

Engineering our Planet: Lessons from the Engagement Frontier

From Designed Interventions to Interdisciplinary Programs and Participatory Platforms
- Nicholas Weller, Arthur Daemmrich & Mahmud Farooque



**Consortium for Science,
Policy & Outcomes**
at Arizona State University

Agenda: Thursday, March 26

Part I: CDR at the Engagement Frontier

- ▶ 4:30 pm - 4:45 pm
 - ▶ Welcome, Arthur Daemmrich
 - ▶ Participatory Technology Assessment Method and Projects, Mahmud Farooque
- ▶ 4:45 pm - 6:00 pm
 - ▶ Fireside Chats with CDR Public Engagement Project Originators and Performers, Moderator, Lisa Margonelli with Rory Jacobson & Emily Hostetler, John Mimikakis & Mara Karageozian, and Amanda Borth & David Tomblin
- ▶ 6:00 pm - 7:00 pm
 - ▶ The Climate Conundrum: An expert deliberation on the role of Carbon Dioxide Removal, Facilitator, Emily Hostetler
- ▶ 7:00 pm - 8:00 pm
 - ▶ Reception and Networking

CSPO: Rethinking the Role of Science in Society

A 25+ year journey ...

- The **Consortium for Science, Policy & Outcomes (CSPO)** is dedicated to enhancing the contribution of science and technology to society's pursuit of equality, justice, freedom, and improved quality of life.
- CSPO is a **platform for dialogue** and a **testbed** for new approaches to S&T policy
- CSPO has been creating **knowledge** and **methods**, cultivating **public discourse**, and **fostering policies** to help decision makers and institutions grapple with the immense power of science and technology as society charts a course for the future.
 - **Real Time Technology Assessment (RTTA)**
 - **Reconciling the Supply of and Demand for Science (RSD)**
 - **Public Value Mapping (PVM)**
 - **Anticipatory Governance (AntGov)**
 - **Participatory Technology Assessment (pTA)**



Why Engage (normative rationale)

- When done well, public participation improves the **quality and legitimacy** of a decision and builds the capacity of all involved to engage in the policy process.
- It can lead to **better results** in terms of environmental quality and other social objectives. It also can **enhance trust** and understanding among parties.
 - U.S. National Academy of Science, Committee on the Human Dimensions of Global Change, Division of Behavioral and Social Sciences and Education, (2008)

“To maximize the benefits and minimize the potential harm of technologies such as artificial intelligence and synthetic biology, we must engage nontraditional stakeholders and diverse voices in NSF research, including civic organizations, labor, local and tribal governments, farmers, and even the public at large.”

- Eddie Bernice Johnson, Chairwoman, Science, Space and Technology Committee

Science will be made more reliable and more valuable for society today not by being protected from societal influences but instead by being brought, carefully and appropriately, into a direct, open, and intimate relationship with those influences.

- - Dan Sarewitz, Saving Science, New Atlantis

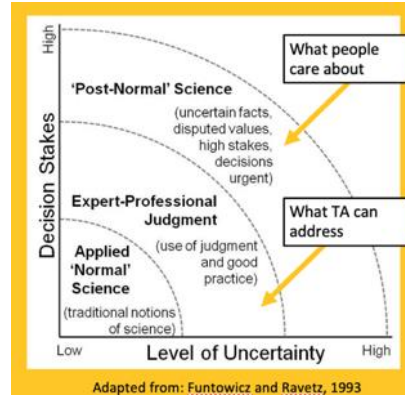
Why Engage (positive rationale)

