

# Institutional Innovation Insight

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2024 Congressional Budget Request of  
the US Department of Energy and Its  
Implications:  
Focusing on Climate Technology  
Investments in the Transportation Sector

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# 2024 Congressional Budget Request of the US Department of Energy and Its Implications: Focusing on Climate Technology Investments in the Transportation Sector

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## Summary

- The fiscal year (FY) 2024 budget for the Office of Energy Efficiency and Renewable Energy (EERE) under the US Department of Energy (DOE) to support R&D investments in climate technologies for the transportation sector is \$3.826 billion, an increase of \$935.12 million (32.3%) over FY 2023.
  - R&D investments for the transportation sector are led by the Vehicle Technology Office, Bioenergy Technology Office, and Hydrogen and Fuel Cell Technology Office, with the Vehicle Technology Office receiving the largest share of the budget at \$526.94 million (52%).
  - FY 2024 investments will focus on next-generation lithium-ion batteries in the Vehicle Technology Office, sustainable production and utilization of biofuels in the Bioenergy Technology Office, and fuel conversion by reducing production costs and increasing utilization of hydrogen in the Hydrogen and Fuel Cell Technology Office.
  - The US DOE's FY 2024 investment plan aligns with the strategic goals of the National Blueprint for Transportation Decarbonization and continues to invest budget in data, modeling, and analysis to help guide R&D investments per technology over the long term.
- ★ **Keywords:** US Department of Energy, President's Budget, Transportation, Carbon Neutrality, Climate Technology

## 1 Background

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» Based on the FY 2024 Congressional Budget Request\* released by the US Department of Energy (DOE) last March, this brief analyzes trends in science and technology innovation policy to reduce greenhouse gas (GHG) emissions from the US transportation sector.

\* FY 2024 in the US is the period from October 1, 2023, to September 30, 2024.

- ♦ The DOE is the leading US administrative organization supporting the research, development, demonstration, and deployment (RDD&D) of climate technologies to achieve carbon neutrality in 2050.
- ♦ The US DOE's Congressional Budget Request provides an indication of the agency's policy direction and commitment to climate technology RDD&D, as it outlines the amount of budget the agency intends to execute and the rationale and plans for it.

» This brief reviews the US DOE's FY 2024 Congressional Budget Request for R&D investments per climate technology sector and aims to summarize, organize, and provide implications of the budget for the "transportation sector."

- ♦ Reducing carbon emissions in the transportation sector is the most important for the US to achieve 2050 carbon neutrality.
- ♦ This is because the transportation sector accounts for 27% of the nation's energy demand and is the largest source of CO<sub>2</sub> emissions in the US which relies on fossil fuels for the majority of its energy demand (33% of total US emissions in 2019).<sup>1)</sup>
  - In Korea, the transportation sector is also a major source of emissions, accounting for 14.3% of total GHG emissions.<sup>2)</sup>

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1) US DOE, US DOT, US EPA, US HUD, 2023. The U.S. National Blueprint for Transportation Decarbonization – A Joint Strategy to Transform Transportation  
2) Joint ministries concerned, 2021. 2050 Carbon Neutral Scenario

## 2 Overview of the US DOE's FY 2024 Congressional Budget Request<sup>3)</sup>

» Within the US DOE budget, climate technology investments to reduce GHG emissions from the transportation sector are allocated to the Office of Energy Efficiency and Renewable Energy (EERE) within the Office of Undersecretary for Science and Innovation.

- ♦ The EERE is the largest investor in clean energy technology development, and its mission is to catalyze the RDD&D of technologies and solutions to achieve carbon neutrality in 2050 through investments in technology development.
- ♦ The EERE identified decarbonization of all transportation subsectors (aviation, marine, rail, and road) as one of five priority investment areas for FY 2024 to meet the goals in the U.S. National Blueprint for Transportation Decarbonization\* released in January 2023.

\* Decarbonization Strategies for the Transportation Sector by 2050 released by the Department of Energy, Department of Transportation (DOT), Environmental Protection Agency (EPA), and Department of Housing and Urban Development (HUD)

- Specifically, the investment strategy is to develop, demonstrate, and deploy decarbonization technologies for the transportation sector, focusing on fuel conversion, including electrification of road vehicles, Sustainable Aviation Fuel (SAF), and the use of hydrogen fuel cells for long-haul heavy-duty trucks.

» The budget for technology development in the transportation sector can be found under the Sustainable Transportation & Fuels Program\* among the EERE's investment programs.

\* A program that supports RDD&D to improve access to clean transportation fuels and enhance the energy efficiency, convenience, and affordability of the transportation sector.

- ♦ The EERE plans to invest \$3.83 billion in FY 2024, an increase of approximately \$366 million (10.58%) over FY 2023, of which \$1.013 billion will be utilized for the "Sustainable Transportation & Fuels Program."
- ♦ The "Sustainable Transportation and Fuels Program" is administered by the Vehicle Technology Office (VTO), Bioenergy Technology Office (BETO), and Hydrogen and Fuel Cell Technology Office (HFTO) within the Office of Transportation.

