

ITIAC Duties and Planning

Zach Pritchard, Incoming Designated Federal Officer
Industrial Technology Innovation Advisory Committee

March 22, 2024



Agenda

Goal: Understand what the committee is working towards and how we'll get there

Committee Duties

- Summary of ITIAC Duties
- Industrial Emissions Reduction Technology Development Program
- Technology Focus Areas
- Strategic Plan
- Reports

Committee Discussion & Planning

- Issues for Discussion
- Draft Outline of Report
- Possible Subcommittees
- Draft Timeline
- Reference Materials for ITIAC

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Energy Act of 2020

Congress Directed DOE to Establish ITIAC and Defined Your Duties

Public Law 116–260 116th Congress	
An Act	
Dec. 27, 2020 [H.R. 133]	Making consolidated appropriations for the fiscal year ending September 30, 2021, providing coronavirus emergency response and relief, and for other purposes.
<i>Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,</i>	
SECTION 1. SHORT TITLE.	
This Act may be cited as the “Consolidated Appropriations Act, 2021”.	

Energy Act of 2020.

42 USC 17001 note.

DIVISION Z—ENERGY ACT OF 2020

SEC. 101. SHORT TITLE; TABLE OF CONTENTS.

- (a) SHORT TITLE.—This division may be cited as the “Energy Act of 2020”.
- (b) TABLE OF CONTENTS.—The table of contents for this Act is as follows:

DIVISION Z—ENERGY ACT OF 2020

Sec. 101. Short title; table of contents.

TITLE I—EFFICIENCY

- Sec. 1001. Coordination of energy retrofitting assistance for schools.
- Sec. 1002. Use of energy and water efficiency measures in Federal buildings.
- Sec. 1003. Energy efficient data centers.
- Sec. 1004. Energy-efficient and energy-saving information technologies.
- Sec. 1005. Extended Product System Rebate Program.
- Sec. 1006. Energy Efficient Transformer Rebate Program.
- Sec. 1007. Smart building acceleration.
- Sec. 1008. Modifications to the ceiling fan energy conservation standard.
- Sec. 1009. Report on electrochromic glass.
- Sec. 1010. Energy and water for sustainability.
- Sec. 1011. Weatherization Assistance Program.
- Sec. 1012. Federal Energy Management Program.
- Sec. 1013. CHP Technical Assistance Partnership Program.
- Sec. 1014. Smart energy water efficiency pilot program.

TITLE II—NUCLEAR

- Sec. 2001. Advanced Nuclear Fuel Availability.
- Sec. 2002. Amendments to definitions in Energy Policy Act of 2005.
- Sec. 2003. Nuclear energy research, development, demonstration, and commercial application programs.
- Sec. 2004. High-performance computation collaborative research program.
- Sec. 2005. Nuclear energy budget plan.



SEC. 6003. INDUSTRIAL EMISSIONS REDUCTION TECHNOLOGY DEVELOPMENT PROGRAM.	
(a) IN GENERAL.—Subtitle D of title IV of the Energy Independence and Security Act of 2007 is amended by adding at the end the following:	
“SEC. 454. INDUSTRIAL EMISSIONS REDUCTION TECHNOLOGY DEVELOPMENT PROGRAM. 42 USC 17113.	
“(a) DEFINITIONS.—In this section:	
“(1) DIRECTOR.—The term ‘Director’ means the Director of the Office of Science and Technology Policy.	
“(2) ELIGIBLE TECHNOLOGY.—The term ‘eligible technology’ means the technology described in subsection (b).	
“(3) EMISSIONS REDUCTION.—The term ‘emissions reduction’ means the reduction in greenhouse gas emissions from a source, as determined by the Secretary, in consultation with the Director, that is attributable to the use of an eligible technology.	
“(4) PROGRAM.—The term ‘program’ means the industrial emissions reduction technology development program established under section 454(b)(1).	
“(b) ESTABLISHMENT.—Not later than 180 days after the date of enactment of the Energy Act of 2020, the Secretary, in consultation with the Director, shall establish an advisory committee, to be known as the ‘Industrial Technology Innovation Advisory Committee’.	
“(c) MEMBERSHIP.—	
“(1) APPOINTMENT.—The Committee shall be comprised of not fewer than 16 members and not more than 20 members, who shall be appointed by the Secretary, in consultation with the Director.	
“(2) REPRESENTATION.—Members appointed pursuant to paragraph (1) shall include—	
“(A) not less than 1 representative of each relevant Federal agency, as determined by the Secretary;	
“(B) the Chair of the Secretary of Energy Advisory Board, if that position is filled;	
“(C) not less than 2 representatives of labor groups;	
“(D) not less than 3 representatives of the research community, which shall include academia and National Laboratories;	
“(E) not less than 2 representatives of nongovernmental organizations;	
“(F) not less than 6 representatives of small- and large-scale industry, the collective expertise of which shall cover every focus area described in section 454(c); and	
“(G) not less than 1 representative of a State government; and	
“(H) any other individuals the Secretary, in coordination with the Director, determines to be necessary to ensure the effective operation of the Committee.	