Democratic Gap



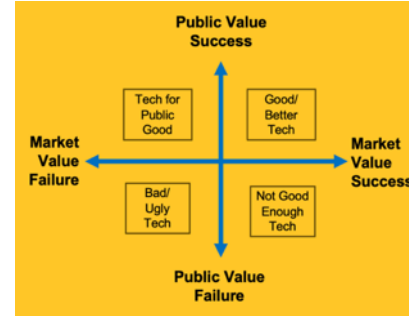
Fill Democratic Gaps

Sociotechnical Gap



Manage Socio-technical uncertainty

Public Value Gap



Assess Public Values

Knowledge Gap

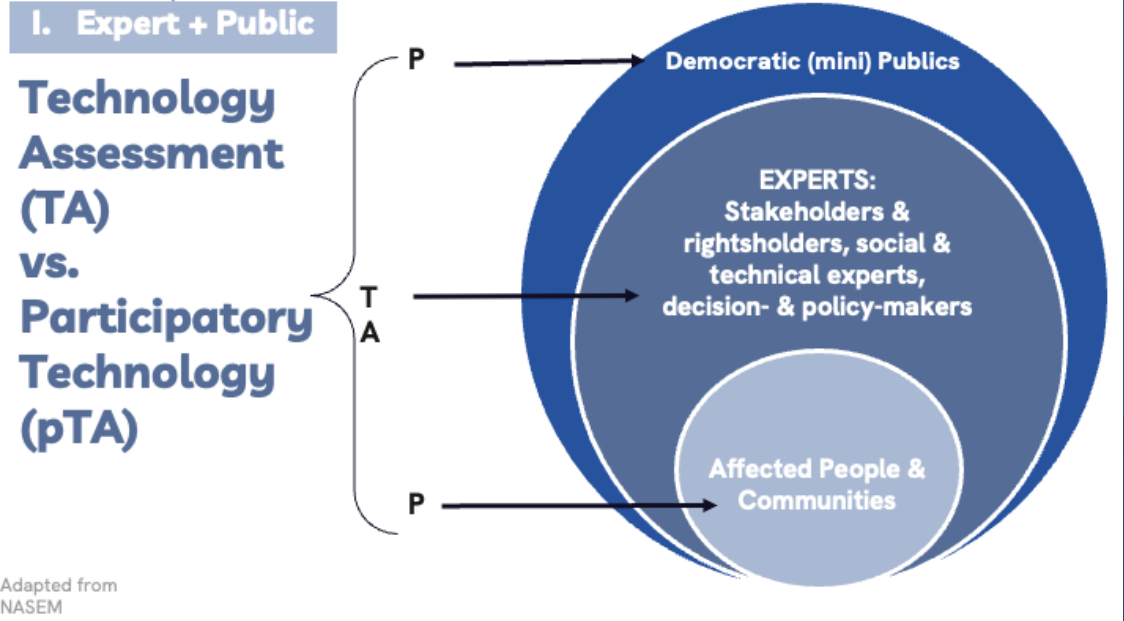


Integrate Living and Lived Knowledge

Participatory Technology Assessment [pTA]

A proven, reflexive, adaptable, replicable, scalable model for innovating with the public

- ▶ An engagement model that seeks to improve the outcomes of science and technology decision-making through dialogue with informed publics and communities.
- ▶ pTA engages groups of non-experts who are representative of the general population who - unlike political, academic, and industry stakeholders - are typically not represented in science and technology related decision-making.



