

Fostering University-Industry Collaborations to Catalyze Utah's Sustainable Energy Future

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Prepared by: Kimberly Johnston, NextGen Energy Partners and Dr. Marian Rice, University of Utah

Executive Summary

The Utah business community envisions an energy future that places Utah at the center of the nation’s energy transition by harmonizing environmental and economic progress to ensure a balanced low-carbon energy future that remains affordable, reliable and sustainable.¹

Balancing the need for reliable and affordable energy with the urgency to minimize environmental and community impacts has prompted increased investment in emerging clean energy, decarbonization technologies, and climate resilience measures. The International Energy Agency (IEA) issued the World Energy Investment 2023 report to provide the global benchmark for capital investment flows towards clean energy project development. The report quantified the acceleration of investment in clean energy in response to the growing need for sustainable, low-carbon energy.

To accelerate the transition to a United States (U.S.) carbon neutral economy by 2050, the U.S. passed historical legislation, the Infrastructure Investment and Jobs Act (IIJA) of 2021 and the Inflation Reduction Act (IRA) of 2022, totaling nearly \$1.7 trillion of stimulus to modernize America’s aging infrastructure and to invest in emerging sustainable energy markets.

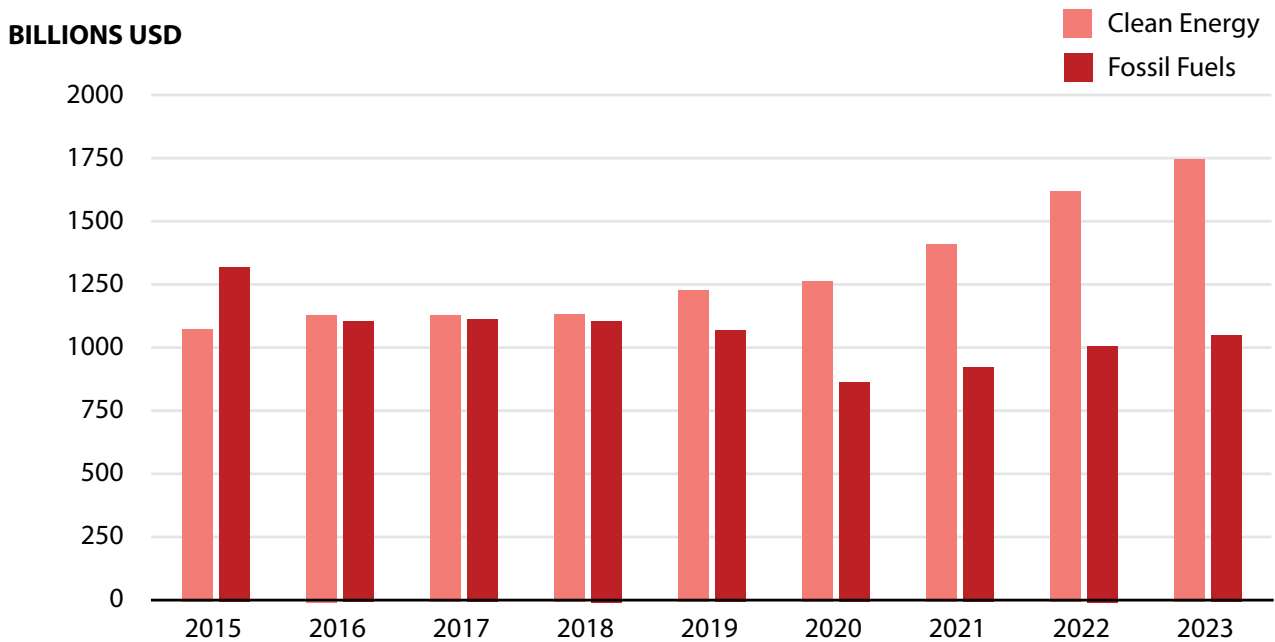


Figure 1: Global energy investment in clean energy and fossil fuels²

The ramp up of clean energy and decarbonization technologies is at a time when U.S. economies and communities are hit hard from natural disasters and extreme weather prompting the urgency for energy security measures. The National Oceanic and Atmospheric Administration (NOAA) reports that one-third of the U.S. economy is sensitive to weather and climate. The U.S. has sustained 376 weather and climate disasters since 1980 where overall damages exceed \$2.7 trillion and in 2023 alone the U.S. was impacted by 28 weather disasters costing \$1 billion or more.³ From 1980 to 2023, Utah experienced 25 extreme weather events, costing between \$2 billion to \$5 billion in social and economic damages.

