Clean Energy Innovation and Deployment

**Goal Leader:** Geraldine Richmond, Under Secretary for Science and Innovation

**Deputy Goal Leader:** Kathleen Hogan, Acting Under Secretary for Infrastructure
Goal Overview

Goal statement
- Support integrated research, development, demonstration and deployment of cost-competitive, clean energy technologies to achieve net zero goals while promoting good paying clean energy jobs, domestic manufacturing, resilient supply chains, and benefits to disadvantaged communities.
- By September 30, 2023, publish 5 crosscutting innovation and deployment strategies with performance and deployment targets that help to achieve economy-wide emissions reductions of 50-52 percent by 2030 compared to 2005 levels and net zero emissions by 2050.

Problem to Be Solved
- The Administration has articulated ambitious climate goals which require national-level coordination for research, development and deployment of critical clean energy technologies. There are multiple Offices across the DOE working in key technology areas critical to meeting national emissions targets, the Department will be more effective and efficient by having a DOE wide innovation strategy for each key technology area identified and an execution plan tied to future budget requests and relevant IIJA funding.

What Success Looks Like
- Investing DOE resources according to strategies for key crosscutting technology areas identified as critical to achieving our climate and energy goals inform funding opportunities and the activities of performers from national labs, industry and academia.
### Goal target(s)

<table>
<thead>
<tr>
<th>Achievement statement</th>
<th>Key indicator(s)</th>
<th>Quantify progress</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeat the achievement statement from the goal statement on the previous slide</td>
<td>A &quot;key performance indicator&quot; measures progress toward a goal target</td>
<td>These values enable us (and you!) to calculate % complete for any type of target*</td>
<td>When is there new data?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>By...</th>
<th>We will...</th>
<th>Name of indicator</th>
<th>Target value</th>
<th>Starting value**</th>
<th>Current value</th>
<th>Update cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/30/23</td>
<td>U.S. clean energy activities in key technology areas will have innovation strategies with performance and deployment targets that lead to emissions reductions of 50-52 percent by 2030 compared to 2005 levels and net zero emissions by 2050</td>
<td>Number of crosscutting technology innovation strategies developed with performance or deployment targets</td>
<td>5</td>
<td>0</td>
<td>60%</td>
<td>Semi-annually</td>
</tr>
<tr>
<td>09/30/23</td>
<td>U.S. clean energy activities in key technology areas will have innovation strategies with performance and deployment targets that lead to emissions reductions of 50-52 percent by 2030 compared to 2005 levels and net zero emissions by 2050</td>
<td>Announce at least two new Energy Earthshots in key technology areas as part of innovation strategies.</td>
<td>2</td>
<td>0</td>
<td>150%</td>
<td>Annually</td>
</tr>
<tr>
<td>09/30/23</td>
<td>U.S. clean energy activities in key technology areas will have innovation strategies with performance and deployment targets that lead to emissions reductions of 50-52 percent by 2030 compared to 2005 levels and net zero emissions by 2050</td>
<td>% funding obligated according to spend plan for key technology IIJA provisions (Hydrogen, Carbon Dioxide Removal, Energy Storage, Critical Minerals &amp; Materials and Industrial Decarbonization)</td>
<td>100</td>
<td>0</td>
<td>50%</td>
<td>Quarterly</td>
</tr>
</tbody>
</table>
Goal Team

Undersecretary for Science and Energy (S-4)
Geraldine Richmond
Undersecretary
Ali Douragh
Chief of Staff
S4 Crosscut Team Lead
Kelly Visconti

Key S-4 Offices
Science
Fossil Energy and Carbon Management
Artificial Intelligence and Technology
Energy Efficiency and Renewable Energy
Nuclear Energy
Electricity

Acting Undersecretary for Science and Energy (S-3)
Kathleen Hogan
Undersecretary
Jeremiah Baumann
Chief of Staff

Key S-3 Offices
Office of Clean Energy Demonstrations
Office of Manufacturing and Supply Chains
Loan Program Office
CESER

Office of the Chief Financial Officer
Chris Johns

Office of Policy
Carla Frisch

Office of Technology Transitions
Vanessa Chan

Office of Economic Impact and Diversity
Vincent Quarles
Deputy Director, Minority Programs
Tony Reames
Senior Advisor
Lady Idos
Senior Advisor, Justice, Equity, Diversity, Belonging, & Inclusion
Jody TallBear
Chief, Civil Rights Division

Office of Acquisition Management
John Bashista
Director and Senior Procurement Executive
Berta Schreiber
Director, Office of Policy
David Leotta
Director, Office of Contract Management

Golden Field Office
Derek Passarelli
Director
Stephanie Carabajal
Director, Financial Assistance
Sara Wilson
Director, Procurement
Goal Strategies

• Development of Innovation Strategies: DOE will charter 5 crosscutting DOE teams and empower staff to lead the development of an innovation strategy for each of the key technology areas. They will be supported by the S4 Office Crosscut team staff who will facilitate the teams, establish best practices and support the development of executable innovation strategies.

• Scope and announce Energy Earthshots*: Following the Energy Earthshots development process – scope and announce at least two new Shots as part of an innovation strategies for the relevant crosscutting technology areas.

• Execute IIJA Funding: The Office of Clean Energy Demonstrations will work with the crosscutting teams to support and track the execution of funding to the spend plan for the key IIJA provisions (Hydrogen, Carbon Dioxide Removal, Energy Storage, Critical Minerals & Materials and Industrial Decarbonization).