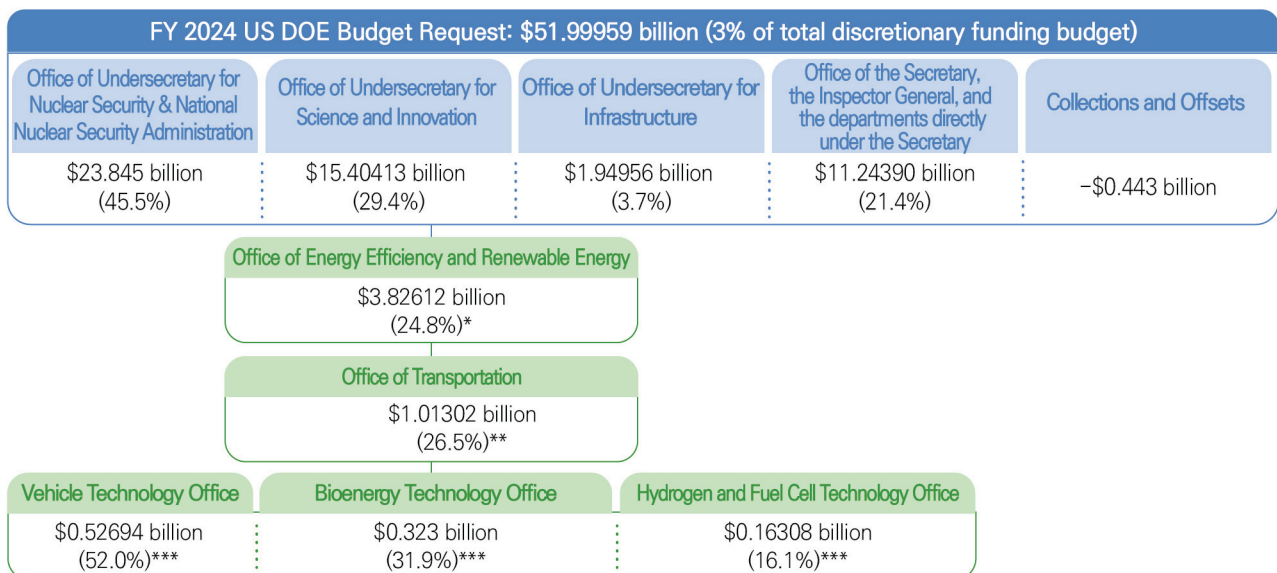
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3) US DOE, 2023a, Energy Efficiency and Renewable Energy·Electricity·Nuclear Energy·Fossil Energy and Carbon Management, Department of Energy FY 2024 Congressional Justification, Vol. 4.

» The Congressional Budget Request in this brief was written based on the President's Budget released on March 13, 2023.

- ♦ The US President's Budget is finalized through the adoption of a budget resolution by the Senate and House of Representatives → passage of a budget bill by the Senate and House of Representatives → signature by the President, so changes may occur during the deliberation process.

**Figure 1** FY 2024 Congressional Budget Request for the US DOE and the EERE



Note 1: Parentheses indicate the budget proportion in the parent department's budget; the budget proportion at the level of the Office of Undersecretary is the proportion of the budget excluding "Collections and Offsets" (\$52.442 billion).

Note 2: The overall US Congressional Budget Request for FY 2024 is \$6.883 trillion, of which \$1.7 trillion is discretionary funding.

Data: Written by the authors based on the US DOE (2023a; 2023b)

\* Proportion of the EERE budget in the Office of Undersecretary for Science and Innovation budget

\*\* Proportion of the Office of Transportation budget in the EERE budget

\*\*\* Proportion of the VTO, BETO, and HFTO budgets in the budget of the Office of Transportation

## US DOE's Climate Technology Investments in the Transportation Sector: The VTO's Congressional Budget Request<sup>4)</sup>

» The VTO aims to improve energy efficiency and fuel economy and support R&D of sustainable transportation technologies such as electric vehicles and operates six programs to achieve this goal.

**Table 1** Operating Programs and Description for FY 2024 of the VTO, US DOE

Programs	Description
Battery and Electrification Technologies	<ul style="list-style-type: none"> <li>Supports the decarbonization and electrification of all modes in the transportation sector and promotes the advancement of battery technology and battery manufacturing in the US, including next-generation lithium-ion batteries</li> </ul>
Decarbonization of Off-Road, Rail, Marine, and Aviation Technologies	<ul style="list-style-type: none"> <li>Supports reduction in GHG emissions in the transportation sector, including powertrains, electric hybrid systems, etc. using advanced biofuels, hydrogen fuel, electricity, etc.</li> </ul>
Materials Technology	<ul style="list-style-type: none"> <li>Supports research, development, and deployment of materials for transportation applications, including material weight reduction and multifunctional material development</li> </ul>
Energy Efficient Mobility Systems (EEMS)	<ul style="list-style-type: none"> <li>Supports the research, development, and deployment of innovative solutions that improve the affordability, accessibility, and energy productivity of the entire transportation system, including platforms and artificial intelligence</li> </ul>
Technology Integration & Deployment	<ul style="list-style-type: none"> <li>Supports various initiatives to accelerate the adoption of electric vehicles and charging infrastructure</li> </ul>
Data, Modeling, and Analysis	<ul style="list-style-type: none"> <li>Helps set policy goals, prioritize R&amp;D portfolios, provide reliable data, and present direction for future R&amp;D investments</li> </ul>

Data: Written by the authors based on the US DOE (2023a)

» The VTO requested a \$527 million budget for FY 2024, an increase of \$72 million over the FY 2023 budget (\$455 million), with the largest share (52%) of the “Sustainable Transportation and Fuels Program” budget for the VTO, BETO, and HFTO.

- ◆ Among the VTO's programs, the budget will be invested heavily in “Battery and Electrification Technologies” (\$266.07 million, 50.5%) and “Technology Integration & Deployment (infrastructure-focused, \$117.16 million, 22.2%).”

