

Advanced Research Projects Agencies (ARPAs)

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Chris Atkinson
ARPA-I



Laurent Pilon
ARPA-E





UNITED STATES
DEPARTMENT OF TRANSPORTATION

Advanced Research Projects Agency – Infrastructure (ARPA-I)

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Dr. Chris Atkinson

Fellow ASME, Fellow SAE

Deputy Director for Technology

chris.atkinson.ctr@dot.gov

The U.S. Department of Transportation (DOT)

- **Mission:**

To deliver the world's leading transportation system, serving the American people and economy through the safe, efficient, sustainable, and equitable movement of people and goods.



- DOT employs almost 55,000 people across the country, in the Office of the Secretary of Transportation (OST) which includes the Office of the Assistant Secretary for Research and Technology (OST-R), and its operating administrations and bureaus, each with its own management and organizational structure.
- Includes these nine operating (modal) administrations:
 - Federal Aviation Administration (FAA)
 - Federal Highway Administration (FHWA)
 - Federal Motor Carrier Safety Administration (FMCSA)
 - Federal Railroad Administration (FRA)
 - Federal Transit Administration (FTA)
 - Great Lakes St. Lawrence Seaway Development Corp (GLS)
 - Maritime Administration (MARAD)
 - National Highway Traffic Safety Administration (NHTSA)
 - Pipeline and Hazardous Materials Safety Administration (PHMSA)



