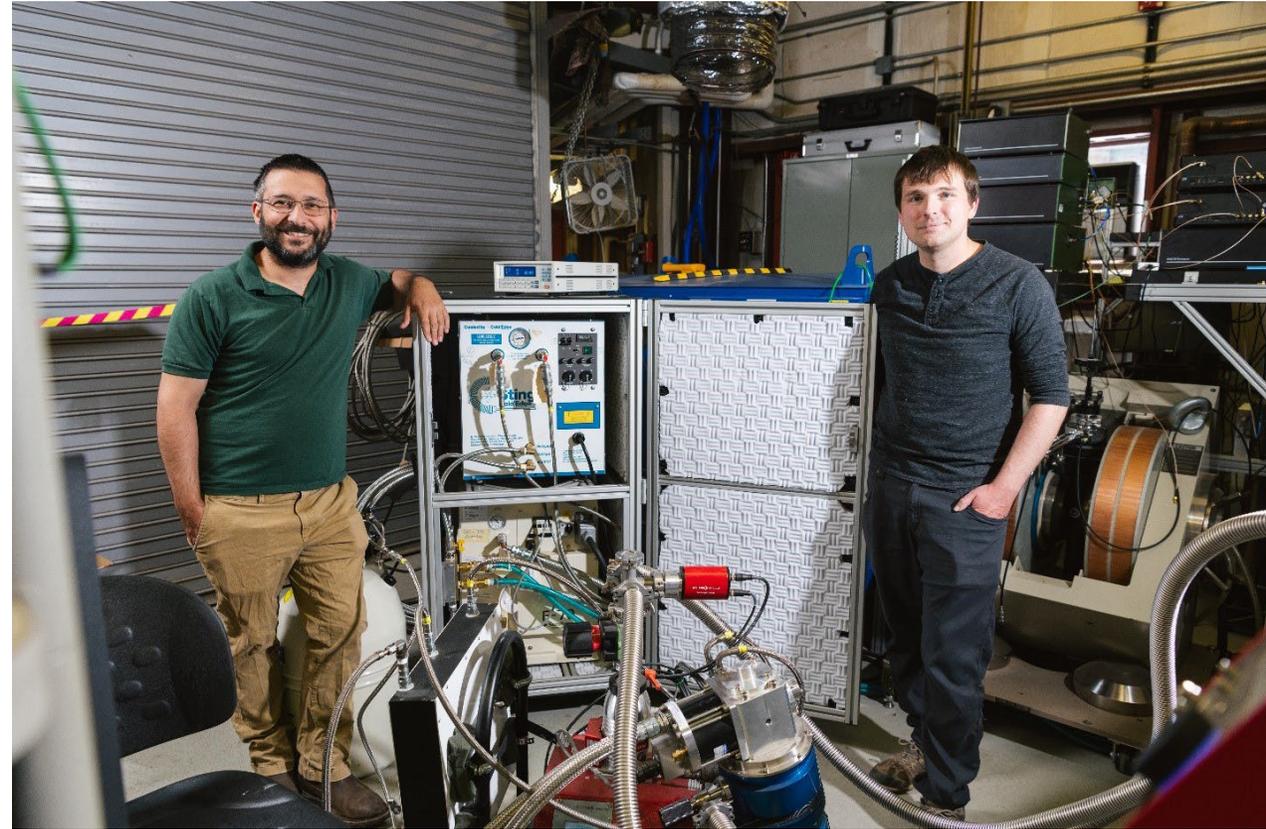
2. Two projects for funding in FY 26

A. \$100k for a helium reliquefier for Nuclear Magnetic Resonance unit

B. \$130k for installation of a compressor for redundancy

Key Takeaways

- Key Driver: Scale-up operations
- In-person engagement
- Integrative
- Economics and the environment
- Facility modifications a barrier





Questions?

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