Summary of ITIAC Duties

Summary of 42 U.S. Code § 17114

Meeting Frequency: At least 2 times per year, at the call of the Chair

Purpose: Advise the Secretary on the Industrial Emissions Reduction Technology Development Program

- Propose missions and goals
- Advise on technologies within focus areas
 - Identify and evaluate technologies being developed by the private sector
 - Identify technology gaps in the private sector or other Federal agencies and make recommendations to close gaps
 - Survey and analyze barriers to adoption of emissions reduction technologies
 - Recommend technology screening criteria to encourage adoption of technology by the private sector
- Develop a strategic plan for the program
- Produce reports on findings and on evaluation of the program

Industrial Emissions Reduction Technology Development Program

42 U.S. Code § 17113(b)(1)

A crosscutting **industrial emissions reduction** technology development program of **research, development, demonstration, and commercial application** to advance innovative technologies that—

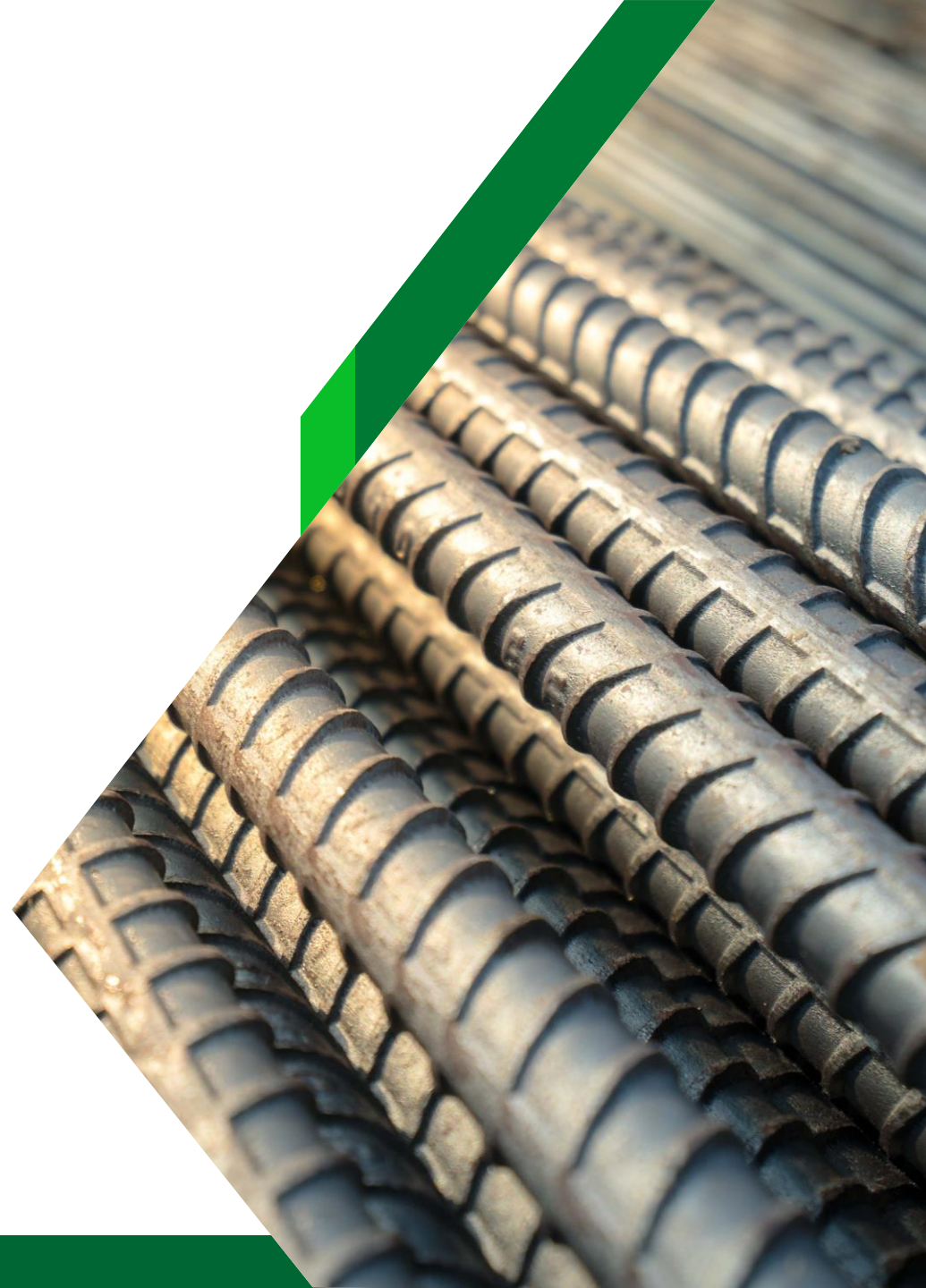
- A. increase the **technological and economic competitiveness** of industry and manufacturing in the United States;
- B. increase the viability and competitiveness of United States **industrial technology exports**; and
- C. achieve **emissions reduction** in nonpower industrial sectors.