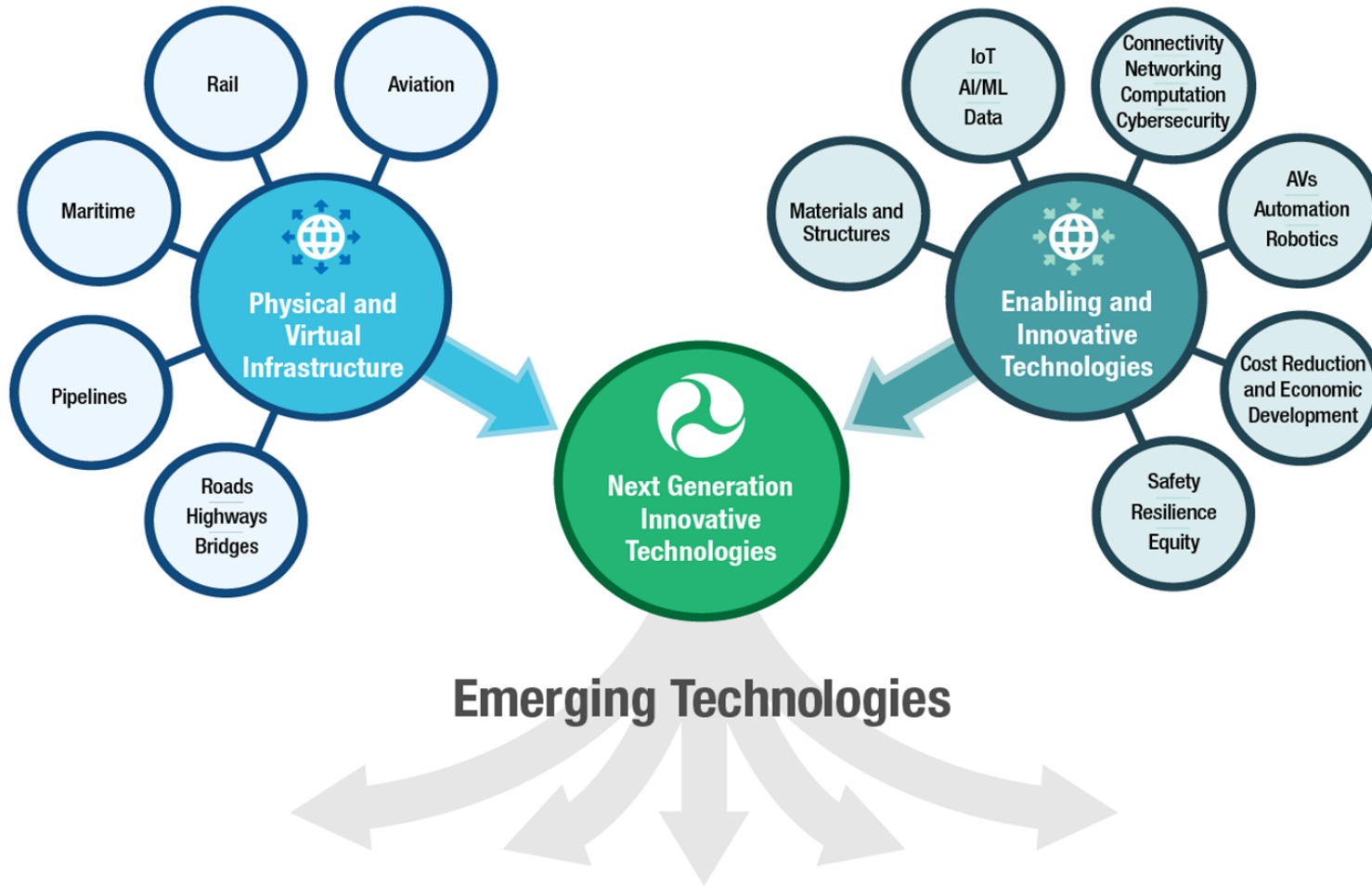


ARPA-I's mission is to catalyze the development of innovative technologies, systems, and capabilities that transform the nation's physical and digital infrastructure to ensure American leadership. We aim to build the future of transportation that is safe, secure, efficient and resilient, while achieving net-zero emissions and increasing equity and access for all.

<https://www.transportation.gov/arpa-i>

The Goal of ARPA-I

Develop Innovative Infrastructure Technologies and Solutions for Transportation



- ARPA-I will be to Transportation as DARPA is to Defense, and ARPA-E is to Energy.
- Develop innovative solutions to persistent problems in infrastructure and transportation – physical and digital.
- Unleash US innovation and creating new infrastructure R&D ecosystems.
- Ensure the US has a 21st Century Infrastructure System and will reach the goal of net-zero GHG emissions by 2050.
- Develop infrastructure that will create the safest, most efficient, climate friendly and resilient transportation system in the world.



Topics of Interest for ARPA-I

Advancing DOT priority goals: Safety, Climate, Transformation, and Equity

Materials, Structures, and Construction

- Zero or negative carbon materials for infrastructure, extremely durable and resilient concrete, accelerated construction processes (3D printing of pavement, bridges, tunnels, pipelines, water infrastructure, and high-speed rail beds), accelerated construction of seawalls and shoreline reinforcement.

Digital Infrastructure for Mobility

- 6G and edge computing for automated vehicles (AVs), intrinsically assured AI and ML for AVs, virtual LIDAR and ubiquitous machine vision, digital twins, HD mapping of infrastructure and topology (above and below surface).

Automated Surface, Air, and Maritime Vehicles

- AV development, testing and validation, vehicle connectivity and networking (V2X), freight and logistics automation, fully electrified transportation – in-situ charging, V2G.
- AI-enhanced ATC and ATM, assuring safety for autonomous aircraft, infrastructure modifications for AAM integration; autonomous shipping.

Cross-cutting and Enabling Technologies

- Advanced PNT – millimetric accuracy (including signals of opportunity), cybersecurity (once and for all) – intrinsically secure networking and data transmission for mobility infrastructure, digital twins of transportation systems and infrastructure, AR and VR for travel replacement.

What Makes an ARPA's Structure Unique?

In an ARPA...



Program Directors set the technical direction and are key to the success of each program.



There is a continuous and structured emphasis on tech to market transitions.



There are frequent staff transitions and Science and Engineering Technical Assistants (SETAs) are depended on for continuity.



Scaling is built into the infrastructure of the Agency.

What Makes an ARPA's Culture Unique?

In an ARPA...



Taking risks is not only encouraged, but required for the Agency's success.



Teams must adopt an entrepreneurial mindset in their work.

Teams can be made up of academic groups, FFRDCs, companies, innovators and others – and have both a technology push and a market pull.



Collegiality must be woven into the Agency's fabric.