Expert and Citizen Assessment of Science and Technology

Independent, non-partisan, interdisciplinary, distributed, and agile

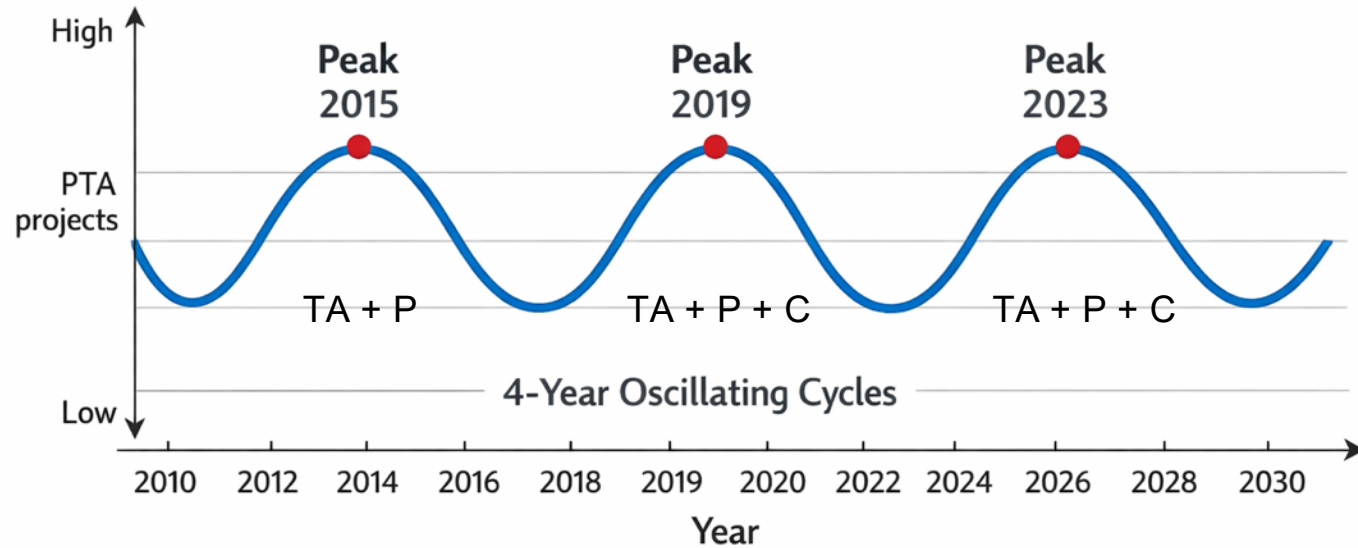
II. Replicable, scalable, adaptable and integrated platform for engagement



15+ Years, \$6+ Million in Sponsored Projects



The pTA story told another way...



Planetary
Defense

Climate
Resilience

Nuclear Waste
Siting

Solar
Geoengineering

Automated
Mobility

Human Gene
Editing

Carbon Dioxide
Removal

Energy
Demonstration

Nuclear Waste
Siting



Planetary Engineering Projects:

What we are leaving unfinished



Exploring
Democratic
Governance of
Solar
Geoengineering
Research
(Sloan, 2017)



CDR Technology
Public Forums
and Applications
in U.S. and
Canada
(Sloan, 2022)



Shared
Principles for
Community
Collaboration for
DAC Hub in
Louisiana
(DOE, 2023)

