NSF ASCEND ENGINE in Colorado and Wyoming

Building regional economic development through climate resilience technology and solutions

Drive | Lead | Succeed Conference
Pueblo, Colorado

October 27, 2025

NSF Advanced Sensing and Computation for Environmental Decision-making Engine in Colorado and Wyoming

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ASCEND Team

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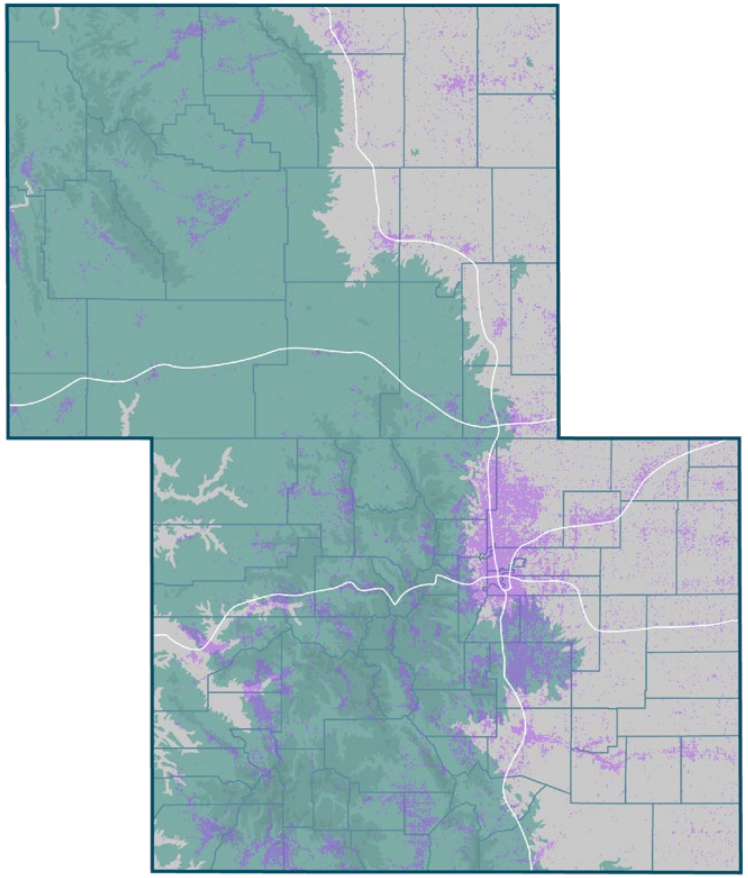
Workforce & Regional
Engagement Director

Same Engine, New Name

Advanced
Sensing and
Computation for
Environmental
Decision-making



6.4M+ People

6 Tribal Nations

100+ Academic Institutions

5 Federal Labs

8 Fortune 500 Companies

Four Focus Areas

Air Quality

Boulder County, *Boulder Daily Camera*

Soil Health

CSU Extension

Water Quality & Availability

Urban sewage, CSU Colorado Water Quality

Wildfire Mitigation & Response

Alexander Mountain Fire, July 2024 – *The Denver Post*

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NSF Innovation Ecosystem Life Cycle

Phase 2: NASCENT

Solidify organization and partnerships

Ramp up innovation activities

Phase 3: EMERGENT

Scale technological products and services

Scale workforce capabilities

Attract sizeable external funding to promote innovation-based economic activity

Phase 4: GROWTH

Grow innovation ecosystem as a national leader

Attract increasing levels of economic activity and business creation

Support from state, local and federal governments

Phase 5: MATURE

Innovation ecosystem is well established and can sustain itself without NSF funding