Technology Focus Areas

Summary of Areas in 42 U.S. Code § 17113(c)

- Industrial Materials Production Processes (iron, steel, steel mill products, aluminum, cement, glass, pulp, paper, and industrial ceramics)
- Medium and High-Temperature Heat (electrification, renewable heat, CHP, alternative fuels)
- Sustainable Chemistry
- Smart/Digital Manufacturing, Advanced Data Analytics
- Sustainability & Material Efficiency
- Energy Efficiency
- Alternative Materials with Fewer Lifecycle Emissions
- Development of Net-Zero Emissions Liquid and Gaseous Fuels
- Emissions Reductions in Shipping, Aviation, and Long-distance Transportation
- Carbon Capture Technologies for Industrial Processes
- High-Performance Computing to Develop Advanced Materials and Processes



Technology Focus Areas 42 U.S. Code § 17113(c)

1. Industrial production processes, including technologies and processes that—
 - a. Achieve emissions reduction in high-emissions industrial materials production processes, including production processes for iron, steel, steel mill products, aluminum, cement, glass, pulp, paper, and industrial ceramics;
 - b. Achieve emissions reduction in medium- and high-temperature heat generation, including—
 - i. through electrification of heating processes;
 - ii. through renewable heat generation technology;
 - iii. through combined heat and power; and
 - iv. by switching to alternative fuels, including hydrogen and nuclear energy;
 - c. Achieve emissions reduction in chemical production processes, including by incorporating, if appropriate and practicable, principles, practices, and methodologies of sustainable, green chemistry and engineering;
 - d. Leverage smart manufacturing technologies and principles, digital manufacturing technologies, and advanced data analytics to develop advanced technologies and practices in information, automation, monitoring, computation, sensing, modeling, and networking to—
 - i. model and simulate manufacturing production lines;
 - ii. monitor and communicate production line status;
 - iii. manage and optimize energy productivity and cost throughout production; and
 - iv. model, simulate, and optimize the energy efficiency of manufacturing processes;
 - e. Minimize the negative environmental impacts of manufacturing and sustainable chemistry while conserving energy and resources, including—
 - i. by designing products that enable reuse, refurbishment, remanufacturing, and recycling;
 - ii. by minimizing waste from industrial processes, including through the reuse of waste as other resources in other industrial processes for mutual benefit; and
 - iii. by increasing resource efficiency; and
 - f. Increase the energy efficiency of industrial processes;
2. Alternative materials that produce fewer emissions during production and result in fewer emissions during use, including—
 - a. Innovative building materials;
 - b. High-performance lightweight materials; and
 - c. Substitutions for critical materials and minerals;
3. Development of net-zero emissions liquid and gaseous fuels;
4. Emissions reduction in shipping, aviation, and long-distance transportation;
5. Carbon capture technologies for industrial processes;
6. Other technologies that achieve net-zero emissions in nonpower industrial sectors, as determined by the Secretary, in consultation with the Director; and
7. High-performance computing to develop advanced materials and manufacturing processes contributing to the focus areas described in paragraphs (1) through (6), including—
 - a. Modeling, simulation, and optimization of the design of energy efficient and sustainable products; and
 - b. The use of digital prototyping and additive manufacturing to enhance product design

