

# LENR Workshop Introduction

Scott Hsu, Program Director, ARPA-E

ARPA-E LENR workshop (virtual)  
October 21, 2021



U.S. DEPARTMENT OF  
**ENERGY**

# Thanks to the entire program team!



Dr. Scott Hsu,  
Program Director



Dr. Katharine  
Greco, Fellow



Dr. Robert Ledoux,  
Program Director



Mr. Sam Wurzel,  
T2M Advisor



Dr. Halle Cheeseman,  
Program Director



Dr. Robert Thompson,  
Tech SETA



Dr. Curt Nehr Korn,  
Tech SETA



Dr. Colleen Nehl,  
Tech SETA



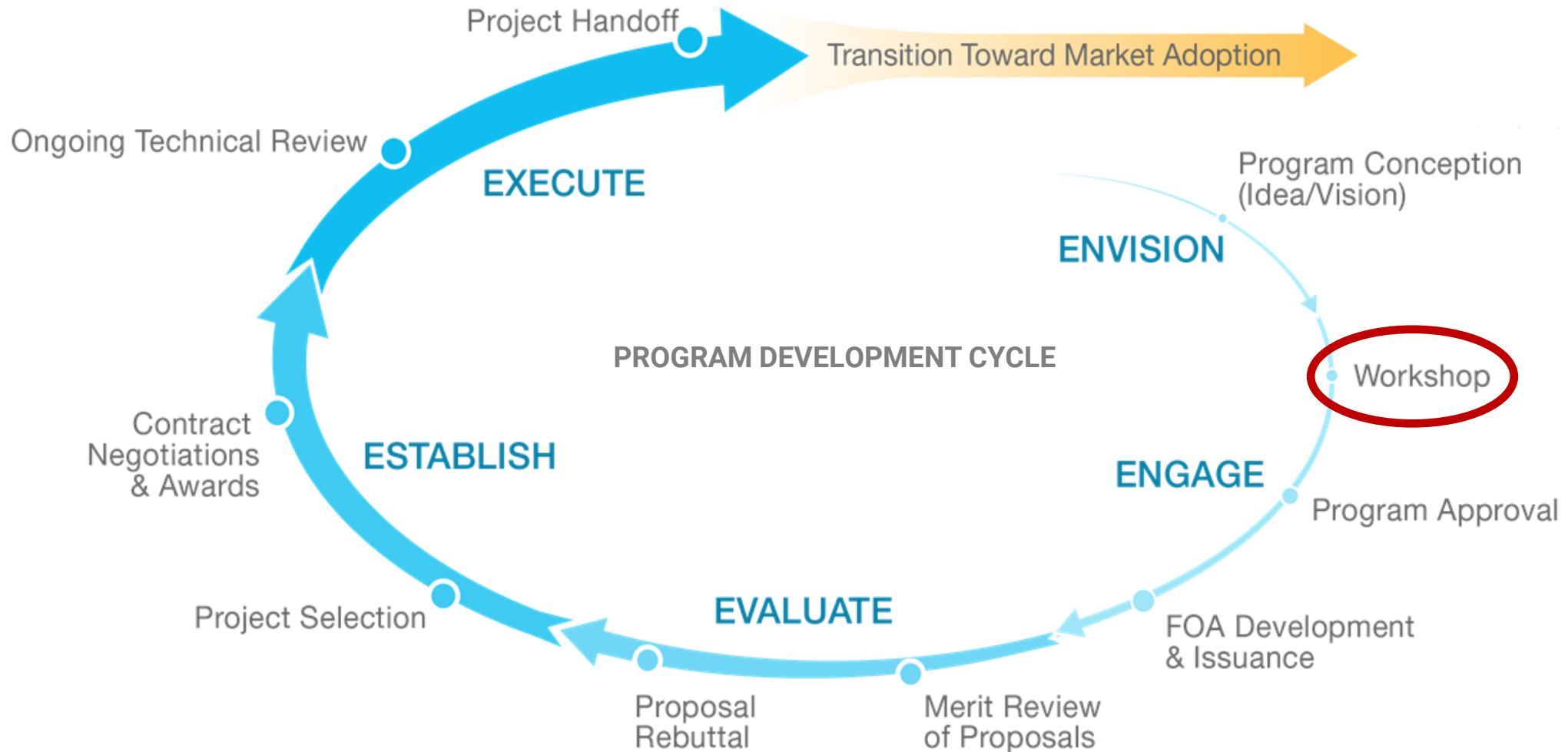
Dr. Christina Leggett,  
Tech SETA

# Names and definitions

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- ▶ For the purposes of this workshop, we assume LENR to be:
  - an all-inclusive name that includes “cold fusion” as a subset (let’s not argue about names at this workshop)