Year 1-2
NSF $7.5M/Year
Cost Share
$7.5M/Year

Years 3-5
NSF $15M/Year
Cost Share
$30M/Year

Years 6-10
NSF $20M/Year
Cost Share $60M/Year

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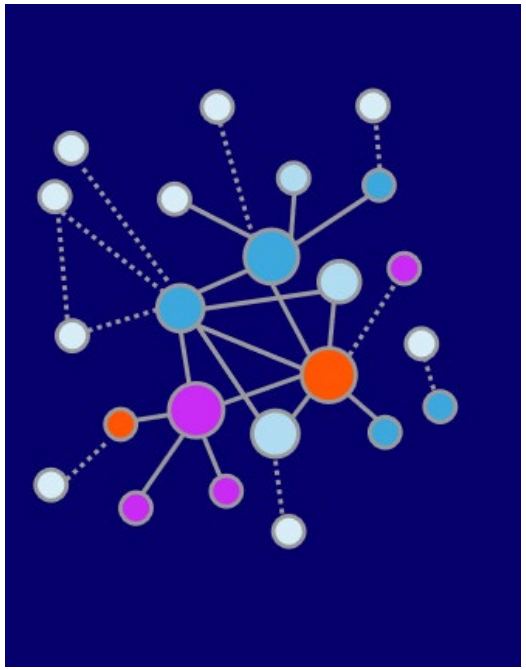
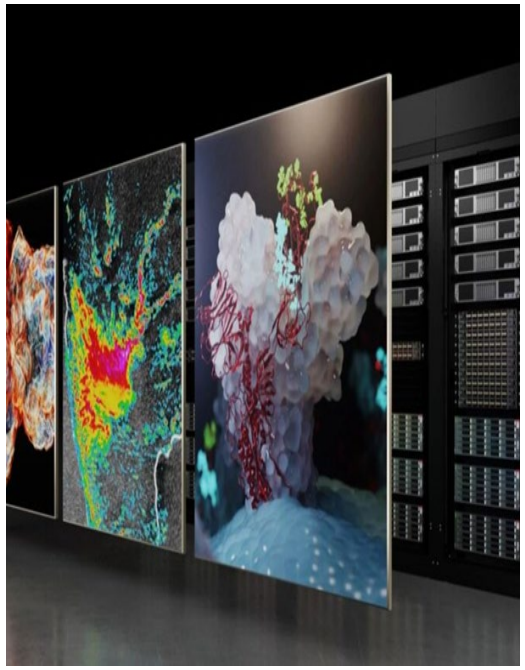
Engine Pillars



Ecosystem Building



Technology Research & Development

Translation & Commercialization

Workforce Development

Technology Development

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Sensing and Decision-Making are Ubiquitous

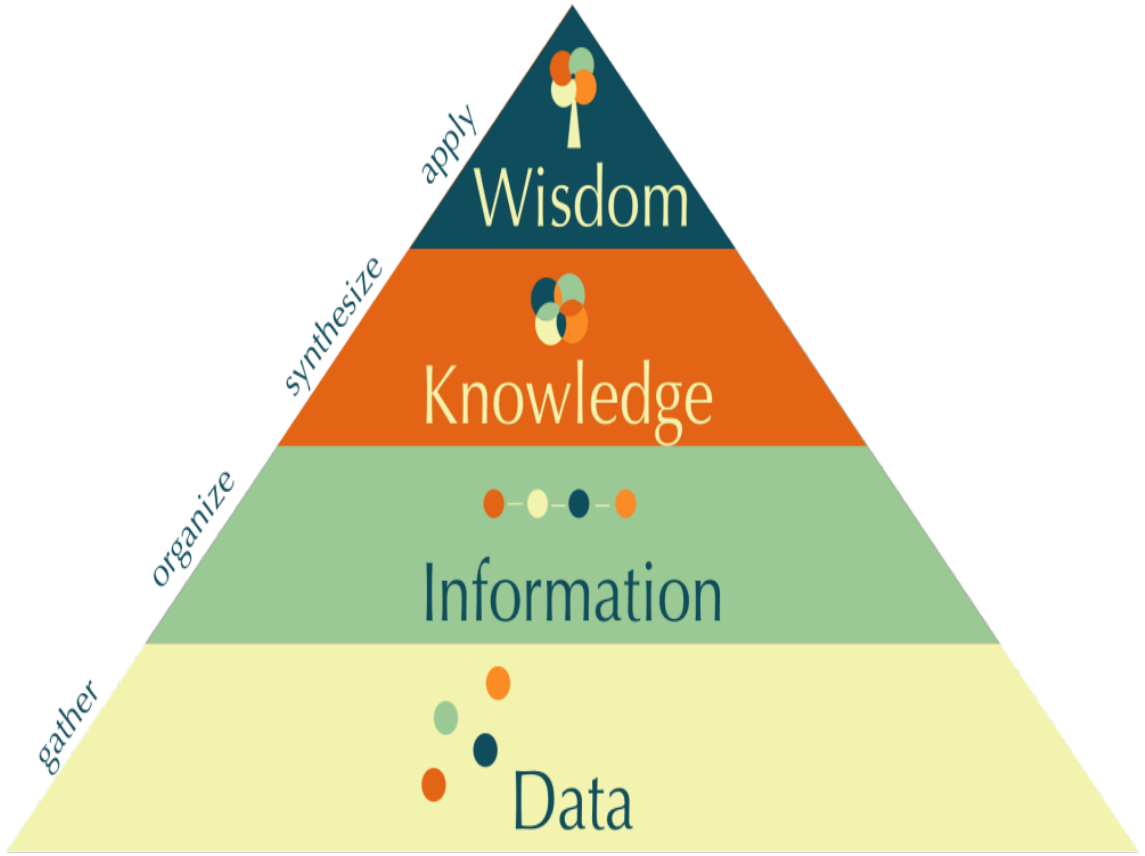
1. Who can tell us what the forecasted high temperature in Casper, Wyoming will be today?