Disaster Type	Events	Events Per Year	% Frequency	Total Costs	% of Costs
Drought	12	0.3	48%	\$500M-\$1.0B	14.80%
Wildfire	10	0.2	40%	\$1.0B-\$2.0B	39.30%
Flooding	1	0	4%	\$1.0B-\$2.0B	44.80%
Freeze	1	0	4%	\$5M-\$100M	0.30%
Severe Storm	1	0	4%	\$5M-\$100M	0.80%
All Disasters	25	0.6	100%	\$2.0B-\$5.0B	100%

Table 1: Billion-dollar events to affect Utah from 1980 to 2023 (CPI-Adjusted)

According to the United Nations, for every dollar invested in climate-resilient infrastructure, nearly 6 dollars of economic loss is avoided. Affordable, reliable, and secure energy is critical to the security of the U.S. and the state of Utah.

The state of Utah has a tremendous opportunity to receive a sizable portion of energy-centric IIJA funds and IRA incentives amounting to \$430 billion towards the modernization of America’s energy system.⁴ The Utah Better Business Bureau notes that, “The IIJA and IRA framework represents the largest ever single investment in our clean energy economy—across buildings, transportation, industry, electricity, agriculture, and climate smart practices in our lands and waters. And the framework will enlist a diverse generation of Utahns in conserving our public lands, bolstering community resilience, and addressing the changing climate, all while putting good-paying union jobs within reach.”⁵

Global investment in the energy transition is across power grids, long-duration energy storage, carbon capture and sequestration, advanced nuclear, hydrogen, and renewable energy. According to the recently issued Bloomberg Energy Transition Investment Trends Report, annual global investment in energy transition technologies rose to \$1.77 trillion in 2023 – a new all-time high and a 17% year-on-year gain. Electrified transportation investment has overtaken renewable energy to become the largest sector for spending at \$634 billion in 2023, up 36% year-on-year. Investment in new renewable energy projects, which includes wind, solar, biofuels and other renewables, grew 8% to \$623 billion. The momentum of the energy market transition coupled with the IIJA and IRA framework offers an unprecedented opportunity for the Utah region to catalyze public-private capital investments towards energy transition projects to achieve economies of scale, unlock emerging markets, and attract businesses and talent to Utah.

The University of Utah, as a globally recognized research institute with breakthrough research and technology capabilities, state-of-the-art facilities, and high-profile energy transition demonstration projects, is well positioned to serve as the science and innovation lead for Utah and the Western region. The energy transition will require cross-sector collaboration to spur public-private capital investments to accelerate pathways to a low-carbon future.