4) US DOE, 2023b, Department of Energy FY 2024 Budget in Brief, FY 2024 Congressional Justification

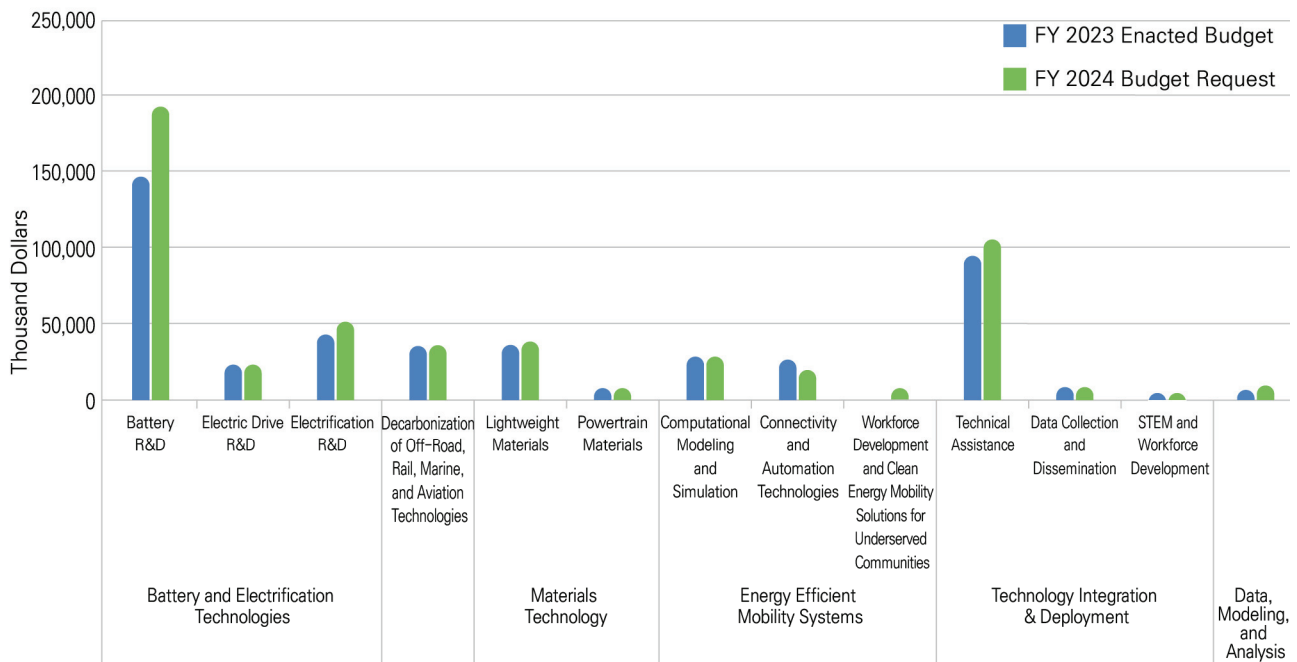
**Table 2** Composition of the Congressional Budget Request for FY 2024 of the VTO, US DOE  
(thousand dollars)

Programs	Detailed Programs	FY 2023 Enacted Budget	FY 2024 Congressional Budget Request	Year-over-year Increment
Battery and Electrification Technologies	Battery R&D	146,500	192,500	△ 46,000
	Electric Drive R&D	22,500	22,500	0
	Electrification R&D	42,500	51,016	△ 8,516
	Subtotal	211,500(46.4%)	266,016(50.5%)	△ 54,516
Decarbonization of Off-Road, Rail, Marine, and Aviation Technologies		35,000(7.7%)	35,579(6.8%)	△ 579
Materials Technology	Lightweight Materials	35,500	38,000	△ 2,500
	Powertrain Materials	7,000	7,000	0
	Subtotal	42,500(9.3%)	45,000(8.5%)	△ 2,500
Energy Efficient Mobility Systems (EEMS)	Computational Modeling and Simulation	28,000	28,000	0
	Connectivity and Automation Technologies	26,000	19,000	▽ 7,000
	Workforce Development and Clean Energy Mobility Solutions for Underserved Communities	0	7,000	△ 7,000
	Subtotal	54,000(11.9%)	54,000(10.2%)	0
Technology Integration & Deployment	Technical Assistance	94,000	105,162	△ 11,162
	Data Collection and Dissemination	8,000	8,000	0
	STEM and Workforce Development	4,000	4,000	0
	Subtotal	106,000(23.3%)	117,162(22.2%)	△ 11,162
Data, Modeling, and Analysis		6,000(1.3%)	9,185(1.7%)	△ 3,185
Total		455,500	526,942	△ 71,942

Data: Written by the authors based on the US DOE (2023a)



**Figure 2** Comparison of the Budget for FY 2023 and FY 2024 of the VTO (thousand dollars)



Data: Written by the authors based on the US DOE (2023a)

» **(Battery and Electrification Technologies) Budget will be increased to focus on developing next-generation lithium-ion batteries, reducing battery cell costs, reducing reliance on key materials such as cobalt, nickel, and graphite, and developing data and tools for vehicle grid integration.**

- ◆ (Battery R&D) Supports the development of new battery materials, advanced high-capacity battery technologies, battery cell R&D to improve the energy, life, safety, and cost of batteries, and battery material recycling and reuse technologies.
  - FY 2024 requested \$192.5 million, an increase of \$46 million, for R&D on next-generation lithium-ion batteries, including improving battery performance and reducing the cost of silane-derived silicon.
- ◆ (Electric Drive R&D) Supports R&D of ultra-high power electric drive systems that reduce volume and space and improve durability and reliability; budget and the investment direction are the same as FY 2023 (\$22.5 million).
- ◆ (Electrification R&D) Requested \$51.07 million, an increase of \$8.52 million, for R&D on communications and cybersecurity for the national electric grid, improving compatibility among electric vehicle charging networks, and supporting the development of ultra-fast charging technologies, and vehicle grid integration technologies.