  - a not-yet-understood process (or class of processes) characterized by system energy outputs characteristic of nuclear physics (typically  $\gg 1$  keV/amu/reaction) and energy inputs characteristic of chemistry ( $\sim$ eV/atom)

# Why are we here? To identify and develop a targeted, impactful, potential LENR R&D program



>100 registered attendees: long-time and new LENR researchers, non-LENR researchers, potential partners (government, commercial, NGOs)

# Vision: Catalyze a technical path toward achieving scientific understanding and commercial impact for LENR

Basic research agencies (many projects each at hundreds \$k/year)

Build scientific understanding and explore multiple concepts

Establish rigorous, widely accepted evidence

ARPA-E ~\$10M + partners

Optimization & scaleup

One or more ARPA-E ~\$30M programs + partners

Development and demonstration

Applied-energy and mission-driven agencies, VCs >>\$100M

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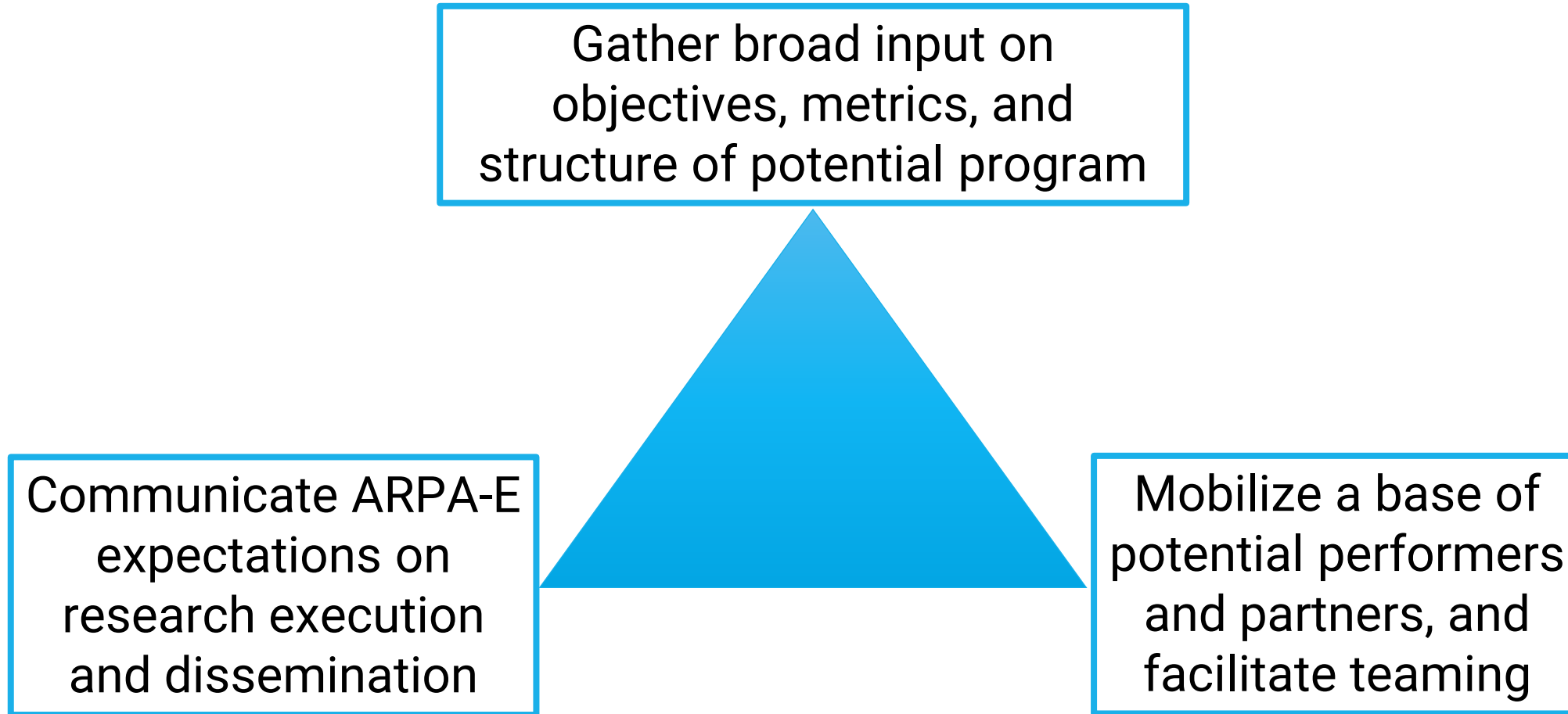
~5