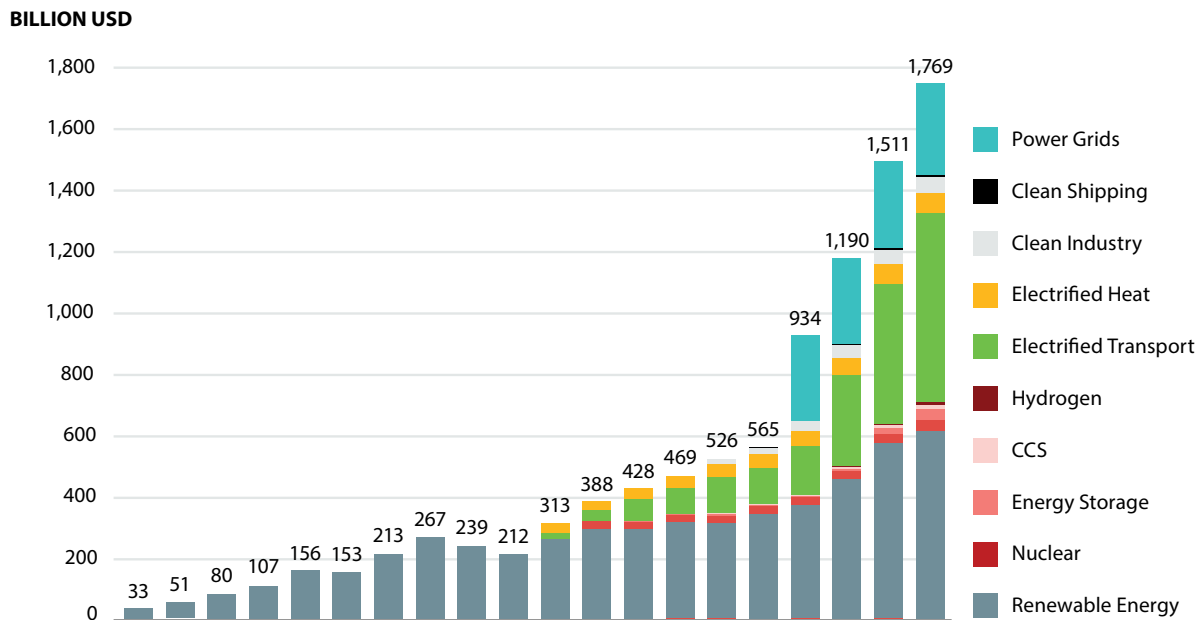


Figure 2: Global investment in energy transition by sector⁶

Demonstrated Success

Early Stage Wins. The Utah business community and the University of Utah have successfully secured federal grants matched by the private sector for transformative clean energy and grid innovation projects.

- Over the tenure of the **Frontier Observatory for Research in Geothermal Energy** (FORGE) project, the U.S. Department of Energy awarded the University of Utah close to \$250 million.⁷
- The University of Utah secured \$5 million to co-lead the **U.S.-Canada Center on Climate-Resilient Western Interconnected Grid** serving 80 million customers across fourteen states and two Canada provinces.
- The Utah region secured federal funds for a first-of-a-kind green hydrogen storage facility, **ACES Delta**.
- Nearly \$50 million of grants have been awarded to the University of Utah for research and development projects in clean energy, energy efficiency, and emerging decarbonization technologies.

Utah Regional Collaborator. The University of Utah serves the state of Utah as a strategic collaborator to jointly pursue and implement a diversified portfolio of energy transition projects.

- **Grid Resilience and Innovation Partnership.** The University of Utah has coordinated with the Utah Office of Energy Development, PacifiCorp, and other western states on regional grid resilience and innovation projects as sustainability and energy security measures.
- **Priority Climate Action Plan.** The University of Utah coordinated with Salt Lake City, Salt Lake County, and the Utah Department of Environmental Quality/Division of Air Quality on regional priority climate action plans outlining shared climate and energy priorities for EPA Climate Pollution Reduction Grant implementation funds in 2024.
- **Solar for All.** The University of Utah entered into a Memorandum of Understanding with the Utah Office of Energy Development as part of a coalition to pursue \$100 million in funding under the U.S. Environmental Protection Agency (EPA) Solar for All program, to deliver clean energy with storage technologies to Utah homeowners and communities.

Experience and Expertise

Globally Recognized Centers and Institutes. The University of Utah is well positioned to lead transformative energy initiatives as innovative scalable models across Utah and Western regions given its diversified and state-of-the-art energy innovation centers and institutes.