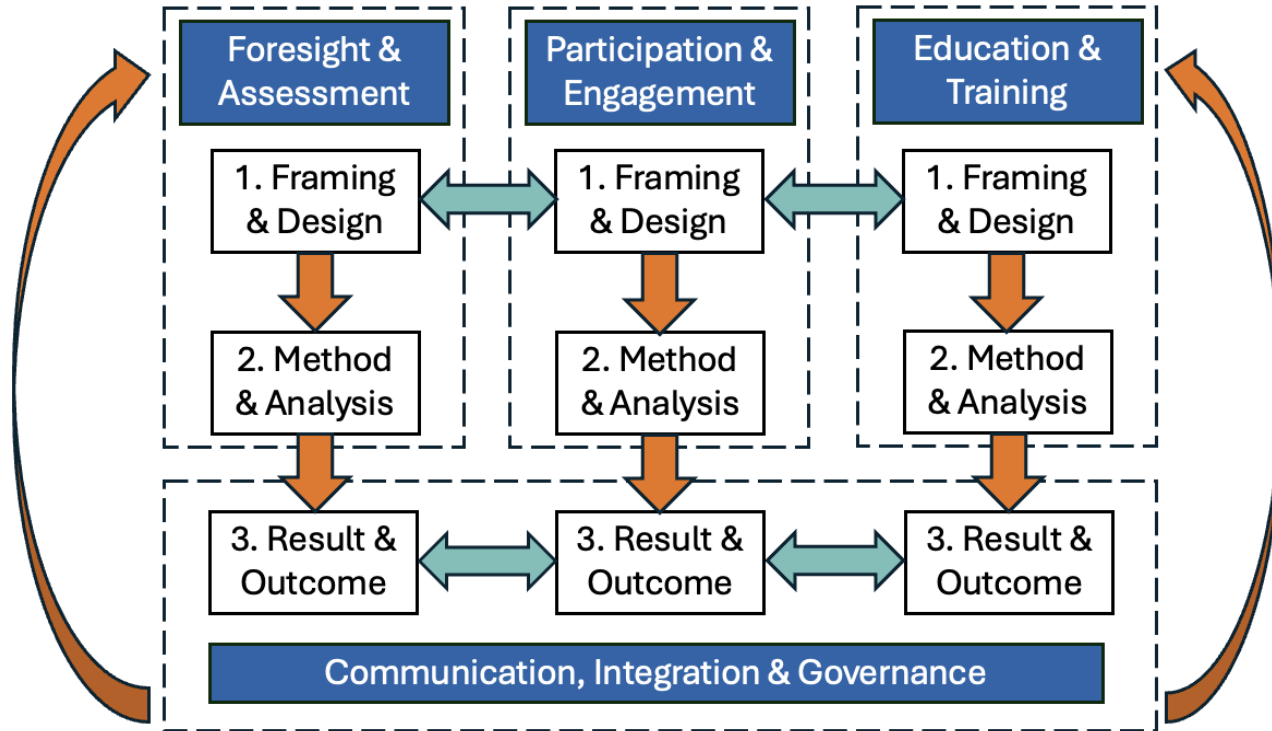


Building
Involved and
Engaged
Community for
Responsible
mCDR
(NSF, 2024)



Planetary Engineering Platform:

Where we could go next



Engineering our Planet: From Designed Interventions to Interdisciplinary Programs and Participatory Platforms



Lisa Margonelli
moderator



Rory
Jacobson



Emily
Hostetler



John
Mimikakis



Mara
Karageozian



Amanda
Borth



David
Tomblin



Consortium for Science,
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at Arizona State University



THE CLIMATE CONUNDRUM

A public discussion on the role of carbon dioxide removal



Consortium for Science,
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at Arizona State University



Museum of Science.

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ECAST

EXPERT AND CITIZEN ASSESSMENT
OF SCIENCE AND TECHNOLOGY



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What brings us together today?

Carbon dioxide removal (CDR) could be a key component among a range of technologies to address climate change - and we want to learn from you!

Who should be involved in the decision-making process?

If not CDR, what other actions should be taken to address climate change?

What should the role of CDR be in managing climate change?



THE
CLIMATE
CONUNDRUM

Agenda

Welcome and Introduction	10:00 am	10:20 am
Session 1: Climate Change Remediation	10:20 am	1:00 pm
Lunch	1:00 pm	1:55 pm
Session 2: CDR Case Study	1:55 pm	3:30 pm
Session 3: Group Share out	3:30 pm	3:50 pm
Closing & Evaluation	3:50 pm	4:00 pm

Discussion Overview

Session 1: Climate Change Remediation

Session 2: CDR Case Study

Session 3: Group Share Out

The CLIMATE CONUNDRUM

MAKE A CLIMATE REMEDIATION PLAN
Your group must include at least one card from each service, but you can use as many cards as you like.
Keep in mind cost, pros, and cons.
Type down your group's choices.

Additional notes:

- 1 You are not required to spend all your chips if you do not want to.
- 2 You may purchase a card on your card or share the cost with your table mates.
- 3 Your table must purchase at least one card per category.

Summit CO2 Storage energy storage cards				
Remove CO2 from the atmosphere cards				
Adaptation to climate change cards				
Prevent large-scale land-use changes cards				

TABLE # _____

The CLIMATE CONUNDRUM

GROUP CARBON DIOXIDE REMOVAL (CDR) PLAN
Rank the cards from what your group most the most to least to carry out the research.
Please tape down your cards when you're finished.