» (Decarbonization of Off-Road, Rail, Marine, and Aviation Technologies) Supports R&D of green vehicle technologies, including powertrains\* and electric and hybrid systems, etc. using bio-hydrogen-electric fuels, etc., and requested \$35.58 million in FY 2024, an increase of \$580,000.

\* Any component that generates and transmits power, including engines, transmissions, driveshaft's, etc.<sup>5)</sup>

» (Materials Technology) Requested \$45 million, an increase of \$2.5 million, to develop recycling technologies for metal materials.

- ◆ (Lightweight Materials) Supports R&D on materials such as high-strength steel, aluminum and magnesium alloys, carbon fiber composites, and polymers; requested \$33 million in FY 2024, an increase of \$2.5 million, to develop recycling processing technologies for materials
- ◆ (Powertrain Materials) Supports R&D of structures and materials to reduce weight and improve efficiency in powertrains and requested \$7 million, the same as FY 2023.

» (EEMS) Requested a budget of \$54 million, the same as FY 2023.

- ◆ (Computational Modeling and Simulation) Transportation systems research, development, modeling, simulation, and demonstration and evaluation tool development. Supports multidisciplinary research in areas such as simulation and transportation data management, and requested a budget of \$28 million, the same as FY 2023.
- ◆ (Connectivity and Automation Technologies) Supports increased productivity in the movement of passengers and freight via the development of connectivity, communications, automation, and other transportation solutions by artificial intelligence and computing; requested \$19 million, decreased by \$7 million, for FY 2024.
- ◆ (Workforce Development and Clean Energy Mobility Solutions for Underserved Communities) A new detailed program in FY 2024 to support the transfer of green transportation solutions and workforce training for underserved communities, with a budget of \$7 million.

» (Technology Integration & Deployment) A budget of \$117.16 million, increase by \$11.16 million, will be invested.

- ◆ (Technical Assistance) A detailed program that provides cities, states, and regions with information, technology, and other support for green transportation, with an \$11 million increase to \$151.6 million in FY 2024 to expand alcohol support and electric vehicle charger demonstration and deployment.
- ◆ (Data Collection and Dissemination) A detailed program to support the delivery of objective transportation sector data to decision makers, researchers, etc., with a budget of \$8 million.

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5) Hyundai Transys, Passenger Car Powertrain. <https://www.hyundai-transys.com/ko/product/passenger-vehicle-powertrain/lineup.do> (accessed on 2023.04.18)

- ◆ (STEM and Workforce Development) A detailed program to support the EcoCar Mobility Challenge research project involving 14 university teams, with a budget request of \$4 million.
- » (Data, Modeling, and Analysis) A budget of \$9.19 million, increased by \$3.19 million, was requested to provide reliable data, support modeling, simulation, and energy accounting for vehicles and systems, and identify cost-effective transportation sector decarbonization scenarios.

## 4 US DOE's Climate Technology Investments in the Transportation Sector: The BETO's Congressional Budget Request<sup>6)</sup>

- » BETO aims to support technologies that utilize biomass and other waste resources in the US to convert them into sustainable biofuels, including SAF and operates four programs to this end.

**Table 3** Operating Programs and Description for FY 2024 of the BETO, US DOE

Programs	Description
System Development and Integration	<ul style="list-style-type: none"> <li>• Supports collaborative industry-academia-government R&amp;D on engineering-scale technology development, testing, and validation to improve integrated bio refinery process performance, improve consumer acceptance of biofuels and products, and create opportunities in future bio markets</li> </ul>
Renewable Carbon Resources	<ul style="list-style-type: none"> <li>• Supports the development of technologies to sustainably produce and supply raw materials to meet SAF adoption goals</li> <li>• Name changed from Feedstock and Algal System Technologies</li> </ul>
Conversion Technologies	<ul style="list-style-type: none"> <li>• Supports R&amp;D to convert biomass and waste feedstock's into transportation fuels or bio-based compounds and products</li> </ul>
Data, Modeling, and Analysis	<ul style="list-style-type: none"> <li>• Helps BETO make decisions about the direction and scope of its future R&amp;D portfolio in bioenergy technologies through quantitative analysis</li> </ul>

Data: Written by the authors based on the US DOE (2023a)

- » BETO is budgeted \$323 million in FY 2024, an increase of \$43 million over the FY 2023 budget.
- ◆ Among the programs, the “System Development and Integration” Program received the largest budget increase.