- **Advanced Energy Systems Research Facility** accelerates scale-up translation of energy technologies from lab to commercialization by providing space, infrastructure and engineering expertise for design, construction, and operation of pilot-scale systems.
- **Energy & Geoscience Institute** (EGI) engages geoscience and engineering professionals to expand the body of scientific research and knowledge in the hydrocarbon and geothermal fields.
- **Global Change & Sustainability Center** (GCSC) coordinates, promotes, and accelerates interdisciplinary research and training on natural and human-built systems.
- **Intermountain Industrial Assessment Center** (IAAC) provides no-cost energy consulting services to manufacturers in the Intermountain Region.
- **Kem C. Gardner Policy Institute** prepares economic, demographic, and public policy research.
- **Southwest CO₂ Sequestration Partnership** involves University of Utah researchers with this national consortium studying the feasibility of capturing and permanently storing carbon dioxide.
- **Southwest Sustainability Innovation Engine** (SWSIE) unites academic, community, nonprofit, and industry partners across Arizona, Nevada, and Utah with a shared committed to catalyze economic opportunity and establish the Southwest as a leader in carbon capture, water security, and renewable energy attracting industries to the region.
- **Utah Energy & Power Innovation Center** (U-EPIC) represents engineers, social scientists, and climate scientists to innovate the future of equitable, sustainable, and resilient power and energy infrastructure.
- **U-Smart Campus** initiative brings together technology, campus governance, students, and faculty to enable smarter energy, water, transportation, waste, and food systems for the University of Utah.
- **Wallace Stegner Center** offers students law and policy educational opportunities including law courses, an Environmental Dispute Resolution Program, a Law & Policy Program, and public events and speakers.
- **Wilkes Centers for Climate Science & Policy** drives research on climate change forecasting, impacts, and solutions.
- **WIRED Global Center** is the U.S.-Canada Western Interconnected Grid hub for research, innovation, and workforce development in the fields of power grid resilience amid climate risk mitigation. The Center unites experts in power engineering, climate, forestry, data, policy, and social science to innovate energy security for 80 million people.