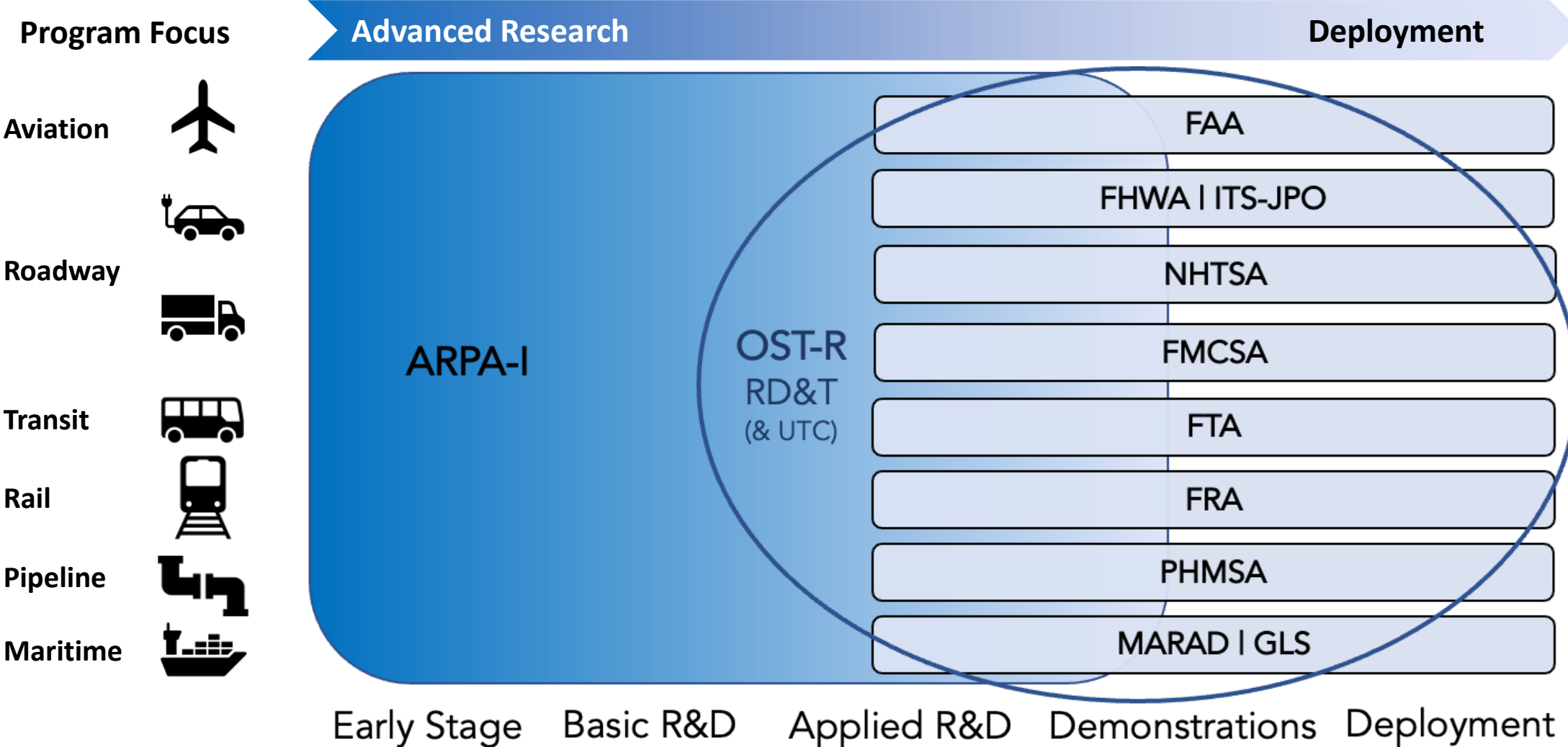
The Agency's focus and exploration areas should remain above the political fray.



Outcomes are far more important than adhering to a strict process - there is no roadmap.