Final Plan

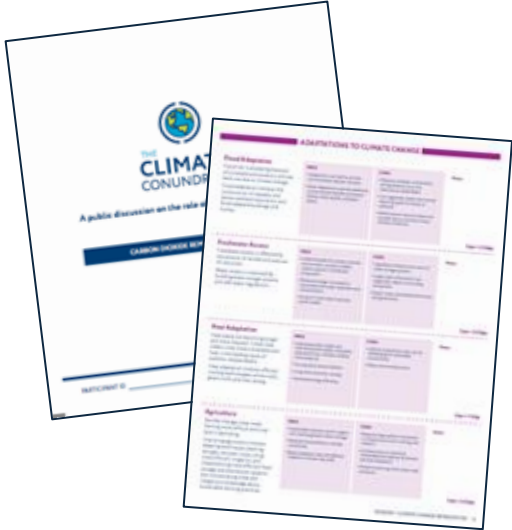
Research and Reassessment Place the Research and Reassessment cards in order of least to most needed.	Monitor Place the Monitor Cards here in order of least to most needed.	Stop Place the Stop Cards here in order of least to most needed.	Development and Reporting Place the Development and Reporting Cards here in order of least to most needed.	Adapt Place the Adapt Cards here in order of least to most needed.
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Discussion Overview



Videos



Workbook



Group Activities

Ground Rules for Discussion

- Ask questions of “curiosity” or “wonder,” which are clarifying questions to better understand each other.
- Speak for yourself using “I” instead of “we” statements.
- Disagreement should be voiced with empathy.
- Share the airtime – make space for everybody who would like to speak. Listen to understand points of view that might be different from our own.
- Be sure not to interrupt, except to indicate if we cannot hear a speaker.
- You are welcome to share about your experience, but please do not share another participant’s comments outside of the room.
- If you are not prepared to speak when called upon, you can “pass for now.”

VIDEO:
INTRODUCTION TO CLIMATE CHANGE



CLIMATE CHANGE REMEDIATION ACTIVITY

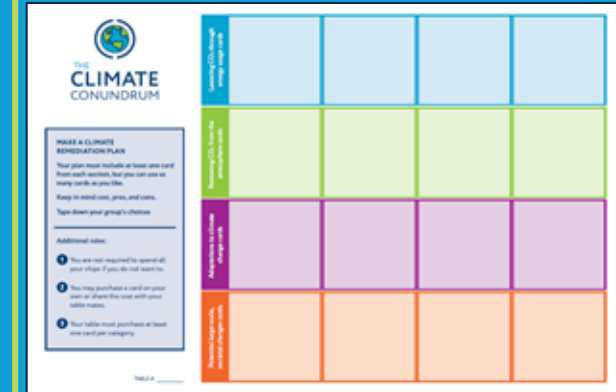
Climate Solutions Cards



Climate Solutions Descriptions



Session 1 Board



Climate Change Remediation Activity

Step 1: Climate Solutions
15 min

Climate Change Remediation Activity

Step 1: Climate Solutions
5 min

Climate Change Remediation Activity

Step 1: Climate Solutions
Time's Up!

Climate Change Remediation Activity

Step 2: Climate Remediation Plan
25 min

Climate Change Remediation Activity

Step 2: Climate Remediation Plan
15 min

Climate Change Remediation Activity

Step 2: Climate Remediation Plan
5 min

Don't forget to select a table representative!

Climate Change Remediation Activity

Step 2: Climate Remediation Plan

Time's Up!

Don't forget to select a table representative!

Share out!

Each table has 2 minutes to share
your plan!

Thank you!

Join us in the lobby downstairs to enjoy refreshments and discussion.

We will reconvene tomorrow morning at 8:30am for breakfast and our panel on Building Capacity for Planetary Engineering Technologies.



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