2. Who can tell us the expected arrival time for Jeni, Robert, and Brian in Fort Collins, leaving here at 3pm? Leaving at 5pm?

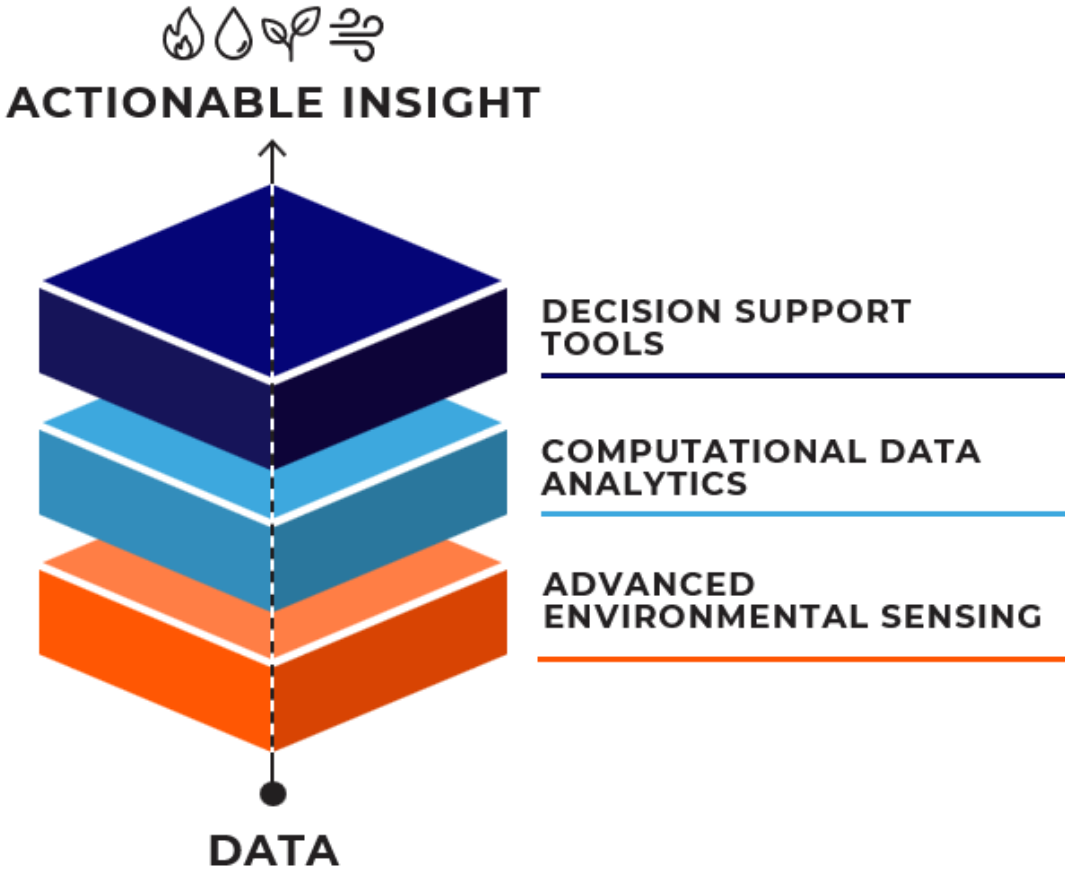
3. Who can tell us how many minutes of deep sleep and REM sleep they got last night?