Infrastructure Technology R&D at USDOT

ARPA-I fills a gap in innovative early-stage research across transportation modes



CURRENT STATE

42,915 motor vehicle traffic fatalities in 2021

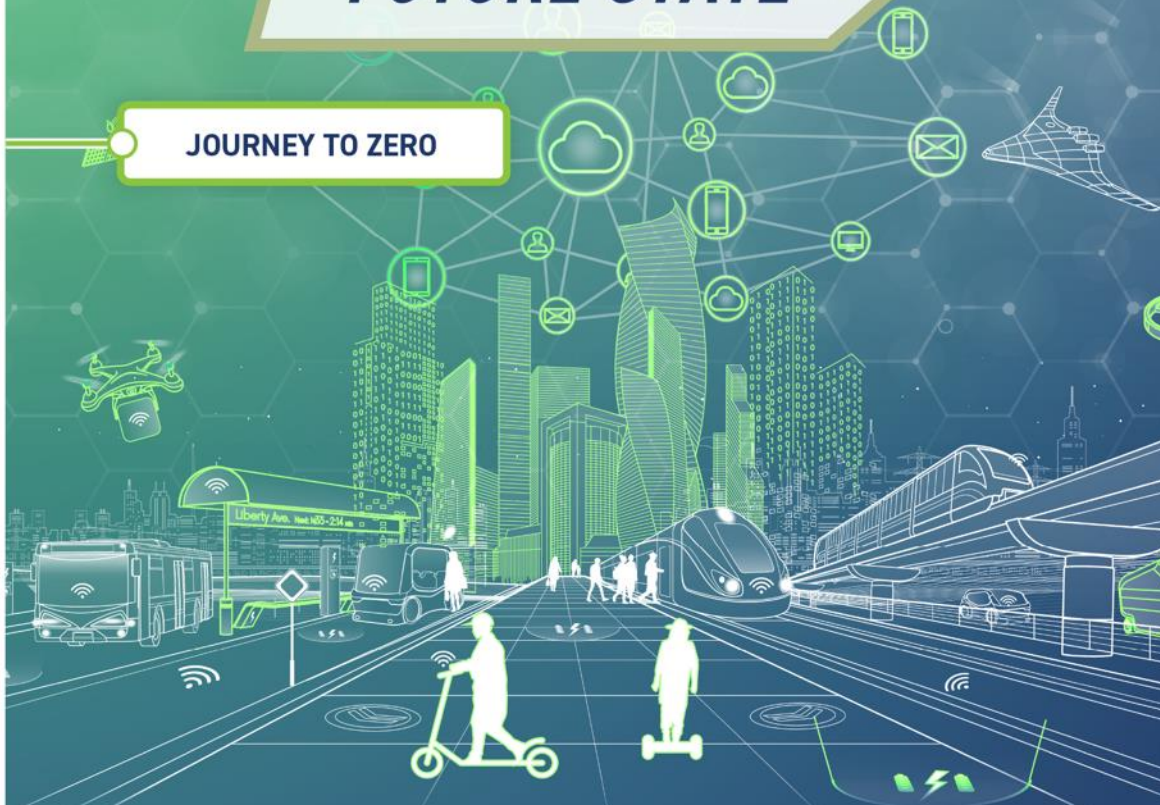
111,018 canceled flights in 2021

The Transportation Sector generates more greenhouse gas emissions than any other sector in the U.S.



FUTURE STATE

JOURNEY TO ZERO



Working together, we can *transform* transportation for a better future for all.

Advanced Project Research Agency – Energy (ARPA-E)