~10

years

# Workshop objectives

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# Findings/themes → recommendations

Findings/themes	Recommendations
Lack of widely accepted, on-demand, repeatable, irrefutable LENR experiment	Need targeted R&D to deliver at least one such LENR experiment with agreed-upon metrics
Disagreement among LENR researchers on the rigor/reliability of empirical evidence/claims	LENR researchers and skeptics alike should define and agree on metrics and standards for what constitutes “irrefutable proof” of LENR
Some LENR researchers operate in secrecy, largely motivated by intellectual-property (IP) concerns	To make faster scientific progress, which benefits the entire field, LENR researchers should strive for transparency and peer review
Majority of LENR R&D activities are not well-integrated into the larger research enterprise	LENR researchers should present at top conferences and publish in top-tier journals
Many aspects of LENR can be distilled into well-posed scientific research questions (including theory)	Starting immediately, develop/submit high-quality proposals for discipline-appropriate basic research funding from NSF, DOE Office of Science, and research offices of mission-driven agencies.

# Possible desired outcomes of a potential, initial program

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At least one on-demand, repeatable, irrefutable LENR experiment satisfying agreed-upon metrics

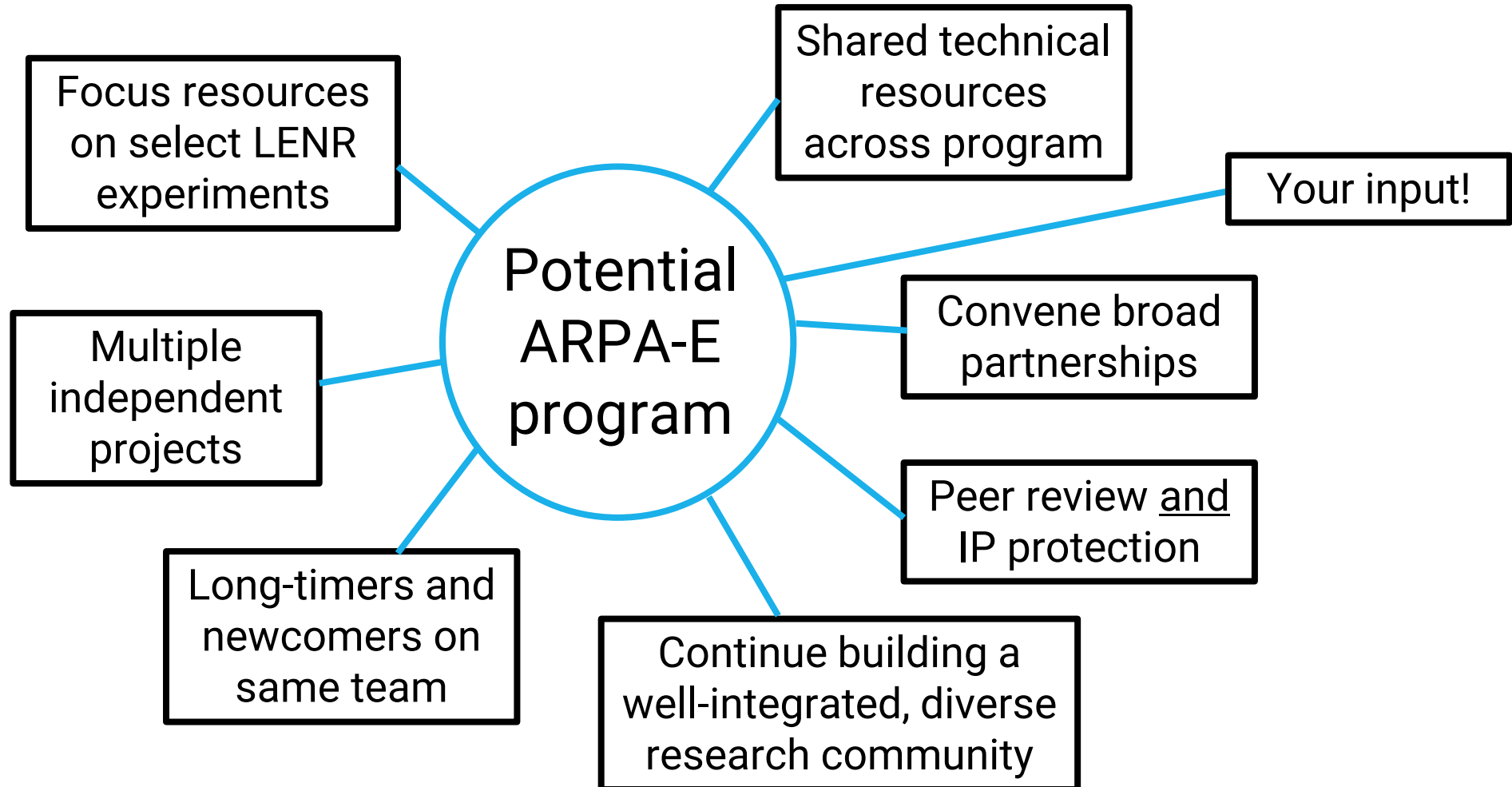
Present LENR evidence at top conferences and publish in top-tier journals

Several multi-disciplinary teams well-positioned for follow-on funding, both public and private



# But this is what Google already tried to do...

Important for ARPA-E to leverage/build on the recent achievements of the Google program and others (e.g., NASA GRC, Naval Surface Warfare Center IH, efforts in Japan), but avoid repeating exactly what was done.



# Aims of the agenda

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Agenda: <https://arpa-e.energy.gov/events/low-energy-nuclear-reactions-workshop>

Setting  
the stage

Acknowledge  
what has come  
before

Moving  
forward

How to break the  
stalemate?

T2M and  
partnerships

Identify path/barriers  
for LENR to become a  
disruptive energy  
technology

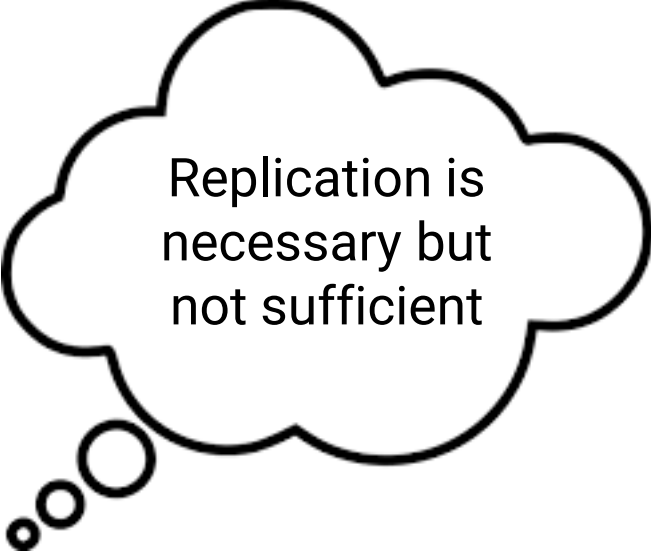
# We want everyone to have a chance to provide input