The Utah Competitive Advantage. The University of Utah, as a globally recognized research institute, is well positioned to leverage and bring to bear the Utah regional attributes to meet the growing energy security needs of Utah and the Western region. The combination of the University of Utah research community and Utah regional strengths is a competitive advantage to spur private and public capital investments towards innovation, pilots, and demonstration projects to boost economic vitality and accelerate pathways to a low-carbon future. The University of Utah partnering with Utah governmental agencies, industry, nonprofit organizations, and communities will attract the investment needed to launch new energy transition initiatives and position Utah as a global energy transition leader for the U.S. and global markets.

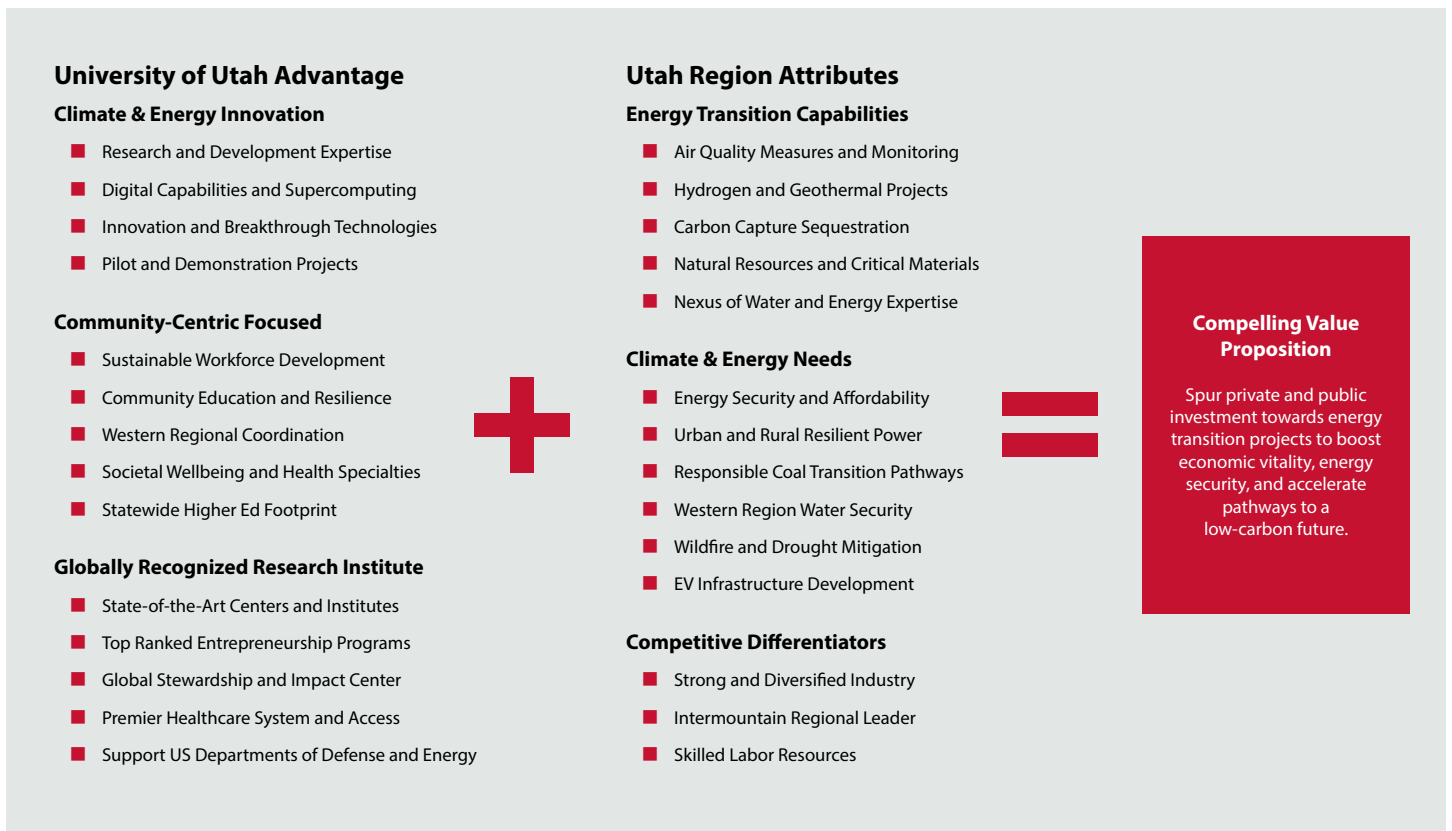


Figure 3: Compelling Value Proposition for Private and Public Capital Investment

Stellar Capabilities. The University of Utah has committed resources with deep expertise and proven capabilities to strategically source public-private funds to innovate and scale breakthrough energy technologies.

- The **Energy Futures Research Engine** connects technology, policy, collaboration and thoughtful approach to transform the Utah energy landscape.
- The **Vice President for Research** office supports new initiatives and growth of research through investment in facilities, personnel, and technology-focused hubs.
- The **Grants Toolbox** provides detailed guidance for multiple federal agencies, technical assistance materials, and templates and tools to help increase the competitiveness of University of Utah investigators.
- The **Large Infrastructure Funding Team** (LIFT) is designed to assist cross-disciplinary teams in the successful launch of University of Utah centers, programs, and regional large-scale infrastructure programs.
- The **Office of Sponsored Projects** provides effective management of extramural sponsored proposals and awards funded by federal and state agencies, foundations, and other public and private sources.
- The **Pre-Award Office** assists with the preparation and submission of competitive funding applications to advance faculty research and development projects across industrial decarbonization and emerging energy markets.
- The **Technology Licensing Office** supports investigators with disclosures, patent filing, licensing of new technologies and translation to the marketplace.
- The **Technology Commercialization Office** provides guidance and resources for development of startup companies to accelerate commercialization of innovative technologies.

Recommendations

Spur Capital Investment. Proactively source public and private capital investment to fund development of breakthrough technologies to support a sustainable energy future.