Dr. Laurent Pilon
Program Director
laurent.pilon@hq.doe.gov

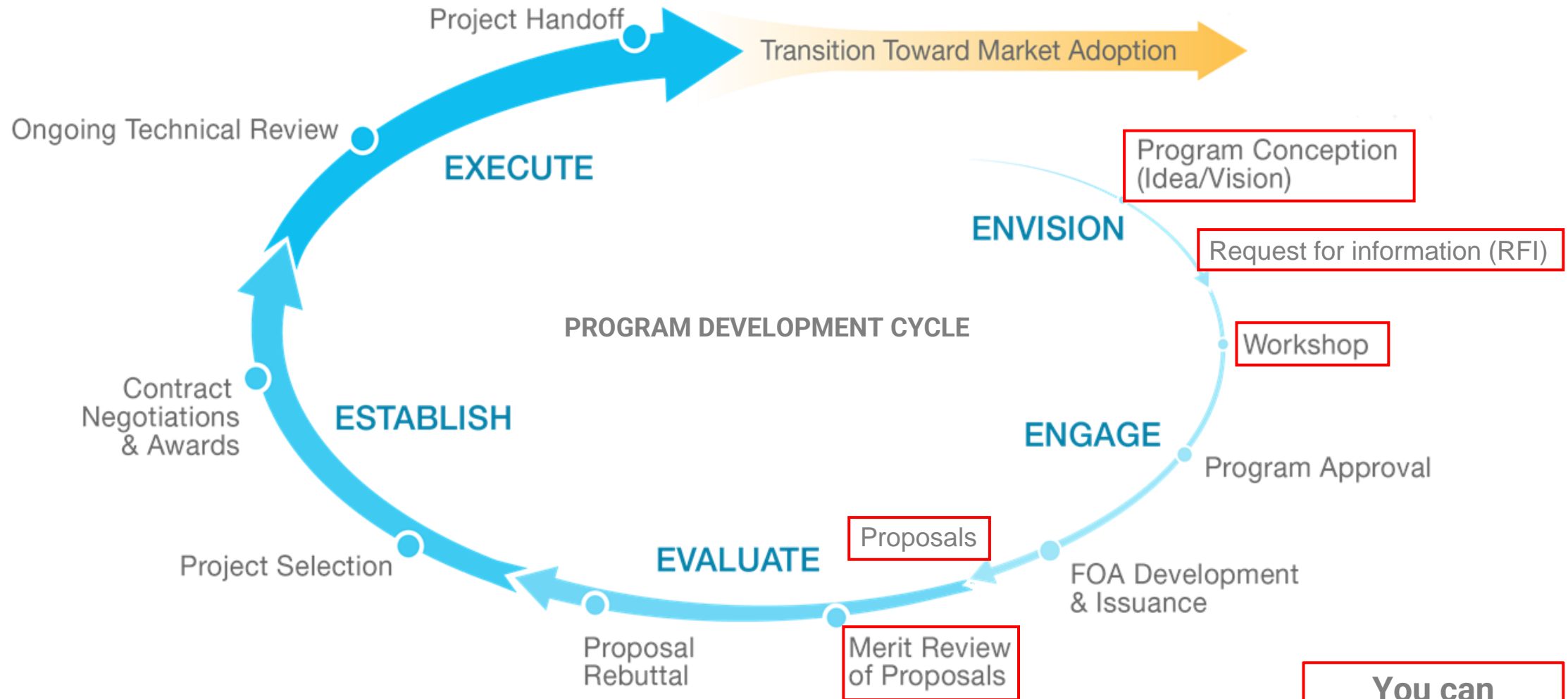
Advanced Research Project Agency – Energy (ARPA-E)

Goal 1: To enhance the economic and energy security of the United States through the development of energy technologies that—