Knowledge Value Chain for Climate Resilience

DIKW Pyramid



ASCEND Engine Technology Investments



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What is an Environmental Decision?

Should I tele-commute today because it is a high ozone day?

How do I rearrange my schedule to pick the kids up early because of a high heat day?

Winds are expected to be high today, are we prepared for a public-safety power shutoff?

How do we manage water supply after the mud slide and wildfire silt spilling into the Poudre River?

What code changes do we want to make to support greater water resilience in the City?

What grass or plants should I replace my lawn with to reduce my annual water budget?

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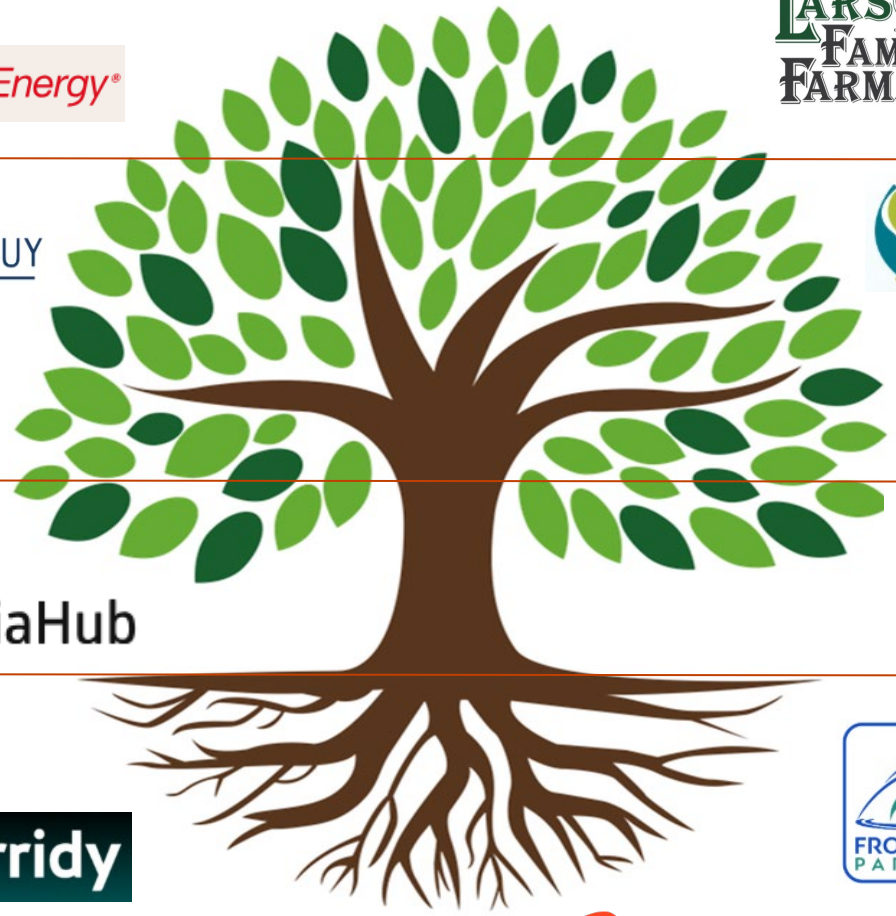
Colorado-Wyoming Ecosystem



DECISION MAKERS

KNOWLEDGE BROKERS

COMPUTATIONAL ANALYTICS

SENSING/DATA COLLECTION

TRI-STATE

COLORADO STATE UNIVERSITY PUEBLO

POUDRE SCHOOL DISTRICT NORTHERN COLORADO

DENVER WATER

LARSON FAMILY FARMS

DEN

Xcel Energy

KODY THE WX GUY

brendle GROUP

Pinyon Environmental, Inc.