*Energy Earthshots are highly focused and aggressive activities designed to drive integrated program development across the U.S. Department of Energy’s science and applied energy offices and Advanced Research Projects Agency – Energy (ARPA-E) and take an ‘all R&D community’ approach to leading science and technology innovations to address tough technological challenges and cost hurdles, and rapidly advance solutions to help achieve our climate and economic competitiveness goals.
Key indicators

- Plan vs. completed strategies

- Total New Energy Earthshots Planned vs. Launch in FY22
DOE will charter 5 crosscutting DOE teams and empower staff to lead the development of an innovation strategy for each of the key technology areas.

<table>
<thead>
<tr>
<th>Key Milestone</th>
<th>Milestone Due Date</th>
<th>Milestone Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy 1 - Charter 5 key crosscutting teams</td>
<td>Q2, FY22</td>
<td>Complete</td>
<td>Five crosscutting teams (Hydrogen, Energy Storage, Carbon Dioxide Removal, Industrial Decarbonization and Subsurface Energy Innovations) were established by end of Q2. Fusion and Clean Energy Technology Manufacturing crosscuts established.</td>
</tr>
<tr>
<td>Strategy 1 - Innovation Strategy Best Practices Defined</td>
<td>Q1, FY23</td>
<td>Revised</td>
<td>This task is in progress, draft best practices created, continue to refine and get feedback on in Q1FY23.</td>
</tr>
<tr>
<td>Strategy 1 - Draft innovation strategy for 2 key technical areas</td>
<td>Q3, FY22</td>
<td>Complete</td>
<td>An update to the Energy Storage Grand Challenge Roadmap is going through concurrence. A national hydrogen strategy and roadmap are also in development and going through concurrence.</td>
</tr>
<tr>
<td>Strategy 1 - Draft innovation strategy for 3 key technical areas</td>
<td>Q4, FY22</td>
<td>On track</td>
<td>The Industrial Decarbonization crosscut team is finalizing a roadmap that is going through concurrence. Carbon Dioxide Removal and Grid Modernization strategies being drafted.</td>
</tr>
<tr>
<td>Strategy 1 - Publish 5 innovation strategies</td>
<td>Q2, FY23</td>
<td>On track</td>
<td>Industrial Decarbonization roadmap published FY22Q4</td>
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</tbody>
</table>
Summary of progress

Narrative – FY 22 Q1

Three of five crosscutting teams (Hydrogen, Energy Storage, and Carbon Dioxide Removal) were established by end of Q1 with two more on track for kickoff in Q2.

Each of these 3 crosscutting teams has identified leaders, established regular meeting frequency and are developing or updating strategies, roadmaps, execution plans including related IIJA provisions.

- An update to the Energy Storage Grand Challenge Roadmap is going through concurrence in Q3.

- A national hydrogen strategy and hydrogen shot roadmap are also in development and anticipated for release in Q3.

- The Industrial Decarbonization crosscut team is developing a Charter and finalizing a roadmap that is anticipated for release in Q3.
Narrative – FY 22 Q2

Five crosscutting teams (Hydrogen, Energy Storage, Carbon Dioxide Removal, Industrial Decarbonization and Subsurface Energy Innovations) were established by end of Q2.

Each of these 5 crosscutting teams has identified leaders, established regular meeting frequency and are developing or updating strategies, roadmaps, execution plans including related IIJA provisions.

• An update to the Energy Storage Grand Challenge Roadmap is going through concurrence in Q3.
• A national hydrogen strategy and hydrogen shot roadmap are also in development and anticipated for release in Q3.
• The Industrial Decarbonization crosscut team is finalizing a roadmap that is anticipated for release in Q3.

Scope and announce Energy Earthshots - DOE is making progress on the development of two new Energy Earthshot concepts.
Five crosscutting teams (Hydrogen, Energy Storage, Carbon Dioxide Removal, Industrial Decarbonization and Subsurface Energy Innovations) were established by end of Q2. Each of these 5 crosscutting teams has identified leaders, established regular meeting frequency and are developing or updating strategies, roadmaps, execution plans including related IIJA provisions.

- An update to the Energy Storage Grand Challenge Roadmap began concurrence in Q3 and now into Q4.
- A national hydrogen strategy and roadmap are also in development and going through concurrence in Q3 and now into Q4.
- The Industrial Decarbonization crosscut team is finalizing a roadmap that is going through concurrence in Q3 and now into Q4.
- Additional innovation strategy work is underway for other technology areas in the last quarter.

Scope and announce Energy Earthshots - DOE has developed two new Energy Earthshot concepts and is planning to announce these in Q4. Including the three previously launched (Hydrogen, Storage and Carbon Negative Shot) that brings the Energy Earthshots portfolio to five total by end of FY22. DOE is scoping and deciding on a few additional topics for consideration for launch in FY23. A total of 6-8 is the anticipated total.
Five crosscutting teams (Hydrogen, Energy Storage, Carbon Dioxide Removal, Industrial Decarbonization and Subsurface Energy Innovations) were established by end of Q2. Each of these 5 crosscutting teams has identified leaders, established regular meeting frequency and are developing or updating strategies, roadmaps, execution plans including related IIJA provisions.

- An update to the Energy Storage Grand Challenge Roadmap began concurrence in Q3 and now into Q4.
- A national hydrogen strategy and roadmap are also in development and going through concurrence in Q3 and now into Q4.
- The Industrial Decarbonization crosscut team is finalizing a roadmap that is going through concurrence in Q3 and now into Q4.
- Additional innovation strategy work is underway for other technology areas in the last quarter.

Scope and announce Energy Earthshots – announced three new Energy Earthshots (Enhanced Geothermal, Floating Offshore Wind and Industrial Heat) in FY22Q4, bringing the total to 6, exceeding the goal of 5 by the end of FY22. DOE is scoping and deciding 1-2 additional topics for consideration for launch in FY23.