Actuate Climate
Breakthrough systems innovation to eliminate emissions in time

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Mitigating climate change requires eliminating emissions in time

Annual global greenhouse gas emissions (in gigatons of CO₂-equivalents)

Pledges & targets are improving but still leave a gap

New technologies take many decades to contribute

After many decades, renewables are just now mitigating 5% of emissions:

Current policies
2.7 - 3.1°C

Pledges & targets
2.4°C

2°C pathways
1.5°C pathways

Actuate Climate breaks through systems barriers to eliminate emissions faster
To eliminate emissions in time, we are building a different and essential kind of innovation

**Innovation efforts today**
- Typically push a technology one stage at a time from lab towards deployment
- Important—we need more and better
- By themselves, not on track to fully deploy fast enough to eliminate emissions in time

**Breakthrough systems innovation**
- We start on the right, asking: what does it take to realize faster emissions reduction at massive scale?
- We scope, design, and conduct experimental programs to shift the system by breaking through multiple technology and institutional barriers
Actuate adapts a proven, powerful model to the challenge of mass scale
A portfolio of experimental programs to achieve breakthroughs for complex, critical challenges

**Program #1**
- Define a bold goal and a rigorous plan to achieve it
- Build and mobilize top-notch teams across companies, universities, other organizations
- Actively manage the program

**Full success changes what’s possible**
- A convincing *demonstration* of the breakthrough
- A *community* of people and organizations able to implement the new approach at increasing scale
- Other *decision makers* ready to act to accelerate scale

Directed by an exceptional program leader
Typically tens of $M over 3-5 years
Robust program design requires 6-12 months
Actuate Climate is currently in the early stages of this process

The Actuate Questions guide development

1. **Objective:** What are you trying to do in this program?
2. **Problem:** What’s the problem you aim to solve? How is it done today, and what are the limits of current practice?
3. **Opportunity:** What’s your hypothesis? What’s new in your approach? What are the risks?
4. **Impact:** If your program succeeds, what difference will it make?
5. **Plan:** What work will you fund in the program? Who will need to act to fully scale successful results? What will the program cost? How will you assess progress and success?

Adapted from the Heilmeier Catechism
We approach each sector of emissions as a complex system.
Examples of questions to craft programs that break barriers to mass scale:

- The variability of renewables limits full-scale electricity decarbonization. How can we accelerate low-cost, carbon-free sources of grid flexibility?
- Cattle are a significant portion of ag emissions. What combinations of strategies and incentives would drastically reduce methane from cows?
- Decarbonizing passenger transportation requires much more than high-income car buyers with garages. How can we equitably, cheaply, and rapidly build urban charging?
- Mineralization could remove carbon at low cost. What would it take to accelerate commercialization and mass scale-up?

CURRENT SOURCES:
- Electricity Production
- Food, Agriculture, & Land Use
- Transportation
- Buildings
- Other

CURRENT SINKS:
- Land Sinks
- Coastal & Ocean Sinks

THE ATMOSPHERE
Remains in the Atmosphere

Emissions diagram credit: Project Drawdown
### Actuate Climate: breakthrough systems innovation to eliminate emissions in time

**Actuate Climate will conduct a portfolio of experimental programs**
- Systems innovation that breaks through the technical and institutional roadblocks to emissions reductions
- DARPA’s proven methodology applied to faster emissions reduction

**Our team brings a track record**
- Deep energy and climate expertise, systems perspective, and networks
- DARPA experience in delivering high impact for large-scale, systemic challenges

**Each program aims to open a radically better reduction pathway**
A program mobilizes companies, universities, nonprofits, and communities that:
- Create the tools, techniques, and evidence for a powerful new approach
- Initiate a structural shift

**We’re at development stage**
- Exploring and developing programs with a wide community of actors
- Scoping the Actuate Climate Portfolio to address the scale and diversity of the challenge of zero emissions in time
Actuate
Thank you

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