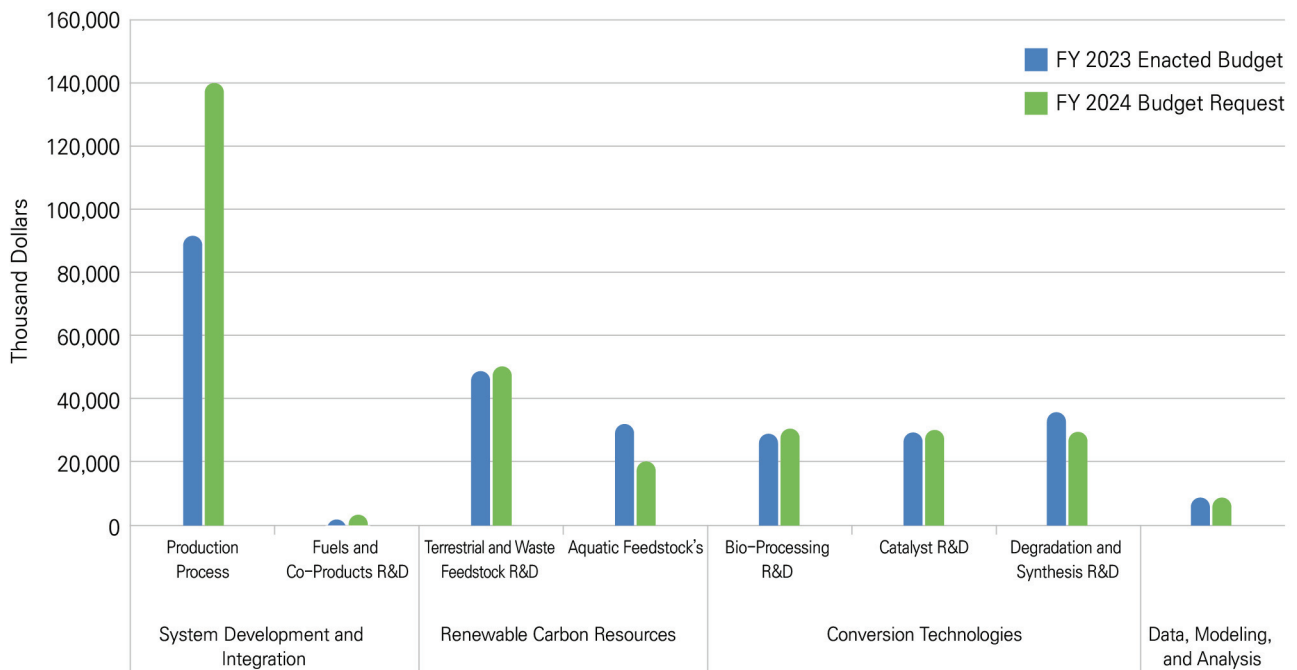
6) US DOE, 2023b, Department of Energy FY 2024 Budget in Brief, FY 2024 Congressional Justification

**Table 4** Composition of the Congressional Budget Request for FY 2024 of the BETO, US DOE  
(thousand dollars)

Programs	Detailed Programs	FY 2023 Enacted Budget	FY 2024 Congressional Budget Request	Year-over-year Increment
System Development and Integration	Production Process	92,368	140,500	△ 48,132
	Fuels and Co-Products R&D	232	5,000	△ 4,768
	Subtotal	92,600 (33.1%)	145,500 (45.0%)	△ 52,900
Renewable Carbon Resources	Terrestrial and Waste Feedstock's R&D	45,229	48,000	△ 2,771
	Aquatic Feedstock's	32,671	20,000	▽ 12,671
	Subtotal	77,900 (27.8%)	68,000 (21.1%)	▽ 9,900
Conversion Technologies	Bio-Processing R&D	31,322	34,000	△ 2,678
	Catalyst R&D	31,500	33,500	△ 2,000
	Deconstruction and Synthesis R&D	37,178	32,500	▽ 4,678
	Subtotal	100,000 (35.7%)	100,000 (31.0%)	0
Data, Modeling, and Analysis		9,500 (3.4%)	9,500 (2.9%)	0
Total		280,000	323,000	△ 43,000

Data: Written by the authors based on the US DOE (2023a)

**Figure 3** Comparison of the Budget for FY 2023 and FY 2024 of BETO (thousand dollars)



Data: Written by the authors based on the US DOE (2023a)

» **(System Development and Integration)** A budget of \$145 million, increased by \$52.9 million, will be invested to develop an integrated bio refinery process, construct a pilot refinery for sustainable SAF production, etc.

- ♦ (Production Process) A budget of \$140.5 million, increased by \$48.13 million, will be invested to support engineering-scale development and validation of new processes and scale-up of integrated bio refinery and SAF production processes.
- ♦ (Fuels and Co-Products R&D) Supports fuel characterization to improve engine efficiency and reduce emissions and requested \$5.0 million, increased by \$4.77 million, to expand research on SAF blends.

» **(Renewable Carbon Resources)** \$68 million budget will be invested, focusing on research on feedstock crops for SAF.

- ♦ (Terrestrial and Waste Feedstock R&D) Supports R&D to reduce production costs and improve utilization of terrestrial and waste resources, including production, pretreatment, and supply chain analysis of feedstock's; a budget of \$48 million will be invested to expand field validation of SAF feedstock's.

- ♦ (Aquatic Feedstock's) A detailed program that supports R&D, analysis, evaluation, and workforce development to reduce production costs and improve yields of aquatic resources; FY 2024 budget request is reduced by \$9.9 million due to the closing of the DISCOVER project. \*

\* The Development of Integrated Screening, Cultivar Optimization, and Verification Research, a Study to Reduce the Cost of Aquatic Feedstock's Biomass Production and Preserve Pond Ecosystems

» (Conversion Technologies) Requested the budget of \$100 million, the same as FY 2023.

- ♦ (Bio-Processing R&D) Supports R&D to reduce the cost and time of bioprocesses, including organism development and metabolic pathway optimization, and requested the budget of \$34 million, increased by \$26.8 million, in FY 2024, with no significant change in the investment direction.
- ♦ (Catalysis R&D) Supports the development of inorganic catalysts to convert biomass and other feedstock's into fuels, products, etc. and requested a budget of \$33.5 million, an increase of \$2 million for scale-up research of Catalyst.
- ♦ (Degradation and Synthesis R&D) Supports R&D to degrade biomass feedstock's and analyze synthesis pathways to desired outputs; requested a budget of \$32.5 million in FY 2024, decreased by \$4.68 million, to reexamine budget investment priorities for technical assistance performed, municipal partnership building, etc.

» (Data, Modeling, and Analysis) No change was made in the investment direction, and the same \$9.5 million budget as 2023 was requested.

## US DOE's Climate Technology Investments in the Transportation Sector: The HFTO's Congressional Budget Request<sup>7)</sup>

» The HFTO aims to support technologies that improve the deployment and utilization of hydrogen and fuel cells, including improving fuel cell durability and producing, supplying, and storing clean hydrogen, and operates four programs to this end.

