



Regional Innovation to Enable the Clean Energy Transition

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AND TECHNOLOGICAL
MAKING SCIENTIFIC BREAKTHROUGHS POSSIBLE

Opportunities Are Now



- Opportunities for enhancing national & economic security through clean mining practices



- Opportunities for innovation to drive economy and workforce dev.



- Opportunities for tribes to drive collaboration



National & Economic Security through a Clean Lifecycle

- Re-shore capabilities to protect supply chains
- Critical materials are... critical
 - We must dig, and we must do it more efficiently, effectively, & sustainably
- Circular economy: using scrap, waste, and recycled products

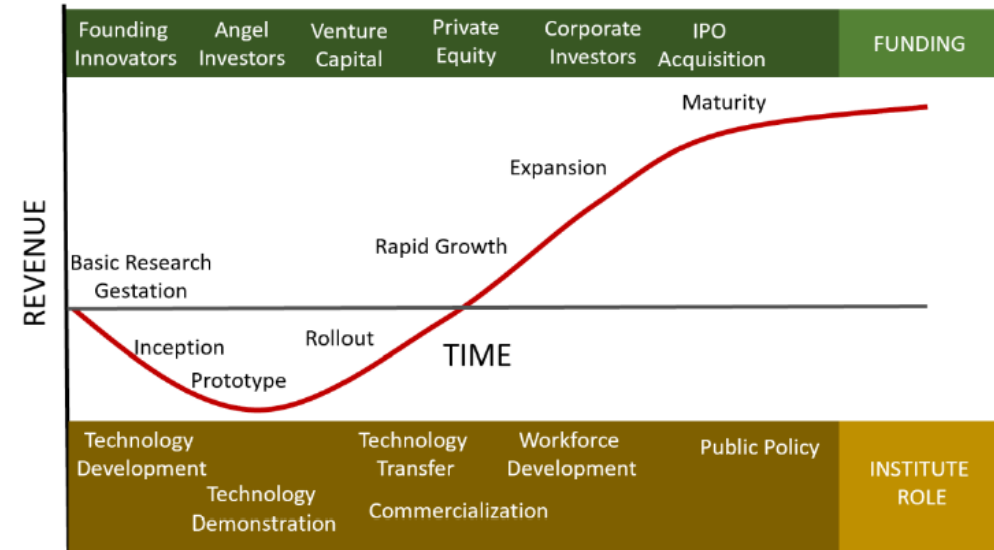




Innovation Drives Economy and Workforce Dev.

	Technology Readiness Level		Manufacturing Readiness Level
TRL 1	Basic principles observed and reported	MRL 1	Basic manufacturing implications identified
TRL 2	Technology concept and/or application formulation	MRL 2	Manufacturing concepts identified
TRL 3	Analytical and experimental critical function and/or characteristic	MRL 3	Manufacturing proof of concept developed
TRL 4	Component and/or breadboard validation in a laboratory environment	MRL 4	Capability to produce the technology in a laboratory environment
TRL 5	Component of breadboard validation in a relevant environment	MRL 5	Capability to produce prototype components in a production relevant environment
TRL 6	System/subsystem model or prototype demonstration in a relevant environment	MRL 6	Capability to produce a prototype system or subsystem in a production relevant environment
TRL 7	System prototype demonstration in an operational environment	MRL 7	Capability to produce systems, subsystems or components in a production representative environment
TRL 8	Actual system completed and qualified through test and demonstration	MRL 8	Pilot line capability demonstrated. Ready to begin low rate production
TRL 9	Actual system proven through successful mission operations	MRL 9	Low rate production demonstrated. Capability in place to begin Full Rate Production

The Technology Maturation and Investment Cycle



- Bridge the gap between good idea and good product
- Nurture a workforce to keep pace with technology



Tribes Driving Collaboration

- Ultimate stakeholders for cleaner air, water, and land
- Workforce development and economic mobility
- Key stakeholders for AUI's
 - Center for Greening the Supply Chain (CGSC)
 - US Center for Mining and Extraction (UCME)
 - Instituto Chileno de Tecnologías Limpias (ICTL)
 - NSF Engines proposal
 - Actively soliciting tribal leaders, expanding from AZ outward

Who is AUI?

- We build, manage, & operate large-scale science facilities
- Non-profit, non-member, .edu, convenes experts
 - We cannot confer degrees—we support research
- Facilities created/in process
 - **DOE's** Brookhaven National Lab (nuclear medicine, maglev, DNA imaging, 1st video game, Nobels, etc.)
 - **NSF's** National Radio Astronomy Observatory
 - ALMA Observatory (\$1.3B construction project at altitude of 5,050 m, 1st image of black hole)
 - Green Bank Observatory (Includes GBT, formerly the world's largest movable object)
 - Very Large Array (countless discoveries, recently received \$23M for design/development of upgrades)
 - Very Long Baseline array (collaborative with **DOD**, stretches from HI to St. Croix)
 - **Chile's** ICTL (clean tech institute)