NCAR Operated by UCAR

National Oceanic and Atmospheric Administration U.S. Department of Commerce

UNIVERSITY OF WYOMING

JuliaHub

NVIDIA

virridy

FROG CREEK PARTNERS

PAGE

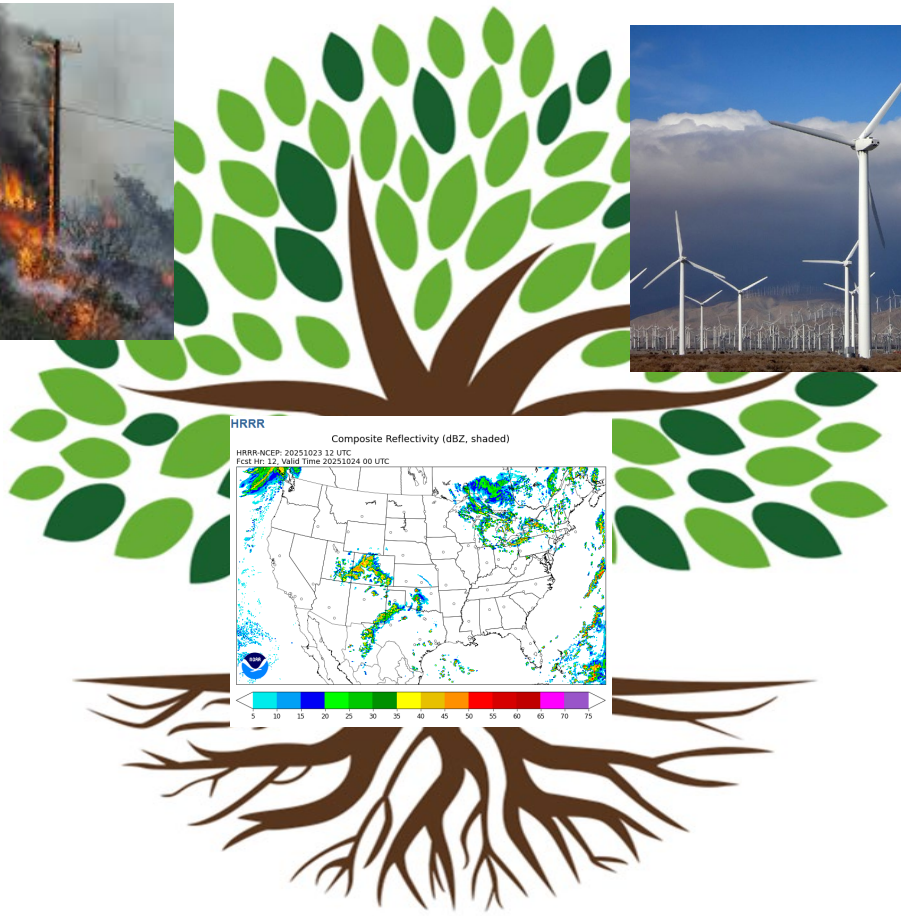
OroraTech

Flow of Data Nutrients into Decision-Making

On a high wind day, which power lines might need to be shut off?

Where should we build a wind farm?

How much electricity will our wind farm put onto the grid today? Do we need to ramp up the coal power plant?