**Table 5** Operating Programs and Description for FY 2024 of the HFTO, US DOE

Programs	Description
Fuel Cell Technologies	<ul style="list-style-type: none"> <li>Reduces costs for key materials and components, increases durability and efficiency, and improves performance to make fuel cells more competitive</li> </ul>
Hydrogen Technologies	<ul style="list-style-type: none"> <li>Supports the development of low-cost, sustainable hydrogen production, storage, and infrastructure technologies to achieve the Hydrogen Shot* goal</li> </ul>
System Development and Integration	<ul style="list-style-type: none"> <li>Supports the integration, development, and demonstration of hydrogen end-use technologies required for low-cost clean hydrogen production and the realization of the H2@Scale** vision to accelerate the commercialization of hydrogen and fuel cell systems and achieve the Hydrogen Shot goal</li> </ul>
Data, Modeling, and Analysis	<ul style="list-style-type: none"> <li>Supports the HFTO's RDD&amp;D direction and prioritization, including assessing the impact of hydrogen and fuel cell technologies, analyzing synergies and interactions with other energy sectors, and assessing R&amp;D gaps</li> </ul>

Data: Written by the authors based on the US DOE (2023a)

\* The DOE's Hydrogen Shot Project, announced in June 2021, established the goal of reducing the cost of producing clean hydrogen to \$1/kg by 2031

\*\* The DOE funded \$64 million in funding in July 2020 to support 18 projects in H2@Scale, a DOE initiative that brings together stakeholders to advance the production, transportation, storage, and utilization of affordable hydrogen to enable decarbonization and revenue opportunities across sectors.<sup>8)</sup>

» The HFTO requested a budget of \$163 million for FY 2024, a decrease of 69 million from the FY 2023 budget (\$170 million), with the only one seeing a decrease in budget among VTO, BETO, and HFTO in the “Sustainable Transportation and Fuels Program.”

- ◆ Among the HFTO's four programs, the budget for the “Fuel Cell Technologies” (down \$5 million) and “Hydrogen Technologies” (down \$6 million) Programs decreased, while the budget for the “System Development and Integration” Program (up \$4.08 million) increased.

<sup>7)</sup> Ibid.

<sup>8)</sup> US DOE, H2@Scale, <https://www.energy.gov/eere/fuelcells/h2scale> (accessed on 2023.04.24)

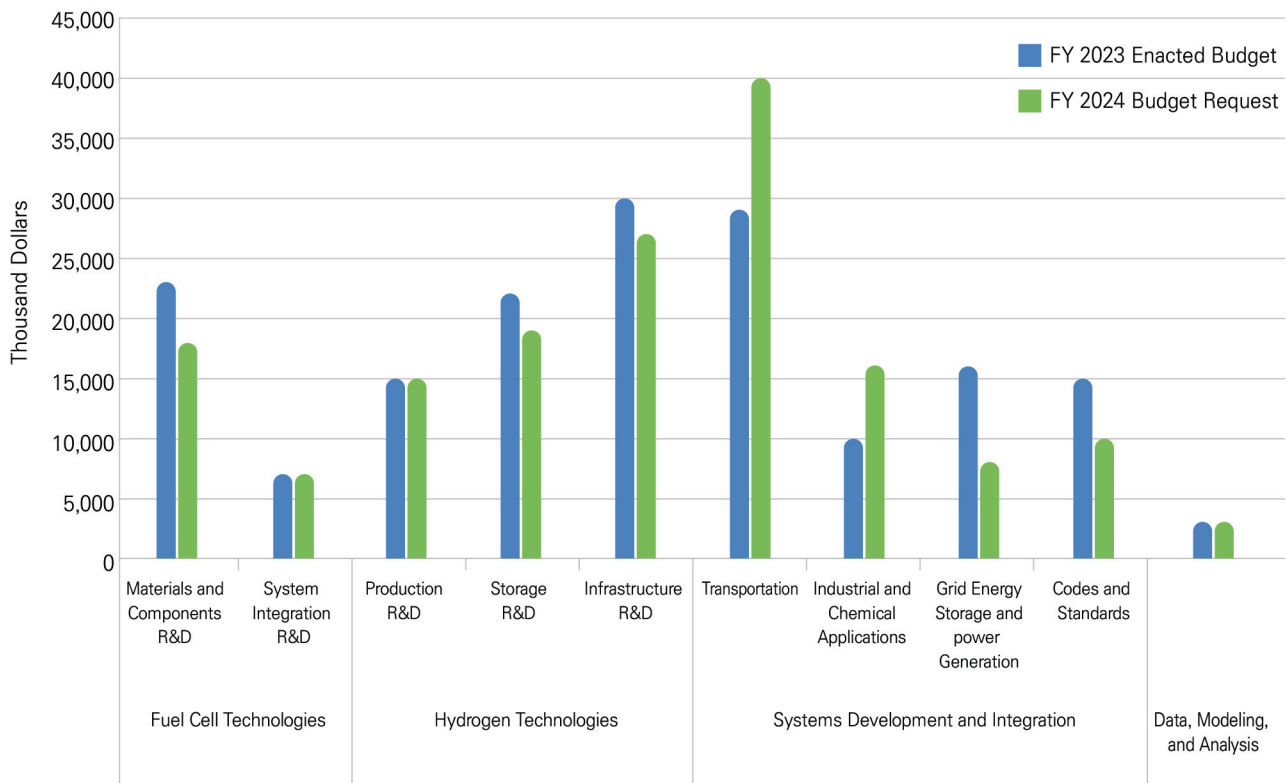
**Table 6** Composition of the Congressional Budget Request for FY 2024 of the HFTO, US DOE  
(thousand dollars)