ITIAC has experience and knowledge in all major focus areas.

Strategic Plan

Summary of 42 U.S. Code § 17114(d)(2)

Timeframe: Not specified

Purpose: Set forth a plan for achieving the goals of the program, including for the technology focus areas

- Specify near-term and long-term qualitative and quantitative objectives relating to each technology focus area
 - include research, development, demonstration, and commercial application objectives
 - specify the anticipated timeframes for achieving the objectives
 - identify the appropriate role for investment by the Federal Government, in coordination with the private sector, to achieve the objectives
 - identify the public and private costs of achieving the objectives
 - estimate the economic and employment impact in the United States of achieving those objectives
- Include plans for developing emissions reduction technologies that are globally cost-competitive, including, as applicable, in developing economies
- Leverage relevant existing roadmaps

Reports

Summary of 42 U.S. Code § 17114(f)

Frequency: Not later than 2 years after 12/27/2020, and every three years thereafter, submit to Secretary; 60 days after receipt, Secretary submits copy to Congress

Report Contents:

Advise on Technologies

- Describe how committee has carried out duties and any relevant findings
- Identify technology innovation opportunities
- Identify technology gaps in the private sector or other Federal agencies
- Recommend improvements to technology screening criteria and management of the program
- Recommend changes to focus areas, if necessary

Program Evaluation

- Evaluate progress and RD&D activities
- Progress made in achieving goals of the strategic plan and, if necessary, an update to the strategic plan
- Review management, coordination, and industry utility of the program
- Assess the extent to which progress has been made under the program in developing commercial, cost-competitive technologies in each focus area
- Assess the effectiveness of the program in coordinating efforts within DOE and with other Federal agencies

Issues for Committee Discussion

Questions/Discussion on ITIAC Duties

Draft Material to Discuss

- Report Outline
- Subcommittees
- Timeline

Additional Questions for Discussion

- What are priorities for the report to address?
- Are there any focus areas missing?
- What topics would the committee like to address in future meetings?

Draft Outline of First ITIAC Report

Draft for Committee Discussion

1. Front Matter
 - 1.1. List of Committee Members
 - 1.2. Acknowledgements
2. Executive Summary
3. Introduction
 - 3.1. The Imperative and Opportunity for Industrial Decarbonization
 - 3.2. Overview of DOE Strategic Documents
 - 3.2.1. Industrial Decarbonization Roadmap
 - 3.2.2. Pathways to Commercial Liftoff
 - 3.3. Motivation for this Report
 - 3.4. Committee Charge & Approach
4. Subsector-specific Barriers & Opportunities
 - 4.1. Iron, Steel, & Steel Mill Products
 - 4.2. Chemicals
 - 4.3. Cement
 - 4.4. Pulp & Paper
 - 4.5. Aluminum
 - 4.6. Glass & Ceramics
 - 4.7. *Additional Industries?*
5. Cross-cutting Barriers & Opportunities
 - 5.1. Carbon Capture Technologies
 - 5.2. Smart Manufacturing
 - 5.3. Critical Materials
 - 5.4. Heavy-Duty Transportation
 - 5.5. *Additional Topics?*
6. Department of Energy Approaches to Industrial Technology
 - 6.1. Overview of DOE Activity
 - 6.2. Assessment of DOE Activity
 - 6.3. Strategic Plan
7. Summary and Conclusions
8. Appendices
 - 8.1. Committee Charter