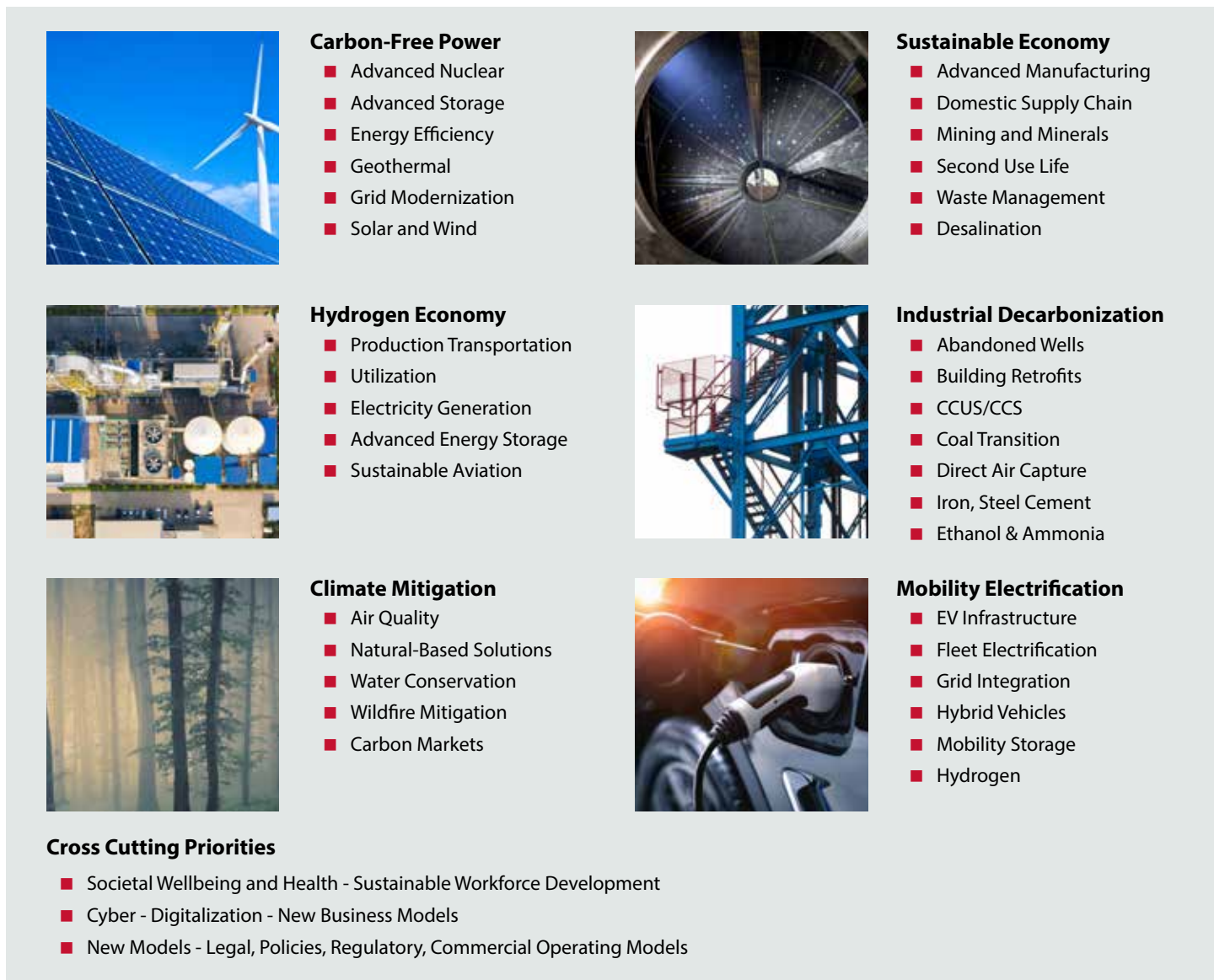


Figure 4: Pathways to a Sustainable Energy Secure Future

Serve as Regional Resource. Position the University of Utah to serve Utah and Western regional public and private sector stakeholders in unlocking emerging energy transition markets with breakthrough innovation and technologies.

- Promote University of Utah as the science and engineering arm for demonstration projects across Utah and the Western region.
- Host a series of discovery sessions with Utah state agencies to raise awareness of the University of Utah value proposition and forge strategic alliances on targeted demonstration projects.
- Engage proactively with key stakeholders on Delta Hydrogen, FORGE Geothermal, and other regional energy projects.
- Embed cross-discipline expertise in legal, policy, finance, management, social, and health to create holistic and interconnected solutions towards a Utah sustainable economy.

Partner with Utah Agencies. Form strategic alliances with Utah government agencies and local government to advance shared regional energy transition priorities benefiting Utah rural and urban communities.

- **Research Arm.** Position the University of Utah in the development and launch of high-profile projects across power, industrial decarbonization, hydrogen, climate mitigation, mobility, and sustainable economic development.
- **Research and Development.** Provide technological breakthroughs, entrepreneurship opportunities, and innovation capabilities to public and private entities as early-stage project development activities.
- **Regional Coordination.** Support community education, stakeholder engagement, and regional coordination plans as independent trusted experts to successfully execute regional infrastructure projects.
- **Workforce Development.** Leverage and build upon the University of Utah next generation workforce development offerings to meet the rapidly growing labor needs, upskill the Utah workforce, and attract top notch talent.
- **Education and Stakeholder Engagement.** Work with state and local government, nonprofit organizations, and community groups on public education and stakeholder engagement.

Catalyze Public and Private Collaborations. Initiate a series of outreach programs to spark strategic multi-stakeholder collaborations to jointly launch transformative initiatives meeting the needs of the industry and communities.