Programs	Detailed Programs	FY 2023 Enacted Budget	FY 2024 Congressional Budget Request	Year-over-year Increment
Fuel Cell Technologies	Materials and Components R&D	23,000	18,000	▽ 5,000
	System Integration R&D	7,000	7,000	0
	Subtotal	30,000 (17.6%)	25,000 (15.3%)	▽ 5,000
Hydrogen Technologies	Production R&D	15,000	15,000	0
	Storage R&D	22,000	19,000	▽ 3,000
	Infrastructure R&D	30,000	27,000	▽ 3,000
	Subtotal	67,000 (39.4%)	61,000 (37.4%)	▽ 6,000
System Development and Integration	Transportation	29,000	40,000	△ 11,000
	Industrial and Chemical Applications	10,000	16,000	△ 6,000
	Grid Energy Storage and Power Generation	16,000	8,075	▽ 7,925
	Codes and Standards	15,000	10,000	▽ 5,000
	Subtotal	70,000 (41.2%)	74,075 (45.4%)	△ 4,075
Data, Modeling, and Analysis		3,000 (1.8%)	3,000 (1.8%)	0
Total		170,000	163,075	▽ 6,925

Data: Written by the authors based on the US DOE (2023a)



**Figure 4** Comparison of the Budget for FY 2023 and FY 2024 of the HFTO (thousand dollars)



Data: Written by the authors based on the US DOE (2023a)

» **(Fuel Cell Technologies)** No significant change was made in the direction of R&D investment, but a budget of \$25 million, decreased by \$5 million, was requested due to the incomplete finalizing of results and materials from the previous year's projects.

- ◆ (Materials and Components R&D) Supports R&D for catalysts, electrodes, and other Membrane Electrode Assemblies (MEAs) and stack components, with R&D reduced in FY 2024 to finalize results and materials from the previous year's projects.
- ◆ (System Integration R&D) Supports R&D to integrate previously developed MEAs or stack components into existing systems, with a budget request of \$7 million in FY 2024 with no change in the investment direction or budget.

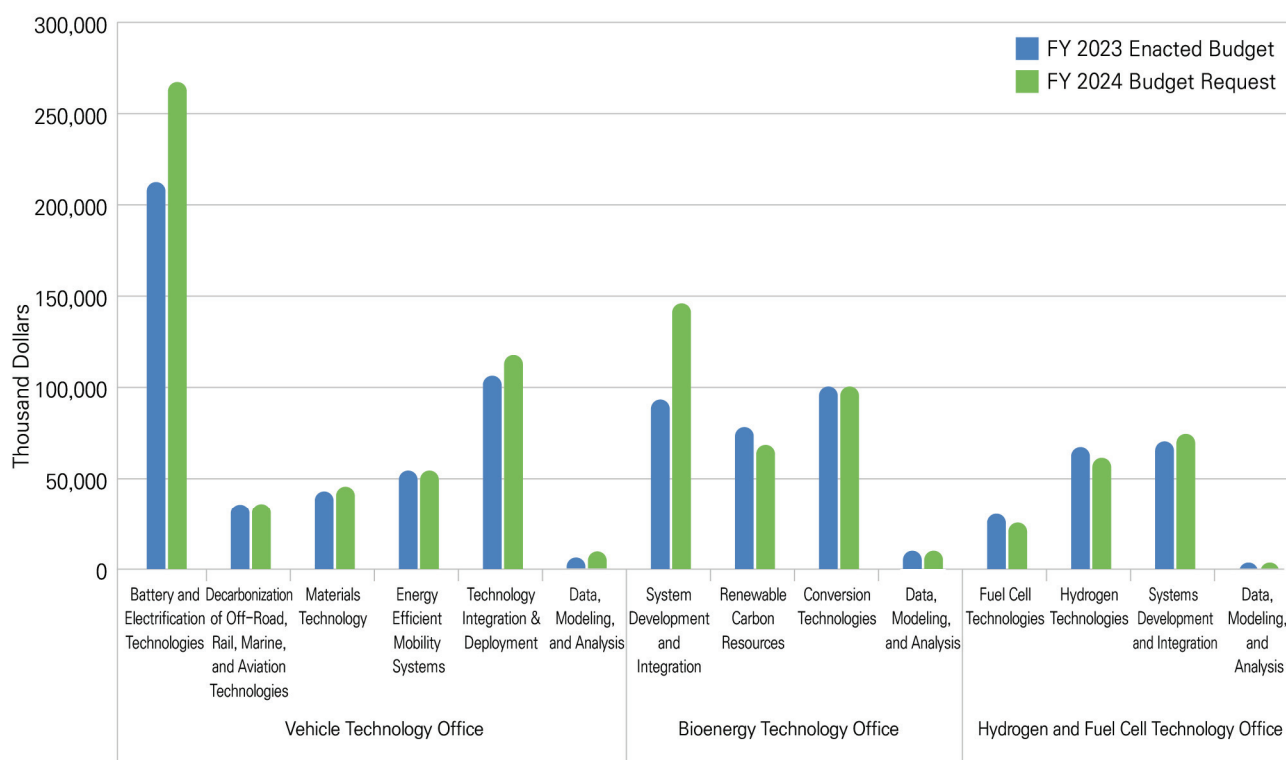
» **(Hydrogen Technologies)** No significant change was made in the direction of R&D investments, but a budget of \$61 million, decreased by \$6 million, was requested due to the incomplete finalizing of results and materials from the previous year's projects.

- ◆ (Production R&D) Supports R&D on electrolysis, fermentation processes, and hybrid systems to reduce the cost of hydrogen production; a budget of \$15 million was requested in FY 2024, the same as FY 2023.