High Resolution Rapid Refresh HRRR

NOAA weather data

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Mental Health & Technology

Inspiring new behaviors

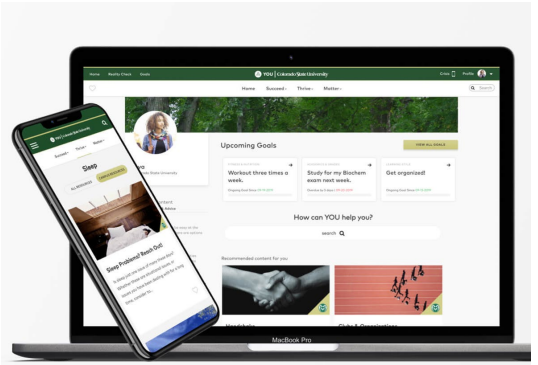
Personalized feedback based on science

Science-based analysis, seamlessly built into user experience

Online assessments for early detection

Counseling Center ramps up group sessions, based on analytics

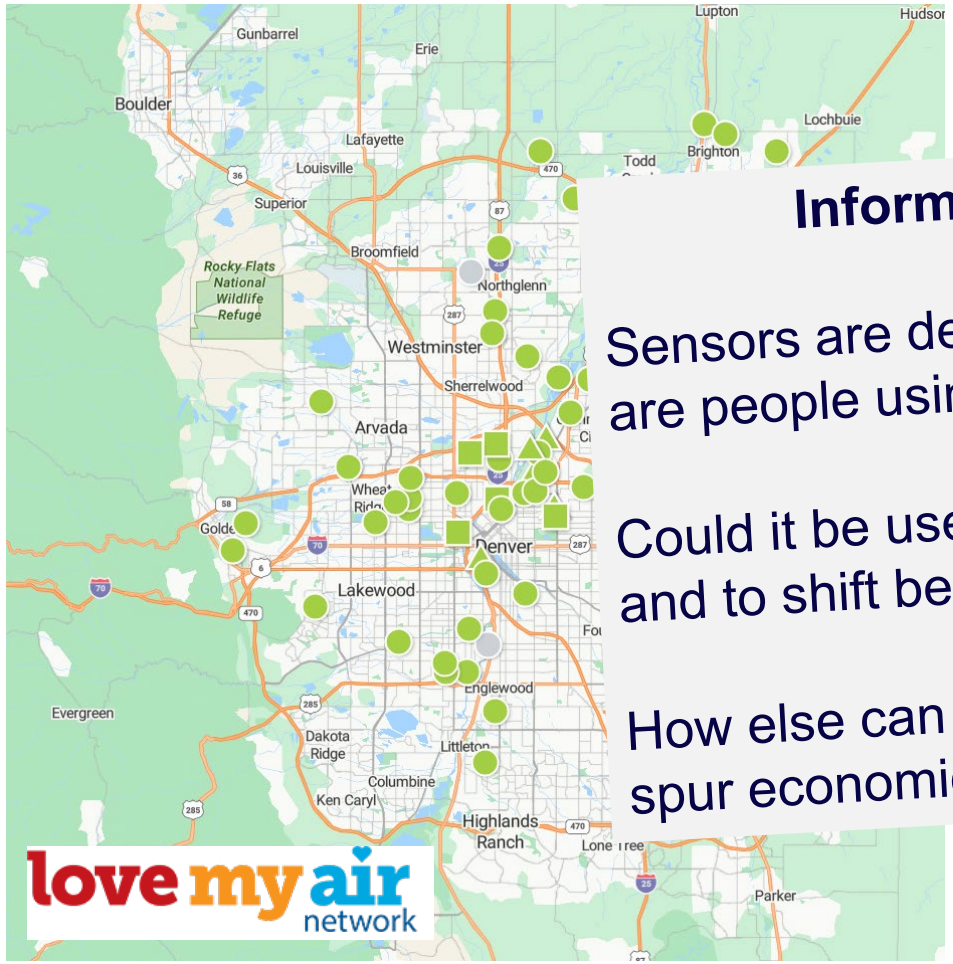
GRIT DIGITAL HEALTH



Over 60% of college students experience anxiety, depression, or other mental health challenge.