For each subsector, include subsections:

- Industry Overview
- Industrial Electrification
- Low-Carbon Fuels, Feedstocks, & Energy Sources
- Energy & Material Efficiency

***Please share your
thoughts verbally and
through the Mural Board***

Draft Outline of First ITIAC Report

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 - 5.5. *Additional Topics?*
 - 6. Department of Energy Approaches to Industrial Technology
 - 6.1. Overview of DOE Activity
 - 6.2. Assessment of DOE Activity
 - 6.3. Strategic Plan
 - 7. Summary and Conclusions
 - 8. Appendices
 - 8.1. Committee Charter
- Barriers & Opportunities sections can form basis for subcommittees
- Please share your thoughts verbally and through the Mural Board*

Possible Subcommittees

Draft for Committee Discussion

1. Metals (Iron & Steel; Steel Mill Products; Aluminum)
 2. Chemicals; Pulp & Paper
 3. Cement, Glass, & Industrial Ceramics
 4. Smart Manufacturing, Modeling, and High-Performance Computing
 5. Carbon Capture Technologies
 6. Critical Materials
 7. Heavy-Duty Transportation
- Consider a mixture of standing/long-term subcommittees and ad-hoc/short-term subcommittees

Please share your thoughts verbally and through the Mural Board
Indicate interest in subcommittees through the Mural Board



Draft Timeline

Draft for Committee Discussion

Date		Full Committee Meetings	Report Milestones
March 2024	(today)	First ITIAC Meeting	Complete Report Draft Final Report Prepared, Approved, and Sent to Secretary Final Report Sent to Congress
September 2024	(6 months)	Subcommittee Report-Outs	
March 2025	(12 months)	Full Committee Review & Discussion	
September 2025	(18 months)	Full Committee Presents Report	
November 2025	(20 months)		
March 2026	(24 months)	Next Phase of Committee Work	

- What should be the cadence of full committee meetings and subcommittee meetings? *(Note that the full committee must meet at least twice a year)*
- What topics would you like to hear more about in future meetings?

Please share your thoughts verbally and through the Mural Board

Reference Materials for ITIAC

Existing Resources Can Inform the Committee's Work

ITIAC Essentials

- [ITIAC Charter](#)
- [42 U.S. Code § 17114](#) (ITIAC) | [42 U.S. Code § 17113](#) (Program)
- [DOE Industrial Technology Programs](#) | [Joint Strategy Fact Sheet](#)

Strategic Documents

- [DOE Industrial Decarbonization Roadmap](#) (2022)
- [Pathways to Commercial Liftoff: Industrial Decarbonization](#) (2023)

Energy Earthshots

- [Industrial Heat Shot Fact Sheet](#)
- [Clean Fuels & Products Shot Fact Sheet](#)

Technology Resources

- [Thermal Process Intensification Workshop Report](#) (2022)
- [Manufacturing Energy and Carbon Footprints](#) (2021)
- [DOE Quadrennial Technology Review](#) (2015)
- [Manufacturing Energy Bandwidth Studies](#)
- [Additional Resources](#)

Slides from ITIAC Meeting #1 will be shared with the committee

Considerations for Subcommittee Organization

- Need to cover all technology focus areas to be addressed in report
- Need reasonable number of subcommittees
- Need reasonable number of members on each subcommittee
 - No subcommittee can include more than half of members (currently 9)
 - Need more than 1-2 members
- Can include mixture of standing/long-term subcommittees and ad-hoc/short-term subcommittees (or task forces)
- Engagement between subcommittees – might need small groups of experts that engage with multiple subcommittees (e.g., high-performance computing applications across other focus areas)