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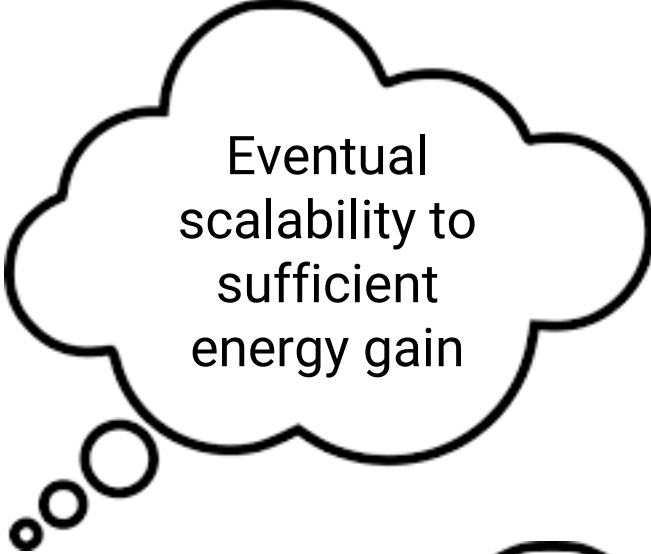
- ▶ Ask questions of speakers
- ▶ Contribute to breakout discussions
- ▶ Request one-on-one meeting tomorrow (immediately after the workshop)
- ▶ Send input via email with subject line “LENR input” to [robert.thompson@hq.doe.gov](mailto:robert.thompson@hq.doe.gov) by Oct. 30, 2021; we will read your input!

# A few final thoughts before we begin...

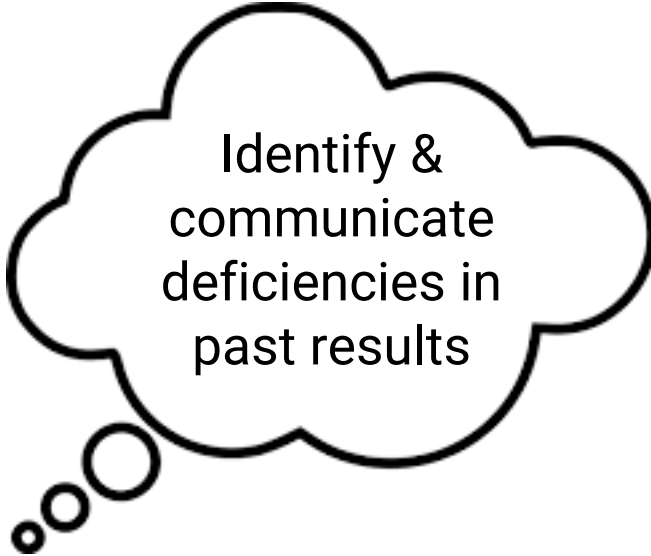
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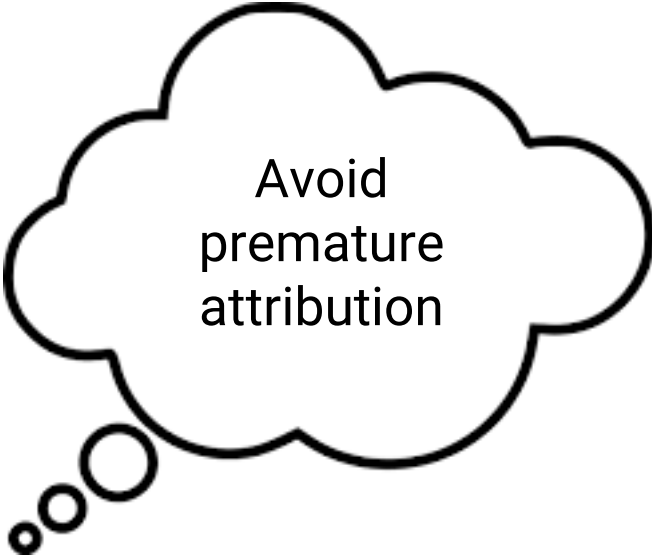
Replication is  
necessary but  
not sufficient



Eventual  
scalability to  
sufficient  
energy gain



Identify &  
communicate  
deficiencies in  
past results



Avoid  
premature  
attribution



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