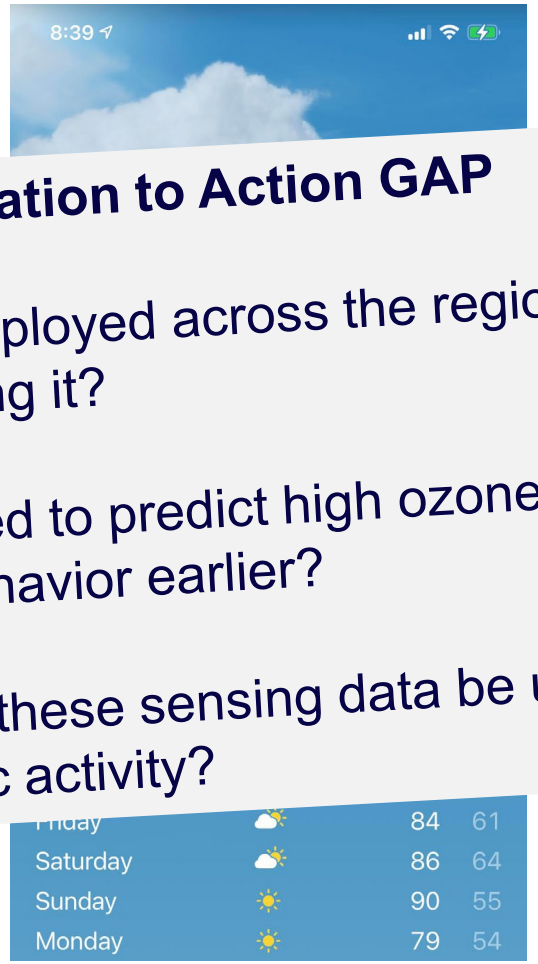
Air Quality Data and Decision-Making

Sensing

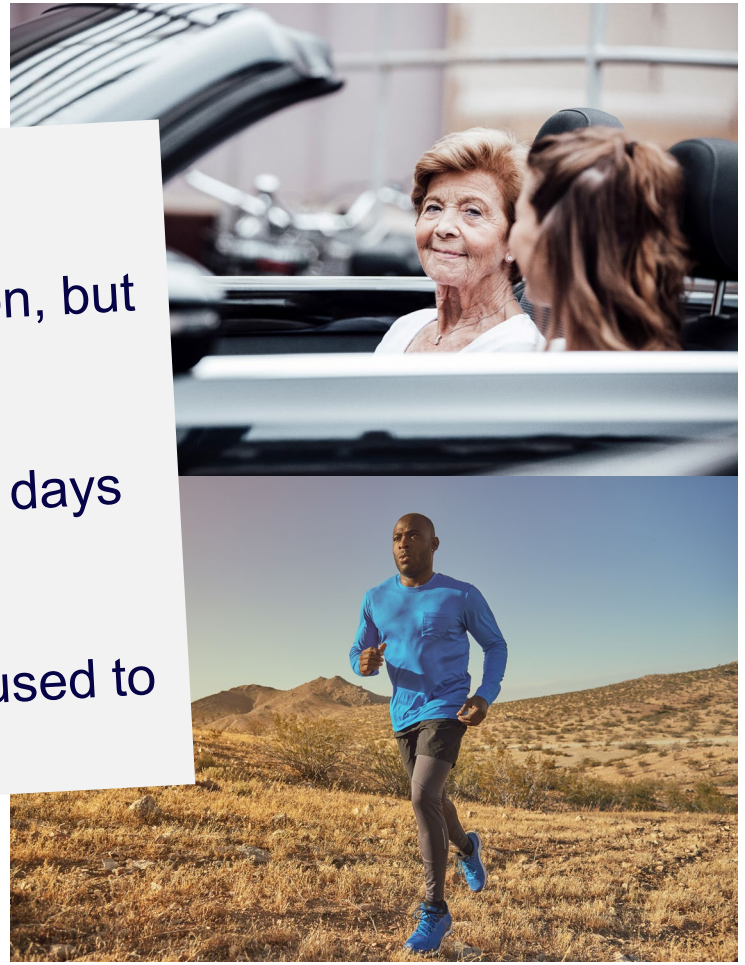


Organizing

Synthesizing



Decision-making/Action-Taking



Information to Action GAP

Sensors are deployed across the region, but are people using it?

Could it be used to predict high ozone days and to shift behavior earlier?

How else can these sensing data be used to spur economic activity?

Share

Respond at pe.app/amberrahn

Poll Everywhere

Thinking about startups and companies in your community, which level of the tree produces the most economic activity?

Inactive

0

0%

Leaves: decision-making support tools

0%

Branches: knowledge brokers

0%

Trunk: data analysis and computation

0%

Roots: sensing and data creation

Add Choice

When Presented

Hide Responses | Lock | Show Correctness

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What does the Data to Decision-Making Ecosystem look like in your community?

Where could you be enhancing connections up and down the tree?

Environmental Decision-Makers
Knowledge Brokers
Data Analysis/Computation/Models
Sensing Networks

Share

Respond at pe.app/amberrahn

Poll Everywhere

When you go back to your community, what new action will you take to help build out the companies in the knowledge to decision-support value chain?