Focus Area Crosswalk

Where do focus areas fit for different subcommittee structures? Technology/industry crosswalk		Industry						Transportation
		Metals (Iron & Steel; Steel Mill Products; Aluminum)	Chemicals	Cement	Glass & Industrial Ceramics	Pulp & Paper	Other	Shipping, Aviation, and long-distance transportation
Technologies	Industrial Materials Production Processes	X	X	X	X	X		
	Medium and High-Temperature Heat (electrification, renewable heat, CHP, alternative fuels)	X	X	X	X	X	X	
	Smart/Digital Manufacturing, Advanced Data Analytics	X	X	X	X	X	X	
	Sustainability & Material Efficiency	X	X	X	X	X	X	
	Energy Efficiency	X	X	X	X	X	X	
	Alternative Materials with Fewer Lifecycle Emissions	Innovative building materials; high-performance lightweight materials		Innovative building materials			Substitutions for critical materials and minerals	
	Development of Net-Zero Emissions Liquid and Gaseous Fuels		X			?		X
	Emissions Reductions in Shipping, Aviation, and Long-distance Transportation		?			?		X
	Carbon Capture Technologies for Industrial Processes							
	HPC to Develop Advanced Materials and Processes	X	X	X	X	X	X	X
	Other [also, DOE and ITIAC can add more to this list]		Sustainable, green chemistry & engineering					

Organize by Industry

Possible Industry Subcommittees

1. Metals (Iron & Steel; Steel Mill Products; Aluminum)
2. Chemicals; Pulp & Paper
3. Cement, Glass, & Industrial Ceramics

Crosscuts & targeted areas need dedicated expertise

Possible Crosscutting Subcommittees

4. Smart Manufacturing, Modeling, and High-Performance Computing
5. Carbon Capture Technologies
6. Critical Materials
7. Heavy-Duty Transportation

Where do focus areas fit for different subcommittee structures? Technology/industry crosswalk		Industry						Transportation
		Metals (Iron & Steel; Steel Mill Products; Aluminum)	Chemicals	Cement	Glass & Industrial Ceramics	Pulp & Paper	Other	Shipping, Aviation, and long-distance transportation
Technologies	Industrial Materials Production Processes	X	X	X	X	X		
	Medium and High-Temperature Heat (electrification, renewable heat, CHP, alternative fuels)	X	X	X	X	X	X	
	Smart/Digital Manufacturing, Advanced Data Analytics	X	X	X	X	X	X	
	Sustainability & Material Efficiency	X	X	X	X	X	X	
	Energy Efficiency	X	X	X	X	X	X	
	Alternative Materials with Fewer Lifecycle Emissions	Innovative building materials; high-performance lightweight materials		Innovative building materials			Substitutions for critical materials and minerals	
	Development of Net-Zero Emissions Liquid and Gaseous Fuels		X			?		X
	Emissions Reductions in Shipping, Aviation, and Long-distance Transportation		?			?		X
	Carbon Capture Technologies for Industrial Processes							
	HPC to Develop Advanced Materials and Processes	X	X	X	X	X	X	X
	Other [also, DOE and ITIAC can add more to this list]		Sustainable, green chemistry & engineering					

Organize by Pillar/Technology

Pillar Subcommittees

1. Industrial Electrification
2. Low-Carbon Fuels, Feedstocks, and Energy Sources
3. Carbon Capture, Utilization, and Storage
4. Energy & Material Efficiency
5. Manufacturing Technology Innovation

Significant industry-specific expertise would be needed across many pillars

Unclear fit for some focus areas

	Industrial Electrification	LCFFES	CCUS	Energy Efficiency	Material Efficiency	Manufacturing Innovation	Other?
Industrial Materials Production Processes	X	X		X	X	X	
Medium and High-Temperature Heat (electrification, renewable heat, CHP, alternative fuels)	X	X		X			
Sustainable Chemistry		?			?	?	?
Smart/Digital Manufacturing, Advanced Data Analytics						X	
Sustainability & Material Efficiency					X		
Energy Efficiency				X			
Alternative Materials with Fewer Lifecycle Emissions					X		
Development of Net-Zero Emissions Liquid and Gaseous Fuels		X					
Emissions Reductions in Shipping, Aviation, and Long-distance Transportation		?					?
Carbon Capture Technologies for Industrial Processes			X				
HPC to Develop Advanced Materials and Processes						X	