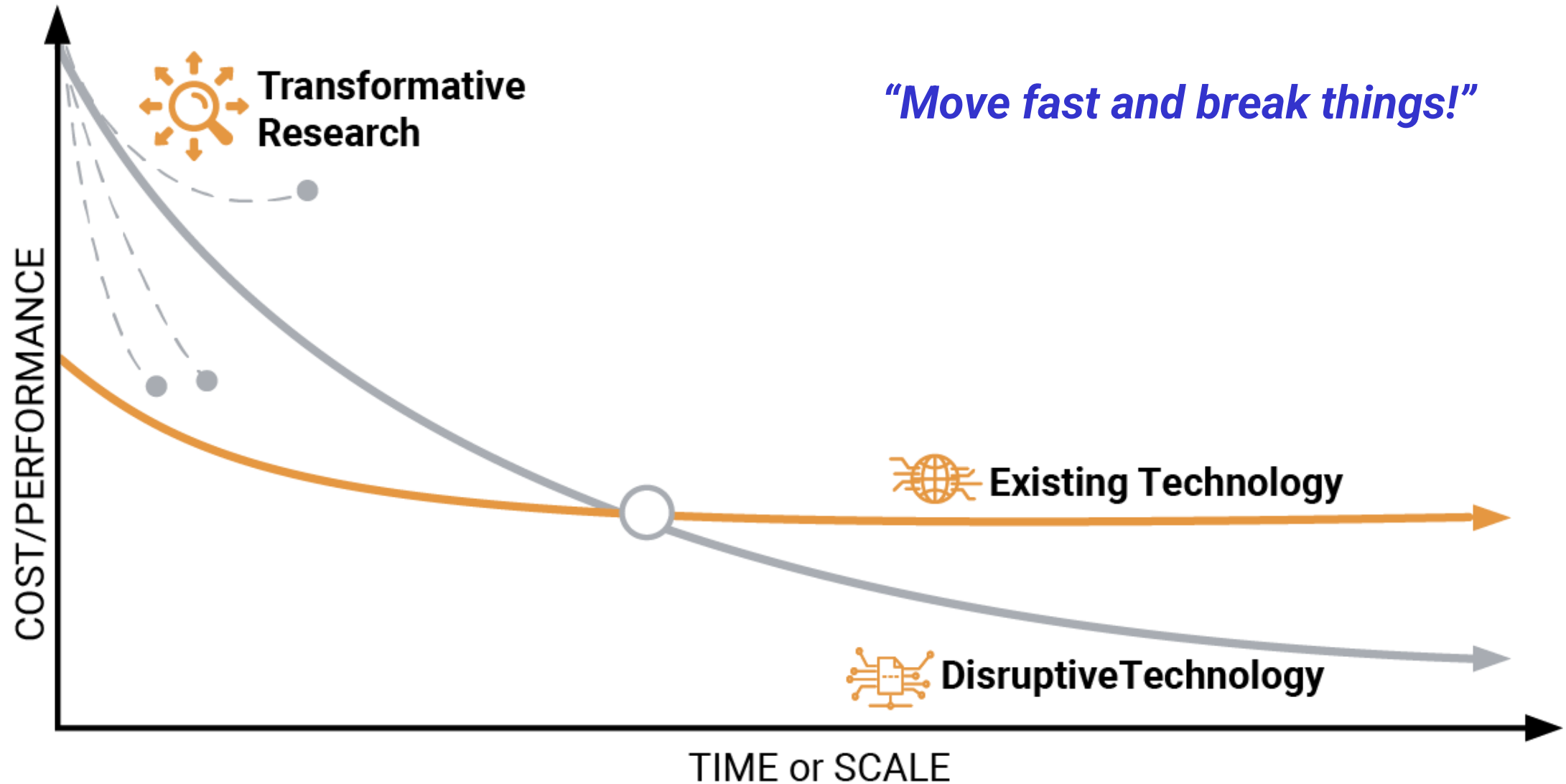
Goal 2: To ensure that the United States maintains a technological lead in developing and deploying advanced energy technologies.

Technology Acceleration Model



You can engage with us

Creating New Learning Curves



ARPA-E Impact Indicators 2022

Since 2009
ARPA-E has
provided

\$3.27 billion

in R&D funding to
more than **1,415 projects**



200 projects

have attracted more than

\$11 billion

in private-sector follow-on funding



131 companies

formed by
ARPA-E projects



26 exits

market valuations worth

\$21.8 billion

from mergers, acquisitions, and IPOs



281 projects

have **partnered with
other government
agencies**

for further development



6,257

peer-reviewed
journal articles
from ARPA-E
projects



934

patents

issued by
U.S. Patent and
Trademark Office



289

licenses

reported from
ARPA-E projects



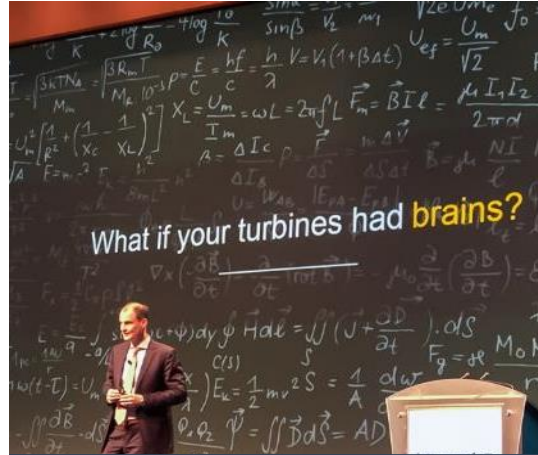
As of September 2022



energy innovation summit



Highly Selective
Technology Showcase



Inspiring Keynotes



Unparalleled
Networking



Fast-Paced
Technology Pitches

arpae-summit.com

May 22-24, 2024

Dallas, Texas



If it works...

will it matter?

Dr. Laurent Pilon
Program Director
laurent.pilon@hq.doe.gov