Inactive

0

Awaiting first audience response

When Presented

Hide Responses

Lock

What’s Coming?

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Years 3-5 R&D Programs: Infrastructure for High-Impact Translational Activity

Motivation: Coalesce and scale promising, synergistic clusters of Years 1-2 R&D activity to support concentrated translational activity. Build investable platforms.

Approach: Multi-year, multi-team investments to (1) deliver transformational innovation for dedicated program partners; (2) support continuous cohorts of accelerator companies with enabling infrastructure and expertise.

SHIELD

A distributed testbed for **soil health innovation** focused on the critical industry challenge of trustworthy, low-cost **measurement at scale.**

ARID

Interoperable, multi-layer digital twins for **wildfire management** focused on **power and water systems**.

“Program C”

Program to be launched in 2027 that will leverage promising Years 1-2 activities not yet integrated into ARID or SHIELD + additional Year 3 seedlings.

Workforce and Regional Engagement Goals

- **Addressing Critical Talent Shortages**: Workforce programming targets urgent gaps in systems engineering, environmental sensing, and climate resilience by aligning training and credentials with demonstrated employer needs across the region.
- **Expanding Career Access**: The Engine builds equitable, accessible pathways into ASCEND-related careers, particularly for non-degreed, rural, and Tribal populations in Colorado and Wyoming.
- **Co-Designing Workforce Solutions with Stakeholders**: Programs are developed in collaboration with educators, employers, workforce boards, and community organizations to ensure relevance and long-term adoption.
- **Cultivating Future Talent Pipelines**: Early investment in K–12 engagement introduces students to environmental and sensing technologies through mobile STEM labs, expanded 4-H robotics, and other experiential learning models.
- **Deepening Tribal Engagement and Partnership**: Workforce strategies include formal Tribal Consultation guidelines and culturally grounded co-design approaches to support long-term collaboration with Tribal Nations.

Key Learnings & Years 3-5 Pivots

Years 1-2
Key Learning

Critical Talent Shortage in Non-Degreed Workforce

Years 3-5
Pivot
- Reallocating budget to better impact non-degreed workers
- Expand career access for non-degreed, rural, tribal

Years 1-2
Key Learning

Short, stackable credentials are the best on ramp for non-degreed workers.

Years 3-5
Pivot
- ActivateWork
- Gener8tor
- Custom Trainings

Years 1-2
Key Learning

WF Programming should be co-designed

Years 3-5
Pivot
- The need for developing the Non-Degreed Workforce Collaborative

ASCEND Talent Pipeline

K-12

- CSU Mobile Lab
- 4H Robotics
- CSU/UWY Extension Engagement

Post-Secondary Training

- ActivateWork
- Gener8tor
- Workforce Collaborative
- MSU/Community College Internships

College Level Pathways

- Systems Engineering Internships
- 12 credit ASCEND certification (CSU)
- ICLEI Policy Internships

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Non-Degreed Workforce Collaborative

Higher Education Program Partners

University of Wyoming

Colorado State University

Central Wyoming College

Pikes Peak State College

Metropolitan State University of Denver

ICLEI Local Governments for Sustainability

Workforce Program Partners

Workforce Wyoming Services

Colorado Workforce Development Council

Elevate Quantum

Wyoming Innovation Partnership

Larimer County Economic & Workforce Development

Colorado Thrives

gener8tor

ActivateWork

Corporate Program Partners

Shell

Chevron

MARS

NVIDIA

Xcel

VAISALA

Lockheed Martin

JuliaHub

Denver Water

Rural/Tribal Program Partners

EDCC Economic Development Council of Colorado

Wind River TERO

Eastern Shoshone Tribe 1863 1868 Shoshone Reservation

Engagement and Extension Colorado State University

University of Wyoming Extension

Wind River Tribal Buffalo Initiative

Northern Arapho Tribe

Share

Respond at pe.app/amberrahn

Poll Everywhere

Which of the four Engine pillars would you most like to engage with?

Inactive

0

A 0% Ecosystem building

B 0% Research and Development

C 0% Translation and Commercialization

D 0% Workforce Development

Add Choice

When Presented

Hide Responses | Lock | Show Correctness

Thank You!

Jeni Cross – Director of Co-Creation
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