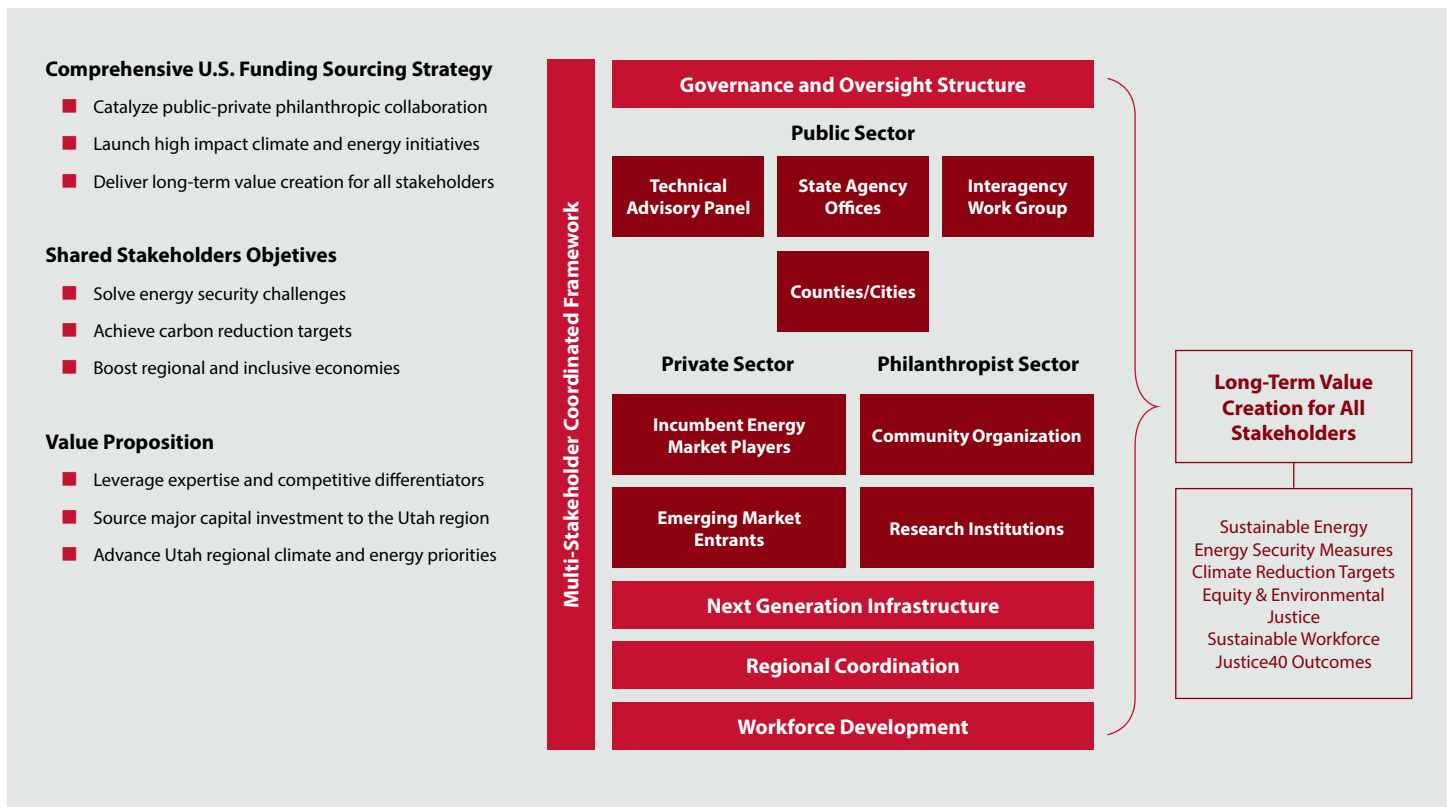


Figure 5: Multi-Stakeholder Coordination Framework.

Executive Summary

The University of Utah and its recently launched Energy Futures Research Engine is committed to a responsible transition to a low-carbon energy and secure future for Utah and the Western region. Building upon its stellar innovation capabilities and momentum gained, University of Utah is positioned for the successful launch of high-profile energy transition initiatives.

The University of Utah, serving as the trusted independent expert for state of Utah and the Western region, will leverage the regional competitive advantages and mobilize public-private capital investments towards transformative pilots and demonstration projects and develop the workforce of tomorrow while engaging and educating communities.

The moment is now for the University of Utah to further catalyze innovation to mitigate the devastating impacts of climate-related risks and accelerate commercialization pathways for breakthrough energy technologies. Thus, achieving energy security and economic vitality across Utah communities for generations of today and tomorrow.

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1. A Business Vision for Utah's Energy Future, Prepared by the Salt Lake Chamber (October 2022)
 2. IEA World Energy Investment 2023 Report www.iea.org
 3. <https://www.ncei.noaa.gov/access/billions/>
 4. U.S. Department of Energy Investing in American Energy Report (August 2023)
 5. Utah Better Business Bureau Whitehouse State Fact Sheet
 6. Bloomberg Energy Transition Investment Trends (January 2024)
 7. <https://www.energy.gov/articles/doe-awards-46-million-geothermal-initiative-projects-potential-power-millions-us-homes>