- ◆ (Storage R&D) Supports R&D on improving the safety, efficiency, and storage density of hydrogen storage, etc., with a reduction in R&D in FY 2024 to finalize results and materials from the previous year's projects.
  - ◆ (Infrastructure R&D) Supports R&D to reduce costs and improve safety and efficiency of hydrogen infrastructure, with a budget of \$27 million to be invested in FY 2024 focused on high-capacity supply, including pipelines.
- » (Systems Development and Integration) A budget of \$74.08 million, increased by \$4.08 million, will be invested to expand the use of hydrogen and demonstrate large-scale hydrogen fueling infrastructure.
- ◆ (Transportation) Supports validation and demonstration of medium- and large-scale fuel cell use in the transportation sector, and analysis of applications and market opportunities, with a budget of \$40 million in FY 2024, increased by \$11 million, to expand the scope of fuel cell demonstrations, including marine and rail.
  - ◆ (Industrial and Chemical Applications) Support activities to explore the potential for applications of hydrogen as a feedstock, including as a reducing agent, and a budget of \$16 million, increased by \$6 million, will be invested to demonstrate the use of hydrogen as a reducing agent for decarbonization in ammonia and steel production.
  - ◆ (Grid Energy Storage and power Generation) Supports activities on the storage and grid integration of hydrogen for grid stability, with a budget of \$8.08 million invested in FY 2024, focusing on the integration of multi-megawatt water electrolyzers with renewable and nuclear energy.
  - ◆ (Codes and Standards) Supports the development of codes and standards for the introduction of hydrogen and fuel cell technologies, with a slightly reduced budget of \$10 million in FY 2024.
- » (Data, Modeling, and Analysis) No change was made in the investment direction, and the same \$3 million budget as 2023 was requested.

## 6 Summary and Key Implications

**Figure 5** Comparison of the Budget for FY 2023 and FY 2024 of the VTO, BETO, and HFTO (thousand dollars)



Data: Written by the authors based on the US DOE (2023a)

» The US DOE's investment in RDD&D to achieve carbon neutrality is increasing every year, as is investment in the transportation sector, the largest emitter of GHGs.

- ◆ Korea has also established the spread of green vehicles and increased utilization of hydrogen as policy goals through the "Basic Plan for Carbon Neutrality and Green Growth" and aims to make it a new industrial engine in the carbon neutral era.<sup>9)</sup> As the transportation sector is a major emitter of GHGs (7.6% of total emissions), active investment in RDD&D is necessary to achieve carbon neutrality.

» The US DOE's FY 2024 climate technology R&D investment plan for the transportation sector aligns with US transportation sector policy goals.

- ◆ The DOE's keywords of the investments in the transportation sector for 2024 include next-generation lithium-ion batteries, recycling processing technologies, sustainable production and utilization of biofuels such as SAF, and fuel conversion by reducing the cost and increasing the availability of hydrogen.

9) Joint ministries concerned, 2023. National Basic Plan for Carbon Neutrality and Green Growth (Proposal)

– Specifically, the VTO will focus on the “Battery and Electrification Technologies” and “Technology Integration & Deployment” Programs, BETO on the “System Development and Integration” and “Conversion Technologies” Programs, and the HFTO on the “Hydrogen Technologies” and “System Development and Integration” Programs.

- ◆ In its National Blueprint for Transportation Decarbonization released with DOT, EPA, and HUD, the DOE outlined short-term strategies to decarbonize the transportation sector by 2030, including lowering the cost of batteries, biofuels, and hydrogen, seamless integration with the energy system, and accelerated adoption of green vehicles, which aligns with the direction of the DOE’s 2024 transportation sector investments.
- ◆ The DOE also continues to invest in data, modeling, and analytics to suggest and support the direction of R&D investment in each technology sector to achieve mid- and long-term strategic goals through 2050, including the greening of all vehicles and the full integration and reliable operation of green infrastructure, such as EV charging stations and hydrogen, with the existing energy system.

» **In order to cooperate with the US in the battery and hydrogen sectors, Korea should also consider focused R&D investments in these areas.<sup>10)</sup>**

- ◆ On April 25, 2023, President Yoon Suk Yeol’s state visit to the US prompted Korea and the US to sign MOUs\* for cooperation in 10 high-tech industry areas such as batteries and 13 clean energy areas such as hydrogen and nuclear power plants.
  - \* MOU signatories are government-funded research institutes and companies in Korea and US associations and companies and establish cooperative relationships in various areas such as joint R&D, personnel exchange, standards, production and supply, and business.
- ◆ A comparison of the US’s FY 2023 Enacted Budget and FY 2024 Congressional Budget Request shows a strong commitment to developing and leading battery manufacturing and generic technologies and building and demonstrating hydrogen utilization systems in the US.
- ◆ In order to achieve successful outcomes through cooperation and strengthen technology alliances, South Korea should also consider focusing on and fostering the sector.

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10) Ministry of Trade, Industry and Energy, 2023. Korea and the US sign 23 Memorandums of Understanding (MOUs) on Advanced Industries, Small Modular Reactors (SMRs), and Clean Hydrogen, Ministry of Trade, Industry and Energy’s press release, April 25, 2023.

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※ The opinions expressed in this brief are those of the author and do not necessarily represent the official views of the Institute.

※ This article summarizes and organizes part of the content being analyzed for the National Institute of Green Technology's (NIGT) major project, "A Study on Regulation Improvement and Innovation Ecosystem Revitalization to Realize Carbon-Neutral Green Growth."

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No. 2 (2023.08.31.)	2024 Congressional Budget Request of the US Department of Energy and Its Implications: Focusing on Climate Technology Investments in the Transportation Sector	Surim Oh, Researcher Ji-Hee Son, Director of the Center for Institutional Innovation
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